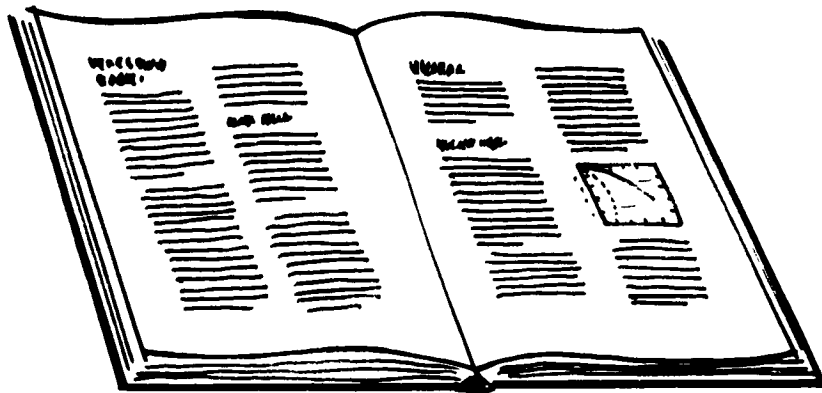


REFERENCES



Research Panel

C. Meetre — Database Designer

M.A. Baldauf
K. Taylor

APPENDIX: REFERENCES

- Abbas, M. M., T. Kostiuk, M. J. Mumma, D. Buhl, V. G. Kunde, and L. W. Brown, Stratospheric ozone measurement with an infrared heterodyne spectrometer, *Geophys. Res. Lett.*, *5*, 317-320, 1978.
- Ackerman, M., Ultraviolet solar radiation related to mesospheric processes, in *Mesospheric Models and Related Experiments*, edited by G. Fiocco, pp. 149-159, D. Reidel, Dordrecht, 1971.
- Ackerman, M., and C. Muller, Stratospheric methane and nitrogen dioxide from infrared spectra, *Pure Appl. Geophys.*, *106-108*, 1325-1335, 1973.
- Ackerman, M., J. C. Fontanella, D. Frimout, A. Girard, N. Louisnard, and C. Muller, Simultaneous measurements of NO and NO₂ in the stratosphere, *Planet. Space Sci.*, *23*, 651-660, 1975.
- Ackerman, M., D. Frimout, A. Girard, A. Gottignies, and C. Muller, Stratospheric HCl from infrared spectra, *Geophys. Res. Lett.*, *3*, 81-83, 1976.
- Ackerman, M., D. Frimout, C. Muller, and D. J. Wuebbles, Stratospheric methane measurements and predictions, *Pure Appl. Geophys.*, *117*, 367-380, 1978/79.
- Ackerman, M., C. Lippens, C. Muller, J. Vercheval, J. Besson, A. Girard, J. Laurent, and M. P. Lemaitre, Observations of middle atmosphere CH₄ and N₂O vertical distributions by the Spacelab one grille spectrometer, *Geophys. Res. Lett.*, submitted, 1985.
- Ahlquist, J., Normal-mode global Rossby waves, theory and observations, *J. Atmos. Sci.*, *39*, 193-202, 1982.
- Aikin, A. C., B. Woodgate, and H. J. P. Smith, Equatorial ozone profiles from the solar maximum mission - A comparison with theory, *Planet. Space Sci.*, *32*, 503-513, 1984.
- Aimedieu, P., P. Rigaud, and J. Barat, The sunrise ozone depletion problem of the upper stratosphere, *Geophys. Res. Lett.*, *8*, 787-789, 1981.
- Aimedieu, P., A. J. Krueger, D. E. Robbins, and P. C. Simon, Ozone profile intercomparison based on simultaneous observations between 20 and 40 km, *Planet. Space Sci.*, *31*, 801-807, 1983.
- Al-Ajmi, D. N., R. S. Harwood, and T. Miles, A sudden warming in the middle atmosphere of the Southern Hemisphere, *Quart. J. Roy. Meteorol. Soc.*, *111*, 359-389, 1985.
- Allam, R. J., and A. F. Tuck, Transport of water vapour in a stratosphere-troposphere general circulation model I. Fluxes, *Quart. J. Roy. Meteorol. Soc.*, *110*, 321-356, 1984a.
- Allam, R. J., and A. F. Tuck, Transport of water vapour in a stratosphere-troposphere general circulation model II. Trajectories, *Quart. J. Roy. Meteorol. Soc.*, *110*, 357-392, 1984b.
- Allam, R. J., K. S. Groves, and A. F. Tuck, Global OH distribution derived from general circulation model fields of ozone and water vapor, *J. Geophys. Res.*, *86*, 5303-5320, 1981.
- Allen, D. C., J. D. Haigh, J. T. Houghton, and C. J. S. M. Simpson, Radiative cooling near the mesopause, *Nature*, *281*, 660-661, 1979.
- Allen, D. C., T. Scragg, and C. J. S. M. Simpson, Low temperature fluorescence studies of the deactivation of the bend-stretch manifold of CO₂, *Chem. Phys.*, *51*, 279-298, 1980.
- Allen, M., and J. E. Frederick, Effective photodissociation cross sections for molecular oxygen and nitric oxide in the Schumann-Runge bands, *J. Atmos. Sci.*, *39*, 2066-2075, 1982.
- Allen, M., J. I. Lunine, and Y. L. Yung, The vertical distribution of ozone in the mesosphere and lower thermosphere, *J. Geophys. Res.*, *89*, 4841-4872, 1984.
- Alpert, J. C., M. A. Geller, and S. K. Avery, The response of stationary planetary waves to tropospheric forcing, *J. Atmos. Sci.*, *40*, 2467-2483, 1983.
- Altshuller, A. P., and J. J. Bufalini, Photochemical aspects of air pollution: A review, *Environ. Sci. Technol.*, *5*, 39-64, 1971.
- Anderson, G. P., and L. A. Hall, Attenuation of solar irradiance in the stratosphere: Spectrometer measurements between 191 and 207 nm, *J. Geophys. Res.*, *88*, 6801-6806, 1983.
- Anderson, J. G., The absolute concentration of OH ($X^2\Pi$) in the Earth's stratosphere, *Geophys. Res. Lett.*, *3*, 165-168, 1976.

REFERENCES

- Anderson, J. G., Free radicals in the earth's stratosphere: A review of recent results, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone: Its Variation and Human Influences*, Rep. FAA-EE-80-20, edited by A. C. Aikin, pp. 233-251, DOT, FAA, Washington, DC, 1980.
- Anderson, J. G., The past five years-the next five years, paper presented at the International Workshop on Current Issues in our Understanding of the Stratosphere and the Future of the Ozone Layer, BMFT, NASA, FAA, WMO, Feldafing, FRG, June 11-16, 1984.
- Anderson, J. G., J. J. Margitan, and D. H. Stedman, Atomic chlorine and the chlorine monoxide radical in the stratosphere: Three in-situ observations, *Science*, *198*, 501-503, 1977.
- Anderson, J. G., H. J. Grassl, R. E. Shetter, and J. J. Margitan, Stratospheric free chlorine measured by balloon-borne in situ resonance fluorescence, *J. Geophys. Res.*, *85*, 2869-2887, 1980.
- Anderson, J. G., H. J. Grassl, R. E. Shetter, and J. J. Margitan, HO₂ in the stratosphere: Three in situ observations, *Geophys. Res. Lett.*, *8*, 289-292, 1981.
- Anderson, J. R., and R. D. Rosen, The latitude-height structure of 40-50 day variations in atmospheric angular momentum., *J. Atmos. Sci.*, *40*, 1584-1591, 1983.
- Anderson, P. W., Pressure broadening in the microwave and infrared regions, *Phys. Rev.*, *76*, 647-661, 1949.
- Andrews, D. G., and M. E. McIntyre, Planetary waves in horizontal and vertical shear: The generalized Eliassen-Palm relation and the mean zonal acceleration, *J. Atmos. Sci.*, *33*, 2031-2048, 1976.
- Andrews, D. G., and M. E. McIntyre, Generalized Eliassen-Palm and Charney-Drazin theorems for waves on axisymmetric mean flows in compressible atmospheres, *J. Atmos. Sci.*, *35*, 175-185, 1978a.
- Andrews, D. G., and M. E. McIntyre, An exact theory of nonlinear waves on a Lagrangian mean flow, *J. Fluid. Mech.*, *89*, 609-646, 1978b.
- Andrews, D. G., J. D. Mahlman, and R. W. Sinclair, Eliassen-Palm diagnostics of wave-mean flow interaction in the GFDL "SKYHI" general circulation model, *J. Atmos. Sci.*, *40*, 2768-2784, 1983.
- Angell, J. K., and J. Korshover, Recent rocketsonde-derived temperature variations in the Western Hemisphere, *J. Atmos. Sci.*, *35*, 1758-1764, 1978a.
- Angell, J. K., and J. Korshover, Estimate of global temperature variations in the 100-30 mb layer between 1958 and 1977, *Mon. Weather Rev.*, *106*, 1422-1432, 1978b.
- Angell, J. K., and J. Korshover, Global temperature variations in the troposphere and stratosphere, *Mon. Weather Rev.*, *111*, 901-921, 1983a.
- Angell, J. K., and J. Korshover, Global variations in total ozone and layer-mean ozone: An update through 1981, *J. Clim. Appl. Meteor.*, *22*, 1611-1627, 1983b.
- Angell, J. K., J. Korshover, and W. G. Planet, Ground-based and satellite evidence for a pronounced total-ozone minimum in early 1983 and responsible atmospheric layers, *Mon. Weather Rev.*, *113*, 641-646, 1985.
- Apruzese, J., and D. F. Strobel, Radiative relaxation rates for individual 15-micron CO₂ lines in the upper stratosphere and lower mesosphere, *J. Geophys. Res.*, *89*, 7187-7194, 1984.
- Apruzese, J. P., M. R. Schoeberl, and D. F. Strobel, Parameterization of IR cooling in a middle atmosphere dynamics model. I. Effect on the zonally averaged circulation, *J. Geophys. Res.*, *87*, 8951-8966, 1982.
- Arakawa, A., and W. H. Schubert, Introduction of cloud ensemble with the large scale environment, *J. Atmos. Sci.*, *31*, 674-701, 1974.
- Arijs, E., D. Neverjans, and J. Ingles, Unambiguous mass determination of major stratospheric positive ions, *Nature*, *288*, 684-686, 1980.
- Arijs, E., D. Neverjans, and J. Ingels, Stratospheric positive ion composition measurements, ion abundances and related trace gas detection, *J. Atmos. Terr. Phys.*, *44*, 43-53, 1982.
- Arnold, F., Multi-ion complexes in the stratosphere-Implications for trace gases and aerosol, *Nature*, *284*, 610-611, 1980.

REFERENCES

- Arnold, F., Stratospheric trace gas detection by rocket-, balloon-, and aircraft-borne chemical ionization mass spectrometry, paper presented at the International Workshop on Current Issues in our Understanding of the Stratosphere and the Future of the Ozone Layer, BMFT, NASA, FAA, WMO, Feldafing, FRG, June 11-16, 1984.
- Arnold, F., and G. Henschen, First mass analysis of stratospheric negative ions, *Nature*, *275*, 521-522, 1978.
- Arnold, F., and S. Qiu, Upper stratosphere negative ion composition measurements and inferred trace gas abundances., *Planet. Space Sci.*, *32*, 169-177, 1984.
- Arnold, F., H. Bohringer, and G. Henschen, Composition measurements of stratospheric positive ions, *Geophys. Res. Lett.*, *5*, 653-656, 1978.
- Arnold, P. W., Losses of nitrous oxide from soil, *J. Soil*, *5*, 116-128, 1955.
- Arrhenius, S., On the influence of carbonic acid in the air upon the temperature of the ground, *Philos. Mag.*, *41*, 237, 1896.
- Arvesen, J. C., R. N. Griffin, and B. D. Pearson, Jr., Determination of extraterrestrial solar spectral irradiance from a research aircraft, *Appl. Optics*, *8*, 2215-2232, 1969.
- Asai, K., T. Itabe, and T. Igarashi, Range-resolved measurements of atmospheric ozone using a differential-absorption CO₂ laser radar, *Appl. Phys. Lett.*, *35*, 60-62, 1979.
- Atkinson, R., and A. C. Lloyd, Evaluation of kinetic and mechanistic data for modeling of photochemical smog, *J. Phys. Chem. Ref. Data*, *13*, 315-444, 1984.
- Atkinson, R., S. M. Aschmann, A. M. Winer, and W. P. L. Carter, Rate constants for the gas-phase reactions of NO₃ with furan, thiophene and pyrrole at 295 K and atmospheric pressure, *Environ. Sci. Technol.*, *19*, 87-90, 1985.
- Atticks, M. G., and G. D. Robinson, Some features of the structure of the tropical tropopause, *Quart. J. Roy. Meteorol. Soc.*, *109*, 295-308, 1983.
- Attmannspacher, W., and H. U. Duetsch, International ozone sonde intercomparison at the Observatory Hohenpeissenberg 5-20 April 1978, *Ber. Deutschen Wetterdienstes*, *Nr. 20*, 1970.
- Attmannspacher, W., and H. U. Duetsch, Second international ozone sonde intercomparison at the Observatory Hohenpeissenberg 5-20 April 1978, *Ber. Deutschen Wetterdienstes*, *Nr. 157*, 1981.
- Augustsson, T., and V. Ramanathan, A radiative-convective model study of the CO₂ climate problem, *J. Atmos. Sci.*, *34*, 448-451, 1977.
- Ausloos, P., R. E. Rebert, and L. Glasgow, Photodecomposition of chloromethane absorbed on silica surfaces, *J. of Res. of Nat. Bureau of Standards*, *82*, 1-8, 1977.
- Austin, J., Comparison of stratospheric air parcel trajectories calculated from SSU and LIMS satellite data, *J. Geophys. Res.*, in press, 1985.
- Austin, J., and A. F. Tuck, The calculation of stratospheric air parcel trajectories using satellite data, *Quart. J. Roy. Meteorol. Soc.*, *111*, 279-307, 1985.
- Austin, J., R. R. Garcia, J. M. Russell III, S. Solomon, and A. F. Tuck, On the atmospheric photochemistry of nitric acid, *J. Geophys. Res.*, in press, 1985a.
- Austin, J., R. C. Pallister, J. A. Pyle, A. F. Tuck, and A. M. Zarody, Photochemical model comparisons with LIMS observations in a stratospheric trajectory coordinate system, *Quart. J. Roy. Meteorol. Soc.*, in press, 1985b.
- Azouit, M., and J. Vernin, Remote investigation of tropospheric turbulence by two dimensional analysis of stellar scintillation, *J. Atmos. Sci.*, *37*, 1550-1557, 1980.
- Bacastow, R. B., C. D. Keeling, and T. P. Whorf, Seasonal amplitude increase in atmospheric CO₂ concentration at Mauna Loa, Hawaii, 1959-1982, *J. Geophys. Res.*, *90*, 10529-10540, 1985.
- Baker, C. B., W. R. Kuhn, and E. Ryzner, Effects of the El Chichon volcanic cloud on direct and diffuse irradiances, *J. Clim. Appl. Meteor.*, *23*, 449-452, 1984.
- Baker-Blocker, A., T. M. Donahue, and K. H. Mancy, Methane flux from wetlands areas, *Tellus*, *29*, 245-250, 1977.

REFERENCES

- Baldecchi, M. G., B. Carli, F. Mencaraglia, A. Bonetti, and M. Carlotti, Atlas of stratospheric submillimeter lines: 1. The 7-20 cm^{-1} interval, *J. Geophys. Res.*, **89**, 11689-11704, 1984.
- Baldwin, A. C., and D. M. Golden, Heterogeneous atmospheric reactions-Sulphuric acid aerosols as tropospheric sinks, *Science*, **206**, 562-563, 1979.
- Baldwin, A. C., J. R. Barker, D. M. Golden, and D. G. Hendry, Photochemical smog. Rate parameter estimates and computer simulation, *J. Phys. Chem.*, **81**, 2483-2492, 1977.
- Ballard, H. N., A review of seven papers concerning the measurement of temperature in the stratosphere and mesosphere, *Tech. Rep. ECOM-5125*, 67 pp., U.S. Atmos. Sci. Lab., White Sands Missile Range, NM, 1967.
- Balsley, B. B., and D. A. Carter, The spectrum of atmospheric velocity fluctuations at 8 km and 86 km, *Geophys. Res. Lett.*, **9**, 465-468, 1982.
- Balsley, B. B., and A. C. Riddle, Monthly mean values of the mesospheric wind field over Poker Flat, Alaska, *J. Atmos. Sci.*, **41**, 2368-2375, 1984.
- Baluteau, J. P., A. Marten, E. Bussoletti, M. Anderegg, J. E. Beckman, A. F. M. Moorwood, and N. Coron, High resolution infrared spectra of the Earth's atmosphere-II. Ground-based observations in the 500-570 cm^{-1} range, *Infrared Phys.*, **17**, 211-224, 1977.
- Bamber, D. J., P. G. W. Healey, B. M. R. Jones, S. A. Penkett, A. F. Tuck, and G. Vaughan, Vertical profiles of tropospheric gases: Chemical consequences of stratospheric intrusions, *Atmos. Environ.*, **18**, 1759-1766, 1984.
- Barat, J., Some characteristics of clear-air turbulence in the middle atmosphere, *J. Atmos. Sci.*, **39**, 2553-2564, 1982.
- Barbe, A., P. Marche, C. Secroun, and P. Jouve, Measurements of tropospheric and stratospheric H_2CO by an infrared high resolution technique, *Geophys. Res. Lett.*, **6**, 463-465, 1979.
- Barnes, I., K. H. Becker, E. H. Fink, A. Reimer, F. Zabel, and H. Niki, Rate constant and products of the reaction $\text{CS}_2 + \text{OH}$ in the presence of O_2 , *Int. J. Chem. Kinet.*, **15**, 631-645, 1983.
- Barnes, R. A., A. R. Bandy, and A. T. Torres, ECC ozonesonde accuracy and precision, *J. Geophys. Res.*, **90**, 7881-7887, 1985.
- Barnett, J. J., The mean meridional temperature behaviour of the stratosphere from November 1970 to November 1971 derived from measurements by the selective chopper radiometer on Nimbus 4, *Quart. J. Roy. Meteorol. Soc.*, **100**, 505-530, 1974.
- Barnett, J. J., and M. Corney, Temperature comparisons between the NIMBUS 7 SAMS, rocket/radiosondes and the NOAA-6 SSU, *J. Geophys. Res.*, **89**, 5294-5302, 1984.
- Barnett, J. J., and M. Corney, A middle atmosphere temperature reference model from satellite measurements, *Adv. Space Res.*, **5**, 125-134, 1984.
- Barnett, J. J., J. T. Houghton, and J. A. Pyle, The temperature dependence of the ozone concentration near the stratopause, *Quart. J. Roy. Meteorol. Soc.*, **101**, 245-257, 1975a.
- Barnett, J. J., R. S. Harwood, J. T. Houghton, C. G. Morgan, C. D. Rodgers, and E. J. Williamson, Comparison between radiosonde, rocketsonde and satellite observations of atmospheric temperatures, *Quart. J. Roy. Meteorol. Soc.*, **101**, 423-436, 1975b.
- Barrett, E. W., P. M. Kuhn, and A. Shlanta, Recent measurements of the injection of water vapor and ozone into the stratosphere by thunderstorms, in *Proceedings of the 2nd Conference on the Climatic Impact Assessment Program, DOT-TSC-OST-73-4*, edited by A. J. Broderick, pp. 34-46, Transportation Systems Center, Cambridge, MA, 1973.
- Barth, C. A., D. W. Rusch, R. J. Thomas, G. H. Mount, G. J. Rottman, G. E. Thomas, R. W. Sanders, and G. M. Lawrence, Solar Mesosphere Explorer: Scientific objectives and results, *Geophys. Res. Lett.*, **10**, 237-240, 1983.
- Barton, I. J., Upper level cloud climatology from an orbiting satellite, *J. Atmos. Sci.*, **40**, 435-447, 1983.

REFERENCES

- Basco, N., and J. E. Hunt, Mutual combination of ClO radicals, *Int. J. Chem. Kin.*, *11*, 649-664, 1979.
- Bass, A. M., and R. J. Paur, The ultraviolet cross sections of ozone: I. The measurements, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 606-610, D. Reidel, Dordrecht, 1984.
- Bates, D. R., Rayleigh scattering by air, *Planet. Space Sci.*, *32*, 785-790, 1984.
- Bauer, E., A catalog of perturbing influences on stratospheric ozone, 1955-1975, *J. Geophys. Res.*, *84*, 6929-6940, 1979.
- Baulch, D. L., R. A. Cox, R. F. Hampson, Jr., J. A. Kerr, J. Troe, and R. T. Watson, Evaluated kinetic and photochemical data for atmospheric chemistry, *J. Phys. Chem. Ref. Data*, *9*, 295-471, 1980.
- Baulch, D. L., R. A. Cox, P. J. Crutzen, R. F. Hampson, J. A. Kerr, J. Troe, and R. T. Watson, Evaluated kinetic and photochemical data for atmospheric chemistry: Supplement I. CODATA Task Group on Chemical Kinetics, *J. Phys. Chem. Ref. Data*, *11*, 327-496, 1982.
- Baulch, D. L., R. A. Cox, R. F. Hampson, Jr., J. A. Kerr, J. Troe, and R. T. Watson, Evaluated kinetic and photochemical data for atmospheric chemistry supplement II. CODATA Task Group on Gas Phase Chemical Kinetics, *J. Phys. Chem. Ref. Data*, *13*, 1259-1380, 1984.
- Belmont, A. D., and D. G. Dartt, Semiannual variation in zonal wind from 20 to 65 kilometers, at 80°N-10°S, *J. Geophys. Res.*, *78*, 6373-6376, 1973.
- Belmont, A. D., D. G. Dartt, and G. D. Nastrom, Periodic variations in stratospheric zonal winds from 20 to 65 km, at 80°N to 70°S, *Quart. J. Roy. Meteorol. Soc.*, *100*, 203-211, 1974.
- Berg, W. W., and P. D. Sperry, Atmospheric bromine in the Arctic, *J. Geophys. Res.*, *88*, 6719-6736, 1983.
- Berg, W. W., P. J. Crutzen, F. E. Grahek, S. N. Gitlen, and W. A. Sedlacek, First measurements of total chlorine and bromine in the lower stratosphere, *Geophys. Res. Lett.*, *7*, 937-940, 1980.
- Berg, W. W., L. E. Heidt, W. Pollock, P. D. Sperry, R. J. Cicerone, and E. S. Gladney, Brominated organic species in the Arctic atmosphere, *Geophys. Res. Lett.*, *11*, 429-432, 1984.
- Berner, W., H. Oeschger, and B. Stauffer, Information on the CO₂ cycle from ice-core studies, *Radiocarbon*, *22*, 227-235, 1980.
- Betts, A. K., Parametric interpretation of trade wind cumulus budget studies, *J. Atmos. Sci.*, *32*, 1934-1945, 1975.
- Bevilacqua, R. M., J. J. Olivero, P. R. Schwartz, C. J. Gibbins, J. M. Bologna, and D. L. Thacker, An observational study of water vapor in the mid-latitude mesosphere using ground-based microwave techniques, *J. Geophys. Res.*, *88*, 8523-8534, 1983.
- Bevilacqua, R. M., W. J. Wilson, W. B. Ricketts, P. R. Schwartz, and R. J. Howard, Possible seasonal variability of mesospheric water vapor, *Geophys. Res. Lett.*, *12*, 397-400, 1985.
- Bhartia, P. K., K. F. Klenk, A. J. Fleig, C. G. Wellemeyer, and D. Gordon, Intercomparison of Nimbus 7 Solar Backscattered Ultraviolet ozone profiles with rocket, balloon and Umkehr profiles, *J. Geophys. Res.*, *89*, 5227-5238, 1984a.
- Bhartia, P. K., K. F. Klenk, C. K. Wong, D. Gordon, and A. J. Fleig, Intercomparison of the Nimbus 7 SBUV/TOMS total ozone data sets with Dobson and M83 results, *J. Geophys. Res.*, *89*, 5239-5248, 1984b.
- Bhartia, P. K., D. F. Heath, and A. J. Fleig, Observation of anomalously small ozone densities in South Polar Stratosphere during October 1983 and 1984, paper presented at 5th General Assembly, IAGA Symposium, Prague, Czechoslovakia, July, 1985.
- Blackmer, A. M., and J. M. Bremner, Potential of soil as a sink for atmospheric nitrous oxide, *Geophys. Res. Lett.*, *3*, 739-742, 1976.
- Blackshear, W. T. W. L. Grose, and R. E. Turner, Simulated sudden stratospheric warmings: Synoptic evaluations, *Quart. J. Roy. Meteorol. Soc.*, in press, 1986.
- Blake, A. J., An atmospheric absorption model for the Schumann-Runge bands of oxygen, *J. Geophys. Res.*, *84*, 3272-3282, 1979.

REFERENCES

- Blake, A. J., S. T. Gibson, and D. G. McCoy, Photodissociation of $^{16}\text{O}^{18}\text{O}$ in the atmosphere, *J. Geophys. Res.*, **89**, 7277-7284, 1984.
- Blake, D. R., Increasing concentrations of atmospheric methane, 1979-1983, Ph.D. thesis, 213 pp., U. of California, Irvine, CA, 1984.
- Blake, D. R., and F. S. Rowland, World-wide increase in tropospheric methane, *J. Atmos. Chem.*, in press, 1985.
- Blake, D. R., W. E. Mayer, S. C. Tyler, Y. Makide, D. C. Montaque, and F. S. Rowland, Global increase in atmospheric methane concentrations between 1978 and 1980, *Geophys. Res. Lett.*, **9**, 477-480, 1982.
- Blake, D. R., V. H. Woo, S. C. Tyler and F. S. Rowland, Methane concentrations and source strengths in urban locations, *Geophys. Res. Lett.*, **11**, 1211-1214, 1984.
- Blanchet, J. P., and R. List, On the optical properties of Arctic haze, in *Aerosols and Their Climate Effects*, edited by H. E. Gerber and A. Deepak, pp. 179-196, A. Deepak Publ., Hampton, VA, 1984.
- Blatherwick, R. D., A. Goldman, D. G. Murcray, F. J. Murcray, G. R. Cook, and J. W. Van Allen, Simultaneous mixing ratio profiles of stratospheric NO and NO₂ as derived from balloon-borne infrared solar spectra, *Geophys. Res. Lett.*, **7**, 471-473, 1980.
- Blatherwick, R. D., F. J. Murcray, F. H. Murcray, A. Goldman, and D. G. Murcray, Atlas of South Pole IR solar spectra, *Appl. Opt.*, **21**, 2658-2659, 1982.
- Bloomfield, P., M. L. Thompson, and S. Zeger, A statistical analysis of Umkehr measurements of 32-46 km ozone, *J. Appl. Meteorol.*, **21**, 1828-1837, 1982.
- Bloomfield, P., G. Oehlert, M. L. Thompson, and S. Zeger, A frequency domain analysis of trends in Dobson total ozone records, *J. Geophys. Res.*, **88**, 8512-8522, 1983.
- Blumenthal, D. L., W. S. Keifer, and J. A. McDonald, Aircraft measurements of pollutants and meteorological parameters during the Sulphate Regional Experiment (SURE), *Rep. EPRI-EA-1909*, 230 pp., Meteorology Research, Santa Rosa, CA, 1981.
- Bohringer, H., D. W. Fahey, F. C. Fehsenfeld, and E. E. Ferguson, The role of ion molecule reactions in conversion of N₂O₅ to HNO₃ in the stratosphere, *Planet. Space Sci.*, **31**, 185-191, 1983.
- Bojkov, R. D., Some characteristics of the total ozone deduced from Dobson-spectrophotometer and filter-ozonometer data and their application to determination of the effectiveness of the ozone station network, *Ann. Geoph.*, **25**, 293-299, 1969.
- Bojkov, R. D., Tropospheric ozone, its changes and possible radiative effect, *WMO Special Environment Report 16*, 1983.
- Bojkov, R. D., and G. C. Reinsel, Trends in tropospheric ozone concentration, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 775-781, D. Reidel, Dordrecht, 1984.
- Bollinger, M. J., C. J. Hahn, D. D. Parrish, P. C. Murphy, D. L. Albritton, and F. C. Fehsenfeld, NO_x measurements in clean continental air and analysis of the contributing meteorology, *J. Geophys. Res.*, **89**, 9623-9631, 1984.
- Bonsang, B., and G. Lambert, Nonmethane HC in an oceanic atmosphere, *J. Atmos. Chem.*, **2**, 257-271, 1985.
- Borchers, R., P. Fabian, and S. A. Penkett, First measurements of the vertical distribution of CCl₄ and CH₃CCl₃ in the stratosphere, *Naturwiss.*, **70**, 514-516, 1983.
- Borchers, R., P. Fabian, B. C. Krueger, S. Lal, U. Schmidt, D. Knapska, and S. A. Penkett, The vertical distribution of CCl₂F-CClF₂ (CFC-113) and CClF₂-CClF₂ (CFC-114) in the stratosphere, paper presented at 5th General Assembly, International Association of Geomagnetism and Aeronomy, Prague, 5-17 August 1985.
- Borden, T. R., and W. S. Hering, Ozonesonde observations over North America, Vol I, 525 pp., II, 286 pp., III, 266 pp., IV, 376 pp., *Report AFCRL-65-913*, Air Force Cambridge Res. Labs., Hanscom AFB, MA, 1964.

REFERENCES

- Borden, T. R., and W. S. Hering, Mean distributions of ozone density over North America 1963-1964, *Environmental Research Paper No. 162, Report AFCRL-65-913*, 28 pp., Air Force Cambridge Research Labs., Hanscom AFB, MA, 1965.
- Borghì, R., D. Cariolle, A. Girard, J. Laurent, and N. Louisnard, Comparison entre les résultats d'un modèle unidimensionnel et des résultats de mesures stratosphériques de CH₄, H₂O et des oxydes d'azote, *Rev. Phys. Appl.*, 18, 229-237, 1983.
- Borisenkov, Ye. P., and Yu. Ye. Kazakov, Effect of freons and halocarbons on the ozone layer of the atmosphere and climate, typed manuscript, USSR, 1977.
- Borucki, W. J., and W. L. Chameides, Lightning: Estimates of the rates of energy dissipation of nitrogen fixation, *Res. Geophys. and Space Phys.*, 22, 363-372, 1984.
- Bossy, L., and M. Nicolet, On the variability of Lyman alpha with solar activity, *Planet. Space Sci.*, 29, 907-914, 1981.
- Bottenheim, J. W., K. A. Brice, and K. G. Anlauf, Discussion of a Lagrangian trajectory model describing long-range transport of oxides of nitrogen, the incorporation of PAN in the chemical mechanism, and supporting measurements of PAN and nitrate species at rural sites in Ontario, Canada, *Atmos. Environ.*, 18, 2609-2619, 1984.
- Boughner, R. E., The effect of increased carbon dioxide concentrations on stratospheric ozone, *J. Geophys. Res.*, 83, 1326-1332, 1978.
- Boughner, R. E., and V. Ramanathan, Climatic consequence of increasing CO₂: A study of the feedback mechanism between increasing CO₂ concentrations and the atmospheric ozone, water vapor, and thermal structure balance, paper presented at Second Conf. Atmospheric Radiation, Amer. Meteor. Soc., Arlington, VA, 29-31 October, 1975.
- Boughner, R., J. C. Larsen, and M. Natarajan, The influence of NO and ClO variations at twilight on the interpretation of solar occultation measurements, *Geophys. Res. Lett.*, 7, 231-234, 1980.
- Bowman, K. P., and A. J. Krueger, A global climatology of total ozone from the Nimbus 7 Total Ozone Mapping Spectrometer (TOMS), *J. Geophys. Res.*, 90, 7967-7976, 1985.
- Boyd, J. P., The noninteraction of waves with the zonally averaged flow on a spherical Earth and the interrelationships of eddy fluxes of energy, heat and momentum, *J. Atmos. Sci.*, 33, 2285-2291, 1976.
- Bradford, C. M., F. H. Murcray, J. W. Van Allen, J. N. Brooks, D. G. Murcray, and A. Goldman, Ground level detection and feasibility for monitoring of several trace atmospheric constituents by high resolution infrared spectroscopy, *Geophys. Res. Lett.*, 3, 387-390, 1976.
- Bradshaw, J. D., and D. D. Davis, Sequential two-photon laser-induced fluorescence—A new method for detecting atmospheric trace levels of NO, *Optics Letters*, 7, 224-226, 1982.
- Bradshaw, J. D., S. KeSheng, M. O. Rodgers, S. T. Sandholm, and D. D. Davis, Measurements of tropospheric NO concentrations as part of the NASA GTE/CITE program, *Eos Trans. AGU*, 65, 835, 1984.
- Brasseur, G., *Physique et chimie de l'atmosphère moyenne*, Masson, Paris, 1982.
- Brasseur, G., and M. Bertin, The action of chlorine on the ozone layer as given by a zonally averaged two-dimensional model, *Pure Appl. Geophys.*, 117, 436-450, 1978/79.
- Brasseur, G., and M. Nicolet, Chemospheric process of nitric oxide in the mesosphere and stratosphere, *Planet. Space Sci.*, 21, 939-961, 1973.
- Brasseur, G., and P. C. Simon, Stratospheric chemical and thermal response to long-term variability in solar UV irradiance, *J. Geophys. Res.*, 86, 7343-7362, 1981.
- Brasseur, G., and S. Solomon, *Aeronomy of the Middle Atmosphere: Chemistry and Physics in the Stratosphere and Mesosphere*, 441 pp., D. Reidel, Dordrecht, 1984.
- Brasseur, G., P. De Baets, and A. De Rudder, Solar variability and minor constituents in the lower thermosphere and in the mesosphere, *Space Sci. Rev.*, 34, 377-385, 1983a.

REFERENCES

- Brasseur, G., A. De Rudder, and P. C. Simon, Implication for stratospheric composition of a reduced absorption cross section in the Herzberg continuum of molecular oxygen, *Geophys. Res. Lett.*, *10*, 20-23, 1983b.
- Brasseur, G., A. De Rudder, and C. Tricot, Stratospheric response to chemical perturbations, *J. Atmos. Chem.*, *3*, 261-288, 1985.
- Bremner, J. M., and A. M. Blackmer, Nitrous oxide: Emission from soils during nitrification of fertilizer nitrogen, *Science*, *199*, 295-298, 1978.
- Bremner, J. M., S. G. Robbins, and A. M. Blackmer, Seasonal variability in emission of nitrous oxide in soil, *Geophys. Res. Lett.*, *7*, 611-643, 1980.
- Bretherton, F. P., Momentum transport by gravity waves, *Quart. J. Roy. Meteorol. Soc.*, *95*, 213-243, 1969.
- Brewer, A. W., Evidence for a world circulation provided by the measurements of helium and water vapour distribution in the stratosphere, *Quart. J. Roy. Meteorol. Soc.*, *75*, 351-363, 1949.
- Brewer, A. W., and J. R. Milford, The Oxford-Kew ozonesonde, *Proc. Roy. Soc. London A*, *256*, 470-495, 1960.
- Brewer, A. W., and A. W. Wilson, The regions of formation of atmospheric ozone, *Quart. J. Roy. Meteorol. Soc.*, *94*, 249-265, 1968.
- Brice, K. A., R. G. Derwent, A. E. J. Eggleton, and S. A. Penkett, Measurements of CCl₃F and CCl₄ at Harwell 1/75-6/81, *Atmos. Environ.*, *16*, 2543-2554, 1982.
- Brice, K. A., S. A. Penkett, D. H. F. Atkins, F. J. Sandalls, D. J. Bamber, A. F. Tuck, and G. Vaughan, Atmospheric measurements of peroxyacetyl nitrate (PAN) in rural, South-East England: Seasonal variations, Winter photochemistry, and long-range transport, *Atmos. Environ.*, *18*, 2691-2702, 1984.
- Brietenbeck, G. A., A. M. Blackmer, and J. M. Bremner, Effects of different nitrogen fertilizers on emissions of nitrous oxide from soil, *Geophys. Res. Lett.*, *7*, 85-88, 1980.
- Briggs, J., and W. T. Roach, Aircraft observations near jet streams, *Quart. J. Roy. Meteorol. Soc.*, *89*, 225-247, 1963.
- Broadfoot, A. L., The solar spectrum 2100-3200 Å, *Astrophys. J.*, *173*, 681-689, 1972.
- Broecker, W. S., T. H. Peng, and R. Engh, Modeling the carbon system, *Radiocarbon*, *22*, 565-598, 1980.
- Browell, E. V., A. F. Carter, and S. T. Shipley, An airborne lidar system for ozone and aerosol profiling in the troposphere and lower stratosphere, in *Proceedings of the Quadrennial International Ozone Symposium, Vol. I*, edited by J. London, pp. 99-107, IAMAP, NCAR, Boulder, CO, 1981.
- Browell, E. V., A. F. Carter, S. T. Shipley, R. J. Allen, C. F. Butler, M. N. Mayo, J. H. Siviter, Jr, and W. M. Hall, NASA multi purpose airborne DIAL system and measurements of ozone and aerosol profiles, *Appl. Opt.*, *22*, 522-534, 1983.
- Browell, E. V., S. Ismail, E. F. Danielsen, G. L. Gregory, and S. M. Beck, Airborne lidar and in situ measurements of a tropopause fold event, in press, 1985.
- Bruehl, C. H., and P. J. Crutzen, A radiative-convective model to study the sensitivity of climate and chemical composition to a variety of human activities, *Stratosphere*, Proceedings of a working party meeting, Brussels, May 18, 1984, *Commission of European Communities*, edited by A. Ghazi, pp. 85-94, 1984.
- Brune, W. H., E. M. Weinstock, J. J. Schwab, R. M. Stimpfle, and J. G. Anderson, Stratospheric ClO: In situ detection with a new approach, *Geophys. Res. Lett.*, *12*, 441-444, 1985.
- Bryan, K., F. G. Komro, S. Manabe, and M. J. Spelman, Transient climate response to increasing atmospheric carbon dioxide, *Science*, *215*, 56-58, 1982.
- Bryan, K., F. G. Komro, and C. Rooth, The ocean's transient response to global surface temperature anomalies, in *Climate Processes and Climate Sensitivity, Geophysical Monograph 29*, Maurice Ewing Series Vol. 5, edited by J. E. Hansen and T. Takahashi, pp. 29-38, American Geophysical Union, Washington, DC, 1984.

REFERENCES

- Bufton, J. L., R. W. Stewart, and Chi Weng, Remote measurement of tropospheric ozone, *Appl. Opt.*, **18**, 3363-3364, 1979.
- Buijs, H. L., G. L. Vail, G. Tremblay, and D. J. W. Kendall, Simultaneous measurements of the volume mixing ratio of HCl and HF in the stratosphere, *Geophys. Res. Lett.*, **7**, 205-208, 1980.
- Burkhardt, E. G., C. A. Lambert, and C. K. N. Patel, Stratospheric nitric oxide: Measurements during daytime and sunset, *Science*, **188**, 1111-1113, 1975.
- Burnett, C. R., and E. B. Burnett, Spectroscopic measurements of the vertical column abundance of hydroxyl (OH) in the Earth's atmosphere, *J. Geophys. Res.*, **86**, 5185-5202, 1981.
- Burnett, C. R., and E. B. Burnett, Vertical column abundance of atmospheric OH at solar maximum from Fritz Peak, Colorado, *Geophys. Res. Lett.*, **9**, 708-711, 1982.
- Burnett, C. R., and E. B. Burnett, OH PEPSIOS, *Appl. Opt.*, **22**, 2887-2892, 1983a.
- Burnett, C. R., and E. B. Burnett, OH column abundance measurements from Boca Raton, FL, Fritz Peak, CO, and Poker Flat, AK, *Eos Trans. AGU*, **64**, 781, 1983b.
- Burnett, C. R., and E. B. Burnett, Observational results on the vertical column abundance of atmospheric hydroxyl: Description of its seasonal behavior 1977-1982 and of the 1982 El Chichon perturbation, *J. Geophys. Res.*, **89**, 9603-9611, 1984.
- Burnett, C. R., and E. B. Burnett, Atmospheric hydroxyl response to the partial solar eclipse of May 30, 1984, *Geophys. Res. Lett.*, **12**, 263-266, 1985.
- Burnham, J., Atmospheric gusts-A review of the results of some recent research at the Royal Aircraft Establishment, *Mon. Weather Rev.*, **98**, 723-734, 1970.
- Burrows, J. P., T. J. Wallington, and R. P. Wayne, Kinetics of the reaction of OH with ClO, *J. Chem. Soc. Faraday Trans. 2*, **80**, 957-971, 1984.
- Burrows, J. P., D. W. T. Griffith, G. K. Moortgat, and G. S. Tyndall, Matrix isolation Fourier transform infrared study of the products of the reaction between ClO and NO₂, *J. Phys. Chem.*, 266-271, 1985.
- Butchart, N., and E. E. Remsberg, The area of the stratospheric polar vortex as a diagnostic for tracer transport on an isentropic surface, *J. Atmos. Sci.*, in press, 1985.
- Butchart, N., S. A. Clough, T. N. Palmer, and P. J. Trevelyan, Simulations of an observed stratospheric warming with quasi-geostrophic refractive index as a model diagnostic, *Quart. J. Roy. Meteorol. Soc.*, **108**, 475-502, 1982.
- Butler, D. M., Earth observing system. Science and mission requirements. Working group report, Volume I, Part 2, *NASA Technical Memorandum 86129*, NASA Goddard Space Flight Center, Greenbelt, MD, 1984.
- Cadle, R. D., and G. W. Grams, Stratospheric aerosol particles and their optical properties, *Reviews of Geophysics and Space Physics*, **13(4)**, 475-501, 1975.
- Cadle, R. D., P. J. Crutzen, and D. H. Ehhalt, Heterogeneous chemical reactions in the stratosphere, *J. Geophys. Res.*, **80**, 3381-3385, 1975.
- Cahen, C., J. Pelon, P. Flamant, and G. Megie, Mesure de la vapeur d'eau tropospherique par absorption differentielle laser, *C. R. Acad. Sci.*, Paris, **292**, 29, 1981.
- Callis, L. B., and M. Natarajan, Stratospheric ozone and temperature perturbations: An examination of synergistic effects, in *Proceedings of the Quadrennial International Ozone Symposium, Vol. II*, edited by J. London, pp. 910-917, IAMAP, NCAR, Boulder, CO, 1981.
- Callis, L. B., and M. Natarajan, Atmospheric carbon dioxide and chlorofluoromethanes: Combined effects on stratospheric ozone, temperature, and surface temperature, *Geophys. Res. Lett.*, **8**, 587-590, 1981.
- Callis, L. B., M. Natarajan, and R. E. Boughner, On the relationship between the greenhouse effect, atmospheric photochemistry and species distribution, *J. Geophys. Res.*, **88**, 1401-1426, 1983a.

REFERENCES

- Callis, L. B., J. M. Russell III, K. V. Haggard, and M. Natarajan, Examination of winter-time latitudinal gradients in stratospheric NO₂ using theory and LIMS observations, *Geophys. Res. Lett.*, *10*, 945-948, 1983b.
- Callis, L. B., M. Natarajan, and J. M. Russell III, Estimates of the stratospheric distributions of odd nitrogen from the LIMS data, *Geophys. Res. Lett.*, *12*, 259-262, 1985a.
- Callis, L. B., M. Natarajan, R. E. Boughner, J. M. Russell III, and J. D. Lambeth, Stratospheric photochemical studies using Nimbus 7 data, Part II: Development of infrared trace species distributions, *J. Geophys. Res.*, in press, 1985b.
- Calvert, J. G., Test of the theory of ozone generation in Los Angeles atmosphere, *Environ. Sci. Technol.*, *10*, 248-256, 1976.
- Camy-Peyret, C., J.-M. Flaud, L. Delbouille, G. Roland, J. W. Brault, and L. Testerman, Quadrupole transitions of the 1-0 band of N₂ observed in high resolution atmospheric spectrum, *J. Physique Lett.*, *42*, 279-283, 1981.
- Camy-Peyret, C., J.-M. Flaud, J. Laurent, and G. M. Stokes, First infrared measurement of atmospheric NO₂ from the ground, *Geophys. Res. Lett.*, *10*, 35-38, 1983.
- Cariolle, D., and D. Brard, The distribution of ozone and active stratospheric species: Results of a two-dimensional atmospheric model, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 77-81, D. Reidel, Dordrecht, 1984.
- Cariolle, D., and M. Deque, A GCM study of the transport of heat, momentum and ozone in the stratosphere, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 24-27, D. Reidel, Dordrecht, 1984.
- Carli, B., F. Mencaraglia, and A. Bonetti, Fourier spectroscopy of the stratospheric emission, *Int. J. Infrared mm Waves*, *1*, 253-276, 1980.
- Carli, B., F. Mencaraglia, and A. Bonetti, New assignments in the submillimeter emission of the stratosphere, *Int. J. Infrared mm Waves*, *3*, 385-394, 1982.
- Carli, B., F. Mencaraglia, A. Bonetti, B. M. Dinelli, and F. Forni, Submillimeter detection of stratospheric OH and further line assignments in the stratospheric emission spectrum, *Int. J. Infrared mm Waves*, *4*, 475-488, 1983.
- Carli, B., F. Mencaraglia, and A. Bonetti, Submillimeter high resolution FT spectrometer for atmospheric studies, *Appl. Opt.*, *23*, 2534-2603, 1984.
- Carli, B., F. Mencaraglia, A. Bonetti, M. Carlotti, and I. Nolt, Detection of atomic oxygen and further line assignments in the far infrared stratospheric spectrum, *Int. J. Infrared mm Waves*, *6*, 149-176, 1985a.
- Carli, B. M. Carlotti, D. M. Dinelli, F. Mencaraglia, and I. Nolt, Further evidence of stratospheric chlorine monoxide, in press, 1985b.
- Carney, T. A., and J. Fishman, An investigation of the vertical distribution of trace constituents in the troposphere with a one-dimensional photochemical model and a model of the trade-wind boundary layer, *Eos Trans. AGU*, *65*, 836, 1984.
- Carroll, M. A., and B. A. Ridley, Tropospheric NO_x measurements, *Eos Trans. AGU*, *65*, 834, 1984.
- Carter, W. P. L., A. C. Lloyd, J. L. Sprung, and J. N. Pitts, Jr., Progress in the validation of a detailed mechanism for the photooxidation of propene and nebutane in photochemical smog, *Int. J. Chem. Kinet.*, *11*, 45-111, 1979.
- Carver, J. H., B. H. Horton, and F. G. Burger, Nocturnal ozone distribution in the upper atmosphere, *J. Geophys. Res.*, *71*, 4189-4191, 1966.
- Carver, J. H., H. P. Giess, T. H. Hobbs, B. R. Lewis, and J. H. McCoy, Temperature dependence of the molecular oxygen photoabsorption cross section near the H Lyman alpha line, *J. Geophys. Res.*, *82*, 1955-1960, 1977.
- CDAC: See National Research Council, *Changing Climate*, Carbon Dioxide Assessment Committee.
- Cess, R. D., Climatic change: An appraisal of atmospheric feedback mechanisms employing zonal climatology, *J. Atmos. Sci.*, *33*, 1831-1843, 1976.

REFERENCES

- Cess, R. D., and S. C. Chen, The influence of ethane and acetylene upon the thermal structure of the Jovian atmosphere, *Icarus*, 26, 444-450, 1975.
- Cess, R. D., and S. D. Goldenberg, The effect of ocean heat capacity upon global warming due to increasing atmospheric carbon dioxide, *J. Geophys. Res.*, 86, 498-502, 1981.
- Cess, R. D., and G. L. Potter, A commentary on the recent CO₂-climate controversy, *Climatic Change*, 6, 365-376, 1984.
- Cess, R. D., and L. S. Wang, A band absorptance formulation for nonisothermal gaseous radiation, *Int. J. Heat Mass Transfer*, 13, 547-555, 1970.
- Cess, R. D., B. P. Briegleb and M. S. Lian, Low-latitude cloudiness and climate feedback: Comparative estimates from satellite data, *J. Atmos. Sci.*, 39, 53-59, 1982.
- Cess, R. D., D. P. Kratz, S. J. Kim and J. Caldwell, Infrared band models for atmospheric methane, *J. Geophys. Res.*, in press, 1985.
- Chamberlin, T. C., An attempt to frame a working hypothesis of the cause of glacial periods on an atmospheric basis, *J. Geol.*, 7, 545, 1899.
- Chameides, W. L., The photochemistry of a remote marine stratiform cloud, *J. Geophys. Res.*, 89, 4739-4755, 1984.
- Chameides, W. L., and D. D. Davis, The free radical chemistry of cloud droplets and its impact upon the composition of rain, *J. Geophys. Res.*, 87, 4863-4877, 1982.
- Chameides, W. L., and A. Tan, The two dimensional diagnostic model for tropospheric OH: An uncertainty analysis, *J. Geophys. Res.*, 86, 5209-5223, 1981.
- Chameides, W. L., and J. C. G. Walker, A photochemical theory of tropospheric ozone, *J. Geophys. Res.*, 78, 8751-8760, 1973.
- Chameides, W. L., D. H. Stedman, R. R. Dickerson, D. W. Rusch, and R. J. Cicerone, NO_x production in lightning, *J. Atmos. Sci.*, 34, 143-149, 1977a.
- Chameides, W. L., S. C. Liu, and R. J. Cicerone, Possible variations in atmospheric methane, *J. Geophys. Res.*, 82, 1795-1798, 1977b.
- Chan, S. H., and C. L. Tien, Total band absorptance of nonisothermal infrared-radiating gases, *J. Quant. Spectrosc. Radiat. Transfer*, 9, 1261-1271, 1969.
- Chance, K. V., and W. A. Traub, An upper limit for stratospheric hydrogen peroxide, *J. Geophys. Res.*, 89, 11655-11660, 1984.
- Chance, K. V., and W. A. Traub, to be published under BIC I, BIC II, 1986.
- Chance, K. V., J. C. Brasunas, and W. A. Traub, Far infrared measurement of stratospheric HCl, *Geophys. Res. Lett.*, 9, 704-706, 1980.
- Chandra, S., Solar-induced oscillations in the stratosphere: A myth or reality?, *J. Geophys. Res.*, 90, 2331-2339, 1985.
- Chang, C. P., Forcing of stratospheric Kelvin waves by tropospheric heat sources, *J. Atmos. Sci.*, 35, 740-744, 1976.
- Chang, J. S., A. C. Baldwin, and D. M. Golden, An explanation of the preferential formation of less stable isomers in threebody reactions: Cl + NO₂ + M, ClO + NO₂ + M, *J. Chem. Phys.*, 71, 2021-2024, 1979.
- Chanin, M. L., The Intercomparison Ozone Campaign held in France in June 1981: Description of the campaign, *Planet. Space Sci.*, 31, 707-715, 1983a.
- Chanin, M. L., The Ozone Intercomparison Campaign, 1981: Concluding remarks, *Planet. Space Sci.*, 31, 811-812, 1983b.
- Chanin, M. L., and A. Hauchecorne, Lidar observations of gravity and tidal waves in the middle atmosphere, *J. Geophys. Res.*, 86, 9715-9721, 1981.

REFERENCES

- Chao, W. C., and M. R. Schoeberl, On the linear approximation of gravity wave saturation in the mesosphere, *J. Atmos. Sci.*, *41*, 1893-1898, 1984.
- Chapman, S., A theory of upper atmospheric ozone, *Mem. Roy. Met. Soc.*, *3*, 103-125, 1930.
- Chapman, W., and G. Peckham, Spectral analysis of wave motions in the middle atmosphere, *Phil. Trans. Roy. Soc. London*, *A296*, 59-63, 1980.
- Charlock, T. P., Cloud optical feedback and climate stability in a radiative-convective model, *Tellus*, *34*, 245-254, 1982.
- Charney, J. G., The dynamics of long waves in a baroclinic westerly current, *J. Meteorol.*, *4*, 135-162, 1947.
- Charney, J. G. (Chairman), *Carbon Dioxide and Climate: A Scientific Assessment*, 33 pp., National Academy Press, Washington, DC, 1979.
- Charney, J. G., and P. G. Drazin, Propagation of planetary-scale disturbances from the lower into the upper atmosphere, *J. Geophys. Res.*, *66*, 83-109, 1961.
- Charney, J. G., and M. E. Stern, On the stability of internal baroclinic jets in a rotating atmosphere, *J. Atmos. Sci.*, *19*, 159-172, 1962.
- Chatfield, R. B., and P. J. Crutzen, Sulfur dioxide in remote oceanic air: Cloud transports of reactive precursors, *J. Geophys. Res.*, *89*, 7111-7132, 1984.
- Chedin, A., and N. A. Scott, The impact of spectroscopic parameters on the comparison of the Jovian atmosphere discussed in connection with the recent laboratory, earth and planetary observation programs, *J. Quant. Spectrosc. Radiat. Transfer*, *32*, 453-461, 1984.
- Chedin, A., N. Husson, N. A. Scott, I. Jobard, I. Cohen-Hallaleh, and A. Berroir, La Banque de données GEISA, Description et logiciel d'utilisation, Laboratoire de Meteorologie Dynamique du C.N.R.S., *Internal Note 108*, Ecole Polytechnique, 91128 Palaiseau Cedex, France, October, 1980.
- Chedin, A., N. Husson, N. A. Scott, I. Cohen-Hallaleh, and A. Berroir, The GEISA data bank: 1984 version, Laboratoire de Meteorologie Dynamique du C.N.R.S., *Internal Note 127*, Ecole Polytechnique, 91128 Palaiseau Cedex, France, February, 1985.
- Chemical Manufacturers Association, CMA, *Effect of chlorofluorocarbons on the atmosphere, revision 17*, edited by B. P. Block, H. Magid, and R. B. Ward, 98 pp., Washington, DC, 1982.
- Chemical Manufacturers Association, CMA, *Production, sales and calculated release of CFC 11 and CFC 12 through 1983*, October, 1984.
- Chemical Manufacturers Association, CMA, *Production, sales and calculated release of CFC 11 and CFC 12 through 1984*, October, 1985.
- Chemical Manufacturers Association-National Bureau of Standards, CMA-NBS, *Proceedings of CMA-NBS workshop on atmospheric spectra*, November 3-4, 1983, Gaithersburg, MD, edited by A. Weber, June, 1985.
- Cheung, A.S.C., K. Yoshino, W. H. Parkinson, and D. E. Freeman, Herzberg continuum cross section of oxygen in the wavelength region 193.5-204.0 nm and band oscillator strengths of the (0,0) and (1,0) Schumann-Runge bands, *Can. J. Phys.*, *62*, 1752-1762, 1984a.
- Cheung, A. S. C., K. Yoshino, W. H. Parkinson, and D. E. Freeman, Herzberg continuum cross-section of oxygen in the wavelength region 193.5-204 nm: New laboratory measurements and stratospheric implications, *Geophys. Res. Lett.*, *11*, 580-582, 1984b.
- Chou, C. C., R. J. Milstein, W. S. Smith, H. Veraruiz, M. J. Molina, and F. S. Rowland, Stratospheric photodissociation of several saturated perhalo- chlorofluorocarbon compounds in current technological use (Fluorocarbons -13, -113, -114, and -115), *J. Phys. Chem.*, *82*, 1-7, 1978.
- Chou, M.-D., L. Peng, and A. Arking, Climate studies with a multilayer energy balance model. Part III: Climatic impact of stratospheric volcanic aerosols, *J. Atmos. Sci.*, *41*, 759-767, 1984.
- Chu, W. P., and M. P. McCormick, Inversion of stratospheric aerosol and gaseous constituents from spacecraft solar extinction data in the 0.38 - 1.0 μm wavelength region, *Appl. Opt.*, *18*, 1404-1413, 1979.
- CIAP: See Climatic Impact Assessment Program.

REFERENCES

- Cicerone, R. J., Atmospheric carbon tetrafluoride: A nearly inert gas, *Science*, 206, 59-61, 1979.
- Cicerone, R. J., Methane in the atmosphere, in *Global Environment Problems*, edited by S. F. Singer, Paragon House, New York, in press, 1985.
- Cicerone, R. J., and J. L. McCrumb, Photodissociation of isotopically heavy O₂ as a source of atmospheric O₃, *Geophys. Res. Lett.*, 7, 251-254, 1980.
- Cicerone, R. J., and J. D. Shetter, Sources of atmospheric methane: Measurements in rice paddies and a discussion, *J. Geophys. Res.*, 86, 7203-7209, 1981.
- Cicerone, R. J., and R. Zellner, The atmospheric chemistry of hydrogen cyanide, *J. Geophys. Res.*, 88, 10689-10696, 1983.
- Cicerone, R. J., S. Walters, and S. C. Liu, Non-linear response of stratospheric ozone column to chlorine injections, *J. Geophys. Res.*, 88, 3647-3661, 1983a.
- Cicerone, R. J., J. D. Shetter, and C. C. Delwiche, Seasonal variation of methane flux from a California rice paddy, *J. Geophys. Res.*, 88, 11022-11024, 1983b.
- Cieslik, S., and M. Nicolet, The aeronomic dissociation of nitric oxide, *Planet. Space Sci.*, 21, 925-930, 1973.
- Clancy, R. T., D. O. Muhleman, and G. L. Berge, Microwave spectra of terrestrial mesospheric CO, *J. Geophys. Res.*, 87, 5009-5014, 1982.
- Clark, J.H.E., and L. T. Morone, Mesospheric heating due to convectively excited gravity waves. A case study, *Mon. Weather Rev.*, 109, 990-1001, 1981.
- Clark, J.H.E., and T. G. Rogers, The transport of conservative trace gases by planetary waves, *J. Atmos. Sci.*, 35, 2232-2235, 1978.
- Clark, T. A., and D. J. W. Kendall, Far infrared emission spectrum of the stratosphere from balloon altitudes, *Nature*, 260, 31-32, 1976.
- Clark, T. A., and D. J. W. Kendall, Line positions and strengths of magnetic dipole transitions of molecular oxygen from stratospheric emission spectra, *J. Quant. Spectrosc. Radiat. Transfer*, 24, 65-73, 1980.
- Clark, T. A., D. A. Naylor, R. T. Boreiko, J. M. Hoogerdijk, B. Fitton, M. F. Kessler, and R. J. Emery, Downward flux of atmospheric 63 μ m emission from atomic oxygen at balloon altitudes, *Nature*, 313, 206-207, 1985.
- Climate Analysis Center, *Climate Diagnostics Bulletin*, Published monthly by the Climate Analysis Center, NOAA/NMC/NWS, Washington, DC, 1983.
- Climate Analysis Center, *Climate Diagnostics Bulletin*, Published monthly by the Climate Analysis Center, NOAA/NMC/NWS, Washington, DC, 1984.
- Climatic Impact Assessment Program, Report of findings: The effects of stratospheric pollution by aircraft, *DOT-TST-75-50*, edited by A. J. Grobecker, S. C. Coroniti, and R. H. Cannon, Jr., 551 pp., Department of Transportation, Washington, DC, 1974.
- Clough, S. A., N. S. Grahame, and A. O'Neill, Potential vorticity in the stratosphere derived using data from satellites, *Quart. J. Roy. Meteorol. Soc.*, 111, 335-358, 1985.
- CMA: See Chemical Manufacturer's Association.
- Coakley, J. A. Jr., and R. D. Cess, The effect of tropospheric aerosols on the earth's radiation budget: A parameterization for climate models, *J. Atmos. Sci.*, 40, 116-138, 1983.
- Coffey, M. T., W. G. Mankin, and A. Goldman, Simultaneous spectroscopic determination of the latitudinal, seasonal, and diurnal variability of stratospheric N₂O, NO, NO₂, and HNO₃, *J. Geophys. Res.*, 86, 7331-7341, 1981a.
- Coffey, M. T., W. G. Mankin, and R. J. Cicerone, Spectroscopic detection of stratospheric hydrogen cyanide, *Science*, 214, 333-335, 1981b.
- Coffey, M. T., W. G. Mankin, A. Goldman, C. P. Rinsland, G. A. Harvey, V. Malathy Devi, and G. M. Stokes, Infrared measurements of atmospheric ethane (C₂H₆) from aircraft and ground based solar absorption spectra in the 3000 cm⁻¹ region, *Geophys. Res. Lett.*, 12, 199-202, 1985.

REFERENCES

- Coffey *et al.*, 1985: See Roscoe *et al.*, 1985.
- Cohen, Y., and L. I. Gordon, Nitrous oxide in the oxygen minimum of the eastern tropical North Pacific: Evidence for its consumption during denitrification and possible mechanisms for its production, *Deep Sea Res.*, **6**, 509-524, 1978.
- Cohen, Y., and L. I. Gordon, Nitrous oxide production in the ocean, *J. Geophys. Res.*, **84**, 347-353, 1979.
- Cole, A. E., and A. J. Kantor, Air Force Reference Atmospheres, *Rep. AFGL-TR-78-0051*, 78 pp., Air Force Geophys. Lab., Hanscom AFB, MA, 1978.
- Connell, P. S., D. J. Wuebbles, and J. S. Chang, Stratospheric hydrogen peroxide-The relationship of theory and observation, *J. Geophys. Res.*, **90**, 10726-10732, 1985.
- Cook, J. W., G. E. Brueckner, and M. E. Van Hoosier, Variability of the solar flux in the far ultraviolet 1175-2100 Å, *J. Geophys. Res.*, **85**, 2257-2268, 1980.
- Cornford, S. G., and C. S. Spavins, Some measurements of cumulonimbus tops in the pre-monsoon season in the north-east of India, *Met. Mag.*, **102**, 314-332, 1973.
- COSPAR International Reference Atmosphere*, CIRA, edited by A. C. Strickland, Akademie-Verlag, Berlin, 1972.
- Cowley, J. R., and G. M. Lawrence, Earth Limb altitude determination for the Solar Mesosphere Explorer, paper presented at AIAA Aerospace Sciences Meeting, *AIAA Paper 83-0429*, 9 pp., Reno, Nevada, January 10-13, 1983.
- Cox, R. A., and M. J. Coffey, Thermal decomposition of peroxyacetyl nitrate in the presence of NO, *Environ. Sci. Tech.*, **11**, 900-906, 1977.
- Cox, R. A., and R. G. Derwent, Kinetics of chlorine oxide radical reactions using modulated photolysis, Part I, Disproportionation of ClO, *J. Chem. Soc. Far. I*, **75**, 1635-1647, 1979.
- Cox, R. A., A. E. J. Eggleton, R. G. Derwent, J. E. Lovelock, and D. H. Pack, Long-range transport of photochemical ozone in north-western Europe, *Nature*, **255**, 118-121, 1975.
- Cox, R. A., R. G. Derwent, A. E. J. Eggleton, and H. J. Reid, Kinetics of chlorine oxide radical reactions using modulated photolysis, Part 2, ClO and ClOO radical kinetics, *J. Chem. Soc. Far. I*, **75**, 1648-1666, 1979.
- Cox, R. A., J. P. Burrows, and G. B. Coker, Product formation in the association reaction of ClO with NO₂ investigated by diode laser spectroscopy, *Int. J. Chem. Kinet.*, **16**, 445-467, 1984.
- Coy, L., An unusually large westerly amplitude of the quasi-biennial oscillation, *J. Atmos. Sci.*, **36**, 174-176, 1979.
- Coy, L., An unusually large westerly amplitude of the quasi-biennial oscillation, corrigendum, *J. Atmos. Sci.*, **37**, 913, 1980.
- Coy, L., and M. Hitchman, Kelvin wave packets and flow acceleration: A comparison of modeling and observation, *J. Atmos. Sci.*, **41**, 1875-1880, 1984.
- Craig, H., and C. C. Chou, Methane: The record in polar ice cores, *Geophys. Res. Lett.*, **9**, 1221-1224, 1982.
- Craig, R. A., *The Upper Atmosphere: Meteorology and Physics*, 209 pp., Academic Press, New York, 1965.
- Craig, R. L., R. A. Vincent, G. J. Fraser, and M. J. Smith, The quasi 2-day wave in the Southern Hemisphere mesosphere, *Nature*, **287**, 319-320, 1980.
- Craig, R. L., R. A. Vincent, and R. A. Plumb, On the interaction between the quasi 2-day wave and the mean flow, in *Handbook for MAP, Vol. 18*, edited by S. Kato, pp. 76-79, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Crane, A. J., Uses of satellite data in studies of stratospheric dynamics, Ph.D. thesis, Oxford University, Oxford, 1977.
- Crane, A. J., Aspects of the energetics of the upper stratosphere during the January-February 1973 major sudden warming, *Quart. J. Roy. Meteorol. Soc.*, **105**, 185-206, 1979.

REFERENCES

- Crane, A. J., J. D. Haigh, J. A. Pyle, and C. F. Rogers, Mean meridional circulations of the stratosphere and mesosphere, *Pure Appl. Geophys.*, *118*, 307-328, 1980.
- Crutzen, P. J., discussion of "Absorption and emission by carbon dioxide in the mesosphere", *Quart. J. Roy. Meteorol. Soc.*, *96*, 767-769, 1970.
- Crutzen, P. J., Ozone production rates in an oxygen, hydrogen, nitrogen-oxide atmosphere, *J. Geophys. Res.*, *76*, 7311-7327, 1971.
- Crutzen, P. J., Gas phase nitrogen and methane chemistry in the atmosphere, in *Physics and Chemistry of Upper Atmospheres*, edited by B. M. McCormac, D. Reidel, Boston, MA, 1973a.
- Crutzen, P. J., A discussion of the chemistry of some minor constituents in the stratosphere and troposphere, *Pure Appl. Geophys.*, *106-108*, 1385-1399, 1973b.
- Crutzen, P. J., Photochemical reactions initiated by and influencing ozone in unpolluted tropospheric air, *Tellus*, *26*, 47-57, 1974.
- Crutzen, P. J., The possible importance of CSO for the sulfate layer of the stratosphere, *Geophys. Res. Lett.*, *3*, 73-76, 1976.
- Crutzen, P. J., The role of NO and NO₂ in the chemistry of the stratosphere and troposphere, *Ann. Rev. Earth Pl. Sci.*, *7*, 443-472, 1979.
- Crutzen, P. J., Atmospheric interactions--Homogeneous gas reactions of C, N and S containing compounds, in *The Major Biogeochemical Cycles and Their Interactions*, edited by B. Bolin and R. Cook, pp. 67-112, Wiley, New York, 1983.
- Crutzen, P. J., The role of the tropics in atmospheric chemistry, in *Geophysiology of Amazonia*, edited by R. Dickinson, Wiley, New York, in press, 1985.
- Crutzen, P. J., and D. H. Ehhalt, Effects of nitrogen fertilizers and combustion on the stratospheric ozone layer, *Ambio*, *6*, 112-117, 1977.
- Crutzen, P. J., and J. Fishman, Average concentrations of OH in the troposphere and the budgets of CH₄, CO, H₂, and CH₃CCl₃, *Geophys. Res. Lett.*, *4*, 321-324, 1977.
- Crutzen, P. J., and L. T. Gidel, A two dimensional photochemical model of the atmosphere. 2. The tropospheric budgets of the anthropogenic chlorocarbons, CO, CH₄, CH₃Cl and the effect of various NO_x sources on tropospheric ozone, *J. Geophys. Res.*, *88*, 6641-6661, 1983.
- Crutzen, P. J., and U. Schmailzl, Chemical budgets of the stratosphere, *Planet. Space Sci.*, *31*, 1009-1032, 1983.
- Crutzen, P. J., and S. Solomon, Response of mesospheric ozone to particle precipitation, *Planet. Space Sci.*, *28*, 1147-1153, 1980.
- Crutzen, P. J., I. S. A. Isaksen, and G. C. Reid, Solar proton events: Stratospheric sources of nitric oxide, *Science*, *189*, 457-459, 1975.
- Crutzen, P. J., L. E. Heidt, J. P. Krasnec, W. H. Pollock, and W. Seiler, Biomass burning as a source of atmospheric gases CO, H₂, N₂O, NO, CH₃Cl and COS, *Nature*, *282*, 253-256, 1979.
- Crutzen, P. J., W. Seiler, A. C. Delany, J. Greenburg, P. Haagensen, L. Heidt, R. Lueb, W. Pollock, A. Wartburg, and P. Zimmerman, Tropospheric chemical composition measurements in Brazil during the dry seasons, *J. Atmos. Chem.*, *2*, 233-256, 1983.
- Cunnold, D., Fluorocarbon lifetime and releases from 5 years of ALE data, paper presented at CSIRO symposium, The Scientific Application of Baseline Observations of Atmospheric Composition, Aspendale, Australia, 7-9 November, 1984.
- Cunnold, D., F. N. Alyea, N. Phillips, and R. G. Prinn, A three-dimensional dynamical chemical model of atmospheric ozone, *J. Atmos. Sci.*, *32*, 170-194, 1975.
- Cunnold, D. M., F. N. Alyea, and R. G. Prinn, Relative effects on atmospheric ozone of latitude and altitude of supersonic flight, *AIAA Journal*, *15*, 337-345, 1977.

REFERENCES

- Cunnold, D. M., F. N. Alyea, and R. G. Prinn, Preliminary calculations concerning the maintenance of the zonal mean ozone distribution in the Northern Hemisphere, *Pure Appl. Geophys.*, 118, 329-354, 1980.
- Cunnold, D. M., R. G. Prinn, R. A. Rasmussen, P. G. Simmonds, F. N. Alyea, C. A. Cardelino, A. J. Crawford, P. J. Fraser, and R. D. Rosen, The atmospheric lifetime experiment, 3, Lifetime methodology and application to 3 years of CFC₁₃ data, *J. Geophys. Res.*, 88, 8379-8400, 1983a.
- Cunnold, D. M., R. G. Prinn, R. A. Rasmussen, P. G. Simmonds, F. N. Alyea, C. A. Cardelino, and A. J. Crawford, The atmospheric lifetime experiment, 4, Results for CF₂Cl₂ based on 3 years of data, *J. Geophys. Res.*, 88, 8401-8414, 1983b.
- Curtis, P. D., J. T. Houghton, G. D. Peskett, and C. D. Rodgers, The pressure modulator radiometer for Nimbus F, *Proc. Roy. Soc. London A*, 337, 135-150, 1974.
- Dacey, J., and M. J. Klug, Methane efflux from lake sediments through water lilies, *Science*, 203, 1253-1255, 1979.
- Danielsen, E. F., Trajectories: Isobaric, Isentropic and Actual, *J. Meteorol.*, 18, 479-493, 1961.
- Danielsen, E. F., *Project Springfield Report*, Defense Atomic Support Agency, DASA 1517, Washington, DC, 1964.
- Danielsen, E. F., Transport and diffusion of stratospheric radioactivity based on synoptic hemispheric analyses of potential vorticity, Final report, *Report NYO-3317-3*, 97 pp., Pennsylvania State University, University Park, PA, 1967.
- Danielsen, E. F., Stratospheric-tropospheric exchange based on radioactivity, ozone and potential vorticity, *J. Atmos. Sci.*, 25, 502-518, 1968.
- Danielsen, E. F., The relationship between severe weather, major dust storms and rapid large-scale cyclogenesis (II), in *Subsynoptic Extratropical Weather Systems: Observations, Analysis, Modeling, and Prediction, Notes from a colloquium, Summer, 1974, Volume II: Seminars and workshops*, Report PB-247286/8, pp. 226-241, NCAR, Boulder, CO, 1974.
- Danielsen, E. F., An objective method for determining the generalized transport tensor for two-dimensional Eulerian models, *J. Atmos. Sci.*, 38, 1319-1339, 1981.
- Danielsen, E. F., Statistics of cold cumulonimbus anvils based on enhanced infrared photographs, *Geophys. Res. Lett.*, 9, 601-604, 1982.
- Danielsen, E. F., Meteorological context for Global Tropospheric Experiments' instruments tests, paper presented to American Geophysical Union, San Francisco, California, December 3-7, 1984, *Eos Trans. AGU*, 65, 834, 1984.
- Danielsen, E. F., and R. S. Hipskind, Stratospheric-tropospheric exchange at polar latitudes in summer, *J. Geophys. Res.*, 85, 393-400, 1980.
- Danielsen, E. F., and D. Kley, A tropical cumulonimbus source for correlated water vapor and ozone minima in extratropical stratosphere, *J. Geophys. Res.*, in press, 1985.
- Danielsen, E. F., and V. A. Mohnen, Project Dustorm Report: Ozone transport, in situ measurements and meteorological analyses of tropopause folding, *J. Geophys. Res.*, 82, 5867-5877, 1977.
- Danielson, E. F., R. Bleck, J. Shedlovsky, A. Wartburg, P. Haagensen and W. Pollock, Observed distribution of radioactivity, ozone and potential vorticity associated with tropopause folding, *J. Geophys. Res.*, 75, 2353-2361, 1970.
- Dave, J. V., J. J. DeLuisi, and C. L. Mateer, Results of a comprehensive theoretical examination of the optical effects of aerosols on the Umkehr measurements, *Spec. Environ. Rep.* 14, pp. 15-22, WMO, Geneva, 1979.
- Davies, R. W., Many body treatment of pressure shifts associated with collisional broadening, *Phys. Rev.*, A12, 927-946, 1975.
- Dawson, G. A., Nitrogen fixation by lightning, *J. Atmos. Sci.*, 37, 174-178, 1980.

REFERENCES

- De La Noe, J., A. Baudry, M. Perault, P. Dierich, N. Monnanteuil, and J. M. Colmont, Measurements of the vertical distribution of ozone by ground-based microwave techniques at the Bordeaux Observatory during the June 1981 intercomparison campaign, *Planet. Space Sci.*, **31**, 737-741, 1983.
- De More: See DeMore.
- De Muer, D., Vertical ozone distributions over Uccle, Belgium from six years of soundings, *Beit. Phys. Atmos.*, **49**, 1-16, 1976.
- De Rudder, A., and G. Brasseur, Ozone in the 21st century: Increase or decrease?, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 92-96, D. Reidel, Dordrecht, 1984.
- De Rudder, A., and G. Brasseur, A model calculation of the ozone response to the increase in the atmospheric emission of several gases, *Internal Report*, Inst. Aeronomie Spatiale de Belgique, Brussels, 1985.
- de Zafra, R. L., A. Parrish, P. M. Solomon, and J. W. Barrett, A measurement of stratospheric HO₂ by ground-based millimeter-wave spectroscopy, *J. Geophys. Res.*, **89**, 1321-1326, 1984.
- de Zafra, R. L., A. Parrish, P. M. Solomon, and J. W. Barrett, Quantitative observations of stratospheric chlorine monoxide as a function of latitude and season during the period 1980-1983, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 206-209, D. Reidel, Dordrecht, 1985a.
- de Zafra, R. L., A. Parrish, J. Barrett, and P. Solomon, An observed upper limit on stratospheric hydrogen peroxide, *J. Geophys. Res.*, **90**, 13087-13090, 1985b.
- Deguchi, S., and D. O. Muhleman, Mesospheric water vapor, *J. Geophys. Res.*, **87**, 1343-1346, 1982.
- Delany, A. C., P. J. Crutzen, P. Haagensen, S. Walters, and A. F. Wartburg, Photochemically produced ozone in the emission from large-scale tropical vegetation fires, *J. Geophys. Res.*, **90**, 2425-2429, 1985.
- Delany, A. C., D. R. Fitzjarrald, D. Pearson, D. H. Lenschow, G. J. Wendel, and B. Woodruff, Direct measurements of fluxes of oxides of nitrogen and of ozone over grasslands, *J. Atmos. Chem.*, in press, 1986.
- Delbouille, L., G. Roland, J. W. Brault, and L. Testerman, Photometric atlas of the solar spectrum from 1850 to 10,000 cm⁻¹, preliminary data, Kitt Peak National Observatory, 1981.
- Delmas, R. J., J. M. Ascencia, and M. Legrand, Polar ice evidence that atmospheric CO₂ 20,000 B.P. was 50% of present, *Nature*, **284**, 155-157, 1980.
- DeLuisi, J. J., Umkehr vertical ozone profile errors caused by the presence of stratospheric aerosols, *J. Geophys. Res.*, **84**, 1766-1770, 1979.
- Demerjian, K. L., J. A. Kerr, and J. G. Calvert, Mechanism of photochemical smog formation, *Adv. Environ. Sci. Technol.*, **10**, 1-262, 1974.
- Demerjian, K. L., K. L. Schere, and J. T. Peterson, Theoretical estimates of active (spherically integrated) flux and photolytic rate constants of atmospheric species in the lower troposphere, *Adv. Environ. Sci. Technol.*, **10**, 369-459, 1980.
- DeMore, W. B., Rate constants for the reactions of hydroxyl and hydroperoxyl radicals with ozone, *Science*, **180**, 735-737, 1973.
- DeMore, W. B., Rate constant and possible pressure dependence of the reaction OH + HO₂, *J. Phys. Chem.*, **86**, 121-126, 1982.
- DeMore, W. B., and O. Raper, Hartley band extinction coefficients of ozone in the gas phase and in liquid nitrogen, carbon monoxide and argon, *J. Phys. Chem.*, **68**, 412-414, 1964.
- DeMore, W. B., M. J. Molina, R. T. Watson, D. M. Golden, R. F. Hampson, M. J. Kurylo, C. J. Howard, and A. R. Ravishankara, Chemical kinetics and photochemical data for use in stratospheric modeling, Evaluation number 6, *JPL Publication 83-62*, 219 pp., Jet Propulsion Lab., Pasadena, CA, 1983.
- DeMore, W. B., J. J. Margitan, M. J. Molina, R. T. Watson, D. M. Golden, R. F. Hampson, M. J. Kurylo, C. J. Howard, and A. R. Ravishankara, Chemical kinetics and photochemical data for use in stratospheric modeling, Evaluation Number 7, *JPL Publication 85-37*, 226 pp., Jet Propulsion Lab., Pasadena, CA, 1985.

REFERENCES

- Derwent, D. G., Two-dimensional model studies of the impact of aircraft emission on tropospheric ozone, *Atmos. Environ.*, *16*, 1997-2007, 1982.
- Derwent, R. G., and A. E. J. Eggleton, Two dimensional model studies of methyl chloroform in the troposphere, *Quart. J. Roy. Meteorol. Soc.*, *107*, 231-242, 1981.
- Derwent, R. G., and H. N. M. Steward, Elevated ozone levels in the air of central London, *Nature*, *241*, 342-343, 1973.
- Dickerson, R. R., Measurements of reactive nitrogen compounds in the free troposphere, *Atmos. Chem.*, *18*, 2585-2593, 1984.
- Dickenson, R. E., Planetary Rossby waves propagating vertically through weak westerly wind wave guides, *J. Atmos. Sci.*, *25*, 984-1002, 1968.
- Dickinson, R. E., Theory of planetary wave-zonal flow interaction, *J. Atmos. Sci.*, *26*, 73-81, 1969.
- Dickinson, R. E., Infrared radiative heating and cooling in the Venusian mesosphere, 1, Global mean radiative equilibrium, *J. Atmos. Sci.*, *29*, 1551-1556, 1972.
- Dickinson, R. E., Method of parameterization for infrared cooling between altitudes of 30 and 70 kilometers, *J. Geophys. Res.*, *78*, 4451-4457, 1973.
- Dickinson, R. E., Energetics of the stratosphere, *J. Atmos. Terr. Phys.*, *37*, 855-864, 1975.
- Dickinson, R. E., Modeling climate changes due to carbon dioxide increases, in *Carbon Dioxide Review*, edited by W. C. Clark, pp. 101-133, Clarendon Press, New York, 1982.
- Dickinson, R. E., Infrared radiative cooling in the mesosphere and lower thermosphere, *J. Atmos. Terr. Phys.*, *46*, 995-1008, 1984.
- Dickinson, R. E., Modeling of future climate. WMO/ICSU/UNEP international assessment of the impact of an increased atmospheric concentration of carbon dioxide on the environment, in press, 1985.
- Dickinson, R. E., S. C. Liu, and T. M. Donahue, Effect of chlorofluoromethane infrared radiation on zonal atmospheric temperature, *J. Atmos. Sci.*, *35*, 2142-2152, 1978.
- Ditchburn, R. W., and P. A. Young, The absorption of molecular oxygen between 1850 and 2500 Å, *J. Atmos. Terr. Phys.*, *24*, 127-139, 1962.
- Dobson, G. M. B., Origin and distribution of polyatomic molecules in the atmosphere, *Proc. Roy. Soc. London*, *A236*, 187-193, 1956.
- Dobson, G. M. B., The laminated structure of the ozone in the atmosphere, *Quart. J. Roy. Meteorol. Soc.*, *99*, 599-607, 1973.
- Dobson, G. M. B., D. N. Harrison, and J. Lawrence, Measurements of the amount of ozone in the Earth's atmosphere and its relation to other geophysical conditions: Part III, *Proc. Roy. Soc. London*, *A122*, 456-486, 1929.
- Dobson, G. M. B., A. W. Brewer, and B. M. Cwilong, Meteorology of the lower stratosphere, *Proc. Roy. Soc. London*, *A185*, 144-175, 1946.
- Dodge, M. C., Combined effects of organic reactivity and NMHC/NO_x ratio on photochemical oxidant formation--a modeling study, *Atmos. Environ.*, *18*, 1657-1665, 1984.
- Dognon, A. M., F. Caralp, and R. Lesclaux, Reactions of chlorofluoromethyl peroxy radicals with NO: A kinetic study in the temperature range 230-430K, *J. Chem. Phys. Phys. Biol.*, in press, 1985.
- Doherty, G. M., R. E. Newell, and E. F. Danielsen, Radiative heating rates near the stratospheric fountain, *J. Geophys. Res.*, *89*, 1380-1384, 1984.
- Donner, L. J., and H.-L. Kuo, Radiative forcing of stationary planetary waves, *J. Atmos. Sci.*, *41*, 2849-2868, 1984.
- Donner, L. J., and V. Ramanathan, Methane and nitrous oxide: Their effects on the terrestrial climate, *J. Atmos. Sci.*, *37*, 119-124, 1980.
- Doplick, T. G., Radiative heating of the global atmosphere: Corrigendum, *J. Atmos. Sci.*, *36*, 1812-1817, 1979.

REFERENCES

- Douglass, A. R., R. B. Rood, and R. S. Stolarski, Interpretation of ozone temperature correlations, 2. Analysis of SBUV ozone data, *J. Geophys. Res.*, **90**, 10693-10708, 1985.
- Drayson, S. R., Calculation of long-wave radiative transfer in planetary atmospheres, Ph.D. thesis, *Rep. 07584-1-T*, 110 pp., College of Engineering, University of Michigan, Ann Arbor, MI, 1967.
- Drayson, S. R., P. L. Bailey, H. Fischer, J. C. Gille, A. Girard, L. L. Gordley, J. E. Harries, W. G. Planet, E. E. Remsberg, and J. M. Russell, III, Spectroscopy and transmittances for the LIMS experiment, *J. Geophys. Res.*, **89**, 5141-5146, 1984.
- Drummond, J. R., and R. F. Jarnot, Infrared measurements of stratospheric composition II. Simultaneous NO and NO₂ measurements, *Proc. Roy. Soc. London A*, **364**, 237-254, 1978.
- Drummond, J. R., J. T. Houghton, G. D. Peskett, C. D. Rodgers, M. J. Wale, J. Whitney, and E. J. Williamson, The stratospheric and mesospheric sounder on Nimbus 7, *Phil. Trans. Roy. Soc. London*, **A296**, 219-241, 1980.
- Drummond, J. W., J. M. Rosen, and D. J. Hofmann, Balloon borne chemiluminescent measurement of NO to 45 km, *Nature*, **265**, 319-320, 1977.
- Drummond, J. W., A. Volz, and D. H. Ehhalt, An optimized chemiluminescence detector for tropospheric NO measurements, *J. Atmos. Chem.*, **2**, 287-306, 1985.
- Duce, R. A., V. A. Mohnen, P. R. Zimmerman, D. Grosjean, W. Cautreels, R. Chatfield, R. Jaenicke, J. A. Ogren, E. D. Pellizzari, and G. T. Wallace, Organic material in the global troposphere, *Revs. Geophys. Space Phys.*, **21**, 921-952, 1983.
- Duetsch, H. U., Two years of regular ozone soundings over Boulder, Colorado, *NCAR Tech. Note No. 10*, 449 pp., NCAR, Boulder, CO, 1966.
- Duetsch, H. U., Vertical ozone distribution on a global scale, *Pure Appl. Geophys.*, **116**, 511-529, 1978.
- Duetsch, H. U., Total ozone trend in the light of ozone soundings, The impact of El Chichon, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 263-268, D. Riedel, Dordrecht, 1985.
- Duetsch, H. U., C. Ling, and W. Zuellig, Regular ozone observation at Thalwill, Switzerland and at Boulder, Colorado, *Rept. LAPETH-1*, 279 pp., Eidgenoessische Technische Hochschule, Zurich, 1970.
- Dunkerton, T. J., On the mean meridional mass motions of the stratosphere and mesosphere, *J. Atmos. Sci.*, **35**, 2325-2333, 1978.
- Dunkerton, T. J., On the role of Kelvin waves in the westerly phase of the semi-annual zonal wind oscillation, *J. Atmos. Sci.*, **36**, 32-41, 1979.
- Dunkerton, T. J., Stochastic parameterization of gravity wave stresses, *J. Atmos. Sci.*, **39**, 1711-1725, 1982a.
- Dunkerton, T. J., Theory of the mesopause semi-annual oscillation, *J. Atmos. Sci.*, **39**, 2681-2690, 1982b.
- Dunkerton, T. J., Laterally-propagating planetary waves in the easterly phase of the quasi-biennial oscillation, *Atmosphere-Ocean*, **21**, 55-68, 1983a.
- Dunkerton, T. J., Modification of stratospheric circulation by trace constituent changes?, *J. Geophys. Res.*, **88**, 10831-10836, 1983b.
- Dunkerton, T. J., and N. Butchart, Propagation and selective transmission of internal gravity waves in a sudden warming, *J. Atmos. Sci.*, **41**, 1443-1460, 1984.
- Dunkerton, T. J., and D. P. Delisi, Climatology of the equatorial lower stratosphere, *J. Atmos. Sci.*, **42**, 376-396, 1984.
- Dunkerton, T. J., C. P. F. Hsu, and M. E. McIntyre, Some Eulerian and Lagrangian diagnostics for a model stratospheric warming, *J. Atmos. Sci.*, **38**, 819-843, 1981.
- Dutton, J. A., *The Ceaseless Wind*, 579 pp., McGraw-Hill, New York, 1976.
- Duxbury, J. M., D. R. Bouldin, R. E. Terry, and R. L. Tate, Emissions of nitrous oxide from soils, *Nature*, **298**, 462-464, 1982.
- Dvoryashina, Y. V., V. I. Dianov-Klokov, and L. N. Yurganov, On the variations of atmospheric total column carbon monoxide abundance for 1970-1982, *Phys. Atmos. Oceans*, **20**, 40-47, 1984.
- Eady, E. T., Long waves and cyclone waves, *Tellus*, **1**, 35-42, 1949.

REFERENCES

- Eastman, J. A., and D. H. Stedman, A fast response sensor for eddy-correlation flux measurement, *Atmos. Environ.*, *11*, 1209-1211, 1977.
- Eaton, F., and G. Wendler, Some environmental effects of forest fires in interior Alaska, *Atmos. Environ.*, *17*, 1331-1337, 1983.
- Edmon, Jr., H. J., B. J. Hoskins, and M. E. McIntyre, Eliassen-Palm cross sections for the troposphere, *J. Atmos. Sci.*, *37*, 2600-2616, 1980.
- Edmonds, J. A., J. Reilly, J. R. Trabalka, and D. E. Reichle, An analysis of possible future atmospheric retention of fossil fuel CO₂, *DOE/OR-21400/1*, 169 pp., Institute for Energy Analysis, Washington, DC, 1984.
- Edwards, D. K., and S. J. Morizumi, Scaling of vibration-rotation band parameters for nonhomogeneous gas radiation, *J. Quant. Spectrosc. Radiat. Transfer*, *10*, 175-188, 1970.
- Ehhalt, D. H., The atmospheric cycle of methane, *Tellus*, *26*, 58-70, 1974.
- Ehhalt, D. H., and J. W. Drummond, The tropospheric cycle of NO_x, in *Chemistry of the Unpolluted and Polluted Troposphere*, edited by H. W. Georgii and W. Jaeschke, D. Reidel, Hingham, MA, 1982.
- Ehhalt, D. H., and J. Rudolph, On the importance of light hydrocarbons in multiple atmospheric systems, in *Berichte der Kernforschungsanlage*, Julich GmbH, Juli, 1984.
- Ehhalt, D. H., and U. Schmidt, Sources and sinks of atmospheric methane, *Pure Appl. Geophys.*, *116*, 452-464, 1978.
- Ehhalt, D. H., and A. Toennissen, Hydrogen and carbon compounds in the stratosphere, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone: Its Variation and Human Influences*, Rep. No. FAA-EE-80-20, edited by A. C. Aikin, pp. 129-151, DOT, FAA, Washington, DC, 1980.
- Ehhalt, D. H., L. E. Heidt, R. H. Lueb, and E. A. Martell, Concentrations of CH₄, CO, CO₂, H₂, H₂O, and N₂O in the upper stratosphere, *J. Atmos. Sci.*, *32*, 163-169, 1975.
- Ehhalt, D. H., E. P. Roeth, and U. Schmidt, On the temporal variance of stratospheric trace gas concentrations, *J. Atmos. Chem.*, *1*, 27-51, 1983a.
- Ehhalt, D. H., R. J. Zander, and R. A. Lamontagne, On the temporal increase of tropospheric CH₄, *J. Geophys. Res.*, *88*, 8442-8446, 1983b.
- Ehhalt, D. H., J. Rudolph, F. Meixner, and U. Schmidt, Measurements of selected C₂-C₅ hydrocarbons in the background troposphere: Vertical and latitudinal variations, *J. Atmos. Chem.*, *3*, 29-52, 1985.
- Elansky, N. F., A. Ya. Arabov, A. S. Elskhov, and I. A. Senik, Spatial and temporal variability of the NO₂ total content based on annual observation data in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 157-162, D. Reidel, Dordrecht, 1984.
- Eliassen, E., and B. Machenhauer, A study of the fluctuations of atmospheric planetary flow patterns represented by spherical harmonics, *Tellus*, *17*, 220-238, 1965.
- Eliassen, E., and B. Machenhauer, On the observed large-scale atmospheric wave motions, *Tellus*, *21*, 149-165, 1969.
- Eliassen, A., On the vertical circulation in frontal zones, *Geofys. Pub.*, *24* (4), 147-160, 1962.
- Eliassen, A., and E. Palm, On the transfer of energy in stationary mountain waves, *Geofys. Publ.*, *22*, No. 3, 1-23, 1961.
- Elkins, J. W., S. C. Wofsy, M. B. McElroy, C. E. Kolb, and W. A. Kaplan, Aquatic sources and sinks for nitrous oxide, *Nature*, *275*, 602-606, 1978.
- Ellingson, R. G., and G. N. Serafino, Observations and calculations of aerosol heating over the Arabian Sea during MONEX, *J. Atmos. Sci.*, *41*, 575-589, 1984.
- Elliott, W. P., L. Machta and C. D. Keeling, An estimate of the biotic contribution to the atmospheric CO₂ increase based on direct measurements at Mauna Loa Observatory, *J. Geophys. Res.*, *90*, 3741-3746, 1985.

REFERENCES

- Ellis, P., G. Holah, J. T. Houghton, T. S. Jones, G. Peckham, G. D. Peskett, D. R. Pick, C. D. Rodgers, H. K. Roscoe, R. Sandwell, The selective chopper radiometer for Nimbus 5, *Proc. Roy. Soc. London A*, 334, 149-170, 1973.
- Ellsaesser, H. W., Sources and sinks of stratospheric water vapor, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone: Its Variation and Human Influences*, Rep. FAA-EE-80-20, edited by A. C. Aikin, pp. 283-300, DOT, FAA, Washington, DC, 1980.
- Ellsaesser, H. W., J. E. Harries, D. Kley and R. Penndorf, Stratospheric H₂O, *Planet Space Sci.*, 28, 827-835, 1980.
- Enting, I. G., Preliminary studies with a two-dimensional model using transport fields derived from a GCM, *J. Atmos. Chem.*, in press, 1985.
- National air pollutant emission estimates, 1940-1983, EPA-450/4-84-028, Environmental Protection Agency, Research Triangle Park, NC, 1984.
- EPA: See National Air Pollutant Estimates.
- Ertel, H., Ein neuer hydrodynamischer wirbelsatz, *Meteor. Z.*, 59, 277-281, 1942.
- Evans, W. F. J., C. I. Lin, and C. L. Midwinter, The altitude distribution of nitric acid at Churchill, *Atmosphere*, 14, 172-179, 1976.
- Evans, W. F. J., J. B. Kerr, C. T. McElroy, R. S. O'Brien, and J. C. McConnell, Measurements of NO₂ and HNO₃ during a stratospheric warming at 54 degrees N. in February, 1979, *Geophys. Res. Lett.*, 9, 493-496, 1982a.
- Evans, W. F. J., C. T. McElroy, J. B. Kerr, and J. C. McConnell, Simulations of the October 23, 1980 stratoprobe flight, *Geophys. Res. Lett.*, 9, 223-226, 1982b.
- Fabian, P., Halogenated hydrocarbons in the atmosphere, in *The Handbook of Environmental Chemistry*, Vol. 4, Springer-Verlag, Heidelberg, in press, 1985.
- Fabian, P., and C. E. Junge, Global rate of ozone destruction at the earth's surface, *Arch. Met. Geophys. Bioklim.*, A19, 161-172, 1970.
- Fabian, P., J. A. Pyle, and R. J. Wells, The August 1972 solar proton event and the atmospheric ozone layer, *Nature*, 277, 458-460, 1979.
- Fabian, P., R. Borchers, S. A. Penkett, and N. J. D. Prosser, Halocarbons in the stratosphere, *Nature*, 294, 733-735, 1981a.
- Fabian, P., R. Borchers, G. Flentje, W. A. Matthews, W. Seiler, H. Giehl, K. Bunse, F. Muller, U. Schmidt, A. Volz, A. Khedim, and F. J. Johnen, The vertical distribution of stable trace gases at mid-latitudes, *J. Geophys. Res.*, 86, 5179-5184, 1981b.
- Fabian, P., J. A. Pyle, and R. J. Wells, Diurnal variation of minor constituents in the stratosphere modeled as a function of latitude and season., *J. Geophys. Res.*, 87, 4981-5000, 1982.
- Fabian, P., R. Borchers, B. C. Krueger, S. Lal, and S. A. Penkett, The vertical distribution of CHClF₂ (CFC-22) in the stratosphere, *Geophys. Res. Lett.*, 12, 1-3, 1985a.
- Fabian, P., G. Flentje, and W. A. Mathews, Stratospheric NO profiles from simultaneous measurements of two chemiluminescent balloon-borne sondes, *Planet. Space Sci.*, in press, 1985b.
- Fabian, P., R. Borchers, B. C. Krueger, and S. Lal, The vertical distribution of CFC-114 (CClF₂-CClF₂) in the atmosphere, *J. Geophys. Res.*, 90, 13091-13093, 1985c.
- Falls, A. H., and J. H. Seinfeld, Continued development of a kinetic mechanism for photochemical smog, *Environ. Sci. Technol.*, 12, 1398-1400, 1978.
- Farman, J. C., B. G. Gardiner, and J. D. Shanklin, Large losses of total ozone in Antarctica reveal seasonal ClO_x/NO_x interaction, *Nature*, 315, 207-210, 1985.
- Farmer, C. B., and O. F. Raper, The HF:HCl ratio in the 14-38 km region of the stratosphere, *Geophys. Res. Lett.*, 4, 527-529, 1977.

REFERENCES

- Farmer, C. B., O. F. Raper, and R. H. Norton, Spectroscopic detection and vertical distribution of HCl in the troposphere and stratosphere, *Geophys. Res. Lett.*, **3**, 13-16, 1976.
- Farmer, C. B., O. F. Raper, B. D. Robbins, R. A. Toth, and C. Mueller, Simultaneous spectroscopic measurements of stratospheric species: O₃, CH₄, CO, CO₂, N₂O, HCl, and HF at northern and southern mid-latitudes, *J. Geophys. Res.*, **85**, 1621-1632, 1980.
- Farmer, C. B., B. Carli, A. Bonetti, M. Carlotti, B. M. Dinelli, H. Fast, N. Louisnard, C. Alamichel, W. Mankin, M. Coffey, I. G. Nolt, D. G. Murcray, A. Goldman, G. Stokes, D. Johnson, W. Traub, K. Chance, R. Zander, L. Delbounille, and G. Roland, Balloon Intercomparison Campaigns: Results of remote sensing measurements of HCl, to be published, 1986.
- Fast, H., W.F.J. Evans, G. L. Vail, and H. L. Buijs, A measurement of the stratospheric HCl profile at 82°N on November 8, 1978, *J. Geophys. Res.*, in press, 1985.
- FCM: See *The National plan for stratospheric ozone monitoring*.
- Feely, H. W., and J. Spar, Tungsten-185 from nuclear bomb tests as a tracer for stratospheric meteorology, *Nature*, **188**, 1062-1064, 1960.
- Fehsenfeld, F. C., E. E. Ferguson, G. E. Streit, and D. L. Albritton, Stratospheric ion chemistry and the 11-year variation in polar ozone, *Science*, **194**, 544-545, 1976.
- Fels, S. B., Simple strategies for inclusion of Voigt effects in infrared cooling rate calculations, *Appl. Opt.*, **18**, 2634-2637, 1979.
- Fels, S. B., A parameterization of scale dependent radiative damping rates in the middle atmosphere, *J. Atmos. Sci.*, **39**, 1141-1152, 1982.
- Fels, S. B., The radiative damping of short vertical scale waves in the mesosphere, *J. Atmos. Sci.*, **41**, 1755-1764, 1984.
- Fels, S. B., Radiative-dynamical interactions in the middle atmosphere, in *Issues in Atmospheric and Oceanic Modeling*, edited by B. Saltzman, Advances in Geophysics 28, Part A, in press, 1985.
- Fels, S. B., and L. D. Kaplan, A test of the role of longwave radiative transfer in a general circulation model, *J. Atmos. Sci.*, **33**, 779-789, 1975.
- Fels, S. B., and M. D. Schwartzkopf, An efficient, accurate algorithm for calculating CO₂ 15 μm band cooling rates, *J. Geophys. Res.*, **86**, 1205-1232, 1981.
- Fels, S. B., J. D. Mahlman, M. D. Schwarzkopf, and R. W. Sinclair, Stratospheric sensitivity to perturbations in ozone and carbon dioxide: Radiative and dynamical response, *J. Atmos. Sci.*, **37**, 2265-2297, 1980.
- Fiedler, B. H., An integral closure model for the vertical turbulent flux of a scalar in a mixed layer, *J. Atmos. Sci.*, **41**, 674-680, 1984.
- Finger, F. G., M. E. Gelman, F. J. Schmidlin, R. Leviton, and B. Kennedy, Compatibility of meteorological rocketsonde data as indicated by International Comparison Tests, *J. Atmos. Sci.*, **32**, 1705-1714, 1975.
- Firestone, M. K., and J. M. Tiedje, Temporal change in nitrous oxide and dinitrogen following the onset of an aerobiosis, *Appl. Environ. Microbiol.*, **38**, 673-679, 1979.
- Firestone, M. K., M. S. Smith, R. B. Firestone, and J. M. Tiedje, The influence of nitrate, nitrite and oxygen on the gaseous products of denitrification in soil, *Soil Sci. Soc. Am. J.*, **43**, 1140-1144, 1979.
- Fischer, H., F. Fergg, D. Rabus, and P. Burkert, Stratospheric H₂O and HNO₃ profiles derived from solar occultation measurements, *J. Geophys. Res.*, **90**, 3831-3835, 1985a.
- Fischer, H., E. Redemann, F. Fergg, and D. Rabus, Measurements of stratospheric NO₂ profiles using a gas correlation radiometer in the solar occultation mode, *J. Atmos. Chem.*, in press, 1985b.
- Fishman, J., Ozone in the troposphere, in *Ozone in the Free Atmosphere*, edited by R. C. Whitten and S. S. Prasad, pp. 161-194, Van Nostrand Reinhold, New York, 1985.
- Fishman, J., and T. A. Carney, A one-dimensional photochemical model of the troposphere with planetary boundary-layer parameterization, *J. Atmos. Chem.*, **351-376**, 1984.

REFERENCES

- Fishman, J., and P. J. Crutzen, The origin of ozone in the troposphere, *Nature*, 274, 855-858, 1978.
- Fishman, J., and W. Seiler, Correlative nature of ozone and carbon monoxide in the troposphere: Implications for the tropospheric ozone budget, *J. Geophys. Res.*, 88, 3662-3670, 1983.
- Fishman, J., V. Ramanathan, P. J. Crutzen, and S. C. Liu, Tropospheric ozone and climate, *Nature*, 282, 818-820, 1979a.
- Fishman, J., S. Solomon, and P. J. Crutzen, Observational and theoretical evidence in support of a significant in-situ photochemical source of tropospheric ozone, *Tellus*, 31, 432-446, 1979b.
- Fishman, J., W. Seiler, and P. Haagenzen, Simultaneous presence of O₃ and CO bands in the troposphere, *Tellus*, 32, 456-463, 1980.
- Fitzjarrald, D. R., and M. Garstang, Boundary-layer growth over the tropical ocean, *Mon. Weather Rev.*, 109, 1762-1772, 1981.
- Fitzjarrald, D. R., and D. H. Lenschow, Mean concentration and flux profiles for chemically reactive species in the atmospheric surface layer, *Atmos. Environ.*, 17, 2505-2512, 1983.
- Flaud, J.-M., C. Camy-Peyret, and L. S. Rothman, Improved ozone line parameters in the 10- and 4.8 μm regions, *Appl. Opt.*, 19, 655, 1980.
- Flaud, J.-M., C. Camy-Peyret, D. Cariolle, J. Laurent, and G. M. Stokes, Daytime variations of atmospheric NO₂ from ground-based infrared measurements, *Geophys. Res. Lett.*, 10, 1104-1107, 1983.
- Fleig, A. J., K. F. Klenk, P. K. Bhartia, K. D. Lee, C. G. Wellemeyer, and V. G. Kaveeshwar, Vertical ozone profile results from Nimbus 4 data, in *Proc. 4th Conf. Atmos. Radiation*, pp. 20-26, AMS, Toronto, Canada, 1981.
- Fleig, A. J., K. F. Klenk, P. K. Bhartia, D. Gordon, and W. H. Schneider, Users guide for the Solar Backscattered Ultraviolet (SBUV) instrument first-year ozone-S data set, *NASA Ref. Publ. 1095*, 72 pp., NASA Goddard Space Flight Center, Greenbelt, MD, 1982.
- Fontanella, J., A. Girard, L. Gramont, and N. Louisnard, Vertical distribution of NO, NO₂, and HNO₃ as derived from stratospheric absorption infrared spectra, *Appl. Opt.*, 14, 825-839, 1975.
- Foot, J. S., Aircraft measurements of the humidity in the lower stratosphere from 1977 to 1980 between 45°N and 60°N, *Quart. J. Roy. Meteorol. Soc.*, 110, 303-320, 1984.
- Forbes, J. M., Middle atmosphere tides, *J. Atmos. Terr. Phys.*, 46, 1049-1067, 1984.
- Fouquart, Y., B. Bonnel, G. Brogniez, A. Cerf, M. Chaoui, L. Smith, and J. C. Vanhooite, Size distribution and optical properties of Saharan aerosols during Eclats, in *Aerosols and their Climate Effects*, edited by H. E. Gerber and A. Deepak, pp. 35-62, A. Deepak Publ., Hampton, VA, 1984.
- Frank, W. M., The cumulus parameterization problem, *Mon. Weather Rev.*, 111, 1859-1871, 1983.
- Fraser, P. J., M. A. K. Khalil, R. A. Rasmussen, and A. J. Crawford, Trends of atmospheric methane in the Southern Hemisphere, *Geophys. Res. Lett.*, 8, 1063-1066, 1981.
- Fraser, P. J., G. I. Pearman, and P. Hyson, The global distribution of atmospheric CO₂: II. A review of provisional background observations 1978-1980, *J. Geophys. Res.*, 88, 3591-3598, 1982.
- Fraser, P. J., P. Hyson, I. G. Enting, and G. I. Pearman, Global distribution and Southern Hemisphere trend of atmospheric CCl₃F, *Nature*, 302, 692-695, 1983a.
- Fraser, P. J., M. A. K. Khalil, R. A. Rasmussen, and L. P. Steele, Tropospheric methane in the mid-latitudes of the Southern Hemisphere, *J. Atmos. Chem.*, 1, 125-135, 1983b.
- Fraser, P. J., P. Hyson, M. A. K. Khalil, and R. A. Rasmussen, Conference on Scientific Application of Baseline Observations on Atmospheric Composition, Aspendale, Australia, 7-9 November, 1984.
- Frederick, J. E., Solar corpuscular emission and neutral chemistry in the Earth's middle atmosphere, *J. Geophys. Res.*, 81, 3179-1976, 1976.
- Frederick, J. E., Radiative-photochemical response of the mesosphere to dynamical forcing, *J. Geophys. Res.*, 86, 5224-5230, 1981.
- Frederick, J. E., and R. J. Cicerone, Dissociation of metastable O₂ as a potential source of atmospheric odd oxygen, *J. Geophys. Res.*, 90, 10733-10738, 1985.

REFERENCES

- Frederick, J. E., and A. R. Douglass, Atmospheric temperatures near the tropical tropopause: Temporal variations, zonal asymmetry and implications for stratospheric water vapor, *Mon. Weather Rev.*, **111**, 397-1403, 1983.
- Frederick, J. E., and R. D. Hudson, Predissociation linewidths and oscillator strengths for the 2-0 to 13-0 Schumann-Runge bands of O₂, *J. Molec. Spectrosc.*, **74**, 247-258, 1979a.
- Frederick, J. E., and R. D. Hudson, Predissociation of nitric oxide in the mesosphere and stratosphere, *J. Atmos. Sci.*, **36**, 737-745, 1979b.
- Frederick, J. E., and R. D. Hudson, Dissociation of molecular oxygen in the Schumann-Runge bands, *J. Atmos. Sci.*, **37**, 1099-1106, 1980a.
- Frederick, J. E., and R. D. Hudson, Atmospheric opacity in the Schumann-Runge bands and the aeronomic dissociation of water vapor, *J. Atmos. Sci.*, **37**, 1088-1098, 1980b.
- Frederick, J. E., and J. E. Mentall, Solar irradiance in the stratosphere: Implications for the Herzberg continuum absorption of O₂, *Geophys. Res. Lett.*, **9**, 461-464, 1982.
- Frederick, J. E., and N. Orsini, The distribution and variability of mesospheric odd nitrogen: A theoretical investigation, *J. Atmos. Terr. Phys.*, **44**, 479-1982, 1982.
- Frederick, J. E., and G. N. Serafino, Satellite observations of the nitric oxide dayglow: Implications for the behavior of mesospheric and lower thermospheric odd nitrogen, *J. Geophys. Res.*, **90**, 3821-3830, 1985.
- Frederick, J. E., R. D. Hudson, and J. E. Mentall, Stratospheric observations of the attenuated solar irradiance in the Schumann-Runge band absorption region of molecular oxygen, *J. Geophys. Res.*, **86**, 9885-9890, 1981.
- Frederick, J. E., A. J. Blake, D. E. Freeman, R. W. Nicholls, T. Ogawa, and P. C. Simon, MSG-7: Molecular absorption processes related to the penetration of ultraviolet solar radiation into the middle atmosphere, in *Handbook for MAP, Vol. 8*, edited by C. F. Sechrist, Jr., pp. 53-74, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1983a.
- Frederick, J. E., F. T. Huang, A. R. Douglass, and C. A. Reber, The distribution and annual cycle of ozone in the upper stratosphere, *J. Geophys. Res.*, **88**, 3819-3828, 1983b.
- Frederick, J. E., G. N. Serafino, and A. R. Douglass, An analysis of the annual cycle in upper stratospheric ozone, *J. Geophys. Res.*, **89**, 9547-9555, 1984.
- Fredriksson, K., B. Galle, K. Nystrom, and S. Svanberg, Lidar system applied in atmospheric pollution monitoring, *Appl. Optics*, **18**, 2998-2998, 1979.
- Freeman, D. E., K. Yoshino, J. R. Esmond, and W. H. Parkinson, High resolution absorption cross section measurements of ozone at 195 K in the wavelength region 240-350 nm, *Planet. Space Sci.*, **32**, 239-248, 1984.
- Freney, J. R., O. T. Denmead, and J. R. Simpson, Nitrous oxide emissions from soils at low moisture contents, *Soil Biol. Biochem.*, **11**, 167-173, 1979.
- Frerking, M. A., and D. J. Muehlner, Infrared heterodyne spectroscopy of atmospheric ozone, *Appl. Opt.*, **16**, 526-528, 1977.
- Friedl, R. R., W. H. Brune, and J. G. Anderson, Kinetics of SH with NO₂, O₃, O₂, and H₂O₂, *J. Phys. Chem.*, **89**, 5505-5510, 1985.
- Friedli, H., E. Moore, H. Oeschger, U. Siegenthaler, and B. Stauffer, ¹³C/¹²C ratios in CO₂ extracted from antarctic ice, *Geophys. Res. Lett.*, **11**, 1145-1148, 1984.
- Fritts, D. C., Gravity wave saturation in the middle atmosphere: A review of theory and observations, *Rev. Geophys. and Space Phys.*, **22**, 275-308, 1984.
- Fritts, D. C., and T. J. Dunkerton, Fluxes of heat and constituents due to convectively unstable gravity waves, *J. Atmos. Sci.*, **42**, 549-556, 1985.
- Fritz, B., and R. Zellner, Reaction rate and equilibrium constant for ClO + O₂ → OClOO, presented at CMA Chemistry Workshop, Goettingen, 1984.

REFERENCES

- Froidevaux, L., Photochemical modeling of the earth's stratosphere, Ph.D. thesis, 275 pp., California Institute of Technology, Pasadena, CA, 1983.
- Froidevaux, L., and Y. L. Yung, Radiation and chemistry in the stratosphere: Sensitivity to O₂ absorption cross-sections in the Herzberg continuum, *Geophys. Res. Lett.*, **9**, 854-857, 1982.
- Froidevaux, L., M. Allen, and Y. L. Yung, A critical analysis of ClO and O₃ in the mid-latitude stratosphere, *J. Geophys. Res.*, **90**, 12999-13030, 1985a.
- Froidevaux, L., M. Allen, S. Berman, and A. Daughton, Analysis of LIMS observations in the upper stratosphere and lower mesosphere, I. The mean O₃ profile and its temperature sensitivity at mid-latitudes in May, 1979, in press, 1985b.
- Funk, J. P., and G. J. Garnham, Australian ozone observations and a suggested 24-month cycle, *Tellus*, **14**, 378-382, 1962.
- Gage, K. S., and B. B. Balsley, MST radar studies of wind and turbulence in the middle atmosphere, *J. Atmos. Terr. Phys.*, **46**, 739-753, 1984.
- Galbally, I. E., Emission of fixed nitrogen compounds to the atmosphere in remote areas, in *Biogeochemical Cycling of Sulfur and Nitrogen in Remote Areas*, edited by J. N. Galloway, D. Reidel, Dordrecht, in press, 1985.
- Galbally, I. E., and C. R. Roy, Loss of fixed nitrogen from soils by nitric oxide exhalation, *Nature*, **275**, 734-735, 1978.
- Galbally, I. E., and C. R. Roy, Destruction of ozone at the earth's surface, *Quart. J. Roy. Meteorol. Soc.*, **106**, 599-620, 1980.
- Galbally, I. E., and C. R. Roy, Ozone and nitrogen oxides in the Southern Hemisphere troposphere, in *Proceedings of the Quadrennial International Ozone Symposium, Vol. I*, edited by J. London, pp. 431-438, IAMAP, NCAR, Boulder, CO, 1981.
- Galbally, I. E., C. R. Roy, R. S. O'Brien, B. A. Ridley, D. R. Hastie, W. F. J. Evans, C. T. McElroy, J. B. Kerr, P. Hyson, W. Knight, and J. E. Laby, Measurements of the trace composition of the Austral stratosphere: Chemical and meteorological data, *Technical Paper No. 1*, CSIRO, Div. of Atmos. Res., Australia, 1983.
- Galindo, I., Anthropogenic aerosols and their regional scale climatic effects, in *Aerosols and their Climatic Effects*, edited by H. E. Gerber and A. Deepak, pp. 245-260, A. Deepak Publ., Hampton, VA, 1984.
- Gallagher, C. C., C. A. Forsberg, A. S. Mason, B. W. Gandrud, and M. Janghorbani, Total chlorine content in the lower stratosphere, *J. Geophys. Res.*, **90**, 10747-10752, 1985.
- Gamache, R. R., and R. W. Davies, Theoretical N₂-, O₂-, and air broadened halfwidths of O₃ calculated by quantum Fourier transform theory with realistic collision dynamics, *J. Molec. Spec.*, **109**, 283-299, 1985.
- Gamlen, P. H., B. C. Lane, P. M. Midgley, and J. J. Steed, The production and release to atmosphere of CHCl₃ and CCl₂F₂, *Atmos. Environ.*, in press, 1985.
- Gammon, R. H., and W. D. Komhyr, Response of the global atmospheric CO₂ distribution to the atmospheric/oceanic circulation perturbation in 1982, in *IUGG Symposium 19 (Oceans and CO₂ Climate Response)*, Vol. 2, 828 pp., Hamburg, FRG, 1983.
- Gammon, R. H., W. D. Komhyr, L. Waterman, T. Conway, K. Thoning, and D. Gillette, The 1982/83 ENSO event: Response of the global atmospheric CO₂ distribution, paper presented at Conference on Scientific Application of Baseline Observations of Atmospheric Composition, CSIRO, Aspendale, Australia, 7-9 November, 1984.
- Gammon, R. H., E. T. Sandquist, and P. J. Fraser, History of carbon dioxide in the atmosphere, *U.S. Department of Energy State-of-the-Art Report on the Global Carbon Cycle (DOE)*, Chapter 3, in press, 1985a.

REFERENCES

- Gammon, R. H., W. D. Komhyr, and J. T. Peterson, The global atmospheric CO₂ distribution 1968-83: Interpretation of the results of the NOAA/GMCC measurement program, in *The Global Carbon Cycle: Analysis of the Natural Cycle and Implications of Anthropogenic and Alterations for the Next Century*, edited by J. R. Trabalka and D. E. Reichle, Springer-Verlag, New York, in press, 1985b.
- Garcia, R. R., and J. Geisler, Stochastic forcing of small amplitude oscillations in the stratosphere, *J. Atmos. Sci.*, **38**, 2187-2197, 1981.
- Garcia, R. R., and S. Solomon, A numerical model of the zonally averaged dynamical and chemical structure of the middle atmosphere, *J. Geophys. Res.*, **88**, 1379-1400, 1983.
- Garcia, R. R., and S. Solomon, The effect of breaking gravity waves on the dynamics and chemical composition of the mesosphere and lower thermosphere, *J. Geophys. Res.*, **90**, 3850-3868, 1985.
- Garcia, R. R., S. Solomon, R. G. Roble, and D. W. Rusch, A numerical response of the middle atmosphere to the 11-year solar cycle., *Planet. Space Sci.*, **32**, 411-423, 1984.
- Garland, J. A., and S. A. Penkett, Absorption of peroxyacetyl nitrate and ozone by natural surfaces, *Atmos. Environ.*, **10**, 1127-1131, 1976.
- Garland, J. A., A. W. Elzerman, and F. A. Penkett, The mechanism for dry deposition of ozone to sea water surfaces, *J. Geophys. Res.*, **85**, 7488-7492, 1980.
- Gates, W. L., Modeling the ice-age climate, *Science*, **191**, 1138-1144, 1976.
- Gates, W. L., K. H. Cook, and M. E. Schlesinger, Preliminary analysis of experiments on the climatic effects of increased CO₂ with an atmospheric general circulation model and a climatological ocean, *J. Geophys. Res.*, **86**, 6385-6393, 1981.
- Geisler, J. E., and R. E. Dickinson, The five-day wave on the sphere with realistic zonal winds, *J. Atmos. Sci.*, **33**, 632-641, 1976.
- Geller, M. A., Dynamics of the middle atmosphere, *Space Sci. Rev.*, **34**, 359-375, 1983.
- Geller, M. A., Modelling the middle atmosphere circulation, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 467-500, Terrapub, Tokyo, 1984.
- Geller, M. A., and J. C. Alpert, Planetary wave coupling between the troposphere and the middle atmosphere as a possible sun-weather mechanism, *J. Atmos. Sci.*, **37**, 1197-1215, 1980.
- Geller, M. A., M. F. Wu, and M. E. Gelman, Troposphere-stratosphere (Surface-55 km) monthly winter general circulation statistics for the Northern Hemisphere-four year averages, *J. Atmos. Sci.*, **40**, 1334-1352, 1983.
- Geller, M. A., M. F. Wu, and M. E. Gelman, Troposphere-stratosphere (Surface-55 km) monthly winter general circulation statistics for the Northern Hemisphere-interannual variations, *J. Atmos. Sci.*, **41**, 1726-1744, 1984.
- Gelman, M. E., A. J. Miller, R. M. Nagatani, and H. D. Bowman II, Mean zonal wind and temperature structure during the PMP-1 winter periods, *Adv. Space Res.*, **10**, 159-162, 1983.
- Geophysical Monitoring for Climatic Change: See Harris, J. M.
- Georgii, H.-W., and F. X. Meixner, Measurement of the tropospheric and stratospheric SO₂ distribution, *J. Geophys. Res.*, **85**, 7433-7438, 1980.
- Ghazi, A., *Atlas der Globalverteilung des Gesamt ozonbetrages nach Satellitenmessungen (April 1970-Mai 1972)*, Mitteilungen aus dem Institut fuer Geophysik and Meteorologie der Universitat zu Koln, 1980.
- Ghazi, A., and J. J. Barnett, Ozone behavior and stratospheric thermal structure during Southern Hemispheric spring, *Contr. to Atmos. Phys.*, **53**, 1-13, 1980.
- Ghazi, A., A. Ebel, and D. F. Heath, A study of satellite observations of ozone and stratospheric temperatures during 1970-1971, *J. Geophys. Res.*, **81**, 5365-5373, 1976.
- Ghazi, A., V. Ramanathan, and R. E. Dickinson, Acceleration of upper stratospheric radiative damping: Observational evidence, *Geophys. Res. Lett.*, **6**, 437-440, 1979.
- Ghazi, A., R. H. Wang, and M. P. McCormick, A study on radiative damping of planetary waves utilizing stratospheric observations, *J. Atmos. Sci.*, **42**, 2032-2042, 1985.

REFERENCES

- Gibbins, C. J., P. R. Schwartz, D. L. Thacker, and R. M. Bevilacqua, The variability of mesospheric water vapor, *Geophys. Res. Lett.*, **9**, 131-134, 1982.
- Gidel, L. T., Cumulus cloud transport of transient tracers, *J. Geophys. Res.*, **88**, 6587-6599, 1983.
- Gidel, L. T., and M. A. Shapiro, The role of clear air turbulence in the production of potential vorticity in the vicinity of upper tropospheric jetstream-frontal systems., *J. Atmos. Sci.*, **36**, 2125-2138, 1979.
- Gidel, L. T., and M. A. Shapiro, General circulation model estimates of the net vertical flux of ozone in the lower stratosphere and the implications for the tropospheric ozone budget, *J. Geophys. Res.*, **85**, 4049-4058, 1980.
- Gidel, L. T., P. J. Crutzen, and J. Fishman, A two-dimensional photochemical model of the atmosphere. 1: Chlorocarbon emissions and their effect on stratospheric ozone, *J. Geophys. Res.*, **88**, 6622-6640, 1983.
- Gill, A. E., *Atmosphere-Ocean Dynamics*, 662 pp., Academic Press, New York, 1982.
- Gill, P. S., T. E. Graedel, and C. J. Weschler, Organic films on atmospheric aerosol particles, fog droplets, cloud droplets, raindrops and snowflakes, *Rev. Geophys. Space Phys.*, **21**, 903-920, 1983.
- Gille, J. C., and F. B. House, On the inversion of Limb radiance measurements, I, Temperature and thickness., *J. Atmos. Sci.*, **28**, 1427-1442, 1971.
- Gille, J. C., and L. V. Lyjak, An overview of wave-mean flow interactions during the winter of 1978-1979 derived from LIMS observations, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 289-306, Terrapub, Tokyo, 1984.
- Gille, J. C., and J. M. Russell III, The Limb Infrared Monitor of the Stratosphere: Experiment description, performance, and results, *J. Geophys. Res.*, **89**, 5125-5140, 1984.
- Gille, J. C., P. L. Bailey, R. A. Craig, F. B. House, and G. P. Anderson, Sounding the stratosphere and mesosphere by infrared Limb scanning from space, *Science*, **208**, 397-399, 1980a.
- Gille, J. C., P. L. Bailey, and J. M. Russell III., Temperature and composition measurements from the LRIR and LIMS experiments on Nimbus 6 and 7, *Phil. Trans. Roy. Soc. London*, **A296**, 205-218, 1980b.
- Gille, J. C., P. L. Bailey, L. V. Lyjak, and J. M. Russell III, Results from the LIMS experiment for the PMP-1 winter 1978/79, *Adv. in Space Res.*, **2**, 163-167, 1983.
- Gille, J. C., J. M. Russell III, P. L. Bailey, L. L. Gordley, E. E. Remsberg, J. H. Lienesch, W. G. Planet, F. B. House, L. V. Lyjak, and S. A. Beck, Validation of the temperature retrievals obtained by the Limb Infrared Monitor of the Stratosphere (LIMS) experiment on NIMBUS 7, *J. Geophys. Res.*, **89**, 5147-5160, 1984a.
- Gille, J. C., J. M. Russell III, P. L. Bailey, E. E. Remsberg, L. L. Gordley, W. F. J. Evans, H. Fischer, B. W. Gandrud, A. Girard, J. E. Harries, and S. A. Beck, Accuracy and precision of the nitric acid concentrations determined by the Limb Infrared Monitor of the Stratosphere experiment on NIMBUS 7, *J. Geophys. Res.*, **89**, 5179-5190, 1984b.
- Gille, J. C., C. M. Smythe, and D. F. Heath, Observed ozone response to variations in solar ultraviolet radiation, *Science*, **225**, 315-317, 1984c.
- Giorgi, F., and W. L. Chameides, The rainout parameterization in a photochemical model, *J. Geophys. Res.*, **90**, 7872-7880, 1985.
- Girard, A., and N. Louisnard, Stratospheric water vapor, nitrogen dioxide, nitric acid and ozone measurements deduced from spectroscopic observations, *J. Geophys. Res.*, **89**, 5109-5114, 1984.
- Girard, A., J. Besson, R. Giraudet, and L. Gramont, Correlated seasonal and climatic variations of trace constituents in the stratosphere, *Pure Appl. Geophys.*, **117**, 381-393, 1978/79.
- Girard, A., L. Gramont, N. Louisnard, S. Le Boiteux, and G. Fergant, Latitudinal variation of HNO₃, HCl, and HF vertical column density above 11.5 km, *Geophys. Res. Lett.*, **9**, 135-138, 1982.
- Girard, A., G. Ferganti, L. Gramont, O. Lado-Bordowsky, J. Laurent, S. LeBoiteux, M. P. Lemaitre, and N. Louisnard, Latitudinal distribution of ten stratospheric species deduced from simultaneous spectroscopic measurements, *J. Geophys. Res.*, **88**, 5377-5392, 1983.

REFERENCES

- GMCC: See Harris, J. M.
- Godson, W. L., Total ozone in the middle stratosphere over Arctic and sub-Arctic areas in winter and spring, *Quart. J. Roy. Meteorol. Soc.*, **86**, 301-317, 1960.
- Goldan, P. D., W. C. Kuster, D. L. Albritton, and A. L. Schmeltekopf, Stratospheric CFC₁₃, CF₂Cl₂, and N₂O height profile measurements at several latitudes, *J. Geophys. Res.*, **85**, 413-423, 1980.
- Goldman, A., D. G. Murcray, F. H. Murcray, W. J. Williams, and F. S. Bonomo, Identification of the ν_3 NO₂ band in the solar spectrum observed from a balloon-borne spectrometer, *Nature*, **225**, 443-444, 1970.
- Goldman, A., R. N. Stocker, D. Rolens, W. J. Williams, and D. G. Murcray, Stratospheric HNO₃ distributions from balloon-borne infrared atmospheric emission measurements from 1970-75, *Scientific Report*, University of Denver, Denver, CO, 1976.
- Goldman, A., F. G. Fernald, W. J. Williams, and D. G. Murcray, Vertical distribution of NO₂ in the stratosphere as determined from balloon measurements of solar spectra in the 4500 Å region, *Geophys. Res. Lett.*, **5**, 257-260, 1978.
- Goldman, A., D. G. Murcray, F. J. Murcray, G. R. Cook, J. W. Van Allen, F. S. Bonomo, and R. D. Blatherwick, Identification of the ν_3 vibration rotation band of CF₄ in balloon-borne infrared solar spectra, *Geophys. Res. Lett.*, **6**, 609-612, 1979.
- Goldman, A., D. G. Murcray, F. J. Murcray, and E. Niple, High resolution IR balloon-borne solar spectra and laboratory spectra in the HNO₃ 1720 cm⁻¹ region: An analysis, *Appl. Opt.*, **19**, 3721-3724, 1980.
- Goldman, A., F. J. Murcray, R. D. Blatherwick, J. R. Gillis, F. S. Bonomo, F. H. Murcray, D. G. Murcray, and R. J. Cicerone, Identification of acetylene (C₂H₂) in infrared atmospheric absorption spectra, *J. Geophys. Res.*, **86**, 12143-12146, 1981a.
- Goldman, A., J. Reid, and L. S. Rothman, Identification of electric quadrupole O₂ and N₂ lines in the infrared atmospheric absorption spectrum due to the vibration-rotation fundamentals, *Geophys. Res. Lett.*, **8**, 77-78, 1981b.
- Goldman, A., F. J. Murcray, J. R. Gillis, and D. G. Murcray, Identification of new solar OH lines in the 10-12 micron region, *Astrophys. J.*, **248**, L133-L135, 1981c.
- Goldman, A., F. J. Murcray, R. D. Blatherwick, F. S. Bonomo, F. H. Murcray, and D. G. Murcray, Spectroscopic identification of CHClF₂ (F-22) in the lower stratosphere, *Geophys. Res. Lett.*, **8**, 1012-1014, 1981d.
- Goldman, A., R. D. Blatherwick, F. J. Murcray, J. W. Van Allen, F. H. Murcray, and D. G. Murcray, *New Atlas of Stratospheric Infrared Absorption Spectra*, Univ. of Denver, Denver, CO, 1982.
- Goldman, A., F. G. Fernald, F. J. Murcray, F. H. Murcray, and D. G. Murcray, Spectral least squares quantification of several atmospheric gases from high resolution infrared solar spectra obtained at the South Pole, *J. Quant. Spectrosc. Radiat. Transfer*, **29**, 189-204, 1983a.
- Goldman, A., D. G. Murcray, D. L. Lambert, and J. F. Dominy, The pure rotation spectrum of the hydroxyl radical and the solar oxygen abundance, *Mon. Not. R. Astr.*, **203**, 767-776, 1983b.
- Goldman, A., F. H. Murcray, D. G. Murcray, and C. P. Rinsland, A search for formic acid in the upper troposphere: A tentative identification of the 1105 cm⁻¹ ν_6 band Q branch in high-resolution balloon-borne solar absorption spectra, *Geophys. Res. Lett.*, **11**, 307-310, 1984a.
- Goldman, A., C. P. Rinsland, F. J. Murcray, D. G. Murcray, M. T. Coffey, and W. G. Mankin, Balloon-borne and aircraft infrared measurements of ethane (C₂H₆) in the upper troposphere and lower stratosphere, *J. Atmos. Chem.*, **2**, 211-221, 1984b.
- Goldman, A., J. R. Gillis, C. P. Rinsland, F. J. Murcray, and D. G. Murcray, Stratospheric HNO₃ quantification from line-by-line nonlinear least-squares analysis of high-resolution balloon-borne solar absorption spectra in the 870 cm⁻¹ region, *Appl. Opt.*, **23**, 3252-3255, 1984c.

REFERENCES

- Golombek, A., A global three-dimensional model of the circulation and chemistry of long-lived atmospheric species, Ph.D. thesis, 201 pp., Dept. of Meteor. and Phys. Oceanography, MIT, Cambridge, MA, 1982.
- Goody, R. M., A statistical model for water vapor absorption, *J. Meteorol.*, **78**, 165-169, 1952.
- Goody, R. M., *Atmospheric Radiation*, 436 pp., Oxford University Press, London, 1964.
- Goreau, T. J., The biogeochemistry of nitrous oxide, Ph.D. thesis, Harvard Univ., Boston, MA, 1981.
- Goreau, T. J., and W. Z. DeMello, Effects of deforestation on sources and sinks of atmospheric carbon dioxide, nitrous oxide and methane from some Amazonian biota and soils, in press, 1985.
- Goreau, T. J., W. A. Kaplan, S. C. Wofsy, M. B. McElroy, F. W. Valois, and S. W. Watson, Production of NO₂ and N₂O by nitrifying bacteria at reduced concentrations of oxygen, *Appl. Environ. Microbiology*, **40**, 526-532, 1985.
- Gotz, F. W. P., A. R. Meetham, and G. M. B. Dobson, The vertical distribution of ozone in the atmosphere, *Proc. Roy. Soc. London*, **A145**, 416-446, 1934.
- Graedel, T. E., and J. R. McRae, On the possible increase of the atmospheric methane and carbon monoxide concentrations during the last decade, *Geophys. Res. Lett.*, **7**, 977-979, 1980.
- Grant, K. E., P. S. Connell, and D. J. Wuebbles, Monte Carlo uncertainty analysis of atmosphere ozone concentrations from large trace gas perturbations, in press, 1985.
- Gray, L. J., and J. A. Pyle, Semi-annual oscillation and equatorial tracer distributions, *Quart. J. Roy. Meteorol. Soc.*, in press, 1986.
- Gray, W. M., Global view of the origin of tropical disturbances and storms, *Mon. Weather Rev.*, **26**, 653-700, 1968.
- Gray, W. M., Cumulus convection and large-scale circulations, Part I: Broad-scale and mesoscale considerations, *Mon. Weather Rev.*, **101**, 839-855, 1973.
- Greenberg, J. P., and P. R. Zimmerman, Nonmethane HC in remote tropical, continental, and marine atmospheres, *J. Geophys. Res.*, **89**, 4767-4778, 1984.
- Greenberg, J. P., P. R. Zimmerman, L. Heidt, and W. Pollock, Hydrocarbons and carbon monoxide emissions from biomass burning in Brazil, *J. Geophys. Res.*, **89**, 1350-1354, 1984.
- Grevesse, N., A. J. Sauval, and E. F. Van Dishoeck, An analysis of vibration-rotation lines of OH in the solar infrared spectrum, *Astron. Astrophys.*, **141**, 10-16, 1984.
- Griffing, G. W., Ozone and nitrogen oxides production during thunderstorms, *J. Geophys. Res.*, **82**, 943-950, 1977.
- Griggs, M., Absorption coefficients of ozone in the ultraviolet and visible regions, *J. Chem. Phys.*, **49**, 857-859, 1968.
- Grose, W. L., Recent advances in understanding stratospheric dynamics and transport processes: Application of satellite data to their interpretation, *Adv. in Space Res.*, **4**, 19-28, 1984.
- Grose, W. L., and J. M. Russell III, The use of isentropic potential vorticity in conjunction with quasi-conserved species in the study of stratospheric dynamics and transport, in press, 1985.
- Grose, W. L., R. E. Turner, and J. E. Nealy, Transport processes in the stratosphere: Model simulations and comparisons with satellite observations, in *Proceedings of the International Middle Atmosphere Symposium*, Kyoto, Japan, in press, 1984.
- Grose, W. L., R. E. Turner, and J. E. Nealy, Coupling between photochemistry and transport: Simulations with a 3-D model, *J. Atmos. Terr. Phys.*, in press, 1985.
- Grosjean, D., Atmospheric reactions of ortho cresol: Gas phase and aerosol products, *Atmos. Environ.*, **18**, 1641-1652, 1984.
- Groves, G. V., Seasonal and latitudinal models of atmospheric temperature, pressure and density, 25 to 100 km, *AFCRL-70-0261*, 78 pp., Air Force Cambridge Research Labs., Hanscom AFB, MA, 1970.
- Groves, G. V., and J. M. Forbes, Equinox tidal heating of the upper atmosphere, *Planet. Space Sci.*, **32**, 447-436, 1984.

REFERENCES

- Guedalia, D., C. Estournel, and R. Vehil, Effects of Sahel dust layers upon nocturnal cooling of the atmosphere, *ECLATS Experiment*, 644-650, 1984.
- Guicherit, R., and H. Van Dop, Photochemical production of ozone in Western Europe (1971-1978) and its relation to meteorology, *Atmos. Environ.*, *11*, 145-155, 1977.
- Guthrie, P. D., C. H. Jackman, J. R. Herman, and C. J. McQuillan, A diabatic circulation experiment in a two-dimensional photochemical model, *J. Geophys. Res.*, *89*, 9589-9602, 1984.
- Hack, W., and H. Kurzke, The production of H-atoms in the energy transfer reaction of $O_2(^1\Delta_g)$ with $HO_2(X^2A'')$, *Chem. Phys. Lett.*, *104*, 93-96, 1984.
- Hack, W., and H. Kurzke, Kinetic study of the elementary chemical reaction $H(^2S) + O_2(^1\Delta_g) \rightarrow OH(^2\pi) + O(^3P)$ in the gas phase, *J. Phys. Chem.*, in press, 1985.
- Haggard, K. V., and W. L. Grose, Numerical simulation of a sudden stratospheric warming with a three-dimensional spectral, quasi-geostrophic model, *J. Atmos. Sci.*, *38*, 1480-1497, 1981.
- Hahn, J., and P. J. Crutzen, The role of fixed nitrogen in atmospheric photochemistry, *Phil. Trans. Roy. Soc. London*, *B296*, 521-541, 1982.
- Haigh, J. D., and J. A. Pyle, Ozone perturbation experiments in a two-dimensional circulation model, *Quart. J. Roy. Meteorol. Soc.*, *108*, 551-574, 1982.
- Haigh, J. D., Radiative heating in the lower stratosphere and the distribution of ozone in a two-dimensional model, *Quart. J. Roy. Meteorol. Soc.*, *110*, 167-185, 1984.
- Hall, C. A. S., C. A. Ekdahl, and D. E. Wartenberg, A fifteen-year record of biotic metabolism in the Northern Hemisphere, *Nature*, *255*, 136-138, 1975.
- Hameed, S., and R. D. Cess, The impact of a global warming on biospheric sources of methane and its climatic consequences, *Tellus*, *35*, 1-7, 1983.
- Hameed, S., J. P. Pinto, and R. W. Stewart, Sensitivity of the predicted CO-OH-CH₄ perturbation to tropospheric NO_x concentrations, *J. Geophys. Res.*, *84*, 763-768, 1979.
- Hameed, S., R. D. Cess, and J. S. Hogan, Response of the global climate to changes in atmospheric chemical composition due to fossil fuel burning, *J. Geophys. Res.*, *85*, 7537-7545, 1980.
- Hamilton, K., Studies of wave-mean flow interaction in the stratosphere, mesosphere and lower thermosphere, Ph.D. thesis, Princeton University, Princeton, NJ, 1981a.
- Hamilton, K., The vertical structure of the quasi-biennial oscillation and its theory, *Atmos.-Ocean*, *19*, 236-250, 1981b.
- Hamilton, K., Rocketsonde observation of the mesospheric semiannual oscillation at Kwajalein, *Atmos.-Ocean*, *20*, 281-286, 1982a.
- Hamilton, K., Some features of the climatology of the Northern Hemisphere stratosphere revealed by NMC upper atmosphere analyses, *J. Atmos. Sci.*, *39*, 2737-2749, 1982b.
- Hamilton, K., Diagnostic study of the momentum balance in the Northern Hemisphere winter stratosphere, *Mon. Weather Rev.*, *111*, 1434-1441, 1983a.
- Hamilton, K., Aspects of wave behavior in the mid and upper troposphere of the Southern Hemisphere, *Atmos.-Ocean*, *21*, 40-54, 1983b.
- Hamilton, K., Mean wind evolution through the quasi-biennial cycle in the tropical lower stratosphere, *J. Atmos. Sci.*, *41*, 2113-2125, 1984.
- Hampson, J., Chemiluminescent emissions observed in the stratosphere and mesosphere, in *Les Problemes Meteorologiques de la Stratosphere et de la Mesosphere*, edited by CNES, Presses Universitaires de France, Paris, 1965.
- Handwerk, V., and R. Zellner, Laboratory study of the reaction $ClO + O_2(^1\Delta) \rightarrow$ products, Final report to CMA, 1984.
- Hanel, R. A., B. J. Conrath, V. G. Kunde, C. Prabhakara, I. Revah, V. V. Salomonson, and G. Woford, The Nimbus 4 infrared spectroscopy experiment 1. Calibrated thermal emission spectra, *J. Geophys. Res.*, *77*, 2629-2641, 1972.

REFERENCES

- Hansen, J., D. Johnson, A. Lacis, S. Lebedeff, P. Lee, D. Rind, and G. Russell, Climate impact of increasing atmospheric carbon dioxide, *Science*, 213, 957-966, 1981.
- Hansen, J., A. Lacis, D. Rind, G. Russell, P. Stone, I. Fung, R. Ruedy, and J. Lerner, Climate sensitivity: Analysis of feedback mechanisms, in *Climate Processes and Climate Sensitivity*, Maurice Ewing Series 5, edited by J. E. Hansen and T. Takasashi, 368 pp., American Geophysical Union, Washington, DC, 1984.
- Hao, W. M., Sources of N₂O from combustion, Ph.D. thesis, Harvard University, Boston, MA, 1985.
- Harries, J. E., Ratio of HNO₃ to NO₂ concentrations in daytime stratosphere, *Nature*, 274, 235, 1978.
- Harries, J. E., Stratospheric composition measurements as tests of photochemical theory, *J. Atmos. Terr. Phys.*, 44, 591-597, 1982.
- Harries, J. E., D. G. Moss, N. R. W. Swann, G. F. Neill, and P. Gildwarg, Simultaneous measurements of H₂O, NO₂, and HNO₃ in the daytime stratosphere from 15 to 35 km, *Nature*, 259, 300-302, 1976.
- Harries, R. C., D. I. Sebacher, and F. P. Day, Methane flux in the Great Dismal Swamp, *Nature*, 297, 673-674, 1982.
- Harris, J. M. and B. A. Bodhaine (Eds.), *Geophysical Monitoring for Climatic Change, Summary Report 1982*, 160 pp., NOAA Air Resources Laboratory, Boulder, CO, 1983.
- Harris, J. M., and E. C. Nickerson (Eds.), *Geophysical Monitoring for Climatic Change, No. 12, Summary Report, 1983*, 199 pp., NOAA Air Resources Laboratory, Boulder, CO, 1984.
- Harshvardhan, A. Arking, M. D. King and M.-D. Chou, Impact of the El Chichon stratospheric aerosol layer on N. H. temperatures, paper presented at WMO(CAS)/IAMAP Workshop on Aerosols and Their Climatic Effects, Williamsburg, VA, 28-30 March 1983.
- Hartmann, D. L., The structure of the stratosphere in the Southern Hemisphere during late winter 1973 as observed by satellite, *J. Atmos. Sci.*, 33, 1141-1154, 1976a.
- Hartmann, D. L., The dynamical climatology of the stratosphere in the Southern Hemisphere during late winter 1973, *J. Atmos. Sci.*, 33, 1789-1802, 1976b.
- Hartmann, D. L., A note concerning the effect of variable extinction on radiative-photochemical relaxation, *J. Atmos. Sci.*, 35, 1125-1130, 1978.
- Hartmann, D. L., Barotropic instability of the polar night jet stream, *J. Atmos. Sci.*, 40, 817-835, 1983.
- Hartmann, D. L., and R. R. Garcia, A mechanistic model of ozone transport by planetary waves in the stratosphere, *J. Atmos. Sci.*, 36, 350-364, 1979.
- Hartmann, D. L., C. R. Mechoso, and K. Yamazaki, Observations of wave mean-flow interaction in the Southern Hemisphere, *J. Atmos. Sci.*, 41, 351-362, 1984.
- Harwood, R. S., The temperature structure of the Southern Hemisphere stratosphere: August-October, 1971, *Quart. J. Roy. Meteorol. Soc.*, 102, 757-770, 1975.
- Harwood, R. S., and J. A. Pyle, A two-dimensional mean circulation model for the atmosphere below 80 km, *Quart. J. Roy. Meteorol. Soc.*, 101, 723-747, 1975.
- Harwood, R. S., and J. A. Pyle, Studies of the ozone budget using a zonal mean circulation model and linearized photochemistry, *Quart. J. Roy. Meteorol. Soc.*, 103, 319-343, 1977.
- Harwood, R. S., and J. A. Pyle, The dynamical behaviour of a two-dimensional model of the stratosphere, *Quart. J. Roy. Meteorol. Soc.*, 106, 395-420, 1980.
- Hasebe, F., Interannual variations of global total ozone revealed from Nimbus 4 BUUV and ground-based observations, *J. Geophys. Res.*, 88, 6819-6834, 1983.
- Hasebe, F., The global structure of the total ozone fluctuations observed on the time scales of two to several years, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 445-464, Terrapub, Tokyo, 1984.
- Hashimoto, L. K., W. A. Kaplan, S. C. Wofsy, and W. B. McElroy, Transformations of fixed nitrogen in the Cariaco Trench, *Deep Sea Res.*, 30, 575-590, 1983.

REFERENCES

- Hasson, V., and R. W. Nicholls, Absolute spectral absorption measurements in molecular oxygen from 2640-1920 Å: II. Continuum measurements 2430-1920 Å, *J. Phys. B.: Atom. Mol. Phys.*, **4**, 1789-1797, 1971.
- Hastie, D. R., and M. D. Miller, A balloon-borne tunable diode laser absorption spectrometer for multi-species trace gas measurements in the stratosphere, *Appl. Opt.*, in press, 1985.
- Hayashi, Y., A theory of large-scale equatorial waves generated by condensation heat and accelerating the zonal wind, *J. Meteorol. Soc. Japan*, **48**, 140-160, 1970.
- Hayashi, Y., Spectral analysis of tropical disturbances appearing in a GFDL general circulation model, *J. Atmos. Sci.*, **31**, 180-218, 1974.
- Hayashi, Y., Non-singular resonance of equatorial waves under the radiation condition, *J. Atmos. Sci.*, **33**, 183-201, 1976.
- Hayashi, Y., D. Golder, and J. Mahlman, Stratospheric and mesospheric Kelvin waves simulated by the GFDL "SKYHI" general circulation model, *J. Atmos. Sci.*, **41**, 1971-1984, 1984.
- Hayashi, Y., and D. Golder, Transient planetary waves simulated by GFDL spectral general circulation models. Part I: Effects of mountains, *J. Atmos. Sci.*, **40**, 941-950, 1983.
- Hayashi, Y., D. Golder, and J. Mahlman, Stratospheric and mesospheric Kelvin waves simulated by the GFDL "SKYHI" general circulation model, *J. Atmos. Sci.*, **41**, 1971-1984, 1984.
- Heaps, W. S., and T. J. McGee, Balloon borne lidar measurements of the stratospheric hydroxyl radical, *J. Geophys. Res.*, **88**, 5281-5285, 1983.
- Heaps, W. S., and T. J. McGee, Progress in stratospheric hydroxyl measurement by balloon-borne lidar, *J. Geophys. Res.*, **90**, 7913-7922, 1985.
- Heaps, W. S., T. J. McGee, R. D. Hudson, and L. O. Caudill, Stratospheric ozone and hydroxyl radical measurements by balloon-borne lidar, *Applied Opt.*, **21**, 2265-2274, 1982.
- Hearn, A. G., The absorption of ozone in the ultraviolet and visible regions of the spectrum, *Proc. Phys. Soc. (London)*, **78**, 932-940, 1961.
- Heasman, C. H., Satellite observations of mesospheric wind structure, Ph.D. thesis, Oxford University, Oxford, 1981.
- Heastie, H., and P. M. Stephenson, Upper winds over the world, *Geophys. Mem.*, No. 103, London: HMSO, **13**, 1-217, 1960.
- Heath, D. F., A review of observational evidence for short and long term ultraviolet flux variability of the sun, in *Proceedings of the International Conference on Sun and Climate*, Centre National d'Etudes Spatiales, Toulouse, Sept. 30-Oct. 3, 445-450, 1980.
- Heath, D. F., and B. M. Schlesinger, Temporal variability of the UV solar spectral irradiance from 160-400 nm over periods of the evolution and rotation of active regions from maximum to minimum phases of the sunspot cycle, in press, 1985.
- Heath, D. F., A. J. Krueger, H. A. Roeder, and B. D. Henderson, The solar backscatter ultraviolet and total ozone mapping spectrometer (SBUV/TOMS) for Nimbus G, *Opt. Eng.*, **14**, 323-331, 1975.
- Heath, D. F., A. J. Krueger, and P. J. Crutzen, Solar proton event: Influence on stratospheric ozone, *Science*, **197**, 886-889, 1977.
- Heath, D. F., T. P. Repoff, and R. F. Donnelly, Nimbus-7 SBUV observations of solar UV spectral irradiance variations caused by solar rotation and active-region evolution for the period November 7, 1978-November 1, 1980, *NOAA-TM-ERL-ARL-129*, 78 pp., NOAA Air Resources Laboratory, Rockville, MD, September, 1984.
- Heicklen, J., *Atmospheric Chemistry*, 406 pp., Academic Press, New York, 1976.
- Heidt, L. E., J. P. Krasnec, R. A. Lueb, W. H. Pollack, B. E. Henry, and P. J. Crutzen, Latitudinal distributions of CO and CH₄ over the Pacific, *J. Geophys. Res.*, **85**, 7329-7336, 1980.

REFERENCES

- Heikes, B., and A. M. Thompson, Effects of heterogeneous processes on NO_3 , HONO, and HNO_3 chemistry in the troposphere, *J. Geophys. Res.*, *10*, 10883-10895, 1983.
- Helas, G., and P. J. Warneck, Background NO_x mixing ratios in air masses over the North Atlantic Ocean, *J. Geophys. Res.*, *86*, 7283-7290, 1981.
- Held, I. M., Stationary and quasi-stationary eddies in the extratropical troposphere: Theory, in *Large-scale Dynamical Processes in the Atmosphere*, edited by B. J. Hoskins and R. Pearce, pp. 127-168, Academic Press, New York, 1983.
- Helten, M., W. Patz, M. Trainer, H. Fark, E. Klein, and D. H. Ehhalt, Measurements of stratospheric HO_2 and NO_2 by matrix isolation and ESR spectroscopy, *J. Atmos. Chem.*, *2*, 191-202, 1984a.
- Helten, M., W. Patz, D. H. Ehhalt, and E. P. Roeth, Measurements of nighttime NO_3 and NO_2 in the stratosphere by matrix isolation and ESR spectroscopy, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 196-200, D. Reidel, Dordrecht, 1984b.
- Hendry, D. G., and R. A. Kenley, Chapter 7, in *Atmospheric chemistry of peroxy nitrates, nitrogen air pollutants: Chemical and biological implications*, edited by D. Grosjean, Ann Arbor Science, Ann Arbor, MI, 1979.
- Hering, W. S. and T. R. Borden: See Borden, T. R. and W. S. Hering.
- Herman, J. R., and C. J. McQuillan, Atmospheric chlorine and stratospheric ozone nonlinearities and trend detection, *J. Geophys. Res.*, *90*, 5721-5732, 1985.
- Herman, J. R., and J. E. Mentall, O_2 absorption cross sections (187-225 nm) from stratospheric solar flux measurements, *J. Geophys. Res.*, *87*, 8967-8975, 1982a.
- Herman, J. R., and J. E. Mentall, The direct and scattered solar flux within the stratosphere, *J. Geophys. Res.*, *87*, 1319-1330, 1982b.
- Hess, P. H., and J. R. Holton, The origin of temporal variance in long-lived trace constituents in the summer stratosphere, *J. Atmos. Sci.*, *42*, 1455-1463, 1985.
- Hicks, B. B., M. L. Wesely, and J. L. Durham, *Critique of Methods to Measure Dry Deposition*, 83 pp., Environmental Sciences Research Laboratory, Office of Research and Development, U. S. Environmental Protection Agency, Research Triangle Park, NC, 1980.
- Hidalgo, H., and P. J. Crutzen, The tropospheric and stratospheric composition perturbed by NO_x emissions of high-altitude aircraft, *J. Geophys. Res.*, *82*, 5833-5866, 1977.
- Hide, R., and P. J. Mason, Sloping convection in a rotating fluid, *Advances in Physics*, *24*, 47-100, 1975.
- Hill, W. J., P. N. Sheldon, and J. J. Tiede, Analyzing worldwide total ozone for trends, *Geophys. Res. Lett.*, *4*, 21-24, 1977.
- Hills, A. J., and C. J. Howard, Rate coefficient temperature dependence and branching ratio for the $\text{OH} + \text{ClO}$ reaction, *J. Chem. Phys.*, *81*, 4458-4465, 1984.
- Hilsenrath, E., and B. M. Schlesinger, Total ozone seasonal and interannual variations derived from the 7 year Nimbus 4 data, *J. Geophys. Res.*, *86*, 12087-12096, 1981.
- Hilsenrath, E., T. Seiden, and P. Goodman, An ozone measurement in the mesosphere and stratosphere by means of a rocketsonde, *J. Geophys. Res.*, *71*, 1385-1397, 1969.
- Hilsenrath, E., J. Ainsworth, A. Holland, J. Mentall, A. Torres, W. Attmannspacher, A. Bass, W. Evans, W. Komhyr, K. Mauersberger, A. J. Miller, M. Proffitt, D. Robbins, S. Taylor, and E. Weinstock, Results from the balloon ozone intercomparison campaign (BOIC), in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 454-459, D. Reidel, Dordrecht, 1985.
- Hilsenrath, E., J. Ainsworth, W. Attmannspacher, A. Bass, W. F. J. Evans, A. Holland, W. Komhyr, K. Mauersberger, J. Mentall, M. Proffitt, D. Robbins, S. Taylor, A. Torres, and E. Weinstock, Results from the Balloon Ozone Intercomparison Campaign (BOIC), to be published, 1986.
- Hines, C. O., Dynamical heating of the upper atmosphere, *J. Geophys. Res.*, *70*, 177-183, 1965.

REFERENCES

- Hinteregger, H. E., Representations of solar EUV fluxes for aeronomical applications, in *The Mesosphere and Thermosphere*, edited by G. Schmidtke and K. S. W. Champion, pp. 39-52, Pergamon Press, Oxford, 1981.
- Hirooka, T., and I. Hirota, Normal mode Rossby waves observed in the upper stratosphere. Part II. Second antisymmetric and symmetric modes of zonal wavenumbers 1 and 2, *J. Atmos. Sci.*, **42**, 536-548, 1985.
- Hirota, I., Seasonal variation of planetary waves in the stratosphere observed by the Nimbus 5 SCR, *Quart. J. Roy. Meteorol. Soc.*, **102**, 757-770, 1976.
- Hirota, I., Equatorial waves in the upper stratosphere and mesosphere in relation to the semi-annual oscillation of the zonal wind, *J. Atmos. Sci.*, **35**, 714-722, 1978.
- Hirota, I., Kelvin waves in the equatorial middle atmosphere observed by the Nimbus-5 SCR, *J. Atmos. Sci.*, **36**, 217-222, 1979.
- Hirota, I., Observational evidence of the semiannual oscillation in the tropical middle atmosphere-A review, *Pure Appl. Geophys.*, **118**, 217-238, 1980.
- Hirota, I., Climatology of gravity waves in the middle atmosphere, *J. Atmos. Terr. Phys.*, **46**, 767-773, 1984.
- Hirota, I., and T. Hirooka, Normal mode Rossby waves observed in the upper stratosphere. Part I: First symmetric modes of wavenumbers 1 and 2, *J. Atmos. Sci.*, **41**, 1253-1267, 1984.
- Hirota, I., and Y. Sato, Periodic variation of the winter circulation and intermittent vertical propagation of planetary waves, *J. Meteorol. Soc. Japan*, **47**, 390-402, 1969.
- Hirota, I., T. Hirooka, and M. Shiotani, Upper stratospheric circulation in the two hemispheres observed by satellites, *Quart. J. Roy. Meteorol. Soc.*, **109**, 443-454, 1983a.
- Hirota, I., Y. Maekawa, S. Fukao, K. Fukuyama, M. P. Sulzer, J. L. Fellous, T. Tsudo, and S. Kato, Fifteen-day observation of mesospheric and lower thermospheric motions with the aid of the Arecibo UHF radar, *J. Geophys. Res.*, **88**, 6835-6842, 1983b.
- Hitchman, M. H., An observational study of wave-mean flow interaction in the equatorial middle atmosphere, Ph.D. thesis, 360 pp., Dept. of Atmospheric Sciences, University of Washington, Seattle, WA, 1985.
- Hitchman, M. H., and C. B. Leovy, Evolution of the zonal mean state in the equatorial middle atmosphere during October, 1978-May, 1979, *J. Atmos. Sci.*, **43**, in press, 1986.
- Hocking, W. K., Mesospheric turbulence intensities measured with a HF radar at 35° S - II, *J. Atmos. Terr. Phys.*, **45**, 103-114, 1983.
- Hocking, W. K., Turbulence in the region 80-120 km, in *Handbook for MAP, Vol. 16*, edited by K. Labitzke, J. J. Barnett, and B. Edwards, pp. 290-304, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Hodges, Jr., R. R., Generation of turbulence in the upper atmosphere by internal gravity waves, *J. Atmos. Sci.*, **72**, 3455-3458, 1967.
- Hoell, J. M., C. N. Harward, and B. S. Williams, Remote infrared heterodyne radiometer measurements of atmospheric ammonia profiles, *Geophys. Res. Lett.*, **7**, 313-316, 1980.
- Hoell, J. M., G. L. Gregory, M. A. Carroll, M. McFarland, B. A. Ridley, D. D. Davis, J. Bradshaw, M. O. Rodgers, A. L. Torres, G. W. Sachse, G. F. Hill, E. P. Condon, R. A. Rasmussen, M. C. Campbell, J. C. Farmer, J. C. Sheppard, C. C. Wang, and L. I. Davis, An intercomparison of carbon monoxide, nitric oxide, and hydroxyl measurement techniques: Overview of results, *J. Geophys. Res.*, **89**, 11819-11825, 1984.
- Hoffert, M. I., A. J. Callegari, and C. T. Hsieh, The role of deep sea storage in the secular response to climate forcing, *J. Geophys. Res.*, **85**, 6667-6679, 1980.
- Hoffman-Sievert, R., and A. W. Castleman, The reaction of SO₃ with water clusters and the formation of H₂SO₄, *J. Phys. Chem.*, **88**, 3329-3333, 1984.
- Hofmann, D. J., and J. M. Rosen, Balloon-borne observations of stratospheric aerosol and condensation nuclei during the year following the Mt. St. Helens eruption, *Geophys. Res. Lett.*, **87**, 11039-11061, 1982.

REFERENCES

- Hofmann, D. J., and J. M. Rosen, Sulfuric acid droplet formation and growth in the stratosphere after the 1982 eruption of El Chichon, *Science*, 222, 325-327, 1983.
- Holland, A. J., T. D. Keenan, and G. D. Crane, Observations of a phenomenal temperature perturbation in tropical cyclone Kerry (1979), *Mon. Weather Rev.*, 112, 1074-1082, 1984.
- Holstein, K. J., E. H. Fink, J. Wildt, R. Winter, and F. Zabel, Mechanisms of HO₂(A₂A') excitation in various chemical systems, *J. Phys. Chem.*, 87, 3943-3948, 1983.
- Holton, J. R., Waves in the equatorial stratosphere generated by tropospheric heat sources, *J. Atmos. Sci.*, 29, 368-375, 1972.
- Holton, J. R., A note on the frequency distribution of atmospheric Kelvin waves, *J. Atmos. Sci.*, 30, 499-501, 1973.
- Holton, J. R., *The Dynamical Meteorology of the Stratosphere and Mesosphere*, 216 pp., American Meteorological Society, Boston, MA, 1975.
- Holton, J. R., Wave propagation and transport in the middle atmosphere, *Phil. Tran. Roy. Soc. London*, A296, 73-85, 1980.
- Holton, J. R., An advective model for two-dimensional transport of stratospheric trace species, *J. Geophys. Res.*, 86, 11989-11994, 1981.
- Holton, J. R., The role of gravity wave induced drag and diffusion in the momentum budget of the mesosphere, *J. Atmos. Sci.*, 39, 791-799, 1982.
- Holton, J. R., The influence of gravity wave breaking in the circulation of the middle atmosphere, *J. Atmos. Sci.*, 40, 2497-2507, 1983.
- Holton, J. R., The generation of mesospheric planetary waves by zonally asymmetric gravity wave breaking, *J. Atmos. Sci.*, 41, 3427-3430, 1984a.
- Holton, J. R., Troposphere-stratosphere exchange of trace constituents: The water vapor puzzle, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 369-385, Terrapub, Tokyo, 1984b.
- Holton, J. R., A dynamically based transport parameterization for one-dimensional photochemical models, in *Handbook for MAP, Vol. 18*, edited by S. Kato, Chap. 4, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Holton, J. R., A dynamically based transport parameterization for one-dimensional photochemical models of the stratosphere, *J. Geophys. Res.*, in press, 1986.
- Holton, J. R., and R. S. Lindzen, An updated theory of the quasi-biennial oscillation of the tropical stratosphere, *J. Atmos. Sci.*, 29, 1076-1080, 1972.
- Holton, J. R., and H. C. Tan, The influence of the equatorial quasi-biennial oscillation on the global circulation at 50 mb, *J. Atmos. Sci.*, 37, 2200-2208, 1980.
- Holton, J. R., and H. C. Tan, The quasi-biennial oscillation in the Northern Hemisphere lower stratosphere, *J. Meteorol. Soc. Japan*, 60, 140-148, 1982.
- Holton, J. R., and W. M. Wehrbein, The role of forced planetary waves in the annual cycle of zonal mean circulation of the middle atmosphere, *J. Atmos. Sci.*, 37, 1968-1983, 1980a.
- Holton, J. R., and W. M. Wehrbein, A numerical model of the zonal mean circulation of the middle atmosphere, *Pure Appl. Geophys.*, 118, 284-306, 1980b.
- Holton, J. R., and X. Zhu, A further study of gravity wave induced drag and diffusion in the mesosphere, *J. Atmos. Sci.*, 41, 2653-2662, 1984.
- Hood, L. L., The temporal behavior of upper stratospheric ozone at low latitudes: Evidence from Nimbus 4 BUUV data for short-term responses to solar ultraviolet variability, *J. Geophys. Res.*, 89, 9557-9568, 1984.
- Hopkins, R. H., Evidence of polar-tropical coupling in upper stratospheric zonal wind anomalies, *J. Atmos. Sci.*, 32, 712-719, 1975.

REFERENCES

- Horvath, J. J., J. E. Frederick, N. Orsini, and A. R. Douglass, Nitric oxide in the upper stratosphere: Measurements and geophysical interpretation, *J. Geophys. Res.*, **88**, 10809-10817, 1983.
- Hoskins, B. J., Non-Boussinesq effects and further development in a model of upper tropospheric frontogenesis, *Quart. J. Roy. Meteorol. Soc.*, **98**, 532-541, 1972.
- Hoskins, B. J., The role of potential vorticity in symmetric stability and instability, *Quart. J. Roy. Meteorol. Soc.*, **100**, 480-482, 1974.
- Hoskins, B. J., The geostrophic momentum approximation and the semi-geostrophic equations, *J. Atmos. Sci.*, **32**, 233-242, 1975.
- Hoskins, B. J., Modelling of the transient eddies and their feedback on the mean flow, in *Large-scale Dynamical Processes in the Atmosphere*, edited by B. J. Hoskins and R. Pearce, pp. 169-199, Academic Press, New York, 1983.
- Hoskins, B. J., and I. Draghici, The forcing of ageostrophic motion according to the semi-geostrophic equations and in an isentropic coordinate model, *J. Atmos. Sci.*, **34**, 1859-1867, 1977.
- Hoskins, B. J., and W. A. Heckley, Baroclinic waves and frontogenesis in a non-uniform potential vorticity semi-geostrophic model, *J. Atmos. Sci.*, **39**, 1999-2016, 1982.
- Hoskins, B. J., I. Draghici, and H. C. Davies, A new look at the omega equation, *Quart. J. Roy. Meteorol. Soc.*, **104**, 31-38, 1978.
- Hoskins, B. J., M. E. McIntyre, and A. W. Robertson, On the use and significance of isentropic potential vorticity maps, *Quart. J. Roy. Meteorol. Soc.*, **111**, 877-946, 1985.
- Houghton, J. T., *The Physics of Atmospheres*, 203 pp., Cambridge University Press, Cambridge, 1977.
- Houghton, J. T., The stratosphere and mesosphere, *Quart. J. Roy. Meteorol. Soc.*, **104**, 1-30, 1978.
- Houghton, J. T., F. W. Taylor, and C. D. Rodgers, Remote sounding of atmospheres, *Cambridge Planetary Science Series No. 5*, 343 pp., Cambridge University Press, Cambridge, 1984.
- Houze, Jr., R. A., Cloud clusters and long-scale vertical motions in the tropics, *J. Meteorol. Soc. Japan*, **60**, 396-409, 1982.
- Houze, R. A., and A. K. Betts, Convection in GATE, *Rev. Geophys. Space Phys.*, **19**, 541-576, 1981.
- Houze, R. A., S. G. Geotis, F. D. Marks, and A. K. West, Winter monsoon convection in the vicinity of North Borneo. Part I: Structure and time evolution of the clouds and precipitation, *Mon. Weather Rev.*, **109**, 1595-1614, 1981.
- Hov, O., S. A. Penkett, I. S. A. Isaksen, and A. Semb, Organic gases in the Norwegian Arctic, *Geophys. Res. Lett.*, **11**, 425-428, 1984.
- Hoyt, S. D., The air-sea exchange of carbonyl sulfide (OCS) and halocarbons, Ph.D. thesis, Oregon Graduate Center, Beaverton, Oregon, 1982.
- Hsu, C. P. F., Air parcel motions during a numerically simulated sudden stratospheric warming, *J. Atmos. Sci.*, **37**, 2768-2792, 1980.
- Hubler, G., D. Perner, U. Platt, A. Tonnissen, and D. H. Ehhalt, Ground-level OH radical concentrations: New measurements by optical absorption, *J. Geophys. Res.*, **89**, 1309-1319, 1984.
- Huddlestone, R. K., and E. Weitz, A laser-induced fluorescence study of energy transfer between the symmetric stretching and bending modes of CO₂, *Chem. Phys. Lett.*, **83**, 174-179, 1981.
- Hudson, R. D., Critical review of ultraviolet photoabsorption cross sections for molecules of astrophysical and aeronomic interest, *Rev. Geophys. Space Phys.*, **9**, 305-406, 1971.
- Hudson, R. D. (Ed.), *The Stratosphere 1981. Theory and Measurements*, WMO Global Ozone Research and Monitoring Project Report No. 11, 516 pp., WMO, Geneva, 1982.
- Hudson, R. D., and S. H. Mahle, Photodissociation rates of molecular oxygen in the mesosphere and lower thermosphere, *J. Geophys. Res.*, **77**, 2902-2914, 1972.
- Hudson, R. D., and E. I. Reed (Eds.), *The Stratosphere: Present and Future*, NASA Reference Publication 1049, 432 pp., NASA Goddard Space Flight Center, Greenbelt, MD, 1979.

REFERENCES

- Huebert, B. J., The dry deposition of nitric acid to grass, *J. Geophys. Res.*, **90**, 2085-2090, 1985.
- Huebert, B. J., and A. L. Lazrus, Tropospheric gas-phase and particulate nitrate measurements, *J. Geophys. Res.*, **85**, 7322-7328, 1980.
- Hungate, R. E., *The Rumen and Its Microbes*, 533 pp., Academic Press, New York, 1960.
- Hunt, B. G., Experiments with a stratospheric general circulation model. III. Large-scale diffusion of ozone including photochemistry. *Mon. Weather Rev.*, **97**, 287-306, 1969.
- Hunt, B. G., The maintenance of the zonal mean state of the upper atmosphere as represented in a three-dimensional general circulation model extending to 100 km, *J. Atmos. Sci.*, **38**, 2172-2186, 1981.
- Hunt, B. G., The impact of gravity wave drag and diurnal variability on the general circulation of the middle atmosphere, *J. Atmos. Sci.*, in press, 1985.
- Hunt, B. G., and S. Manabe, Experiments with stratospheric general circulation model, II. Large-scale diffusion of tracers in the stratosphere, *Mon. Weather Rev.*, **96**, 503-539, 1968.
- Hunten, D., The philosophy of one-dimensional modeling, in *Proceedings Fourth Conference Climatic Impact Assessment Program, DOT-TSC-OST-75-38*, edited by T. M. Hard and A. J. Broderick, pp. 147-155, Transportation Systems Center, Cambridge, MA, 1975.
- Huntress, W. T. Jr., Upper Atmosphere Research Satellite Program—to study the chemistry, energetics, and dynamics, Final Report, *JPL Publ. 78-54*, 62 pp., Jet Propulsion Lab., Pasadena, CA, 1978.
- Husson, N., A. Chedin, N. A. Scott, I. Cohen-Hallaleh, and A. Berroir, La Banque de donnees GEISA. Mise a jour no. 3, Laboratoire de Meteorologie Dynamique du C.N.R.S., *Internal Note 116*, Ecole Polytechnique, 91128 Palaiseau Cedex, France, July 1982.
- Husson, N., A. Chedin, N. A. Scott, D. Bailly, G. Graner, N. Lacombe, A. Levy, C. Rossetti, G. Tarra-go, C. Camy-Peyret, J. M. Flaud, A. Bauer, J. M. Colmont, N. Monnanteuil, J. C. Hilico, G. Pierre, M. Loete, J. P. Champion, L. S. Rothman, L. R. Brown, G. Orton, P. Varanasi, C. P. Rinsland, M. A. H. Smith, and A. Goldman, The GEISA spectroscopic line parameters data bank in 1984, *Annales Geophysicae*, Fasc. 2, Series A, 1986.
- Hutchinson, G. E., and A. R. Mosier, Nitrous oxide emissions from an irrigated cornfield, *Science*, **205**, 1125-1127, 1976.
- Hyson, P., Stratospheric water vapor over Australia, *Quart. J. Roy. Meteorol. Soc.*, **109**, 285-294, 1983.
- Idso, S. B., The climatological significance of a doubling of earth's atmospheric carbon dioxide concentration, *Science*, **207**, 1462-1463, 1980.
- Iman, R. L., and M. J. Shortencarier, A Fortran 77 program and user's guide for the generation of Latin hypercube and random samples for use with computer models, *SAND 83-2365*, Sandia National Laboratories, Albuquerque, NM, 1984.
- Iman, R. L., J. C. Helton, and J. E. Campbell, An approach to sensitivity analysis of computer models: Part I-Introduction, Input variable selection and preliminary variable assessment, *J. Quality Tech.*, **13**, 174-183, 1981.
- Imbrie, J., and K. P. Imbrie, *Ice Ages, Solving the Mystery*, 224 pp., Enslow Pub., Short Hills, NJ, 1979.
- Inn, E. C. Y., and Y. Tanaka, Absorption coefficient of ozone in the ultraviolet and visible regions, *J. Opt. Soc. Am.*, **43**, 870-873, 1953.
- Inst. fur Met. des Frei Universiteit Berlin, Meteorologische Abhandlungen, Tagliche Hohenkarten der 30-Mbar-flache sowie monatliche mittelkarten fur das jahr 1980, Verlag Von Dietuch Reiner, Berlin, 1980.
- Isaksen, I. S. A., Tropospheric ozone budget and possible man made effects, in *Quadrennial International Ozone Symposium, Vol. II*, edited by J. London, pp. 845-852, IAMAP, NCAR, Boulder, CO, 1981.
- Isaksen, I. S. A., and O. Hov, Calculations of trends in the tropospheric concentration of O₃, OH, CO, CH₄ and NO_x, in press, 1985.

REFERENCES

- Isaksen, I. S. A., and F. Stordal, Ozone perturbations by enhanced levels of CFCs, N₂O and CH₄: A two-dimensional diabatic circulation study including uncertainty estimates, *J. Geophys. Res.*, in press, 1985.
- Ishiwata, T., I. Fujiwara, Y. Naruge, K. Obi, and I. Tanaka, Study of NO₃ by laser induced fluorescence, *J. Phys. Chem.*, **87**, 1349-1352, 1983.
- Itoh, H., The response of equatorial waves to thermal forcing, *J. Meteorol. Soc. Japan*, **55**, 222-239, 1977.
- Jackman, C. H., and P. D. Guthrie, Sensitivity of N₂O, CFC₁₃ and CF₂Cl₂ two-dimensional distributions to O₂ absorption cross sections, *J. Geophys. Res.*, **90**, 3919-3923, 1985.
- Jackman, C. H., and R. D. McPeters, The response of ozone to solar proton events during solar cycle 21: A theoretical interpretation, *J. Geophys. Res.*, **90**, 7955-7966, 1985.
- Jackman, C. H., J. E. Frederick, and R. S. Stolarski, Production of odd nitrogen in the stratosphere and mesosphere: An intercomparison of source strengths, *J. Geophys. Res.*, **85**, 7495-7505, 1980.
- Jackman, C. H., J. A. Kaye, and P. D. Guthrie, LIMS HNO₃ data above 5 mbar: Corrections based on simultaneous observations of other species, *J. Geophys. Res.*, **90**, 7923-7930, 1985.
- Jackman, C. H., R. S. Stolarski, and J. A. Kaye, Two-dimensional monthly average ozone balance from Limb Infrared Monitor of the stratosphere and stratospheric and mesospheric sounder data, *J. Geophys. Res.*, **91**, 1103-1116, 1986.
- Jesson, J. P., Release of industrial halocarbons and tropospheric budget, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone: Its Variation and Human Influences, Rep. FAA-EE-80-20*, edited by A. C. Aikin, pp. 373-396, DOT, FAA, Washington, DC, 1980.
- Johansson, C., Field measurements of emission of nitric oxide from fertilized and unfertilized forest soils in Sweden, *J. Atmos. Chem.*, **1**, 429-442, 1984.
- Johansson, C., and L. Granat, Emission of nitric oxide from arable land, *Tellus*, **36B**, 25-37, 1984.
- Johnson, D. R., Systematic stratospheric-tropospheric exchange through quasi-horizontal transport within active baroclinic waves, in *The Long-Range Transport of Pollutants and its Relation to General Circulation including Stratospheric/Tropospheric Exchange Processes—Conference Proceedings, WMO No. 538*, pp. 401-408, WMO, Geneva, 1979.
- Johnson, D. R., A generalized transport equation for use with meteorological coordinate systems, *Mon. Weather Rev.*, **108**, 733-745, 1980.
- Johnson, D. R., On the forcing and maintenance of the isentropic zonally averaged circumpolar vortex, paper presented at *IAMAP-WMO Symposium on Maintenance of the Quasi-Stationary Components of the Flow in the Atmosphere and in Atmospheric Models*, pp 19-22, WMO, Geneva, Paris, August 30-September 2, 1983.
- Johnson, D. R., On the global distribution of heat sources and sinks and their relation to mass and energy transport, paper presented at *WMO Proceedings of the FGGE Tropics Seminar*, Tallahassee, Florida, October 8-12, 1984a.
- Johnson, D. R., The global circulation during the FGGE year: On the balance of mass, energy, and angular momentum within isentropic and isobaric coordinates as revealed by different FGGE data sets, paper presented at *WMO Proceedings of the Global Weather Experiment Scientific Seminar*, Helsinki, Finland, August 29-31, 1984b.
- Johnson, D. R., and W. K. Downey, Azimuthally averaged transport and budget equations for storms: Quasi-Lagrangian diagnostics 1, *Mon. Weather Rev.*, **103**, 967-979, 1975.
- Johnson, D. R., and R. D. Townsend, Diagnostics of the heat sources and sinks of the Asiatic monsoon and the thermally-forced planetary scale response, M. S. thesis, *AD-A119755*, 72 pp., Wisconsin Univ., Madison, WI, 1981.
- Johnson, D. R., R. D. Townsend, and M-Y Wei, The thermally forced responses of the planetary scale circulation to the global distribution of heat sources and sinks, *Tellus*, **37A**, 106-125, 1985.

REFERENCES

- Johnson, F. S., J. D. Purcell, R. Tourey, and K. Watanabe, Direct measurements of the vertical distribution of atmospheric ozone to 70 kilometers altitude, *J. Geophys. Res.*, **57**, 157-176, 1952.
- Johnson, J. E., The role of the oceans in the atmospheric cycle of carbonyl sulfide, Ph.D. thesis, University of Washington, Seattle, WA, 1985.
- Johnson, K. W., and M. E. Gelman, Trends in the upper stratospheric temperatures as observed by rocket-sondes (1965-1983), in *Handbook for MAP, Vol. 18*, edited by S. Kato, pp. 24-27, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Johnson, R. H., and D. C. Kriete, Thermodynamic circulation characteristics of winter monsoon tropical mesoscale convection, *Mon. Weather Rev.*, **110**, 1898-1911, 1982.
- Johnston, D. A., Volcanic contribution of chlorine to the stratosphere: More significant to ozone than previously estimated?, *Science*, **209**, 491-493, 1980.
- Johnston, H. S., Reduction of stratospheric ozone by nitrogen oxide catalysts from supersonic transport exhaust, *Science*, **173**, 517-522, 1971.
- Johnston, H. S., Human effects on the global atmosphere, *Ann. Rev. Phys. Chem.*, **35**, 481-505, 1984.
- Johnston, H. S., and J. Podolske, Interpretations of stratospheric photochemistry, *Rev. Geophys. Space Phys.*, **16**, 491-519, 1978.
- Johnston, H. S., D. Kattenhorn, and G. Whitten, Use of excess carbon 14 data to calibrate models of stratospheric ozone depletion by supersonic transports, *J. Geophys. Res.*, **78**, 368-380, 1976.
- Johnston, H. S., M. Paige, and F. Yao, Oxygen absorption cross sections in the Herzberg continuum and between 206 and 326 K, *J. Geophys. Res.*, **89**, 11661-11665, 1984.
- Johnston, H. S., C. A. Cantrell, and J. G. Calvert, Unimolecular decomposition of NO₃ to NO and O₂, *J. Geophys. Res.*, in press, 1985.
- Jones, B. M. R., J. P. Burrows, R. A. Cox, and S. A. Penkett, OCS formation in the reaction of OH with CS₂, *Chem. Phys. Lett.*, **88**, 372-376, 1982.
- Jones, B. M. R., R. A. Cox, and S. A. Penkett, Atmospheric chemistry of carbon disulfide, *J. Atmos. Chem.*, **1**, 65-86, 1983.
- Jones, R. L., Satellite measurements of atmospheric composition: Three years' observations of CH₄ and N₂O, *Adv. Space Res.*, **4**, 121-130, 1984.
- Jones, R. L., and J. A. Pyle, Observations of CH₄ and N₂O by the Nimbus 7 SAMS: A comparison with in-situ data and two-dimensional numerical model calculations, *J. Geophys. Res.*, **89**, 5263-5279, 1984.
- Jones, R. L., J. A. Pyle, J. E. Harries, A. M. Zavody, J. M. Russell III, and J. C. Gille, The water vapour budget of the stratosphere studied using LIMS and SAMS satellite data, *Quart. J. Roy. Meteorol. Soc.*, in press, 1985.
- Joseph, J. H., The sensitivity of a numerical model of the global atmosphere to the presence of desert aerosols, Dept. of Geophysics and Planetary Sciences, Tel-Aviv Univ., Ramat Aviv, Israel, 6997, 1983.
- JPL: See DeMore, et al. and NASA-JPL listings.
- Junge, C., W. Seiler, and P. Warneck, The atmospheric ¹²CO and ¹⁴CO budget, *J. Geophys. Res.*, **76**, 2866-2879, 1971.
- Junge, C. E., Global ozone budget and exchange between stratosphere and troposphere, *Tellus*, **14**, 363-377, 1962.
- Junge, C. E., *Air chemistry and radioactivity*, 380 pp., Academic Press, New York, 1963.
- Just, T., and J. Troe, Theory of two-channel unimolecular reactions. 1. General formulation, *J. Phys. Chem.*, **84**, 3068-3072, 1980.
- Kagann, R. H., J. W. Elkins, and R. L. Sams, Absolute band strengths of halocarbons F-11 and F-12 in the 8 to 16 μm region, *J. Geophys. Res.*, **88**, 1427-1432, 1983.
- Kanzawa, H., The behavior of mean zonal wind and planetary-scale disturbances in the troposphere and stratosphere during the 1973 sudden warming, *J. Meteorol. Soc. Japan*, **58**, 329-356, 1980.

REFERENCES

- Kanzawa, H., Eliassen-Palm flux diagnostics and the effect of the mean zonal wind on planetary wave propagation for an observed sudden stratospheric warming, *J. Meteorol. Soc. Japan*, **60**, 1063-1073, 1982.
- Kanzawa, H., Four observed sudden warmings diagnosed by the Eliassen-Palm flux and refractive index, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 307-331, Terapub, Tokyo, 1984.
- Karoly, D. J., and B. J. Hoskins, Three dimensional propagation of planetary waves, *J. Meteorol. Soc. Japan*, **60**, 109-123, 1982.
- Katz, M., *Methods of Air Sampling and Analysis*, edited by M. Katz, pp. 549-555, American Public Health Assoc., Washington, DC, 1977.
- Kawahira, K., A quasi-one-dimensional model of the ozone transport by planetary waves in the winter stratosphere, *J. Meteorol. Soc. Japan*, **60**, 831-849, 1982.
- Keating, G. M., The response of ozone to solar activity variations. A review, *Solar Physics*, **74**, 321-347, 1981.
- Keating, G. M., and D. F. Young, Interim reference ozone models for the middle atmosphere, in *Handbook for MAP, Vol. 16*, edited by K. Labitzke, J. J. Barnett, and B. Edwards, pp. 205-229, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Keating, G. M., G. P. Brasseur, J. Y. Nicholson III, and A. De Rudder, Detection of the response of ozone in the middle atmosphere to short-term solar ultraviolet variations, *Geophys. Res. Lett.*, **12**, 449-452, 1985.
- Keeling, C. D., The Global Carbon Cycle: What we know and could know from atmospheric, biospheric, and oceanic observations, in *Proceedings of the CO₂ Research Conference: Carbon Dioxide, Science and Consensus, DOE CONF-820970*, pp. II.3-II.62, U.S. Dept. of Energy, Washington, DC, 1983.
- Keeling, C. D., A. F. Carter, and W. G. Mook, Seasonal, latitudinal and secular variations in the abundance and isotopic ratios of atmospheric CO₂, *J. Geophys. Res.*, **89**, 4615-4628, 1984.
- Keenan, T. D., and J. I. Templeton, A comparison of tropical cyclone, hurricane and typhoon mass and moisture structure, *Mon. Weather Rev.*, **111**, 320-327, 1983.
- Keller, M., T. J. Goreau, S. C. Wofsy, W. A. Kaplan, and M. B. McElroy, Production of nitrous oxide and consumption of methane by forest soils, *Geophys. Res. Lett.*, **10**, 1156-1159, 1983.
- Keller, M., W. A. Kaplan, and S. C. Wofsy, Emissions of N₂O, CH₄ and CO from tropical forest soils, in press, 1985.
- Kelly, P. M., P. D. Jones, T. M. L. Wigley, R. S. Bradley, H. F. Diaz, and C. M. Goodess, The extended Northern Hemisphere surface air temperature record: 1851-1984, *Proceedings, AMS Conference on Climate Variations*, Boston, MA, 190 pp., 1984.
- Kendall, D. J. W., and H. L. Buijs, Stratospheric NO₂ and upper limits of CH₃Cl and C₂H₆ from measurements at 3.4 μm, *Nature*, **303**, 221-222, 1983.
- Kendall, D. J. W., and T. A. Clark, Balloon-borne far infrared atmospheric emission studies, *Infrared Phys.*, **18**, 803-813, 1978.
- Kendall, D. J. W., and T. A. Clark, The pure rotational atmospheric lines of hydroxyl, *J. Quant. Spectrosc. Radiat. Transfer*, **21**, 511-526, 1979.
- Kendall, D. J. W., and T. A. Clark, Detection of minor constituents of the stratosphere by far infrared emission spectroscopy, *Int. J. Infrared mm Waves*, **3**, 783-808, 1981.
- Kennedy, P. J., and M. A. Shapiro, The energy budget in a clear air turbulence zone as observed by aircraft, *Mon. Weather Rev.*, **111**, 650-993, 1975.
- Kennedy, P. J., and M. A. Shapiro, Further encounters with clear air turbulence in research aircraft, *J. Atmos. Sci.*, **37**, 986-993, 1980.
- Kerr, J. B., and C. T. McElroy, Measurement of stratospheric nitrogen dioxide from the AES stratospheric balloon program, *Atmosphere*, **14**, 166-171, 1976.

REFERENCES

- Kerr, J. B., C. L. Mateer, C. T. McElroy, and D. I. Wardle, Intercomparison of the Dobson and grating ozone spectrophotometers, in *Proc. Joint Symp. on Atm. Ozone, Vol. 1*, pp. 109-120, Dresden, GDR, 1976.
- Kerr, J. B., C. T. McElroy, and W. F. J. Evans, Mid-latitude summertime measurements of stratospheric NO_2 , *Can. J. Phys.*, **60**, 196-200, 1982.
- Keyser, L. F., High pressure flow kinetics. A study of the $\text{OH} + \text{HCl}$ reaction from 2 to 100 torr, *J. Phys. Chem.*, **88**, 4759-4759, 1984.
- Khalil, M. A. K., and R. A. Rasmussen, Increase of CHClF_2 in the earth's atmosphere, *Nature*, **292**, 823-824, 1981.
- Khalil, M. A. K., and R. A. Rasmussen, Secular trends of methane, *Chemosphere*, **12**, 877-883, 1982.
- Khalil, M. A. K., and R. A. Rasmussen, Gaseous tracers of Arctic haze, *Environ. Sci. and Tech.*, **17**, 157-164, 1983a.
- Khalil, M. A. K., and R. A. Rasmussen, Increase and seasonal cycles of nitrous oxide in the Earth's atmosphere, *Tellus*, **35B**, 161-169, 1983b.
- Khalil, M. A. K., and R. A. Rasmussen, Sources, sinks and seasonal cycles of atmospheric methane, *J. Geophys. Res.*, **88**, 5131-5144, 1983c.
- Khalil, M. A. K., and R. A. Rasmussen, Termites and methane, *Nature*, **302**, 355, 1983d.
- Khalil, M. A. K., and R. A. Rasmussen, The atmospheric lifetime of methylchloroform (CH_3CCl_3), *Tellus*, **36B**, 317-332, 1984a.
- Khalil, M. A. K., and R. A. Rasmussen, Global increase of carbon monoxide, in *Transactions of the APCA Specialty Conference on Environmental Impacts of Natural Emissions*, edited by V. P. Aneja, 1984b.
- Khalil, M. A. K., and R. A. Rasmussen, Carbon monoxide in the Earth's atmosphere: Increasing trend, *Science*, **224**, 54-56, 1984c.
- Khalil, M. A. K., and R. A. Rasmussen, Causes of increasing atmospheric methane: Depletion of hydroxyl radicals and the rise of emissions, *Atmos. Environ.*, **19**, 397-407, 1985a.
- Khalil, M. A. K., and R. A. Rasmussen, Global sources, lifetimes and mass balances of carbonyl sulfide (OCS) and carbon disulfide (CS_2) in the earth's atmosphere, *Atmos. Environ.*, **18**, 1805-1813, 1985b.
- Khalil, M. A. K., and R. A. Rasmussen, The trend of bromodifluoromethane (CBrClF_2) and the concentration of other bromine containing gases at the South Pole, *Antarctic Journal of the U.S.*, in press, 1985c.
- Khalil, M. A. K., and R. A. Rasmussen, Trichlorotrifluoroethane (F-113) trends at Pt. Barrow, Alaska, in *Geophysical Monitoring for Climate Change, No. 13, Summary Report 1984*, U.S. Department of Commerce, ERL/NOAA, Boulder, CO, in press, 1985d.
- Khalil, M. A. K., and R. A. Rasmussen, Atmospheric carbon tetrafluoride (CF_4): Sources and trends, *Geophys. Res. Lett.*, **12**, 671-672, 1985e.
- Khalil, M. A. K., and R. A. Rasmussen, Interannual variability of atmospheric methane, *Science*, in press, 1985f.
- Khalil, M. A. K., R. A. Rasmussen, and S. D. Hoyt, Atmospheric chloroform (CHCl_3): Ocean-air exchange and global mass balance, *Tellus*, **35B**, 266-274, 1983.
- Kiang, C. S., D. Stauffer, V. J. Mohnen, J. Bricard, and D. Vigla, Heteromolecular nucleation theory applied to gas-to-particle conversion, *Atmos. Environ.*, **7**, 1279-1283, 1973.
- Kida, H., A numerical investigation of the atmospheric general circulation and stratospheric-tropospheric mass exchange. I. Long-term integration of a simplified general circulation model. II. Lagrangian motion of the atmosphere, *J. Meteorol. Soc. Japan*, **55**, 52-88, 1977.
- Kida, H., General circulation of air parcels and transport characteristics from a hemispheric GCM, Part 1. A determination of advective mass flow in the lower stratosphere, *J. Meteorol. Soc. Japan*, **61**, 171-188, 1983a.

REFERENCES

- Kida, H., General circulation of air parcels and transport characteristics derived from a hemispheric GCM. Part 2. Very long-term motions of air parcels in the troposphere and stratosphere, *J. Meteorol. Soc. Japan*, 61, 510-523, 1983b.
- Kida, H., A numerical experiment on the general circulation of the middle atmosphere with a three-dimensional model explicitly representing internal gravity waves and their breaking, *Pure Appl. Geophys.*, 122, 731-746, 1985.
- Kiehl, J. T., The effect of aerosols on radiative damping rates in the stratosphere, paper presented at *Proceedings of the International Radiation Symposium*, Perugia, Italy, Aug. 21-26, 1984.
- Kiehl, J. T., The results cited under this citation refer to calculations performed by J. T. Kiehl employing the narrow band model described in Ramaswamy, V. and J. T. Kiehl, Sensitivities of the radiative forcing due to large loadings of smoke and dust aerosols, *J. Geophys. Res.*, 90, 5597-5613, 1985.
- Kiehl, J. T., and V. Ramanathan, CO₂ radiative parameterization used in climate models: Comparison with narrow band models and with laboratory data, *J. Geophys. Res.*, 88, 5191-5202, 1983.
- Kiehl, J. T., and S. Solomon, On the radiative balance of the stratosphere, *J. Atmos. Sci.*, 43, in press, 1986.
- Kircher, C., and S. P. Sander, Kinetics and mechanism of HO₂ and DO₂ disproportionations, *J. Phys. Chem.*, 88, 2082-2091, 1984.
- Kleinschmidt, E., Dynamic meteorology, in *Handbuch der Physik*, edited by A. Eliassen and E. Kleinschmidt, pp. 1-154, 1957.
- Kley, D., Ly(α) absorption cross section of H₂O and O₂, *J. Atmos. Chem.*, 2, 203-210, 1984.
- Kley, D., and E. J. Stone, A measurement of water vapor in the stratosphere by photodissociation with Ly (α) (1216 Å) light, *Rev. Sci. Instrum.*, 49, 691-697, 1978.
- Kley, D., E. J. Stone, W. R. Henderson, J. W. Drummond, W. Harrop, A. L. Schmeltekopf, and T. L. Thompson, *In situ* measurements of the mixing ratio of water vapor in the stratosphere, *J. Atmos. Sci.*, 36, 2513-2534, 1979.
- Kley, D., J. W. Drummond, and A. L. Schmeltekopf, On the structure and microstructure of stratospheric water vapor, in *Atmospheric Water Vapor* edited by A. Deepak, T. D. Wilkinson, and L. H. Ruhke. pp. 315-327, Academic Press, New York, 1980.
- Kley, D., J. W. Drummond, M. McFarland, and S. C. Liu, Tropospheric profiles of NO_x, *J. Geophys. Res.*, 86, 3153-3161, 1981.
- Kley, D., A. L. Schmeltekopf, K. Kelley, R. H. Winkler, T. L. Thompson, and M. McFarland, Transport of water vapor through the tropical tropopause, *Geophys. Res. Lett.*, 9, 617-620, 1982.
- Kley, D., A. L. Schmeltekopf, K. Kelly, R. H. Winkler, T. L. Thompson, and M. McFarland, The U2 Lyman-alpha hygrometer results from the 1980 Panama experiment, in *The 1980 Stratospheric-Tropospheric Exchange Experiment, NASA Tech Memo 84297*, edited by A. Margozi, NASA Ames Research Center, Moffett Field, CA, 425 pp., 1983.
- Knapska, D., U. Schmidt, C. Jebsen, G. Kulesa, J. Rudolph and S. A. Penkett, Vertical profiles of chlorinated source gases in the mid-latitude stratosphere, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 117-121, D. Reidel, Dordrecht, 1985a.
- Knapska, D., U. Schmidt, C. Jebsen, F. J. Johnen, A. Khedim, and G. Kulesa, A laboratory test of cryogenic sampling of long lived trace gases under simulated stratospheric conditions, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 122-128, D. Reidel, Dordrecht, 1985b.
- Knight, W., D. R. Hastie, and B. A. Ridley, Measurements of nitric oxide during a stratospheric warming, *Geophys. Res. Lett.*, 9, 489-492, 1982.
- Knittel, J., Ein Beitrag zur Klimatologi der Stratosphaere der Suedhalbkugel, *Meteor. Abh. der F.U., Berlin*, A2, Nr.1, 1976.
- Knollenberg, R. G., A. J. Dasher, and D. Huffman, Measurements of the aerosol and ice crystal population in tropical stratospheric cumulonimbus anvils, *Geophys. Res. Lett.*, 9, 613-616, 1982.

REFERENCES

- Knop, G., and F. Arnold, Nitric acid vapor measurements in the troposphere and lower stratosphere by chemical ionization mass spectrometry, *Geophys. Res. Lett.*, in press, 1985.
- Ko, M. K. W., and N. D. Sze, A 2-D model calculation of atmospheric lifetimes for N₂O, CFC-11 and CFC-12, *Nature*, 297, 317-319, 1982.
- Ko, M. K. W., and N. D. Sze, Effect of recent data revisions on stratospheric modeling, *Geophys. Res. Lett.*, 10, 341-344, 1983.
- Ko, M. K. W., and N. D. Sze, Diurnal variation of ClO: Implications for the stratospheric chemistries of ClONO₂, HOCl, and HCl, *J. Geophys. Res.*, 89, 11619-11632, 1984.
- Ko, M. K. W., N. D. Sze, M. Livshits, M. B. McElroy, and J. A. Pyle, The seasonal and latitudinal behavior of trace gases and O₃ as simulated by a two-dimensional model of the atmosphere, *J. Atmos. Sci.*, 41, 2381-2408, 1984.
- Ko, M. K. W., K. K. Tung, D. K. Weinstein, and N. D. Sze, A zonal-mean model of stratospheric tracer transport in isentropic coordinates: Numerical simulations for nitrous oxide and nitric acid, *J. Geophys. Res.*, 90, 2313-2329, 1985.
- Kobayashi, J., and Y. Toyama, On various methods of measuring the vertical distribution of atmospheric ozone 2, *Papers in Meteor. and Geoph.*, 17, 97-112, 1966.
- Kobayashi, J., M. Kyojuka, and H. Muamatsu, On various methods of measuring the vertical distribution of atmospheric ozone 1, *Papers in Meteor. and Geoph.*, 17, 76-96, 1966.
- Kohn, J., Stratospheric ozone transport due to transient large-amplitude planetary waves, *J. Meteorol. Soc. Japan*, 62, 413-439, 1984.
- Kohri, W. J., LRIR observations of the structure and propagation of the stationary planetary waves in the Northern Hemisphere during December 1975, Ph.D. thesis, *Cooperative Thesis No. 63*, Drexel Univ. and National Center for Atmospheric Research, Boulder, CO, 1981.
- Komhyr, W. D., A carbon-iodine sensor for atmospheric soundings, paper presented at *Proc. Ozone Symp.*, Albuquerque, NM, pp. 26-30, 1965.
- Komhyr, W. D., Electrochemical concentration cells for gas analysis, *Ann. Geoph.*, 25, 203-210, 1969.
- Komhyr, W. D., R. H. Gammon, J. Harriss, L. W. Waterman, T. J. Conway, W. R. Taylor, and K. W. Thoning, Global atmospheric CO₂ distribution and variation from 1968-1982 NOAA/GMCC flask sample data, *J. Geophys. Res.*, 90, 5567-5596, 1985.
- Kondo, Y., W. A. Matthews, A. Iwata, and M. Takagi, Measurements of nitric oxide from 7 to 32 km and its diurnal variation in the stratosphere, *J. Geophys. Res.*, 90, 3813-3820, 1985.
- Koyama, T., Gaseous metabolism in lake sediments and paddy soils and the production of atmospheric methane and hydrogen, *J. Geophys. Res.*, 68, 3971-3973, 1963.
- Koyama, T., Biogeochemical studies on lake sediments and paddy soils and the production of atmospheric methane and hydrogen, in *Recent Researches in the Fields of Hydrosphere, Atmosphere and Nuclear Geochemistry*, edited by Y. Miyake and T. Koyama, Water Research Laboratory, Nagoya University, Nagoya, Japan, 1964.
- Krey, P. W., R. J. Lagomarsino, and L. E. Toonkel, Gaseous halogens in the atmosphere in 1975, *J. Geophys. Res.*, 82, 1753-1766, 1977.
- Krishnamurti, T. N., The subtropical jet stream of winter, *J. Meteorol.*, 18, 172-191, 1961.
- Krueger, A. J., Rocket measurements of ozone over Hawaii, *Ann. Geoph.*, 25, 307-311, 1969.
- Krueger, A. J., and R. A. Minzner, A mid-latitude ozone model for the 1976 U.S. standard atmosphere, *J. Geophys. Res.*, 81, 4477-4481, 1976.
- Krueger, A. J., B. Guenther, A. J. Fleig, D. F. Heath, E. Hilsenrath, R. McPeters, and C. Prabhakara, Satellite ozone measurements, *Phil. Trans. Roy. Soc. London*, A296, 191-204, 1980a.
- Krueger, A. J., A. J. Fleig, J. A. Gatlin, D. F. Heath, P. K. Bhartia, V. G. Kaveeshwar, K. F. Klenk, and P. M. Smith, First results from the Nimbus 7 total ozone mapping spectrometer, in *Proceedings*

REFERENCES

- Quadrennial International Ozone Symposium, Vol. I*, edited by J. London, pp. 322-327, IAMAP, NCAR, Boulder, CO, 1981.
- Krumins, M. V., and W. C. Lyons, Corrections for the upper atmosphere temperatures using a thin-film loop mount, *Tech. Rep. NOLTR 72-152*, 46 pp., U.S. Nav. Ordnance Lab., White Oak, MD, 1972.
- Kuhn, W. R., and J. London, Infrared radiative cooling in the middle atmosphere (30-110 km), *J. Atmos. Sci.*, **26**, 189-204, 1969.
- Kulcke, W., and H. K. Paetzold, Uber eine radiosonde zur bestimmung der vertikalen ozonverteilung, *Ann. Meteorol.*, **8**, 47-53, 1957.
- Kunde, V., B. Conrath, R. Hanel, J. Herman, D. Jennings, W. Maguire, J. Brasunas, H. Buijs, J. Berike, and J. McKinnon, Measurement of lower stratosphere gaseous constituents with a balloon-borne cryogenic spectrometer, *J. Geophys. Res.*, in press, 1985.
- Kurzeja, R. J., The transport of trace chemicals by planetary waves in the stratosphere. Part 1: Steady waves, *J. Atmos. Sci.*, **38**, 2779-2788, 1981.
- Kurzeja, R. J., K. V. Haggard, and W. L. Grose, Numerical experiments with a general circulation model concerning the distribution of ozone in the stratosphere, *J. Atmos. Sci.*, **41**, 2029-2051, 1984.
- Kutepov, A. A., and G. M. Shved, Radiative transfer in the 15 μm CO₂ band with non-LTE in the Earth's atmosphere, *Izves. Atmos. and Ocean. Phys.*, **14**, 28-43, 1978.
- Labitzke, K., The interaction between stratosphere and mesosphere in winter, *J. Atmos. Sci.*, **29**, 1395-1399, 1972.
- Labitzke, K., The temperature in the upper stratosphere: Differences between hemispheres, *J. Geophys. Res.*, **79**, 2171-2175, 1974.
- Labitzke, K., Comparison of the stratospheric temperature distribution over Northern and Southern Hemispheres, *COSPAR Space Research, XVII*, 159-165, 1977.
- Labitzke, K., The major stratospheric warming during January/February 1979, *Beilage zur Berliner Wetterkarte*, **8.5**, 1979.
- Labitzke, K., Stratospheric-mesospheric midwinter disturbances: A summary of observed characteristics, *J. Geophys. Res.*, **86**, 9665-9678, 1981.
- Labitzke, K., On the interannual variability of the middle stratosphere during the northern winters, *J. Meteorol. Soc. Japan*, **60**, 124-139, 1982.
- Labitzke, K., A survey over the PMP-1 winters 1978/79-1981/82 in comparison with earlier winters, *Adv. Space Res.*, **2**, 149-157, 1983.
- Labitzke, K., On the interannual variability of the middle atmosphere during winter, in *Handbook for MAP, Vol. 18*, edited by S. Kato, pp. 1-9, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Labitzke, K., and J. J. Barnett, Review of climatological information obtained from remote sensing of the stratosphere and mesosphere, *Space Res.*, **19**, 97-106, 1979.
- Labitzke, K., and B. Naujokat, On the variability and on trends of temperature in the middle stratosphere, *Beitr. Phys. Atmosph.*, **56**, 495-507, 1983.
- Labitzke, K., and B. Naujokat, An update of the observed QBO of the stratospheric temperatures over the Northern Hemisphere, *Geophys. Res. Lett.*, in press, 1986.
- Labitzke, K., R. Lenschow, B. Naujokat, and K. Petzoldt, The second winter of PMP-1: 1979/80, *Beilage zur Berliner Wetterkarte*, **2.4**, 1980.
- Labitzke, K., R. Lenschow, and B. Naujokat, The third winter of PMP-1: 1980/81, *Beilage zur Berliner Wetterkarte*, **16.7**, 1981.
- Labitzke, K., B. Naujokat, and M. P. McCormick, Temperature effects on the stratosphere of the April 4, 1982 eruption of El Chichon, Mexico, *Geophys. Res. Lett.*, **10**, 24-26, 1983.
- Labitzke, K., J. J. Barnett and B. Edwards (Eds.), *Draft of a New Reference Middle Atmosphere, Handbook for MAP, Vol. 16*, 318 pp., SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.

REFERENCES

- Labitzke, K., G. Brasseur, B. Naujokat, and A. de Rudder, Long-term temperature trends in the stratosphere: Possible influence of antropogenic gases, *Geophys. Res. Lett.*, *13*, 1152-1155, 1986.
- Lacis, A., Chlorofluorocarbons and stratospheric ozone, in *Global Environmental Problems*, edited by S. F. Singer, Paragon House, New York, in press, 1985.
- Lacis, A. A., and J. E. Hansen, A parameterization for the absorption of solar radiation in the Earth's atmosphere, *J. Atmos. Sci.*, *31*, 118-133, 1974.
- Lacis, A., J. Hansen, P. Lee, T. Mitchell, and S. Lebedeth, Greenhouse effect of trace gases, *Geophys. Res. Lett.*, *8*, 1035-1038, 1981.
- Lacome, N., A. Levy, and C. Boulet, Air broadened line width of nitrous oxide: An improved calculation, *J. Mol. Spectrosc.*, *97*, 139-153, 1983.
- Lal, S., R. Borchers, P. Fabian, and B. C. Krueger, Increasing abundance of CBrClF₂ in the atmosphere, *Nature*, *316*, 135-136, 1985.
- Lau, K-M, and P. H. Chan, Short term climate variability and atmospheric teleconnections from satellite-observed outgoing longwave radiation. Part I: Simultaneous relationships, *J. Atmos. Sci.*, *40*, 2735-2750, 1983.
- Laurent, J., M. P. Lemaître, C. Lippens, and C. Muller, *L'Aeronautique et l'Astronautique*, *98*, 60-61, 1983.
- Laurent, J., M. P. Lemaître, J. Besson, A. Girard, C. Lippens, C. Muller, J. Vercheval, and M. Ackerman, Middle atmosphere NO and NO₂ observed by means of the Spacelab 1 grille spectrometer, *Nature*, in press, 1985.
- Lazrus, A. L., and B. W. Gandrud, Distribution of stratospheric nitric acid vapor, *J. Atmos. Sci.*, *31*, 1102-1108, 1974.
- Lazrus, A. L., B. W. Gandrud, R. N. Woodard, and W. A. Sedlacek, Direct measurements of stratospheric chlorine and bromine, *J. Geophys. Res.*, *81*, 1067-1090, 1976.
- Lean, J. L., Estimating the variability of the solar flux between 200 and 300 nm, *J. Geophys. Res.*, *89*, 1-9, 1984.
- Lean, J. L., and A. Skumanich, Variability of the Lyman alpha flux with solar activity, *J. Geophys. Res.*, *88*, 5751-5759, 1983.
- Lean, J. L., O. R. White, W. C. Livingston, D. F. Heath, R. F. Donnelly, and A. Skumanich, A three component model of the variability of the solar ultraviolet flux: 145-200 nm, *J. Geophys. Res.*, *87*, 10307-10317, 1982.
- Leifer, R., R. Larsen, and L. Toonkel, Stratospheric distributions and inventories of trace gases in the Northern Hemisphere for 1976, *Report EML-349, I-211*, Environmental Measurements Lab., New York, 1979a.
- Leifer, R., L. Toonkel, and R. Larsen, Project airstream, trace gases in the stratosphere, *Report EML-349, II-107*, Environmental Measurements Lab., New York, 1979b.
- Leifer, R., K. C. Sommers, and S. F. Guggenheim, Atmospheric trace gas measurements with a new clean air sampling system, *Geophys. Res. Lett.*, *8*, 1079-1081, 1981.
- Leighton, H., Influence of Arctic haze on the solar radiation budget, *Atmos. Environ.*, *17*, 2065-2068, 1983.
- Leighton, P. A., *Photochemistry of Air Pollution*, Academic Press, New York, 1961.
- Lemaître, M. P., J. Laurent, J. Besson, A. Girard, C. Lippens, C. Muller, J. Vercheval, and M. Ackerman, Sample performance of the grille spectrometer, *Science*, *225*, 171-172, 1984.
- Lenoble, J., A general survey of the problem of aerosol climatic impact, in *Aerosols and Their Climatic Effects*, edited by H. E. Gerber and A. Deepak, pp. 279-294, A. Deepak Publ., Hampton, VA, 1984.
- Lenoble, J., D. Tanre, P. Y. Deschamps, and M. Hessman, A simple method to compute the change in earth-atmosphere radiative balance due to a stratospheric aerosol layer, *J. Atmos. Sci.*, *39*, 2565-2576, 1982.

REFERENCES

- Lenschow, D. H., R. Pearson, Jr., and B. B. Stankov, Measurements of ozone vertical flux to ocean and forest, *J. Geophys. Res.*, **87**, 8833-8837, 1982.
- Leone, J. A., and J. H. Seinfeld, Analysis of the characteristics of complex chemical reaction mechanisms: Application to photochemical smog chemistry, *Environ. Sci. Technol.*, **18**, 280-287, 1984a.
- Leone, J. A., and J. H. Seinfeld, Updated chemical mechanism for atmospheric photooxidation of toluene, *Int. J. Chem. Kinet.*, **16**, 159-193, 1984b.
- Leovy, C. B., Simple models of thermally driven mesospheric circulations, *J. Atmos. Sci.*, **21**, 327-341, 1964a.
- Leovy, C. B., Radiative equilibrium of the mesosphere, *J. Atmos. Sci.*, **21**, 238-248, 1964b.
- Leovy, C. B., and P. J. Webster, Stratospheric long waves: Comparison of thermal structure in the northern and southern hemispheres, *J. Atmos. Sci.*, **33**, 1624-1638, 1976.
- Leovy, C. B., C. R. Sun, M. H. Hitchman, E. E. Remsberg, J. M. Russell III, L. L. Gordley, J. C. Gille, and L. V. Lyjak, Transport of ozone in the middle stratosphere: Evidence for planetary wave breaking, *J. Atmos. Sci.*, **42**, 230-244, 1985.
- Lesclaux, R., and F. Caralp, Determination of the rate constants for the reactions of CFCl_2O_2 radical with NO and NO_2 by laser photolysis and time resolved mass spectrometry, *Int. J. Chem. Kinet.*, **16**, 1117-1128, 1984.
- Leu, M. T., Kinetics of the reaction $\text{O} + \text{ClO} \rightarrow \text{Cl} + \text{O}_2$, *J. Phys. Chem.*, **88**, 1394-1398, 1984.
- Levine, J. S., C. P. Rinsland, and G. M. Tennille, The photochemistry of methane and carbon monoxide in the troposphere in 1950 and 1985, *Nature*, **318**, 254-257, 1985.
- Levine, S. Z., and S. E. Schwartz, In-cloud and below-cloud scavenging of nitric acid vapor, *Atmos. Environ.*, **16**, 1725-1734, 1982.
- Levy II, H., Normal atmosphere: Large radical and formaldehyde concentrations predicted, *Science*, **173**, 141-143, 1971.
- Levy II, H., Photochemistry of the lower troposphere, *Planet. Space Sci.*, **20**, 919-935, 1972.
- Levy II, H., J. D. Mahlman, and W. J. Moxim, A preliminary report on the numerical simulation of the three-dimensional structure and variability of atmospheric N_2O , *Geophys. Res. Lett.*, **6**, 155-158, 1979.
- Levy II, H., J. D. Mahlman, and W. J. Moxim, A stratospheric source of reactive nitrogen in the unpolluted troposphere, *Geophys. Res. Lett.*, **7**, 441-444, 1980.
- Levy II, H. B., J. D. Mahlman, W. J. Moxim, and S. C. Liu, Tropospheric ozone: The role of transport, *J. Geophys. Res.*, **90**, 3753-3771, 1985.
- Lewis, B. R., I. M. Vardavas, and J. H. Carver, The aeronomic dissociation of water vapor by H Lyman alpha radiation, *J. Geophys. Res.*, **88**, 4935-4940, 1983.
- Lilly, D. K., D. E. Waco, and S. I. Adelfang, Stratospheric mixing estimated from high-altitude turbulence measurements, *J. Appl. Meteorol.*, **13**, 488-493, 1974.
- Lin, B. D., The behavior of winter stationary planetary waves forced by topography and diabatic heating, *J. Atmos. Sci.*, **39**, 1206-1226, 1982.
- Lindzen, R. S., Some speculations on the roles of critical level interactions between internal gravity waves and mean flows, in *Acoustic-Gravity Waves in the Atmosphere-Symposium Proceedings*, edited by T. M. Georges, Environmental Science Services Administration, Boulder, CO, 427 pp., 1968.
- Lindzen, R. S., Turbulence and stress owing to gravity and tidal breakdown, *J. Geophys. Res.*, **86**, 9707-9714, 1981.
- Lindzen, R. S., and J. R. Holton, A theory of the quasi-biennial oscillation, *J. Atmos. Sci.*, **25**, 1095-1107, 1968.
- Lindzen, R. S., and C. Y. Tsay, Wave structure of the tropical stratosphere over the Marshall Islands area during 1 April-1 July 1958, *J. Atmos. Sci.*, **22**, 2008-2021, 1975.

REFERENCES

- Lindzen, R. S., D. M. Straus, and B. Katz, An observational study of large-scale atmospheric Rossby waves during FGGE, *J. Atmos. Sci.*, *41*, 1320-1335, 1984.
- Ling, X., and J. London, A theoretical study of the quasi-biennial oscillation in the tropical stratosphere, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 53-58, D. Reidel, Dordrecht, 1985.
- Lippens, C., and C. Muller, Atmospheric nitric acid and chlorofluoromethane 11 from interferometric spectra obtained at the Observatoires du Pic du Midi, *J. Optics (Paris)*, *12*, 331-336, 1981.
- Lippens, C., C. Muller, J. Vercheval, M. Ackerman, J. Laurent, M. P. Lemaitre, J. Besson, and A. Girard, Trace constituents measurements deduced from spectrometric observations onboard Spacelab, *Adv. Space Res.*, *4*, 75-79, 1984.
- Lipschultz, F., O. C. Zafiriou, S. C. Wofsy, M. B. McElroy, F. W. Valois, and S. W. Watson, Production of NO and N₂O by soil nitrifying bacteria: A source of atmospheric nitrogen oxides, *Nature*, *294*, 641-643, 1981.
- Liu, S. C., and G. C. Reid, Sodium and other minor constituents of meteoric origin in the atmosphere, *Geophys. Res. Lett.*, *6*, 283-286, 1979.
- Liu, S. C., T. M. Donahue, R. J. Cicerone, and W. L. Chameides, Effect of water vapor on the destruction of ozone in the stratosphere perturbed by Cl_x or NO_x pollutants, *J. Geophys. Res.*, *81*, 3111-3118, 1976.
- Liu, S. C., D. Kley, M. McFarland, J. D. Mahlman, and H. Levy II, On the origin of tropospheric ozone, *J. Geophys. Res.*, *85*, 7546-7552, 1980.
- Liu, S. C., M. McFarland, D. Kley, O. Zafiriou, and B. J. Huebert, Tropospheric NO_x and O₃ budgets in the equatorial Pacific, *J. Geophys. Res.*, *88*, 1360-1368, 1983.
- Loewenstein, M., W. J. Starr, and D. G. Murcray, Stratospheric NO and HNO₃ observations in the Northern Hemisphere for three seasons, *Geophys. Res. Lett.*, *5*, 531-534, 1978a.
- Loewenstein, M., W. J. Borucki, H. F. Savage, J. G. Borucki, and R. C. Whitten, Geographical variations of NO and O₃ in the lower stratosphere, *J. Geophys. Res.*, *83*, 1874-1882, 1978b.
- Logan, J. A., Nitrogen oxides in the troposphere: Global and regional budgets, *J. Geophys. Res.*, *88*, 10785-10807, 1983.
- Logan, J. A., Tropospheric ozone: Seasonal behavior, trends and anthropogenic influence, *J. Geophys. Res.*, *90*, 10463-10482, 1985.
- Logan, J. A., M. J. Prather, S. C. Wofsy, and M. B. McElroy, Atmospheric chemistry: Response to human influence, *Phil. Trans. Roy. Soc. London*, *A290*, 187-234, 1978.
- Logan, J. A., M. J. Prather, S. C. Wofsy, and M. B. McElroy, Tropospheric chemistry: A global perspective, *J. Geophys. Res.*, *86*, 7210-7254, 1981.
- London, J., Radiative energy sources and sinks in the stratosphere and mesosphere, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone: Its Variation and Human Influences, Rep. FAA-EE-80-20*, edited by A. C. Aikin, pp. 703-721, DOT, FAA, Washington, DC, 1980a.
- London, J., The observed distribution and variations of total ozone, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone: Its Variation and Human Influences, Report FAA-EE-80-20*, edited by A. C. Aikin, pp. 31-44, DOT, FAA, Washington, DC, 1980b.
- London, J., and J. Park, Application of general circulation models to the study of stratospheric ozone, *Pure Appl. Geophys.*, *106-108*, 1611-1617, 1973.
- London, J., and J. Park, The interaction of ozone photochemistry and dynamics in the stratosphere: A three-dimensional stratospheric model, *Can. J. Chem.*, *62*, 1599-1609, 1974.
- London, J., B. D. Bojkov, S. Oltmans, and J. F. Kelly, Atlas of the global distribution of total ozone, July 1957-July 1967, *Tech. Note NCAR/TN/113 + STR*, Nat. Center for Atmos. Res., Boulder, CO, Jan., 1976.

REFERENCES

- London, J., J. E. Frederick, and G. P. Anderson, Satellite observations of the global distribution of stratospheric ozone, *J. Geophys. Res.*, **82**, 2543-2556, 1977.
- London, J., G. G. Bjarnason, and G. J. Rottman, 18 months of UV irradiance observations from the Solar Mesosphere Explorer, *Geophys. Res. Lett.*, **11**, 54-56, 1984.
- Lorenc, A. C., The evolution of the planetary scale 200 mb divergent flow during the FGGE year, *Quart. J. Roy. Meteorol. Soc.*, **110**, 427-441, 1984.
- Lorenz, E. N., The nature and theory of the general circulation of the atmosphere, *WMO No 218*, WMO, 1967.
- Louis, J. F., A two-dimensional transport model of the atmosphere, Ph.D. thesis, Univ. of Colorado, Boulder, CO, 1974.
- Louisnard, N., and O. Lado-Bordowsky, Spectroscopic measurements of carbon monoxide in the stratosphere, *J. Geophys. Res.*, **88**, 3781-3797, 1983.
- Louisnard, N., and S. Pollitt, Measurements of neutral constituents using infrared and visible remote sensing, in *Handbook for MAP, Vol. 15*, edited by D. G. Murcray, pp. 37-70, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Louisnard, N., A. Girard, and G. Eichen, Mesures du profil vertical de concentration de la vapeur d'eau stratospherique, *C. R. Acad. Sc. Paris*, **290**, 385-388, 1980.
- Louisnard, N., G. Fergant, A. Girard, L. Gramont, O. Lado-Bordowsky, J. Laurent, S. Le Boiteau, and M. P. Lemaître, Infrared absorption spectroscopy applied to stratospheric profiles of minor constituents, *J. Geophys. Res.*, **88**, 5365-5376, 1983.
- Lovelock, J. E., Atmospheric halocarbons and stratospheric ozone, *Nature*, **252**, 292-294, 1974.
- Lovelock, J. E., Methyl chloroform in the troposphere as an indicator of OH radical abundance, *Nature*, **267**, 32, 1977.
- Ludlam, F. H., *Clouds and Storms, Chapter 8*, Pennsylvania State University Press, University Park, PA, 1980.
- Luther, F., Commentary on climatic effects of minor atmospheric constituents, in *Carbon Dioxide Review*, edited by W. C. Clark, pp. 290-294, Clarendon Press, New York, 1982.
- Luther, F. M., and Y. Fouquart, *WMO Report WCP-93*, 37 pp., Geneva, 1984.
- Luther, F., D. J. Wuebbles, and J. S. Chang, Temperature feedback in a stratospheric model, *J. Geophys. Res.*, **82**, 4935-4942, 1977.
- Madden, R. A., Oscillations in the winter stratosphere. 2: The role of horizontal heat transport and the interaction of transient and stationary planetary-scale waves, *Mon. Weather Rev.*, **103**, 717-719, 1975.
- Madden, R. A., Evidence for large-scale regularly propagating waves in a 73-year data set, in *Extended Summaries of Contributions*, IAGA/IAMAP, Seattle, Washington, International Assoc. for Atmos. Phys., NCAR, Boulder, CO, 1977.
- Madden, R. A., Further evidence of traveling planetary waves, *J. Atmos. Sci.*, **35**, 1605-1618, 1978.
- Madden, R. A., The effect of the interference of traveling and stationary waves on time variations of the large-scale circulation, *J. Atmos. Sci.*, **40**, 1110-1125, 1983.
- Madden, R. A., and P. R. Julian, Detection of a 40-50 day oscillation in the zonal wind in the tropical Pacific, *J. Atmos. Sci.*, **28**, 702-708, 1971.
- Madden, R. A., and P. R. Julian, Descriptions of global scale circulation cells in the tropics with a 40-50 period, *J. Atmos. Sci.*, **29**, 1109-1123, 1972a.
- Madden, R. A., and P. Julian, Further evidence of global-scale 5-day pressure waves, *J. Atmos. Sci.*, **29**, 1464-1469, 1972b.
- Madden, R. A., and P. Julian, Reply to comments by R. Deland, *J. Atmos. Sci.*, **30**, 935-940, 1973.
- Madden, R. A., and K. Labitzke, A free Rossby wave in the troposphere and stratosphere during January 1979, *J. Geophys. Res.*, **86**, 1247-1254, 1981.

REFERENCES

- Madronich, S., D. R. Hastie, B. A. Ridley, and H. I. Schiff, Measurement of the photodissociation coefficient of NO₂ in the atmosphere, I. Method and surface measurements, *J. Atmos. Chem.*, *1*, 3-25, 1983.
- Mahlman, J. D., Relation of stratospheric-tropospheric mass exchange mechanisms to surface radioactivity peaks, *Arch. Met. Geoph. Biokl. A.*, *15*, 1-25, 1965.
- Mahlman, J. D., Long-term dependence of surface fallout fluctuations upon tropopause-level cyclogenesis, *Arch. Met. Geoph. Biokl. A.*, *18*, 299-311, 1969a.
- Mahlman, J. D., Heat balance and mean meridional circulations in the polar stratosphere during the sudden warming of January 1958, *Mon. Weather Rev.*, *97*, 534-540, 1969b.
- Mahlman, J. D., On the maintenance of the polar front jet stream, *J. Atmos. Sci.*, *30*, 544-557, 1973.
- Mahlman, J. D., Some fundamental limitations of simplified transport models as implied by results from a three-dimensional general circulation/tracer model, in *Proceedings Fourth Conference Climatic Impact Assessment Program, DOT-TSC-OST-75-38*, edited by T. M. Hard and A. J. Broderick, pp. 132-146, Transportation Systems Command, Cambridge, MA, 1975.
- Mahlman, J. D., Coupling in atmospheric observations with comprehensive numerical models, *Proc. of ICMUA Sessions and IUGG Symposium 18, XVII IUGG General Assembly, Canberra, Australia, 18*, pp. 253-259, 1980.
- Mahlman, J. D., "Strategies for equatorial lower stratospheric measurements" and "The status of stratospheric general circulation models", papers presented at International Workshop on Current Issues in our Understanding of the Stratosphere and the Future of the Ozone Layer, BMFT, NASA, FAA, WMO, Feldafing, FRG, June 11-16, 1984.
- Mahlman, J. D., Mechanistic interpretation of stratospheric tracer transport, *Issues in Atmos. and Oceanic Modelling, J. Smagorinsky Comm. Vol.*, 1985.
- Mahlman, J. D., and W. J. Moxim, Tracer simulation using global circulation model: results from a midlatitude instantaneous source experiment, *J. Atmos. Sci.*, *35*, 1340-1374, 1978.
- Mahlman, J. D., and R. W. Sinclair, Recent results from the GFDL troposphere-stratosphere-mesosphere general circulation model, *Proc. of ICMUA Sessions and IUGG Symposium 18, XVII IUGG General Assembly, Canberra, Australia, 11-18*, 1980.
- Mahlman, J. D., and L. J. Umscheid, Dynamics of the middle atmosphere: Successes and problems of the GFDL "SKYHI" general circulation model, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 501-525, Terrapub, Tokyo, 1984.
- Mahlman, J. D., H. B. Levy II, and W. J. Moxim, Three-dimensional tracer structure and behavior as simulated in two ozone precursor experiments, *J. Atmos. Sci.*, *37*, 655-685, 1980.
- Mahlman, J. D., D. G. Andrews, H. U. Duetsch, D. L. Hartmann, T. Matsuno, R. J. Murgatroyd, and J. F. Noxon, Transport of trace constituents in the stratosphere, in *Handbook for MAP, Vol. 3*, edited by C. F. Sechrist, Jr., pp. 14-43, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1981.
- Mahlman, J. D., D. G. Andrews, D. L. Hartmann, T. Matsuno, and R. G. Murgatroyd, Transport of trace constituents in the stratosphere, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 387-416, Terrapub, Tokyo, 1984.
- Mahlman, J. D., H. B. Levy II, and W. J. Moxim, Three dimensional simulations of stratospheric N₂O: Predictions for other trace constituents, *J. Geophys. Res.*, in press, 1985.
- Maier, E. J., A. C. Aikin, and J. E. Ainsworth, Stratospheric nitric oxide and ozone measurements using photoionization mass spectrometry and UV absorption, *Geophys. Res. Lett.*, *5*, 37-40, 1978.
- Maki, A. G., F. J. Lovas, and W. B. Olson, Infrared frequency measurements on the ClO fundamental band, *J. Mol. Spectros.*, *92*, 410-418, 1982.
- Makide, Y., and F. S. Rowland, Tropospheric concentrations of methyl chloroform, CH₃CCl₃, in January 1978 and estimates of atmospheric residence times for hydrocarbons, *Proceedings Natl. Acad. Sci., USA*, 5933-5937, 1981.

REFERENCES

- Malcolm, K. W., K. O. Nien, and D. A. K. Sze, A 2-D model calculation of atmospheric lifetimes for N_2O , CFC-11 and CFC-12, *Nature*, 297, 317-319, 1982.
- Malko, M. W., and J. Troe, Analysis of the unimolecular reaction $\text{N}_2\text{O}_5 + \text{M} \rightarrow \text{NO}_2 + \text{NO}_3 + \text{M}$, *Int. J. Chem. Kinet.*, 14, 399-416, 1982.
- Malkmus, W., Random Lorentz band model with exponential tailed S^{-1} line-intensity distribution, *J. Opt. Soc. Amer.*, 57, 323-329, 1967.
- Malkus, J. S., Large-scale interactions, in *The Sea, Vol. 1*, edited by M. N. Hill, Interscience Publishers, New York, 1962.
- Manabe, S., and B. G. Hunt, Experiments with a stratospheric general circulation model: I. radiative and dynamic effects, *Mon. Weather Rev.*, 96, 477-539, 1968.
- Manabe, S., and J. D. Mahlman, Simulation of seasonal and interhemispheric variations in the stratospheric circulation, *J. Atmos. Sci.*, 33, 2185-2217, 1976.
- Manabe, S., and R. J. Stouffer, Sensitivity of a global climate model to an increase of CO_2 concentration in the atmosphere, *J. Geophys. Res.*, 85, 5529-5554, 1980.
- Manabe, S., and R. T. Wetherald, Thermal equilibrium of the atmosphere with a given distribution of relative humidity, *J. Atmos. Sci.*, 24, 241-259, 1967.
- Manabe, S., and R. T. Wetherald, The effects of doubling the CO_2 concentration on the climate of a general circulation model, *J. Atmos. Sci.*, 32, 3-15, 1975.
- Manabe, S., and R. T. Wetherald, On the distribution of climate change resulting from an increase in CO_2 -content of the atmosphere, *J. Atmos. Sci.*, 37, 99-118, 1980.
- Mankin, W. G., and M. T. Coffey, Latitudinal distributions and temporal changes of stratospheric HCl and HF, *J. Geophys. Res.*, 88, 10776-10784, 1983.
- Mankin, W. G., and M. T. Coffey, Increased stratospheric hydrogen chloride in the El Chichon cloud, *Science*, 226, 170-172, 1984.
- Mankin, W. G., M. T. Coffey, D. W. T. Griffith, and S. R. Drayson, Spectroscopic measurement of carbonyl sulfide (OCS) in the stratosphere, *Geophys. Res. Lett.*, 6, 853-856, 1979.
- Mankin, W. G., M. T. Coffey, K. V. Chance, W. A. Traub, B. Carli, A. Bonetti, I. G. Nolt, R. Zander, D. W. Johnson, G. Stokes, and C. B. Farmer, Intercomparison of measurements of stratospheric hydrogen fluoride, to be published, 1986.
- Manson, A. H., C. E. Meek, and J. G. Gregory, Winds and waves (10 min - 30 days) in the mesosphere and lower thermosphere at Saskatoon (32°N , 107°W , $L=4.3$) during the year October 1979 to July 1980, *J. Geophys. Res.*, 86, 9615-9625, 1981.
- Marche, P., and C. Meunier, Atmospheric trace species measured above Haute-Provence Observatory, *Planet. Space Sci.*, 31, 731-733, 1983.
- Marche, P., A. Barbe, C. Secroun, J. Corr, and P. Jouve, Ground based spectroscopic measurements of HCl, *Geophys. Res. Lett.*, 7, 869-872, 1980a.
- Marche, P., A. Barbe, C. Secroun, J. Corr, and P. Jouve, Mesures des acides fluorhydrique et chlorhydrique dans l'atmosphère par spectroscopie infrarouge a partir du sol, *C. R. Acad. Sc. Paris*, 290B, 369-371, 1980b.
- Marche, P., C. Meunier, A. Barbe, and P. Jouve, Total atmospheric ozone measured by ground based high resolution infrared spectra-comparison with Dobson measurements, *Planet. Space Sci.*, 31, 723-727, 1983.
- Margitan, J. J., Chlorine nitrate: The sole product of the $\text{ClO} + \text{NO}_2 + \text{M}$ recombination, *J. Geophys. Res.*, 88, 5416-5420, 1983.
- Margitan, J. J., Kinetics of the reaction $\text{O} + \text{ClO} \rightarrow \text{Cl} + \text{O}_2$, *J. Phys. Chem.*, 88, 3638-3643, 1984a.
- Margitan, J. J., Mechanisms of the atmospheric oxidation of sulfur dioxide catalysis by hydroxyl radicals, *J. Phys. Chem.*, 88, 3314-3318, 1984b.

REFERENCES

- Maroulis, P. J., A. I. Torres, and A. R. Bandy, Atmospheric concentrations of carbonyl sulfide in the southwestern and eastern United States, *Geophys. Res. Lett.*, **4**, 510-512, 1977.
- Martin, L. R., H. S. Judeikis, and M. Wu, Heterogeneous reactions of Cl and ClO in the stratosphere, *J. Geophys. Res.*, **85**, 5511-5518, 1980.
- Maruyama, T., Long-term behavior of Kelvin waves and mixed Rossby-gravity waves, *J. Meteorol. Soc. Japan*, **47**, 245-254, 1969.
- Mason, C. J., and J. J. Horvath, The direct measurement of nitric oxide concentration in the upper atmosphere by a rocket-borne chemiluminescent detector, *Geophys. Res. Lett.*, **3**, 391-394, 1976.
- Massman, W. J., An investigation of gravity waves on a global scale using TWERLE data, *J. Geophys. Res.*, **86**, 4072-4082, 1981.
- Mastenbrook, H. J., Water vapor distribution in the stratosphere and high troposphere, *J. Atmos. Sci.*, **25**, 299-311, 1968.
- Mastenbrook, H. J., and S. J. Oltmans, Stratospheric water vapor variability for Washington, DC/Boulder, CO: 1964-82, *J. Atmos. Sci.*, **40**, 2157-2165, 1983.
- Mateer, C. L., and I. A. Asbridge, On the appropriate haze correction for direct sun total ozone measurements with the Dobson spectrophotometer, in *Proceedings of the Quadrennial International Ozone Symposium, Vol. I*, edited by J. London, pp. 236-242, IAMAP, NCAR, Boulder, CO, 1981.
- Mateer, C. L., and J. J. DeLuisi, The estimation of the vertical distribution of ozone by the short Umkehr method, in *Proceedings of the Quadrennial International Ozone Symposium, Vol. I*, edited by J. London, pp. 64-73, IAMAP, NCAR, Boulder, CO, 1981.
- Mateer, C. L., and H. U. Duetsch, Uniform evaluation of Umkehr observations from the World Ozone Network: Part 1, Proposed standard Umkehr evaluation technique, Nat'l Center for Atmos. Res., Boulder, Colorado, 1964.
- Mathews, E. I. Fung, and S. Ross, Atmospheric methane: Global distributions of biogenic source locations, in press, 1986.
- Matson, M., Eruptions of El Chichon volcano, in *Radiative Effects of the El Chichon Volcanic Eruption: Preliminary Results Concerning Remote Sensing, NASA Tech. Memo. 84959*, edited by W. R. Bandeen and R. S. Fraser, 103 pp., NASA Goddard Space Flight Center, Greenbelt, MD, 1982.
- Matsuno, T., Vertical propagation of stationary planetary waves in the winter Northern Hemisphere, *J. Atmos. Sci.*, **27**, 871-883, 1970.
- Matsuno, T., A dynamical model of the stratospheric sudden warming, *J. Atmos. Sci.*, **28**, 1479-1494, 1971.
- Matsuno, T., Lagrangian motion of air parcels in the stratosphere in the presence of planetary waves, *Pure Appl. Geophys.*, **118**, 189-216, 1980.
- Matsuno, T., A quasi one-dimensional model of the middle atmosphere circulation interacting with internal gravity waves, *J. Meteorol. Soc. Japan*, **60**, 215-226, 1982.
- Mattingly, S. R., The contribution of extratropical severe storms to the stratospheric water vapour budget, *Met. Mag.*, **106**, 256-262, 1977.
- Mayer, E. W., D. R. Blake, S. C. Tyler, Y. Makide, D. C. Montague, and F. S. Rowland, Methane: Interhemispheric concentration gradient and atmospheric residence time, *Proc. Nat. Acad. Sci., USA*, **79**, 1366-1370, 1982.
- McClatchey, R. S., R. W. Fenn, J. E. A. Selby, F. E. Volz, and J. S. Garing, Optical properties of the atmosphere, *AFCRC-71-0279*, 85 pp., Air Force Cambridge Res. Lab., Bedford, MA, 1971.
- McClatchey, R. A., W. S. Benedict, S. A. Clough, D. E. Burch, R. F. Calfee, K. Fox, L. S. Rothman, and J. S. Garing, AFCRL atmospheric absorption line parameters compilation, *AFCRL-TR-73-0096*, 83 pp., Air Force Cambridge Research Laboratory Report, Hanscom AFB, MA, 1973.
- McCormick, M. P., and T. J. Swissler, Stratospheric aerosol mass and latitudinal distribution of the El Chichon eruption cloud for October 1982, *Geophys. Res. Lett.*, **10**, 877-880, 1983.

REFERENCES

- McCormick, M. P., P. Hamill, T. J. Pepin, W. P. Chu, T. J. Swissler, and L. R. McMaster, Satellite studies of the stratospheric aerosol, *Bull. Amer. Meteor. Soc.*, **60**, 1038-1046, 1979.
- McCormick, M. P., H. M. Steele, P. Hamill, W. P. Chu, and T. J. Swissler, Polar stratospheric cloud sightings by SAM II, *J. Atmos. Sci.*, **39**, 1387-1397, 1982.
- McCormick, M. P., T. J. Swissler, E. Hilsenrath, A. J. Krueger, and M. T. Osborn, Satellite and correlative measurements of stratospheric ozone; Comparison of measurements made by SAGE, ECC balloons, chemiluminescent and optical rocketsondes, *J. Geophys. Res.*, **89**, 5315-5320, 1984.
- McCormick, M. P., T. J. Swissler, W. H. Fuller, W. H. Hunt, M. T. Osborn, Airborne and ground-based lidar measurements of the El Chichon stratospheric aerosol from 90N to 56S, *Geof. Int.*, **23-2**, 187-221, 1984.
- McElroy, M. B., Chemical processes in the solar system, in *Chemical Kinetics*, edited by D. R. Hershebach, pp. 127-211, Int. Review of Science, Butterworths, London, 1976.
- McElroy, M. B., and S. C. Wofsy, Tropical forests: Interactions with the atmosphere, in *Symposium volume on 'Tropical Forests and World Atmospheres'*, edited by G. T. Prance, in press, 1985.
- McElroy, M., S. C. Wofsy, J. Penner and J. McConnell, Atmospheric ozone: Possible impact of stratospheric aviation, *J. Atmos. Sci.*, **31**, 287-303, 1974.
- McElroy, M. B., S. C. Wofsy, and Y. L. Yung, The nitrogen cycle: Perturbations due to man and their impact on atmospheric N₂O and O₃, *Phil. Trans. Roy. Soc. London*, **A277**, 159-181, 1977.
- McFarland, J., D. Kley, J. W. Drummond, A. L. Schmeltekopf, and R. H. Winkler, Nitric oxide measurements in the Equatorial Pacific region, *Geophys. Res. Lett.*, **6**, 605-608, 1979.
- McFarland, M., B. A. Ridley, M. Profitt, and D. L. Albritton, Simultaneous in-situ measurements of stratospheric O₃, NO₂, and NO, in press, 1985.
- McGregor, J., and W. A. Chapman, Stratospheric temperatures and geostrophic winds during 1973-1974, *Quart. J. Roy. Meteorol. Soc.*, **105**, 241-261, 1979.
- McInturff, R. M. (Ed.), Stratospheric warmings: Synoptic, dynamic and general-circulation aspects, *NASA Ref. Publ. 1017*, 166 pp., NASA, Washington, DC, 1978.
- McIntyre, M. E., Towards a Lagrangian-mean description of stratospheric circulations and chemical transports, *Phil. Trans. Roy. Soc. London*, **A296**, 129-148, 1980a.
- McIntyre, M. E., An introduction to the generalized Lagrangian-mean description of wave, mean-flow interaction, *Pure Appl. Geophys.*, **118**, 152-176, 1980b.
- McIntyre, M. E., How well do we understand the dynamics of stratospheric warmings?, *J. Meteorol. Soc. Japan*, **60**, 37-65, 1982.
- McIntyre, M. E., and T. N. Palmer, Breaking planetary waves in the stratosphere, *Nature*, **305**, 593-600, 1983.
- McIntyre, M. E., and T. N. Palmer, The 'surf zone' in the stratosphere, *J. Atmos. Terr. Phys.*, **46**, 825-850, 1984.
- McKay, M. D., R. J. Beckman, and W. J. Conover, A comparison of three methods for selecting values of input variables in the analysis of output from a computer code, *Technometrics*, **21**, 239-245, 1979.
- McKenney, D. J., D. L. Wade, and W. I. Findlay, Rates of N₂O evolution from N fertilized soil, *Geophys. Res. Lett.*, **5**, 777-780, 1978.
- McKenney, D. J., K. F. Shuttleworth, J. R. Vriesacker, and W. T. Findlay, Production and loss of nitric oxide from denitrification in anaerobic Brookstone clay, *Appl. Env. Microbiol.*, **43**, 534-541, 1982.
- McKenzie, R. L., and P. V. Johnston, Seasonal variation in stratospheric NO₂ at 45 degrees S, *Geophys. Res. Lett.*, **9**, 1255-1258, 1982.
- McMahon, T. A., and P. J. Denison, Empirical atmospheric deposition parameters—A survey, *Atmos. Environ.*, **13**, 571-585, 1979.

REFERENCES

- McMillin, L. M., and C. Dean, Evaluation of a new operational technique for producing clear radiances, *J. Appl. Meteorol.*, *21*, 1005-1014, 1982.
- McPeters, R. D., and C. H. Jackman, The response of ozone to solar proton events during solar cycle 21: The observations, *J. Geophys. Res.*, *90*, 7945-7954, 1985.
- McPeters, R. D., C. H. Jackman, and E. G. Stassinopoulos, Observations of ozone depletion associated with solar proton events, *J. Geophys. Res.*, *86*, 12071-12081, 1981.
- McPeters, R. D., D. F. Heath, and P. K. Bhartia, Average ozone profiles for 1979 from the NIMBUS 7 SBUV instrument, *J. Geophys. Res.*, *89*, 5199-5214, 1984.
- McPherson, R. D., K. H. Bergman, R. E. Kistler, G. E. Rasch, and D. S. Gordon, The NMC operational global data assimilation system, *Mon. Weather Rev.*, *107*, 1445-1461, 1979.
- Mechoso, C. R., M. J. Suarez, K. Yamazaki, J. Spahr, and A. Arakawa, A study of the sensitivity of numerical forecasts to an upper boundary condition in the lower stratosphere, *Mon. Weather Rev.*, *110*, 1984-1993, 1982.
- Mechoso, C. R., K. Yamazaki, A. Kitch, and A. Arakawa, Numerical forecasts of stratospheric warming events during the winter of 1979, *J. Atmos. Sci.*, in press, 1985.
- Meek, C. E., I. M. Reid, and A. H. Manson, Observations of mesospheric wind velocities. I. Gravity wave horizontal scale and phase velocities determined from spaced wind observations, *Rad. Sci.*, in press, 1985a.
- Meek, C. E., I. M. Reid, and A. H. Manson, Observations of mesospheric wind velocities. II. Cross sections of power spectral density for 48-8h, 8-1h, 1h-10 min over 60-110 km for 1981, *Rad. Sci.*, in press, 1985b.
- Megie, G., and J. E. Blamont, Laser sounding of atmospheric sodium, Interpretation in terms of global atmospheric parameters, *Planet. Space Sci.*, *25*, 1093-1109, 1977.
- Megie, G., and R. T. Menzies, Complementarity of UV and IR differential absorption lidar for global measurements of atmospheric species, *Appl. Optics*, *19*, 1173-1183, 1980.
- Megie, G., J. Y. Allain, M. L. Chanin, and J. E. Blamont, Vertical profile of stratospheric ozone by lidar sounding from the ground, *Nature*, *270*, 329-331, 1977.
- Meier, R. R., D. E. Anderson, Jr., and M. Nicolet, Radiation field in the troposphere and stratosphere from 240-1000 nm - I. General analysis, *Planet. Space Sci.*, *30*, 923-933, 1982.
- Mentall, J. E., J. E. Frederick, and J. R. Herman, The solar irradiance from 200-330 nm, *J. Geophys. Res.*, *86*, 9881-9884, 1981.
- Mentall, J. E., B. Guenther, and D. Williams, The solar spectral irradiance between 150 and 200 nm, *J. Geophys. Res.*, *90*, 2265-2272, 1985.
- Menzies, T., Remote measurement of ClO in the stratosphere, *Geophys. Res. Lett.*, *6*, 151-154, 1979.
- Menzies, T., A re-evaluation of laser heterodyne radiometer ClO measurements, *Geophys. Res. Lett.*, *10*, 729-732, 1983.
- Michalsky, J. J., B. M. Herman and N. R. Larson, Mid-latitude stratospheric aerosol layer enhancement by El Chichon: The first year, *Geophys. Res. Lett.*, *11*, 76-79, 1984.
- Mihelic, D., D. H. Ehhalt, G. F. Kulesa, J. Klomfass, M. Trainer, U. Schmidt, and H. Rohrs, Measurements of free radicals in the atmosphere by matrix isolation and electron paramagnetic resonance, *Pure Appl. Geophys.*, *116*, 530-536, 1978.
- Miles, T., and W. A. Chapman, Intercomparison of planetary-scale diagnostics derived from separate satellite and radiosonde time-mean temperature fields, *Quart. J. Roy. Meteorol. Soc.*, *110*, 1003-1021, 1984.
- Miller, A. J., Periodic variation of atmospheric circulation at 14-16 days, *J. Atmos. Sci.*, *31*, 720-726, 1974.
- Miller, A. J., T. G. Rogers, R. M. Nagatani, D. F. Heath, A. J. Krueger, W. Planet, and D. Crosby, Preliminary comparisons of daily total ozone fields derived from SBUV, TOMS and HIRS-2 satellite

REFERENCES

- instruments, in *Proc. XVII General Assembly of the International Union of Geodesy and Geophysics*, pp. 153-164, 1979.
- Miller, A. J., R. M. Nagatani, T. G. Rogers, A. J. Fleig, and D. F. Heath, Total ozone variations 1970-1974 using Backscattered Ultraviolet (BUV) and ground-based observations, *J. Appl. Meteorol.*, *21*, 621-630, 1982.
- Miller, A. J., R. M. Nagatani and J. E. Frederick, Ozone-temperature relationships in the stratosphere, in *Proceedings of the International Ozone Symposium*, pp. 321-324, Thessaloniki, Greece, D. Reidel, Dordrecht, 1985.
- Miller, C., D. L. Filken, A. J. Owens, J. M. Steed, and J. P. Jesson, A two-dimensional model of stratospheric chemistry and transport, *J. Geophys. Res.*, *86*, 12039-12065, 1981.
- Mitchell, J. F. B., The seasonal response of a general circulation model to changes in CO₂ and sea temperatures, *Quart. J. Roy. Meteorol. Soc.*, *109*, 113-152, 1983.
- Mitchell, J. M., El Chichon: Weather-maker of the century?, *Weatherwise*, *35*, 252-261, 1982.
- Miyahara, S., A numerical simulation of the zonal mean circulation of the middle atmosphere including effects of solar diurnal tidal waves and internal gravity waves; solstice condition, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 271-287, Terrapub, Tokyo, 1984.
- Miyahara, S., Suppression of stationary planetary waves by internal gravity waves in the mesosphere, *J. Atmos. Sci.*, *42*, 100-107, 1985.
- Miyahara, S., Y. Hayashi, and J. D. Mahlman, Interactions between gravity waves and planetary scale flow simulated by GFDL "SKYHI" general circulation model, *J. Atmos. Sci.*, in press, 1985.
- Miyakoda, K., R. F. Strickler, and G. D. Hembree, Numerical simulation of the breakdown of a polar-night vortex in the stratosphere, *J. Atmos. Sci.*, *27*, 139-154, 1970.
- Moeng, C.-H., and J. C. Wyngaard, Statistics of conservative scalars in the convective boundary layer, *J. Atmos. Sci.*, *41*, 3161-3169, 1984.
- Molina, L. T., M. J. Molina, and F. S. Rowland, Ultraviolet absorption cross sections of several brominated methanes and ethanes of atmospheric interest, *J. Phys. Chem.*, *86*, 2672-2676, 1982.
- Molina, L. T., M. J. Molina, R. A. Stachnik and R. D. Tom, An upper limit to the rate of HCl + ClONO₂ reaction, *J. Phys. Chem.*, *89*, 3779-3781, 1985.
- Molina, M. J., and F. S. Rowland, Stratospheric sink for chlorofluoromethanes: chlorine atom catalyzed destruction of ozone, *Nature*, *249*, 810-814, 1974.
- Molina, M. J., L. T. Molina, and T. Ishiwata, Kinetics of the ClO + NO₂ + M reaction, *J. Phys. Chem.*, *84*, 3100-3104, 1980.
- Molina, M. J., L. T. Molina, and C. A. Smith, The rate of the reaction of OH with HCl, *Int. J. Chem. Kinet.*, *16*, 1151-1160, 1984.
- Mook, W. M., M. Koopmans, A. F. Carter, and C. D. Keeling, Seasonal, latitudinal, and secular variations in the abundance and isotopic ratios of atmospheric carbon dioxide (1): Results from land stations, *J. Geophys. Res.*, *88*, 915-933, 1983.
- Morel, O., R. Simonaitis, and J. Heicklen, Ultraviolet absorption spectra of HO₂NO₂, CCl₃O₂NO₂, CCl₂FO₂NO₂ and CH₃O₂NO₂, *Chem. Phys. Lett.*, *73*, 38-42, 1980.
- Mount, G. H., and G. J. Rottman, The solar spectral irradiance 1200-3184 Å near solar maximum: 15 July 1980, *J. Geophys. Res.*, *86*, 9193-9198, 1981.
- Mount, G. H., and G. J. Rottman, Solar absolute spectral irradiance 1150-3173 Å: May 17, 1982, *J. Geophys. Res.*, *88*, 5403-5410, 1983a.
- Mount, G. H., and G. J. Rottman, The solar absolute spectral irradiance at 1216 Å and 1800-3173 Å: January 12, 1983, *J. Geophys. Res.*, *88*, 6807-6811, 1983b.
- Mount, G. H., and G. J. Rottman, The solar absolute spectral irradiance 118-300 nm: July 25, 1983, *J. Geophys. Res.*, *90*, 13031-13036, 1985.

REFERENCES

- Mount, G. H., G. J. Rottman, and J. G. Timothy, The solar spectral irradiance 1200-2550 Å at solar maximum, *J. Geophys. Res.*, **85**, 4271-4274, 1980.
- Mount, G. H., D. W. Rusch, J. M. Zawodny, J. F. Noxon, C. A. Barth, G. J. Rottman, R. J. Thomas, G. E. Thomas, R. W. Sanders, and G. M. Lawrence, Measurements of NO₂ in the Earth's stratosphere using a Limb scanning visible light spectrometer, *Geophys. Res. Lett.*, **10**, 265-268, 1983.
- Mount, G. H., D. W. Rusch, J. F. Noxon, J. M. Zawodny, and C. A. Barth, Measurements of stratospheric NO₂ from the solar mesosphere explorer satellite, 1. An overview of the results, *J. Geophys. Res.*, **89**, 1327-1340, 1984.
- Moxim, W. J., and J. D. Mahlman, Evaluation of the various total ozone sampling networks using the GFDL 3-D tracer model, *J. Geophys. Res.*, **85**, 4527-4539, 1980.
- Mozurkewich, M., and S. Benson, Negative activation energies and curved Arrhenius plots. I. Theory of reaction over potential wells, *J. Phys. Chem.*, **88**, 6429-6435, 1984.
- Mueller, P. K., and G. M. Hidy, The sulfate regional experiment: Report of findings, *EPRI-EA-1901*, Electric Power Research Institute, Palo Alto, CA, March, 1983.
- Muller, C., J. Vercheval, M. Ackerman, C. Lippens, J. Laurent, M. P. Lamaitre, J. Besson, and A. Girard, Observations of middle atmospheric CH₄ and N₂O vertical distributions by the Spacelab 1 grille spectrometer, *Geophys. Res. Lett.*, **12**, 667-670, 1985.
- Muller, H. G., Long period meteor wind oscillations, *Phil. Trans. Roy. Soc. London*, **A271**, 585-598, 1972.
- Muller, H. G., G. A. Whitehurst, and A. O'Neill, Stratospheric warmings and their effects on the winds in the upper atmosphere during the winter of MAP/WINE 1983-1984, *J. Atmos. Terr. Phys.*, in press, 1985.
- Mumma, M. J., J. D. Rogers, T. Kostiuik, D. Deming, J. J. Hillman, and D. Zipoy, Is there any chlorine monoxide in the stratosphere?, *Science*, **221**, 268-271, 1983.
- Murad, E., W. Swider, and S. W. Benson, Possible role for metals in stratospheric chlorine chemistry, *Nature*, **289**, 273-275, 1981.
- Murakami, T., Equatorial stratospheric waves induced by diabatic heat sources, *J. Atmos. Sci.*, **29**, 1129-1137, 1972.
- Murcray, D. G., T. G. Kyle, F. H. Murcray, and W. J. Williams, Nitric acid and nitric oxide in the lower stratosphere, *Nature*, **218**, 78-79, 1968.
- Murcray, D. G., A. Goldman, A. Csoeke-Poeckh, F. H. Murcray, W. J. Williams, and R. N. Stocker, Nitric acid distribution in the stratosphere, *J. Geophys. Res.*, **78**, 7033-7038, 1973.
- Murcray, D. G., D. B. Barker, J. N. Brooks, A. Goldman, and W. J. Williams, Seasonal and latitudinal variations of the stratospheric concentration of HNO₃, *Geophys. Res. Lett.*, **6**, 223-225, 1975.
- Murcray, D. G., A. Goldman, C. M. Bradford, G. R. Cook, J. W. Van Allen, F. S. Bonomo, and F. H. Murcray, Identification of the ν_2 vibration-rotation band of ammonia in ground level solar spectra, *Geophys. Res. Lett.*, **5**, 527-530, 1978.
- Murcray, D. G., A. Goldman, F. H. Murcray, F. J. Murcray, and W. J. Williams, Stratospheric distribution of ClONO₂, *Geophys. Res. Lett.*, **6**, 857-859, 1979.
- Murcray, D. G., F. J. Murcray, A. Goldman, F. H. Murcray, and J. J. Kusters, Balloon-borne remote sensing of stratospheric constituents, **22**, 2629-2640, 1983.
- Murcray, D. G., A. Goldman, J. Kusters, R. Zander, W. Evans, N. Louisnard, C. Alamichele, M. Bangham, S. Pollitt, B. Carli, B. Dinelli, S. Piccioli, A. Volboni, W. Traub, and K. Chance, Intercomparison of stratospheric water vapor profiles obtained during the balloon intercomparison campaign, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 144-148, D. Riedel, Dordrecht, 1985a.
- Murcray, D. G., L. S. Rottman, G. A. Vanasse, F. H. Murcray, F. J. Murcray, and A. Goldman, Atmospheric emission spectra from the stratospheric cryogenic interferometer balloon experiment, paper presented at the Ninth colloquium on High Resolution Molecular Spectroscopy, Riccione, Italy, 1985b.

REFERENCES

- Murcray, D. G., A. Goldman, J. Kusters, R. Zander, W. F. J. Evans, N. Louisnard, D. Alamichel, M. Bangham, S. Pollitt, B. Carli, B. Dinelli, S. Piccioli, A. Volboni, W. Traub, and K. Chance, Inter-comparison of stratospheric water vapor profiles obtained during the balloon intercomparison campaign, to be published, 1986.
- Murcray, F. J., A. Goldman, D. G. Murcray, G. R. Cook, J. W. Van Allen, and R. D. Blatherwick, Identification of isolated NO lines in balloon-borne infrared solar spectra, *Geophys. Res. Lett.*, **7**, 673-676, 1980.
- Murgatroyd, R. J., Recent progress in studies of the stratosphere, *Quart. J. Roy. Meteorol. Soc.*, **108**, 271-312, 1982.
- Murgatroyd, R. J., and R. M. Goody, Sources and sinks of radiative energy from 30 to 90 km, *Quart. J. Roy. Meteorol. Soc.*, **84**, 225-234, 1958.
- Murgatroyd, R. J., and F. Singleton, Possible meridional circulations in the stratosphere and mesosphere, *Quart. J. Roy. Meteorol. Soc.*, **87**, 125-135, 1961.
- Murray, E. R., Remote measurement of gases using discretely tunable infrared lasers, *Opt. Eng.*, **16**, 284-290, 1977.
- Myers, R. J. K., J. R. Simpson, R. Wetselaar, and G. T. McKinney, Problems in modelling the environmental aspects of the nitrogen cycle in agro-ecosystems, SCOPE workshop on "Dynamic Aspects of Nitrogen Cycling in the Australian Ecosystems," Aspendale, Vic., Australia, 1979.
- Nagata, T., T. Tohmatsu, and T. Ogawa, Sounding rocket measurement of atmospheric ozone density, 1965-1970, *Space Res.*, **11**, 849-855, 1971.
- NAS: See National Academy of Sciences.
- NASA, Man's impact on the troposphere: Lectures in tropospheric chemistry, *NASA Reference Publication 1022*, edited by J. S. Levine and D. R. Schryer, Hampton, VA, Sept. 1978.
- NASA, *The Stratosphere: Present and Future*, *NASA Reference Publication 1049*, edited by R. D. Hudson and E. I. Reed, 432 pp., NASA Goddard, Greenbelt, MD, 1979.
- NASA-JPL, Chemical kinetics and photochemical data for use in stratospheric modeling, Evaluation No. 7, NASA Panel for Data Evaluation, *JPL Publication 85-37*, Jet Propulsion Laboratory, Pasadena, CA, 1982.
- Nastrom, G. D., B. B. Balsley, and D. A. Carter, Mean meridional winds in the mid- and high-latitude summer mesosphere, *Geophys. Res. Lett.*, **9**, 139-142, 1982.
- Nastrom, G. D., W. L. Ecklund, and K. S. Gage, Direct measurements of synoptic scale vertical velocities using clear air radars, *Mon. Weather Rev.*, **113**, 708-718, 1985.
- Natarajan, M., L. B. Callis, and J. E. Nealy, Solar UV variability: Effects on stratospheric ozone, trace constituents and thermal structure, *Pure Appl. Geophys.*, **119**, 750-779, 1980/81.
- National Academy of Sciences, NAS, *Halocarbons: Effect on Stratospheric Ozone*, National Academy Press, Washington, DC, 1976.
- The National plan for stratospheric ozone monitoring and early detection of change, 1981-1986, *FCM-P17-1982*, 79 pp., Federal Coordinator for Meteorological Services and Supporting Research, NOAA, Rockville, MD, 1982.
- National Research Council, *Environmental Impact of Stratospheric Flight*, National Academy of Sciences, Washington, DC, 1975.
- National Research Council, *Effects on Stratospheric Ozone*, National Academy of Sciences, Washington, DC, 1976.
- National Research Council, *Stratospheric Ozone Depletion by Halocarbons: Chemistry and Transport*, National Academy of Sciences, Washington, DC, 1979.
- National Research Council, *Protection Against Depletion of Stratospheric Ozone by Chlorofluorocarbons*, Committee on Impacts of Stratospheric Change, 392 pp., National Academy of Sciences, Washington, DC, 1979.

REFERENCES

- National Research Council, *Changing Climate: Report of the Carbon Dioxide Assessment Committee*, CDAC, 496 pp., National Academy Press, Washington, DC, 1983.
- National Research Council, *Causes and Effects of Changes in Stratospheric Ozone: Update 1983*, National Academy Press, Washington, DC, 1984.
- National Research Council, *Global Tropospheric Chemistry, A Plan for Action*, National Academy Press, Washington, DC, 1984.
- Naudet, J. P., P. Rigaud, and D. Huguenin, Stratospheric NO₂ at night from balloons, *J. Geophys. Res.*, **89**, 2583-2587, 1984.
- Naudet, J. P., P. Rigaud, and D. Huguenin, Variabilite temporelle du NO₃ stratospherique, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 201-205, D. Reidel, Dordrecht, 1985.
- Naujokat, B., Long-term variations in the stratosphere of the Northern Hemisphere during the last two sunspot cycles, *J. Geophys. Res.*, **86**, 9811-9816, 1981.
- Naujokat, B., An update of the observed QBO of the stratospheric winds over the tropics, *J. Atmos. Sci.*, in press, 1986.
- Nava, D. F., J. V. Michael, and L. J. Stief, Rate constant for the reaction of atomic bromine with formaldehyde from 223 to 480K, *J. Phys. Chem.*, **85**, 1896-1899, 1981.
- Naylor, D. A., T. A. Clark, and R. T. Boreiko, Determination of stratospheric H₂O and O₃ column densities from balloon altitude far infrared absorption spectra by a curve of growth method, *Infrared Phys.*, **21**, 271-281, 1981.
- Naylor, D. A., R. T. Boreiko, T. A. Clark, R. J. Emery, B. Fitton, and M. F. Kessler, Atmospheric emission in the 20 μm window from Mauna Kea, *Pub. Astron. Soc. Pacific*, **96**, 167-173, 1984.
- Naylor, D. A., J. M. Hoogerdijk, R. T. Boreiko, T. A. Clark, B. Fitton, M. F. Kessler, and R. J. Emery, Observations of 63 micron atomic oxygen emission in the earth's atmosphere from balloon altitudes: Astronomical implications, in press, 1985.
- Neckel, H., and D. Labs, Improved data of solar spectral irradiance from 0.33 to 1.25 μm, *Solar Physics*, **74**, 231-249, 1981.
- Neckel, H., and D. Labs, The solar radiation between 3300 and 12500 Å, *Solar Physics*, **90**, 205-258, 1984.
- Neftel, A., H. Oeschger, J. Schwander, B. Stauffer, and R. Zumbunn, Ice core measurements give atmospheric CO₂ content during the past 40,000 years, *Nature*, **295**, 220-223, 1982.
- Neftel, A., E. Moor, H. Oeschger, and B. Stauffer, Evidence from polar ice cores for the increase in atmospheric CO₂ in the past two centuries, *Nature*, **315**, 45-47, 1985.
- Nelson, H. H., L. Pasternack, and J. R. McDonald, Laser-induced excitation and emissions spectra of NO₃, *J. Phys. Chem.*, **87**, 1286-1266, 1983.
- Newell, R. E., The general circulation of the atmosphere and its effects on the movement of trace substances, *J. Geophys. Res.*, **68**, 3949-3962, 1963a.
- Newell, R. E., The general circulation of the stratosphere above 60 km, *Meteor. Monogr.*, Amer. Meteor. Soc., Boston, **31**, 98-113, 1963b.
- Newell, R. E., Further ozone transport calculations and the spring maximum in ozone amount, *Pure Appl. Geophys.*, **59**, 191-206, 1964.
- Newell, R. E., and T. G. Dopplick, Questions concerning the possible influence of anthropogenic CO₂ on atmospheric temperature, *J. Appl. Meteor.*, **18**, 822-825, 1979.
- Newell, R. E., and S. Gould-Stewart, A stratospheric fountain?, *J. Atmos. Sci.*, **38**, 2789-2796, 1981.
- Newell, R. E., J. W. Kidson, D. G. Vincent, and G. J. Boer, *The General Circulation of the Tropical Atmosphere, Vol. 1*, MIT Press, Cambridge, MA, 1969.
- Newell, R. E., J. W. Kidson, D. G. Vincent, and G. J. Boer, *The General Circulation of the Tropical Atmosphere, Vol. 2*, MIT Press, Cambridge, MA, 1974.

REFERENCES

- Newell, R. E., E. P. Condon, and H. G. Reichle, Measurements of CO and CH₄ in the troposphere over Saudi Arabia, India and the Arabian Sea during the 1979 International Summer Monsoon Experiment (MONEX), *J. Geophys. Res.*, **86**, 9833-9838, 1981.
- Newman, P. A., M. R. Schoeberl, and R. A. Plumb, A computation of the horizontal mixing coefficients calculated from NMC data, *Geophys. Res. Lett.*, in press, 1986.
- Newson, R. L., An experiment with a tropospheric and stratospheric three-dimensional general circulation model, in *Proceedings Third Conference on the Climatic Impact Assessment Program, DOT-TSC-OST-74-15*, edited by A. J. Broderick and T. M. Hard, pp. 461-474, Dept. of Transp., Washington, DC, 1974.
- Newton, C. W., and E. Palmén, Kinematic and thermal properties of a large amplitude wave in the westerlies, *Tellus*, **15**, 99-119, 1963.
- Newton, C. W., and A. Trevisan, Clinogenesis and frontogenesis in jet stream waves. Part I: Analytical relation, *J. Atmos. Sci.*, **41**, 2717-2734, 1984.
- Nicolet, M., On the production of nitric oxide by cosmic rays in the mesosphere and stratosphere, *Planet. Space Sci.*, **23**, 637-649, 1975.
- Nicolet, M., The solar spectral irradiance and its action in the atmospheric photodissociation processes, *Planet. Space Sci.*, **29**, 951-974, 1981.
- Nicolet, M., The influence of solar radiation on atmospheric chemistry, *Annales Geophysicae*, **1**, 493-502, 1983.
- Nicolet, M., On the molecular scattering in the terrestrial atmosphere: An empirical formula for its calculation in the homosphere, *Planet. Space Sci.*, **32**, 1467-1468, 1984a.
- Nicolet, M., On the photodissociation of water vapor in the mesosphere, *Planet. Space Sci.*, **32**, 871-880, 1984b.
- Nicolet, M., Aeronomical aspects of mesospheric photodissociation: Processes resulting from the H Lyman-alpha line, *Planet. Space Sci.*, **33**, 69-80, 1985.
- Nicolet, M., and S. Cieslik, The photodissociation of nitric oxide in the mesosphere and stratosphere, *Planet. Space Sci.*, **28**, 105-115, 1980.
- Nicolet, M., and W. Peetermans, Atmospheric absorption in the O₂ Schumann-Runge band spectral region and photodissociation rates in the stratosphere and mesosphere, *Planet. Space Sci.*, **28**, 85-103, 1980.
- Nicolet, M., R. R. Meier, and D. E. Anderson, Jr., Radiation field in the troposphere and stratosphere. II. Numerical analysis, *Planet. Space Sci.*, **30**, 935-983, 1982.
- Niki, H., P. D. Maker, C. M. Savage, and L. P. Breitenbach, Fourier transform IR spectroscopic observation of pernitric acid formed via $\text{HOO} + \text{NO}_2 \rightarrow \text{HOONO}_2$, *Chem. Phys. Lett.*, **45**, 564-566, 1977.
- Niki, H., P. D. Maker, C. M. Savage, and L. P. Breitenbach, A fourier transform infrared study of the kinetics and mechanisms for the reaction $\text{HO} + \text{CH}_3\text{OOH}$, *J. Phys. Chem.*, **87**, 2190-2193, 1983.
- Niple, E., W. G. Mankin, A. Goldman, D. G. Murcray, and F. J. Murcray, Stratospheric NO₂ and H₂O mixing ratio profiles from high resolution infrared solar spectra using nonlinear least squares, *Geophys. Res. Lett.*, **7**, 489-492, 1980.
- Nitta, T., Response of cumulus updraft and downdraft to GATE A/B-scale motion systems, *J. Atmos. Sci.*, **34**, 1163-1186, 1977.
- Nordhaus, W. D., and G. W. Yohe, Future paths of energy and carbon dioxide emissions, in *Changing Climate*, pp. 87-153, National Academy of Sciences, Washington, DC, 1983.
- North, G. R., R. F. Cahalan and J. A. Coakley, Energy-balance climate models, *Rev. Geophys. Space Phys.*, **19**, 91-122, 1981.
- Norton, R. B., and J. F. Noxon, The dependence of stratospheric NO₃ upon latitude and season, *J. Geophys. Res.*, in press, 1985.
- Noxon, J. F., Atmospheric nitrogen fixation by lightning, *Geophys. Res. Lett.*, **3**, 463-465, 1976.

REFERENCES

- Noxon, J. F., Stratospheric NO₂ in the Antarctic winter, *Geophys. Res. Lett.*, 5, 1021-1022, 1978a.
- Noxon, J. F., Tropospheric NO₂, *J. Geophys. Res.*, 83, 3051-3057, 1978b.
- Noxon, J. F., Stratospheric NO₂, 2, Global behavior, *J. Geophys. Res.*, 84, 5067, 1979.
- Noxon, J. F., Tropospheric NO₂ (Correction), *J. Geophys. Res.*, 85, 4560-4561, 1981a.
- Noxon, J. F., NO_x in the mid-Pacific troposphere, *Geophys. Res. Lett.*, 8, 1223-1226, 1981b.
- Noxon, J. F., NO₃ and NO₂ in the mid-Pacific troposphere, *J. Geophys. Res.*, 88, 11017-11021, 1983.
- Noxon, J. F., R. B. Norton, and W. R. Henderson, Observation of atmospheric NO₃, *Geophys. Res. Lett.*, 5, 675-678, 1978.
- Noxon, J. F., E. C. Whipple Jr., and R. S. Hyde, Stratospheric NO₂ 1. Observational method and behavior at mid-latitude, *J. Geophys. Res.*, 84, 5047-5065, 1979a.
- Noxon, J. F., E. Marovich, and R. B. Norton, Effect of a major warming upon stratospheric NO₂, *J. Geophys. Res.*, 84, 7883, 1979b.
- Noxon, J. F., R. B. Norton, and E. Marovich, NO₃ in the troposphere, *Geophys. Res. Lett.*, 7, 125-128, 1980.
- Noxon, J. F., W. R. Henderson, and R. B. Norton, Stratospheric NO₂, 3. The effects of large scale horizontal transport, *J. Geophys. Res.*, 88, 5240-5248, 1983.
- NRC: See National Research Council.
- Oeschger, H., The contribution of ice core studies to the understanding of environmental processes, in *Green Ice Core: Geophysics, Geochemistry, and the Environment, American Geophysical Union Monograph No. 33*, edited by C. C. Langway, H. Oeschger, and W. Dansgaard, pp. 9-17, 33, 1985.
- Oeschger, H., U. Siegenthaler, U. Schotterer and A. Gugelmann, A box diffusion model to study the carbon dioxide exchange in nature, *Tellus*, 27, 168-192, 1975.
- Ogawa, M., Absorption cross sections of O₂ and CO₂ continua in the Schumann and far-UV regions, *J. Chem. Phys.*, 54, 2550-2556, 1971.
- Ogawa, T., K. Shibasaki, and K. Suzuki, Balloon observation of the stratospheric NO₂ profile by visible absorption spectroscopy, *J. Meteorol. Soc. Japan*, 59, 410-416, 1981.
- Oltmans, S. J., and J. London, The quasi-biennial oscillation in atmospheric ozone, *J. Geophys. Res.*, 87, 8981-8989, 1982.
- O'Neill, A., and C. Youngblut, Stratospheric warmings diagnosed using the transformed Eulerian-mean equations and the effect of the mean state on wave propagation, *J. Atmos. Sci.*, 39, 1370-1386, 1982.
- O'Neill, A., R. L. Newson, and R. J. Murgatroyd, An analysis of the large-scale features of the upper troposphere and the stratosphere in a global, three-dimensional, general circulation model, *Quart. J. Roy. Meteorol. Soc.*, 108, 25-53, 1982.
- Ongstad, A. P., and J. W. Birks, Studies of reactions of importance in the stratosphere. V. Rate constants for the reactions O + NO₂ → NO + O₂ and O + ClO → Cl + O₂ at 298K, *J. Chem. Phys.*, 81, 3922-3930, 1984.
- Oort, A. H., Global Atmospheric Statistics, 1958-1973, *NOAA Professional Paper*, 14, 1983.
- Ooyama, K., On the stability of the baroclinic circular vortex: A sufficient criterion for instability, *J. Atmos. Sci.*, 23, 43-53, 1966.
- Oran, E. S., P. S. Julienne, and D. F. Strobel, The aeronomy of odd nitrogen in the thermosphere, *J. Geophys. Res.*, 80, 3068-3076, 1975.
- Orton, G. S., and A. G. Robiette, A line parameter list for the ν₂ and ν₄ bands of ¹²CH₄ and ¹³CH₄, extended to J¹=25 and its application to planetary atmospheres, *J. Quant. Spectrosc. Radiat. Transfer*, 24, 81-95, 1980.
- Ostlund, H. G., H. G. Dorsey and R. Brescher, GEOSECS Atlantic radiocarbon and tritium results, *Report No. 5*, Univ. Miami Tritium Laboratory Data, 1976.

REFERENCES

- Owens, A. J., J. M. Steed, D. L. Filkin, C. Miller, and J. P. Jesson, The potential effects of increased methane on atmosphere ozone, *Geophys. Res. Lett.*, *9*, 1105-1108, 1982a.
- Owens, A. J., J. M. Steed, C. Miller, D. L. Fillim, and J. P. Jesson, The atmospheric lifetime of CFC-11 and CFC-12, *Geophys. Res. Lett.*, *9*, 700-703, 1982b.
- Owens, A. J., C. H. Hales, D. L. Filkin, C. Miller, and M. McFarland, Multiple scenario ozone change calculations: The subtractive perturbation approach, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 82-86, D. Reidel, Dordrecht, 1985a.
- Owens, A. J., C. H. Hales, D. L. Filken, C. Miller, J. M. Steed, and J. P. Jesson, A coupled one-dimensional radiative-convective, chemistry-transport model of the atmosphere 1. Model structure and steady-state perturbation calculations, *J. Geophys. Res.*, *90*, 2283-2311, 1985b.
- Paetzold, H. K., New experimental and theoretical investigation on the atmospheric ozone layer, *J. Atmos. Terr. Phys.*, *7*, 128-140, 1955.
- Pallister, R. C., and A. F. Tuck, The diurnal variation of ozone in the upper stratosphere as a test of photochemical theory, *Quart. J. Roy. Meteorol. Soc.*, *109*, 271-284, 1983.
- Palmen, E., and C. W. Newton, *Atmospheric Circulation Systems*, 603 pp., Academic Press, New York, 1969.
- Palmer, T. N., Diagnostic study of wavenumber-2 stratospheric sudden warming in a transformed Eulerian mean formalism, *J. Atmos. Sci.*, *38*, 844-855, 1981a.
- Palmer, T. N., Aspects of stratospheric sudden warmings studied from a transformed Eulerian-mean viewpoint, *J. Geophys. Res.*, *86*, 9679-9687, 1981b.
- Palmer, T., and C. Hsu, Stratospheric sudden coolings and the role of nonlinear wave interactions in preconditioning the circumpolar flow, *J. Atmos. Sci.*, *40*, 909-928, 1983.
- Park, J. H., D. J. W. Kendall, and H. L. Buijs, Stratospheric HF mixing ratio profiles in the Northern and Southern Hemispheres, *J. Geophys. Res.*, *89*, 11645-11653, 1984.
- Parker, D. E., and J. L. Brownscombe, Stratospheric warming following the El Chichon volcanic eruption, *Nature*, *301*, 406-408, 1983.
- Parrish, A., R. L. De Zafra, P. M. Solomon, J. W. Barrett, and E. R. Carlson, Chlorine oxide in the stratospheric ozone layer: Ground-based detection and measurement, *Science*, *211*, 1158-1161, 1981.
- Patel, C. K. N., E. G. Burkhardt, and C. A. Lambert, Spectroscopic measurements of stratospheric nitric oxide and water vapor, *Science*, *184*, 1173-1176, 1974.
- Patrick, R., J. R. Barker, and D. M. Golden, Computational study of the $\text{HO}_2 + \text{HO}_2$ and $\text{DO}_2 + \text{DO}_2$ reactions, *J. Phys. Chem.*, *88*, 128-136, 1984.
- Patterson, E. M., B. T. Marshall and K. A. Rahn, Radiative properties of the Arctic aerosol, *Atmos. Environ.*, *16*, 2967-2977, 1982.
- Paur, R. J., and A. M. Bass, The ultraviolet cross sections of ozone II. Results and temperature dependence, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 611-616, D. Reidel, Dordrecht, 1985.
- Payne, W. J., *Denitrification*, 214 pp., Wiley, New York, 1983.
- Pearman, G. I., P. Hyson, and P. J. Fraser, The global distribution of atmospheric carbon dioxide: I. Aspects of observation and modelling, *J. Geophys. Res.*, *88*, 3581-3590, 1983.
- Pearman, G. I., D. Etheridge, F. deSilva, and P. J. Fraser, Evidence of changing concentrations of atmospheric CO_2 , N_2O and CH_4 from air bubbles in antarctica, *Nature*, 1985.
- Pearman, G. I., and P. Hyson, Activities of the global biosphere as reflected in atmospheric CO_2 records, *J. Geophys. Res.*, *85*, 4457-4467, 1980.
- Pearson, Jr., R., and D. H. Stedman, Instrumentation for fast response ozone measurements from aircraft, *Atmos. Techn.*, National Center for Atmospheric Research, Boulder, CO, *12*, 51-55, 1980.

REFERENCES

- Pelon, J., and G. Megie, Ozone monitoring in the troposphere and lower stratosphere: Evaluation and operation of a ground based lidar station, *Geoph. Res.*, **87**, 4947-4955, 1982a.
- Pelon, J., and G. Megie, Ozone vertical distribution and total content using a ground-based active remote sensing technique, *Nature*, **299**, 137-139, 1982b.
- Pelon, J., and G. Megie, Ozone monitoring in the troposphere and lower stratosphere: Evaluation and operation of a ground-based lidar station, *J. Geophys. Res.*, **87**, 4947-4955, 1982c.
- Pelon, J., and G. Megie, Lidar measurements of the vertical ozone distribution during the June 1981 intercomparison campaign GAP/OHP, *Planet. Space Sci.*, **31**, 717-721, 1983.
- Penkett, S. A., The application of analytical techniques to the understanding of chemical processes occurring in the atmosphere, *Toxicol. Environ. Chem.*, **3**, 291-321, 1981.
- Penkett, S. A., R. G. Derwent, P. Fabian, R. Borchers, and U. Schmidt, Methyl chloride in the stratosphere, *Nature*, **283**, 58-60, 1980.
- Penkett, S. A., N. J. D. Prosser, R. A. Rasmussen, and M. A. K. Khalil, Atmospheric measurements of CF₄ and other fluorocarbons containing the CF₃ grouping, *J. Geophys. Res.*, **86**, 5172-5178, 1981.
- Penn, S., A case study using ozone to determine structure and air motions at the tropopause, *J. Appl. Meteorol.*, **3**, 581-586, 1964.
- Perner, D., D. H. Ehhalt, H. W. Paetz, U. Platt, E. P. Roeth, and A. Volz, OH radicals in the lower troposphere, *Geophys. Res. Lett.*, **3**, 466-468, 1976.
- Perry, R., Kinetics of the reactions of NCO radicals with H₂, NO and O₂ using laser photolysis-laser induced fluorescence, paper presented at 16th Informal Conference on Photochemistry, *Abstract T-12*, Cambridge, MA, August, 1984.
- Perry, R. A., R. Atkinson, and J. N. Pitts, Jr., Kinetics and mechanism of the gas phase reactions of OH radicals with aromatic hydrocarbons over the temperature range 296 - 435K, *J. Phys. Chem.*, **82**, 296-304, 1977.
- Philbrick, C. R., Measurements of structural features in profiles of mesospheric density, in *Handbook for MAP, Vol. 2*, edited by S. K. Avery, pp. 333-340, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1981.
- Pick, D. R., and J. L. Brownscombe, Early results based on the stratospheric channels of TOVS on the TIROS-N series of operational satellites, *Adv. in Space Res.*, **1**, 247-260, 1981.
- Pickett, H. M., D. E. Brinza, and E. A. Cohen, Pressure broadening of ClO by nitrogen, *J. Geophys. Res.*, **86**, 7279-7282, 1981.
- Pierotti, D., and R. A. Rasmussen, Combustion as a source of nitrous oxide in the atmosphere, *Geophys. Res. Lett.*, **3**, 265-267, 1976.
- Pierotti, D., and R. A. Rasmussen, The atmosphere distribution of nitrous oxide, *J. Geophys. Res.*, **82**, 5823-5832, 1977.
- Pirre, M., P. Rigaud, and D. Huguenin, New in-situ measurements of the absorption cross section of O₂ in the Herzberg continuum, *Geophys. Res. Lett.*, **11**, 1199-1202, 1984.
- Pirre, M., P. Rigaud, and D. Huguenin, Mesure de l'absorption par la haute atmosphere dans le domaine de hauteurs de la fenetre atmospherique au voisinage de 200 nm, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 630-634, G. Reidel, Dordrecht, 1985.
- Pitari, G., and G. Visconti, Two-dimensional tracer transport: Derivation of residual mean circulation and eddy transport tensor from a 3-D model data set, *J. Geophys. Res.*, **90**, 8019-8032, 1985.
- Pittock, A. B., Climatology of the vertical distribution of ozone over Aspendale, *Quart. J. Roy. Meteorol. Soc.*, **103**, 575-584, 1977.
- Planet, W. G., D. S. Crosby, J. H. Lienesch, and M. L. Hill, Determination of total ozone amounts from TIROS radiance measurements, *J. Clim. and Appl. Meteor.*, **23**, 308-316, 1984.

REFERENCES

- Platt, C. M. R., Cirrus clouds in tropical Australia, *Weatherwise*, 36, 132-133, 1983.
- Platt, U., and D. Perner, Direct measurements of atmospheric CH₂O, HNO₂, O₃, NO₂, and SO₂ by differential optical absorption in the near UV, *J. Geophys. Res.*, 85, 7453-7458, 1980.
- Platt, U., D. Perner, G. W. Harris, A. M. Winer, and J. N. Pitts, Jr., Observations of nitrous acid in an urban atmosphere by differential optical absorption, *Nature*, 285, 312-314, 1980a.
- Platt, U., D. Perner, A. M. Winer, G. W. Harris, and J. N. Pitts, Jr., Detection of NO₃ in the polluted troposphere by differential optical absorption, *Geophys. Res. Lett.*, 7, 89-92, 1980b.
- Platt, U., D. Perner, J. Schroder, C. Kessler, and A. Toennissen, The diurnal variation of NO₃, *J. Geophys. Res.*, 86, 11965-11970, 1981.
- Platt, U. F., A. M. Winer, H. W. Biermann, R. Atkinson, and J. H. Pitts, Jr., Measurement of nitrate radical concentrations in continental air, *Environ. Sci. Technol.*, 18, 365-369, 1984.
- Plumb, R. A., The interaction of two internal waves with the mean flow: Implications for the theory of the quasi-biennial oscillation, *J. Atmos. Sci.*, 34, 1847-1858, 1977.
- Plumb, R. A., Eddy fluxes of conserved quantities by small-amplitude waves, *J. Atmos. Sci.*, 36, 1699-1704, 1979.
- Plumb, R. A., Instability of the distorted polar night vortex: A theory of stratospheric warmings, *J. Atmos. Sci.*, 38, 2514-2531, 1981.
- Plumb, R. A., The circulation of the middle atmosphere, *Aus. Meteorol. Mag.*, 30, 107-121, 1982.
- Plumb, R. A., Baroclinic instability of the summer mesosphere: A mechanism for the quasi-two-day-wave?, *J. Atmos. Sci.*, 40, 262-270, 1983a.
- Plumb, R. A., A new look at the energy cycle, *J. Atmos. Sci.*, 40, 1669-1688, 1983b.
- Plumb, R. A., The quasi-biennial oscillation, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 217-251, Terrapub, Tokyo, 1984.
- Plumb, R. A., and R. C. Bell, A model of the quasi-biennial oscillation on an equatorial beta-plane, *Quart. J. Roy. Meteorol. Soc.*, 108, 335-352, 1982.
- Plumb, R. A., and J. D. Mahlman, The zonally-averaged transport characteristics of the GFDL general circulation/tracer model, *J. Atmos. Sci.*, in press, 1986.
- Plumb, R. A., and A. D. McEwan, The instability of a forced standing wave in a viscous stratified fluid: A laboratory analogue of the quasi-biennial oscillation, *J. Atmos. Sci.*, 35, 1827-1839, 1978.
- Pollack, J. B., and T. P. Ackerman, Possible effects of the El Chichon volcanic cloud on the radiation budget of the northern tropics, *Geophys. Res. Lett.*, 10, 1057-1060, 1983.
- Pollack, J. B., and C. P. McKay, The impact of polar stratospheric clouds on the heating rates of the winter polar stratosphere, *J. Atmos. Sci.*, 42, 245-262, 1985.
- Pollitt, S., M. Coffey, W. Evans, A. Goldman, J. J. Kusters, N. Louisnard, W. G. Mankin, D. G. Murcray, and W. J. Williams, Intercomparative measurements of stratospheric nitric acid, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 151-156, D. Reidel, Dordrecht, 1985.
- Pollitt, S., D. G. Murcray, A. Goldman, J. J. Kusters, W. J. Williams, N. Louisnard, W. F. J. Evans, M. Coffey, W. G. Mankin, R. Zander, D. W. Johnson, G. Stokes, and R. K. Seals, BIC nitric acid intercomparison, to be published, 1986.
- Pollock, W., L. E. Heidt, R. Lueb, and D. H. Ehhalt, Measurement of stratospheric water vapor by cryogenic collection, *J. Geophys. Res.*, 85, 5555-5568, 1980.
- Pommereau, J. P., Observation of NO₂ diurnal variation in the stratosphere, *Geophys. Res. Lett.*, 9, 850-853, 1982.
- Porch, W. M., and M. C. MacCracken, Parametric study to the effects of Arctic soot on solar radiation, *Atmos. Environ.*, 16, 1365-1371, 1982.
- Posey, J., J. Sherwell, and M. Kaufman, Kinetics of the reactions of atomic bromine with HO₂ and H₂O₂, *Chem. Phys. Lett.*, 77, 476-479, 1981.

REFERENCES

- Poulet, G., G. Laverdet, and G. Le Bras, Discharge flow-mass spectrometric determination of the rate coefficient for the reactions of formaldehyde with bromine atoms and chlorine atoms, *J. Phys. Chem.*, **85**, 1891-1895, 1981.
- Poulet, G., G. Laverdet, and G. Le Bras, Kinetics of the reactions of atomic bromine with HO₂ and HCO at 298K, *J. Chem. Phys.*, **80**, 1922-1928, 1984.
- Poulet, G., G. Laverdet, and G. LeBras, Rate constant and branching ratio for the reaction of OH with ClO, *J. Phys. Chem.*, in press, 1985.
- Poynter, R. L., and H. M. Pickett, Submillimeter, millimeter, and microwave spectral line catalogue, *JPL Publication 80-23, Revision 1*, 151 pp., Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 1981.
- Poynter, R. L., and H. M. Pickett, Submillimeter, millimeter, and microwave spectral line catalogue, *JPL Publication 80-23, Revision 2*, 171 pp., Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 1984.
- Prabhakara, C., Effects of non-photochemical processes on the meridional distribution and total amount of ozone in the atmosphere, *Mon. Weather Rev.*, **91**, 411-431, 1963.
- Prasad, S. S., Possible existence and chemistry of ClO.O₂ in the stratosphere, *Nature*, **285**, 152-154, 1980.
- Prata, A., The 4-day wave, *J. Atmos. Sci.*, **41**, 150-155, 1984.
- Prather, M. J., Ozone in the upper stratosphere and mesosphere, *J. Geophys. Res.*, **86**, 5325-5338, 1981.
- Prather, M. J., Continental sources of halocarbons and nitrous oxide, *Nature*, **317**, 221-225, 1985.
- Prather, M. J., M. B. McElroy, and S. C. Wofsy, Reductions in ozone at high concentrations of stratospheric halogens, *Nature*, **312**, 227-231, 1984.
- Prinn, R. G., P. G. Simmonds, R. A. Rasmussen, R. D. Rosen, F. N. Alyea, C. A. Cardelino, A. J. Crawford, D. M. Cunnold, P. J. Fraser, and J. E. Lovelock, The atmospheric lifetime experiment, 1, Introduction, instrumentation and overview, *J. Geophys. Res.*, **88**, 8353-8367, 1983a.
- Prinn, R. G., R. A. Rasmussen, P. G. Simmonds, F. N. Alyea, D. M. Cunnold, B. C. Lane, C. A. Cardelino, and A. J. Crawford, The atmospheric lifetime experiments, 5, Results for CH₃CCl₃ based on three years of data, *J. Geophys. Res.*, **88**, 8415-8426, 1983b.
- Pugh, L. A., and K. N. Rao, Intensities from infrared spectra, *Mol. Spectros., Mod. Res.*, **2**, 165-225, 1976.
- Pyle, J. A., A calculation of the possible depletion of ozone by chlorofluorocarbons using a two-dimensional model, *Pure Appl. Geophys.*, **118**, 355-377, 1980.
- Pyle, J. A., and C. F. Rogers, A modified diabatic circulation model for stratospheric tracer transport, *Nature*, **287**, 711-714, 1980a.
- Pyle, J. A., and C. F. Rogers, Stratospheric transport by stationary planetary waves: The importance of chemical processes, *Quart. J. Roy. Meteorol. Soc.*, **106**, 421-446, 1980b.
- Pyle, J. A., and C. F. Rogers, Modelling tracer budgets in the stratosphere, *Quart. J. Roy. Meteorol. Soc.*, **110**, 1097-1106, 1984.
- Pyle, J. A., and A. M. Zavody, The derivation of near-global fields of hydrogen containing radical concentrations from satellite data sets, *Quart. J. Roy. Meteorol. Soc.*, in press, 1985a.
- Pyle, J. A., and A. M. Zavody, The variability of stratospheric radicals, paper presented at the 5th General Assembly, International Association of Geomagnetism and Aeronomy, Prague, 5-17 August 1985b.
- Pyle, J. A., A. M. Zavody, J. E. Harries, and P. H. Moffat, Derivation of OH concentration from satellite infrared measurements of NO₂ and HNO₃, *Nature*, **305**, 690-692, 1983.
- Quinn, T. H., K. A. Wolf, W. E. Mooz, J. K. Hammitt, T. W. Chesnutt and S. Sarma, Projected use, emissions, and banks of potential ozone depleting substances, *N-2282-EPA*, Rand Corp., Santa Monica, CA, 1985.
- Quiroz, R. S., Stratospheric temperatures during solar cycle 20, *J. Geophys. Res.*, **84**, 2415-2420, 1979a.
- Quiroz, R. S., Tropospheric-stratospheric interaction in the major warming event of January-February 1979, *Geophys. Res. Lett.*, **6**, 645-648, 1979b.

REFERENCES

- Quiroz, R. S., The isolation of stratospheric temperature change due to the El Chichon volcanic signals, *J. Geophys. Res.*, *88*, 6773-6780, 1983a.
- Quiroz, R. S., The climate of the "El Nino" winter of 1982-83. A season of extraordinary climatic anomalies, *Mon. Weather Rev.*, *111*, 1685-1706, 1983b.
- Quiroz, R. S., and M. E. Gelman, An evaluation of temperature profiles from falling sphere soundings, *J. Geophys. Res.*, *81*, 406-412, 1976.
- Quiroz, R. S., A. J. Miller, and R. M. Nagatani, A comparison of observed and simulated properties of sudden stratospheric warmings, *J. Atmos. Sci.*, *32*, 1723-1736, 1975.
- Ramanathan, V., Greenhouse effect due to chlorofluorocarbons: Climatic implications, *Science*, *190*, 50-52, 1975.
- Ramanathan, V., Radiative transfer within the Earth's troposphere and stratosphere: A simplified radiative-convective model, *J. Atmos. Sci.*, *33*, 1330-1346, 1976.
- Ramanathan, V., Climatic effects of anthropogenic trace gases, in *Energy/Climate Interactions*, pp. 269-280, D. Reidel, Dordrecht, 1980.
- Ramanathan, V., The role of ocean-atmosphere interactions in the CO₂ climate problem, *J. Atmos. Sci.*, *38*, 918-930, 1981.
- Ramanathan, V., and J. A. Coakley, Jr., Climate modeling through radiative-convective models, *Rev. Geophys. Space Phys.*, *16*, 465-490, 1978.
- Ramanathan, V., and R. E. Dickinson, The role of stratospheric ozone in the zonal and seasonal radiative energy balance of the earth-troposphere system, *J. Atmos. Sci.*, *36*, 1084-1104, 1979.
- Ramanathan, V., and P. Downey, A non-isothermal emissivity and absorptivity formulation for water vapor, *J. Geophys. Res.*, *91*, in press, 1986.
- Ramanathan, V., L. B. Callis and R. E. Boughner, Sensitivity of atmospheric and surface temperature to perturbations in the stratospheric concentration of ozone and nitrogen dioxide, *J. Atmos. Sci.*, *33*, 1092-1112, 1976.
- Ramanathan, V., M. S. Lian and R. D. Cess, Increased atmospheric CO₂: Zonal and seasonal estimates of the effect on the radiation energy balance and surface temperature, *J. Geophys. Res.*, *84*, 4949-4958, 1979.
- Ramanathan, V., E. J. Pitcher, R. C. Malone and M. L. Blackmon, The response of a spectral general circulation model to refinements in radiative processes, *J. Atmos. Sci.*, *40*, 605-630, 1983.
- Ramanathan, V., R. J. Cicerone, H. B. Singh and J. T. Kiehl, Trace gas trends and their potential role in climate change, *J. Geophys. Res.*, *90*, 5547-5566, 1985.
- Ramaswamy, V., and A. Detwiler, Interdependence of radiation and microphysics in cirrus clouds, *J. Atmos. Sci.*, *43*, in press, 1985.
- Ramaswamy, V., and J. T. Kiehl, Sensitivities of the radiative forcing due to large loadings of smoke and dust aerosols, *J. Geophys. Res.*, *90*, 5597-5613, 1985.
- Randal, W. J., and J. L. Stanford, Structure of medium-scale atmospheric waves in the Southern Hemisphere summer, *J. Atmos. Sci.*, *40*, 2312-2318, 1983.
- Randhawa, J. S., Ozonesonde for rocket flight, *Nature*, *213*, 53-54, 1967.
- Rao, M. S. V., Retrieval of worldwide precipitation and allied parameters from satellite microwave observations, in *Advances in Geophysics*, Vol. 26, edited by B. Saltzman, pp. 1238-1336, Academic Press, New York, 1984.
- Rao (Vupputuri), R. K., Numerical experiment on the steady state meridional structure and ozone distribution in the stratosphere, *Mon. Weather Rev.*, *101*, 510-527, 1973.
- Raper, O. F., C. B. Farmer, R. A. Toth, and B. D. Robbins, The vertical distribution of HCl in the stratosphere, *Geophys. Res. Lett.*, *4*, 531-534, 1977.

REFERENCES

- Rasmussen, R. A., and M. A. K. Khalil, Atmospheric halocarbons: Measurements and analyses of selected trace gases, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone: Its Variation and Human Influences, Rep. FAA-EE-80-20*, edited by A. C. Aikin, pp. 209-231, DOT, FAA, Washington, DC, 1980.
- Rasmussen, R. A., and M. A. K. Khalil, Global atmospheric distribution and trend of methylchloroform (CH_3CCl_3), *Geophys. Res. Lett.*, **8**, 1005-1007, 1981a.
- Rasmussen, R. A., and M. A. K. Khalil, Atmospheric methane (CH_4); Trends and seasonal cycles, *J. Geophys. Res.*, **86**, 9826-9832, 1981b.
- Rasmussen, R. A., and M. A. K. Khalil, Differences in the concentrations of atmospheric trace gases in and above tropical boundary layer, *Pure Appl. Geophys.*, **119**, 990-997, 1981c.
- Rasmussen, R. A., and M. A. K. Khalil, Increase in the concentration of atmospheric methane, *Atmos. Environ.*, **15**, 883-886, 1981d.
- Rasmussen, R. A., and M. A. K. Khalil, Latitudinal distributions of trace gases in and above the boundary layer, *Chemosphere*, **11**, 227-235, 1982.
- Rasmussen, R. A., and M. A. K. Khalil, Natural and anthropogenic trace gases in the lower troposphere of the Arctic, Dept. of Environ. Sci., Beaverton, OR, 1983a.
- Rasmussen, R. A., and M. A. K. Khalil, Atmospheric fluorocarbons and methyl chloroform at the South Pole, *1982 Annual Issue of the Antarctic Journal of the United States*, **17**, 203-205, 1983b.
- Rasmussen, R. A., and M. A. K. Khalil, Global production of methane by termites, *Nature*, **301**, 700-702, 1983c.
- Rasmussen, R. A., and M. A. K. Khalil, Natural and anthropogenic trace gases in the lower troposphere in the arctic, *Chemosphere*, **12**, 371-375, 1983d.
- Rasmussen, R. A., and M. A. K. Khalil, Trace gases at Point Barrow and Arctic haze, in *Geophysical Monitoring for Climatic Change Annual Report 10*, edited by B. A. Bodhaine and J. M. Harris, NOAA/ERL, U.S. Dept. of Commerce, Boulder, CO, 1983e.
- Rasmussen, R. A., and M. A. K. Khalil, Rare trace gases at the South Pole: CHClF_2 , CH_3I , CHCl_3 and SF_6 , 1984a.
- Rasmussen, R. A., and M. A. K. Khalil, Atmospheric methane in recent and ancient atmospheres: Concentrations, trends and interhemispheric gradients, *J. Geophys. Res.*, **89**, 11599-11605, 1984b.
- Rasmussen, R. A., and M. A. K. Khalil, Gaseous bromine in the Arctic and Arctic haze, *Geophys. Res. Lett.*, **11**, 433-436, 1984c.
- Rasmussen, R. A., S. A. Penkett, and N. Prosser, Measurements of carbontetrafluoride in the atmosphere, *Nature*, **277**, 549-550, 1979.
- Rasmussen, R. A., L. E. Rasmussen, M. A. K. Khalil, and R. W. Dalluge, Concentration distribution of methyl chloride in the atmosphere, *J. Geophys. Res.*, **85**, 7350-7356, 1980.
- Rasmussen, R. A., M. A. K. Khalil, and R. W. Dalluge, Atmospheric trace gases in Antarctica, *Science*, **211**, 285-287, 1981.
- Rasmussen, R. A., M. A. K. Khalil, A. J. Crawford, and P. J. Fraser, Natural and anthropogenic trace gases in the Southern Hemisphere, *Geophys. Res. Lett.*, **9**, 704-707, 1982a.
- Rasmussen, R. A., M. A. K. Khalil, R. Gunawardena, and S. D. Hoyt, Atmospheric methyl iodide (CH_3I), *J. Geophys. Res.*, **87**, 3086-3090, 1982b.
- Rasmussen, R. A., M. A. K. Khalil, and R. J. Fox, Altitudinal and temporal variations of hydrocarbons and other gaseous tracers of Arctic haze, *Geophys. Res. Lett.*, **10**, 144-147, 1983.
- Ravishankara, A. R., and P. H. Wine, Absorption cross sections for HNO_3 between 565 and 673 nm, *Chemical Physics Letters*, **101**, 73-78, 1983.
- Ravishankara, A. R., P. H. Wine, A. Torabi, C. A. Smith, and R. Wells, Photodissociation of N_2O_5 , *J. Phys. Chem.*, in press, 1985.

REFERENCES

- Rayez, J. C., B. Veyret, and R. Lesclaux, Thermodynamical and structural data of free radicals of atmospheric interest calculated by MNDO-CI, paper presented at XVth Int. Symp. on Free Radicals, Lauzelle-Ottignies, Belgium, 1983.
- Raynaud, D., and J. M. Barnola, An Antarctica ice core reveals atmospheric CO₂ variations over the past few centuries, *Nature*, 315, 309-311, 1985.
- Reagan, J. B., R. E. Meyerott, R. W. Nightingale, R. C. Gunton, R. G. Johnson, J. E. Evans, W. L. Imhof, D. F. Heath, and A. J. Krueger, Effects of the August 1972 solar particle events on stratospheric ozone, *J. Geophys. Res.*, 86, 1473-1494, 1981.
- Reber, C. A., Upper Atmosphere Research Satellite (UARS) Mission, *NASA Goddard Space Flight Center Publication 430-1003-001*, NASA Goddard Space Flight Center, Greenbelt, MD, 1985.
- Reck, R. A., Stratospheric ozone effects on temperature, *Science*, 192, 557-559, 1976.
- Reck, R. A., Atmospheric temperature calculated for ozone depletion, *Nature*, 263, 116-117, 1976.
- Reck, R. A., Thermal effect of stratospheric ozone depletion at 85° latitude as influenced by airborne particles, *Geophys. Res. Lett.*, 5, 361-364, 1978.
- Reck, R. A., and D. L. Fry, The direct effect of chlorofluoromethanes on the atmospheric surface temperature, *Atmos. Environ.*, 12, 2501-2503, 1978.
- Reck, R. A., and J. R. Hummel, Influence of aerosol optical properties on surface temperatures computed with a radiative-convective model, *Atmos. Environ.*, 15, 1727-1731, 1981.
- Reed, R. J., The role of vertical motions in ozone-weather relationships, *J. Meteorol.*, 7, 263-267, 1950.
- Reed, R. J., A study of a characteristic type of upper level frontogenesis, *J. Meteorol.*, 12, 226-237, 1955.
- Reed, R. J., The structure and dynamics of the 26-month oscillation, paper presented at 40th anniv. meeting of the Amer. Met. Soc., Boston, 1960.
- Reed, R. J., Evidence of geostrophic motion in the equatorial stratosphere, *Quart. J. Roy. Meteorol. Soc.*, 88, 324-327, 1962.
- Reed, R. J. A tentative model of the 26-month oscillation in tropical latitudes, *Quart. J. Roy. Meteorol. Soc.*, 90, 441-466, 1964.
- Reed, R. J., The quasi-biennial oscillation of the atmosphere between 30 and 50 km over Ascension Island, *J. Atmos. Sci.*, 22, 331-333, 1965.
- Reed, R. J., Zonal wind behaviour in the equatorial stratosphere and lower mesosphere, *J. Geophys. Res.*, 71, 4223-4233, 1966.
- Reed, R. J., and E. F. Danielson, Fronts in the vicinity of the tropopause, *Arch. Met. Geophys. Bioklim.*, 11, 1-17, 1959.
- Reed, R. J., and K. E. German, A contribution to the problem of stratospheric diffusion by large-scale mixing, *Mon. Weather Rev.*, 93, 313-321, 1965.
- Reed, R. J., and C. L. Vlcek, The annual temperature variation in the lower tropical stratosphere, *J. Atmos. Sci.*, 26, 163-167, 1969.
- Reed, R. J., D. C. Norquist, and E. F. Recker, The structure and properties of African wave disturbances as observed during Phase III of GATE, *Mon. Weather Rev.*, 105, 317-333, 1977.
- Regener, V. H., Vertical flux of atmospheric ozone, *J. Geophys. Res.*, 62, 221-228, 1957.
- Regener, V. H., Measurement of ozone with the chemiluminescent method, *J. Geophys. Res.*, 69, 3795-3800, 1964.
- Reid, G. C., and K. S. Gage, A relation between the height of the tropical tropopause and the global angular momentum of the atmosphere, *Geophys. Res. Lett.*, 11, 840-842, 1984.
- Reinsel, G., G. C. Tiao, M. N. Wang, R. Lewis, and D. Nychka, Statistical analysis of stratospheric ozone data for the detection of trend, *Atmos. Environ.*, 15, 1569-1577, 1981.
- Reinsel, G., G. C. Tiao, R. Lewis, and M. Bobkoski, Analysis of upper stratospheric ozone profile data from the ground-based Umkehr method and the Nimbus-4 BUV satellite experiment, *J. Geophys. Res.*, 88, 5393-5403, 1983.

REFERENCES

- Reinsel, G. C., G. C. Tiao, J. L. De Luisi, C. L. Mateer, A. J. Miller, and J. E. Frederick, Analysis of upper stratospheric Umkehr ozone profile data for trends and the effects of stratospheric aerosols, *J. Geophys. Res.*, **89**, 4833-4840, 1984.
- Reiter, E. R., Atmospheric transport processes. Part 1: Energy transfers and transformation, *USAEC Report TID-24868*, 253 pp., Colorado State Univ., Fort Collins, CO, 1968.
- Reiter, E. R., Atmospheric transport processes. Part 2: Chemical tracers, *USAEC Report TID-25314*, 382 pp., Colorado State Univ., Fort Collins, CO, 1971.
- Reiter, E. R., Atmospheric transport processes. Part 3: Hydrodynamic tracers, *USAEC Report TID-25731*, 212 pp., Colorado State Univ., Fort Collins, CO, 1972.
- Reiter, E. R., Stratospheric-tropospheric exchange processes, *Rev. Geophys. Space Phys.*, **13**, 459-474, 1975.
- Reiter, E. R., Tropospheric-stratospheric transport processes: Indications of their interannual variability, paper presented at WMO Symp. on Long Range Transport of Pollutants and its Relation to General Circulation including Stratosphere/Troposphere Exchange Processes, *WMO No. 538*, pp. 393-400, 1979.
- Reiter, E. R., and H. J. Kanter, Time behavior of CO₂ and O₃ in the lower troposphere based on recordings from neighbouring mountain stations between 0.7 and 3.0 km ASL including the effects of meteorological parameters, *Arch. Met. Geoph. Biokl. Ser. B*, **30**, 191-225, 1982.
- Reiter, E. R., and J. D. Mahlman, A case study of mass transport from stratosphere to troposphere not associated with surface fallout, in *Atmospheric Science Paper No. 70*, pp. 54-83, Colorado State University, Ft. Collins, CO, 1971.
- Reiter, E. R., and M. P. McCormick, SAGE-European ozonesonde comparison, *Nature*, **300**, 337-339, 1982.
- Reiter, E. R., and A. Nania, Jet stream structure and clear air turbulence (CAT), *J. Appl. Meteorol.*, **3**, 247-260, 1963.
- Reiter, E. R., M. E. Glasser, and J. D. Mahlman, The role of the tropopause in stratospheric-tropospheric processes, *Pure Appl. Geophys.*, **75**, 185-218, 1969.
- Remsberg, E. E., and L. L. Gordley, Analysis of differential absorption lidar from the Space Shuttle, *Appl. Optics*, **17**, 624-630, 1978.
- Remsberg, E. E., J. M. Russell III, J. C. Gille, L. L. Gordley, P. L. Bailey, W. G. Planet, and J. E. Harries, The validation of Nimbus 7 LIMS measurements of ozone, *J. Geophys. Res.*, **89**, 5161-5178, 1984a.
- Remsberg, E. E., J. M. Russell III, L. L. Gordley, J. C. Gille, and P. L. Bailey, Implications of stratospheric water vapor distribution as determined from the Nimbus 7 LIMS experiment, *J. Atmos. Sci.*, 2934-2945, 1984b.
- Ridley, B. A., and D. R. Hastie, Stratospheric odd nitrogen: NO measurements at 51°N in summer, *J. Geophys. Res.*, **86**, 3162-3166, 1981.
- Ridley, B. A., and H. I. Schiff, Stratospheric odd nitrogen: Nitric oxide measurements at 32°N in autumn, *J. Geophys. Res.*, **86**, 3167-3172, 1981.
- Ridley, B. A., J. T. Bruin, H. I. Schiff, and J. C. McConnell, Altitude profile and sunset decay measurements of stratospheric nitric oxide, *Atmosphere*, **14**, 180-188, 1976.
- Ridley, B. A., M. McFarland, J. T. Bruin, H. I. Schiff, and J. C. McConnell, Sunrise measurements of stratospheric nitric oxide, *Can. J. Phys.*, **55**, 212-221, 1977.
- Ridley, B. A., S. H. Luu, D. R. Hastie, H. I. Schiff, J. C. McConnell, W. F. J. Evans, C. T. McElroy, J. B. Kerr, H. Fast, and R. S. O'Brien, Stratospheric odd nitrogen: Measurements of HNO₃, NO, NO₂ and O₃ near 54° N. in winter, *J. Geophys. Res.*, **89**, 4797-4820, 1984.
- Riehl, H., *Climate and Weather in the Tropics*, Academic Press, New York, 611 pp., 1979.
- Rigaud, P., J. P. Naudet, and D. Huguenin, Simultaneous measurements of vertical distribution of stratospheric NO₃ and O₃ at different periods of the night, *J. Geophys. Res.*, **88**, 1463-1467, 1983.

REFERENCES

- Rind, D., and S. Lebedeff, Potential climatic impacts of increasing atmospheric CO₂ with emphasis on water availability and hydrology in the United States, *NASA-TM-87479*, 106 pp., NASA Goddard Space Flight Center, Greenbelt, MD, 1984.
- Rind, D., R. Suozzo, A. Lacis, G. Russell, and J. Hansen, 21 layer troposphere-stratosphere climate model, *Mon. Weather Rev.*, in press, 1985.
- Rinsland, C. P., and J. S. Levine, Free tropospheric carbon monoxide concentrations in 1950 and 1951 deduced from infrared total column amount measurements, *Nature*, *318*, 250-254, 1985.
- Rinsland, C. P., M. A. H. Smith, J. M. Russell, J. H. Park, and C. B. Farmer, Stratospheric measurements of continuous absorption near 2400 cm⁻¹, *Appl. Opt.*, *20*, 4167-4171, 1981.
- Rinsland, C. P., M. A. H. Smith, P. L. Rinsland, A. Goldman, J. W. Brault, and G. M. Stokes, Ground-based infrared spectroscopic measurements of atmospheric hydrogen cyanide, *J. Geophys. Res.*, *87*, 1119-1124, 1982a.
- Rinsland, C. P., M. A. H. Smith, R. K. Seals, Jr., A. Goldman, F. J. Murcray, D. G. Murcray, J. C. Larsen, and P. L. Rarig, Stratospheric measurements of collision-induced absorption by molecular oxygen, *J. Geophys. Res.*, *87*, 3119-3122, 1982b.
- Rinsland, C. P., A. Goldman, F. J. Murcray, D. G. Murcray, M. A. H. Smith, R. K. Seals, Jr., J. C. Larsen, and P. L. Rinsland, Stratospheric N₂O mixing ratio profile from high-resolution balloon-borne solar absorption spectra and laboratory spectra near 1880 cm⁻¹, *Appl. Opt.*, *21*, 4351-4355, 1982c.
- Rinsland, C. P., R. E. Boughner, J. C. Larsen, G. M. Stokes, and J. W. Brault, Diurnal variations of atmospheric nitric oxide: Ground-based infrared spectroscopic measurements and their interpretation with time-dependent photochemical model calculations, *J. Geophys. Res.*, *89*, 9613-9622, 1984a.
- Rinsland, C. P., A. Goldman, V. M. Devi, B. Fridovich, D. G. S. Snyder, G. D. Jones, F. J. Murcray, D. G. Murcray, M. A. H. Smith, R. K. Seals, Jr., M. T. Coffey, and W. G. Mankin, Simultaneous stratospheric measurements of H₂O, HDO, and CH₄ from balloon-borne and aircraft infrared solar absorption spectra and tunable diode laser laboratory spectra of HDO, *J. Geophys. Res.*, *89*, 7259-7266, 1984b.
- Rinsland, C. P., R. E. Boughner, J. C. Larsen, A. Goldman, F. J. Murcray, and D. G. Murcray, Stratospheric NO and NO₂ profiles at sunset from analysis of high resolution balloon-borne infrared solar absorption spectra obtained at 33°N. and calculations with a time-dependent photochemical model, *NASA Tech. Memo 86285*, 46 pp., NASA Langley Research Center, Hampton, VA, 1984c.
- Rinsland, C. P., J. S. Levine, and T. Miles, Concentration of methane in the troposphere deduced from 1951 solar spectra, *Nature*, *318*, 245-249, 1985a.
- Rinsland, C. P., A. Goldman, D. G. Murcray, F. J. Murcray, F. S. Bonomo, R. D. Blatherwick, V. M. Devi, M. A. H. Smith, and P. L. Rinsland, Tentative identification of the 780 cm⁻¹ v₄ band Q branch of chlorine nitrate in high-resolution solar absorption spectra of the stratosphere, *J. Geophys. Res.*, *90*, 7931-7943, 1985b.
- Rinsland, C. P., V. M. Devi, J.-M. Flaud, C. Camy-Peyret, M. A. H. Smith, and G. M. Stokes, Identification of ¹⁸O-isotopic lines of ozone in infrared ground-based solar absorption spectra, *J. Geophys. Res.*, *90*, 10719-10725, 1985c.
- Rinsland, C. P., A. Goldman, and G. M. Stokes, Identification of atmospheric C₂H₂ lines in the 3230-3340 cm⁻¹ region of high resolution solar absorption spectra recorded at the National Solar Observatory, *Appl. Opt.*, *24*, 2044-2046, 1985d.
- Rippel, H., A helium cooled balloon experiment for measuring infrared emission from stratospheric gases, Ph.D. Thesis, Univ. Wuppertal, Dept. of Atmospheric Physics, W. Germany, 1984a.
- Rippel, H., Ein Heliumgekühltes Ballonexperiment zur Messung der Infrarotemissionen stratosphärischer Spurengase., Ph.D. Thesis, University of Wuppertal, F.R.G., 1984b.

REFERENCES

- Roach, W. T., Aircraft observations in the lower sub-arctic stratosphere in winter, *Meteorological Research Committee Paper 121*, (available at National Meteorological Library, UK Meteorological Office), 1962.
- Roach, W. T., and B. F. James, A climatology of the potential vertical extent of giant cumulonimbus clouds in some selected areas, *Met. Mag.*, *101*, 161-181, 1973.
- Robbins, D., W. Evans, N. Louisnard, S. Pollitt, W. Traub, and J. Waters, Ozone intercomparisons from the balloon intercomparison campaign, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 465-469, D. Reidel, Dordrecht, 1985.
- Robbins, D., J. Waters, P. Zimmermann, R. Jarnot, J. Hardy, H. Pickett, S. Pollitt, W. Traub, K. Chance, N. Louisnard, W. F. J. Evans, and J. Kerr, Ozone measurements during the balloon intercomparison campaign, to be published, 1986.
- Robbins, R. C., L. A. Cavanagh, and L. J. Salas, Analysis of ancient atmospheres, *J. Geophys. Res.*, *78*, 5341-5344, 1973.
- Robert, D., and J. Bonamy, Short range force effects in semiclassical molecular line broadening calculations, *Jl. de Physique*, *40*, 923-943, 1979.
- Robertson, J. P., and J. M. Tiedje, Denitrification and nitrous oxide production in successful and old growth Michigan forests, *Soil Sci. Soc. Am. J.*, *48*, 383-389, 1984.
- Robinson, E., and R. C. Robbins, Sources, abundance and fate of gaseous atmospheric pollutants, *Res. Proj. PR-6755*, Suppl. rep., Stanford Res. Inst., Menlo, CA, 1969.
- Robinson, E., R. A. Rasmussen, J. Krasnec, D. Pierotti, and M. Jakubovic, Halocarbon measurements in the Alaskan troposphere and lower stratosphere, *Atmos. Environ.*, *11*, 215-218, 1977.
- Roche, A. E., *UARS Spectroscopy Requirements: Report of the UARS Spectroscopy Working Group*, in press, 1985.
- Rodgers, C. D., The radiative heat budget of the troposphere and lower stratosphere, Planet. Circ. Project, MIT Dept. Meteorol., *Rep. #A2*, 1967.
- Rodgers, C. D., Evidence for the five-day wave in the upper stratosphere, *J. Atmos. Sci.*, *33*, 710-711, 1976a.
- Rodgers, C. D., Retrieval of atmospheric temperature and composition from remote measurements of thermal radiation, *Rev. Geophys. Space Phys.*, *14*, 609-624, 1976b.
- Rodgers, C. D., Statistical principles of inversion theory., in *Inversion Methods in Atmospheric Remote Sounding*, edited by A. Deepak, pp. 117-138, Academic Press, New York, 1977.
- Rodgers, C. D. (Ed.), Coordinated Study of the Behavior of the Middle Atmosphere in Winter (PMP-1), *Handbook for MAP, Vol. 12*, 154 pp., SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1984.
- Rodgers, C. D., and W. L. Grose, PMP-1 Data Comparison Workshop, Part II, in *Handbook for MAP*, SCOSTEP Secretariat, Univ. of Illinois, Urbana, in press, 1985.
- Rodgers, C. D., and A. J. Prata, Evidence for a travelling 2-day wave in the middle atmosphere, *J. Geophys. Res.*, *86*, 9661-9664, 1981.
- Rodgers, C. D., and C. D. Walshaw, The computation of infra-red cooling rate in planetary atmospheres, *Quart. J. Roy. Meteorol. Soc.*, *92*, 67-92, 1966.
- Rodgers, C. D., R. L. Jones, and J. J. Barnett, Retrieval of temperature and composition from Nimbus 7 SAMS measurements, *J. Geophys. Res.*, *89*, 5280-5286, 1984.
- Rogers, C. F., and J. A. Pyle, Stratospheric tracer transport: A modified diabatic circulation model, *Quart. J. Roy. Meteorol. Soc.*, *110*, 219-237, 1984.
- Rood, R. B., and A. R. Douglass, Interpretation of ozone temperature correlations 1. Theory, *J. Geophys. Res.*, *90*, 5733-5743, 1985.
- Roscoe, H., Tentative observation of stratospheric N₂O₅, *Geophys. Res. Lett.*, *9*, 901-902, 1982.
- Roscoe, H. K., J. R. Drummond, and R. F. Jarnot, Infrared measurements of stratospheric composition III. The daytime changes of NO and NO₂., *Proc. Roy. Soc. London A*, *375*, 507-528, 1981.
- Roscoe, H. K., B. J. Kerridge, S. Pollitt, M. Bangham, N. Louisnard, C. Alamichel, J. P. Pommereau, T. Ogawa, N. Iwagami, M. T. Coffey, W. Mankin, J. M. Fland, C. Camay-Peret, F. J. Murcray,

REFERENCES

- A. Goldman, W. F. J. Evans, and T. McElroy, Intercomparison of stratospheric measurements of NO and NO₂, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 149-156, D. Reidel, Dordrecht, 1985a.
- Roscoe, H. K., B. J. Kerridge, J. A. Pyle, L. J. Gray, and R. J. Wells, Simultaneous measurements of stratospheric NO and NO₂ and their comparison with model predictions, *J. Geophys. Res.*, in press, 1985b.
- Roscoe, H. K., B. J. Kerridge, S. Pollitt, M. Bangham, N. Louisnard, C. Alamichel, J. M. Flaud, C. Camy-Peyret, J. R. Pommereau, T. Ogawa, N. Iwagami, M. T. Coffey, W. Mankin, F. J. Murcray, A. Goldman, W. F. J. Evans, T. McElroy, and J. Kerr, Intercomparison of remote measurements of stratospheric NO and NO₂, to be published, 1986.
- Rose, K., and G. Brasseur, Ozone during sudden stratospheric warmings: A three-dimensional simulation, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 28-32, D. Reidel, Dordrecht, 1985.
- Rothman, L. S., *AFGL atmospheric absorption line parameters compilation: 1985 Edition*, in press, 1985.
- Rothman, L. S., A. Goldman, J. R. Gillis, R. R. Gamache, H. M. Pickett, R. L. Poynter, N. Husson, and A. Chedin, AFGL trace gas compilation: 1982 version, *Appl. Opt.*, 22, 1616-1627, 1983a.
- Rothman, L. S., R. R. Gamache, A. Barbe, A. Goldman, J. R. Gillis, L. R. Brown, R. A. Toth, J. M. Flaud, and C. Camy-Peyret, AFGL atmospheric absorption line parameters compilation: 1982 Edition, *Appl. Opt.*, 22, 2247-2256, 1983b.
- Rothman, L. S., G. A. Vanasse, Murcray, D. G., F. H. Murcray, F. J. Murcray, and A. Goldman, Atmospheric emission spectra from the stratospheric cryogenic interferometer balloon experiment, in *Ninth Colloquium on High Resolution Molecular Spectroscopy*, pp. 19, University Press, Bologna, Italy, 1985.
- Rottger, J., Structure and dynamics of the stratosphere and mesosphere revealed by VHF radar investigations, *Pure Appl. Geophys.*, 118, 494-527, 1980.
- Rottman, G. J., 27-day variations observed in solar ultraviolet (120-300 nm) irradiance, *Planet. Space Sci.*, 31, 1001-1007, 1983.
- Rowe, B. R., A. A. Viggiano, F. C. Fehsenfeld, D. W. Fahey, and E. E. Ferguson, Reactions between neutrals clustered on ions, *J. Chem. Phys.*, 76, 742-743, 1982.
- Rowland, F. S., and M. J. Molina, Chlorofluoromethanes in the environment, *Rev. of Geophys. Space Phys.*, 13, 1-36, 1975.
- Rowland, F. S., and P. J. Rogers, Upper stratospheric photolysis of NaCl and KCl, *Proc. Natl. Acad. Sci. USA*, 79, 2737-2739, 1982.
- Rowland, F. S., E. W. Mayer, D. R. Blake and Y. Makide, Trends in atmospheric methane concentrations since 1978, paper presented at Proc. Symp. Composition of the Non-urban Troposphere, Williamsburg, VA, 25-28 May 1982.
- Rowland, F. S., D. R. Blake, and E. W. Mayer, World-wide increase in concentration of atmospheric methane since 1978, in *Symposium Proceedings of WMO Technical Conference on Observation and Measurement of Atmospheric Contaminants*, in press, 1984.
- Roy, C. R., I. E. Galbally, and B. A. Ridley, Measurements of nitric oxide in the stratosphere of the Southern Hemisphere, *Quart. J. Roy. Meteorol. Soc.*, 106, 887-894, 1980.
- Ruderman, M. A., H. M. Folet, and J. W. Chamberlain, Eleven-year variation in polar ozone and stratospheric-ion chemistry, *Science*, 192, 555-557, 1976.
- Rudolph, J., and D. H. Ehhalt, Measurements of C₂-C₅ hydrocarbons over the North Atlantic, *J. Geophys. Res.*, 86, 11959-11964, 1981.
- Rudolph, J., D. H. Ehhalt, and A. Toennissen, Vertical profiles of ethane and propane in the stratosphere, *J. Geophys. Res.*, 86, 7267-7272, 1981.

REFERENCES

- Rundel, R. D., D. M. Butler, and R. S. Stolarski, Uncertainty propagation in a stratospheric model 1. Development of a concise stratospheric model, *J. Geophys. Res.*, **83**, 3063-3072, 1978.
- Rusch, D. W., and R. S. Eckman, Implications of the comparison of ozone abundances measured by the Solar Mesosphere Explorer to model calculations, *J. Geophys. Res.*, **90**, 12991-12998, 1985.
- Rusch, D. W., J. C. Gerard, S. Solomon, P. J. Crutzen, and G. C. Reid, The effect of particle precipitation on the neutral and ion chemistry of the middle atmosphere—I. Odd nitrogen, *Planet. Space Sci.*, **29**, 767-774, 1981.
- Rusch, D. W., G. H. Mount, C. A. Barth, G. J. Rottman, R. J. Thomas, G. E. Thomas, R. W. Sanders, G. M. Lawrence, and R. S. Eckman, Ozone densities in the lower mesosphere measured by a Limb Scanning Ultraviolet Spectrometer, *Geophys. Res. Lett.*, **10**, 241-244, 1983.
- Rusch, D. W., G. H. Mount, C. A. Barth, and M. Callan, Global measurements of ozone in the 1.0 to 0.1 mb region by an ultraviolet spectrometer on the Solar Mesosphere Explorer, *J. Geophys. Res.*, **89**, 11677-11687, 1984.
- Rusch, D. W., R. J. Thomas, and E. Hilsenrath, Satellite-rocket ozone profile comparisons over Natal, *J. Geophys. Res.*, in press, 1985.
- Russell III, J. M., Global distribution and variability of stratospheric constituents measured by LIMS, *Adv. Space Res.*, **4**, 107-116, 1984.
- Russell III, J. M., and J. C. Gille, The Limb Infrared Monitor of the Stratosphere (LIMS) experiment, in *The Nimbus 7 Users' Guide*, edited by C. R. Madrid, pp. 71-103, NASA Goddard Space Flight Center, Greenbelt, MD, 1978.
- Russell III, J. M., J. C. Gille, E. E. Remsberg, L. L. Gordley, P. L. Bailey, S. R. Drayson, J. Fischer, A. Girard, J. E. Harries, and W. F. J. Evans, Validation of nitrogen dioxide results measured by the Limb Infrared Monitor of the Stratosphere (LIMS) experiment on Nimbus 7, *J. Geophys. Res.*, **89**, 5099-5107, 1984a.
- Russell III, J. M., S. Solomon, L. L. Gordley, E. E. Remsberg, and L. B. Callis, The variability of stratospheric and mesospheric NO₂ in the polar winter night observed by LIMS, *J. Geophys. Res.*, **89**, 7267-7275, 1984b.
- Russell III, J. M., J. C. Gille, E. M. Remsberg, L. L. Gordley, P. L. Bailey, H. Fischer, A. Girard, S. R. Drayson, W. F. J. Evans, and J. E. Harries, Validation of water vapor results measured by the Limb Infrared Monitor of the Stratosphere experiment on NIMBUS 7, *J. Geophys. Res.*, **89**, 5115-5124, 1984c.
- Russell III, J. M., S. Solomon, M. P. McCormick, A. J. Miller, D. W. Rusch, and J. J. Barnett, Middle atmosphere composition revealed by satellite observations, in *Handbook for MAP*, in press, 1986.
- Ryden, J. C., N₂O exchange between grassland and the atmosphere, *Nature*, **292**, 235-237, 1981.
- SRI International, *Chemical Economics Handbook Product Review: Fluorocarbons*, August, 1982.
- Salby, M. L., Rossby normal modes in nonuniform background configurations. I: Simple fields, *J. Atmos. Sci.*, **38**, 1803-1826, 1981a.
- Salby, M. L., Rossby normal modes in nonuniform background configurations. II: Equinox and solstice conditions, *J. Atmos. Sci.*, **38**, 1827-1840, 1981b.
- Salby, M. L., The 2-day wave in the middle atmosphere—Observations and theory, *J. Geophys. Res.*, **86**, 9654-9660, 1981c.
- Salby, M. L., A ubiquitous wavenumber-5 anomaly in the Southern Hemisphere during FGGE, *Mon. Weather Rev.*, **110**, 1712-1720, 1982a.
- Salby, M. L., Sampling theory for asynoptic satellite observations. Part I. Space-time spectra, resolution and aliasing. Part II. Fast Fourier synoptic mapping, *J. Atmos. Sci.*, **39**, 2577-2614, 1982b.
- Salby, M. L., Survey of planetary-scale traveling waves: The state of theory and observations, *Rev. Geophys. Space. Phys.*, **22**, 209-236, 1984a.

REFERENCES

- Salby, M. L., Transient disturbances in the stratosphere: Implications for theory and observing systems, *J. Atmos. Terr. Phys.*, 46, 1009-1047, 1984b.
- Salby, M. L., and R. Garcia, Vacillations induced by interference of stationary and traveling waves, in *Handbook for MAP, Vol. 18*, edited by S. Kato, pp. 170-174, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Salby, M. L., and R. G. Roper, Long-period oscillations in the meteor region, *J. Atmos. Sci.*, 37, 237-244, 1980.
- Salby, M. L., D. L. Hartmann, P. L. Bailey, and J. C. Gille, Evidence for equatorial Kelvin modes in Nimbus-7 LIMS, *J. Atmos. Sci.*, 41, 220-235, 1984.
- Samain, D., and P. C. Simon, Solar flux determination in the spectral range 150-210 nm, *Solar Physics*, 49, 33-41, 1976.
- Sandalls, F. J., and S. A. Penkett, Measurements of carbonyl sulfide and carbon disulfide in the atmosphere, *Atmos. Environ.*, 11, 197-199, 1977.
- Sander, S. P., and M. Peterson, Kinetics of the reaction $\text{HO}_2 + \text{NO}_2 + \text{M} \rightarrow \text{HO}_2\text{NO}_2 + \text{M}$, *J. Phys. Chem.*, 88, 1566-1571, 1984.
- Sanheuz, E., and J. Heicklen, Chlorine atom sensitized oxidation of dichloromethane and chloromethane, *J. Phys. Chem.*, 79, 7-11, 1975.
- Sato, T., and R. F. Woodman, Fine altitude resolution observations of stratospheric turbulent layers by the Arecibo 430 MHz radar, *J. Atmos. Sci.*, 39, 2546-2552, 1982.
- Savoie, D. L., and J. M. Prospero, Particle size distribution of nitrate and sulfate in the marine atmosphere, *Geophys. Res. Lett.*, 9, 1207-1210, 1982.
- Sawyer, J. S., The vertical circulation at meteorological fronts and its relation to frontogenesis, *Proc. Roy. Soc. London*, A234, 346-362, 1956.
- Schenkel, A., and B. Broder, Interference of some trace gases with ozone measurements by the KI method, *Atmos. Environ.*, 16, 2187-2190, 1982.
- Schlesinger, M. E., A review of climate model simulations of CO_2 -induced climatic change, *Rep. No. 41*, 135 pp., Climatic Research Institute, Oregon State University, Corvallis, OR, 1983.
- Schlesinger, M. E., Climate model simulation of CO_2 -induced climatic change, in *Advances in Geophysics*, 26, edited by B. Saltzman, pp. 141-235, Academic Press, New York, 1984.
- Schlesinger, M. E., and Y. Mintz, Numerical simulation of ozone production, transport and distribution with a global general circulation model, *J. Atmos. Sci.*, 36, 1325-1361, 1979.
- Schlesinger, M. E., and J. F. B. Mitchell, Model projections of equilibrium climate response to increased CO_2 , edited M. C. MacCracken and F. M. Luther, U.S. Department of Energy, in press, 1985.
- Schlesinger, M. E., W. L. Gates, and Y. J. Han, The role of the ocean in CO_2 -induced climate change: Preliminary results from the OSU coupled atmosphere-ocean general circulation model, in *Coupled Ocean Atmosphere Models*, edited by J. C. Nichol, pp. 447-478, Elsevier Science, New York, 1985.
- Schmailzl, U., and P. J. Crutzen, Budgets of stratospheric trace gases from 2-D-model calculations and satellite observations, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 43-47, D. Reidel, Dordrecht, 1985.
- Schmeisser, M., and K. Brandle, Halogennitrate und ihre Reaktionen, *Angew. Chem.*, 73, 388-393, 1961.
- Schmidt, U., G. Kulesa, A. Khedim, D. Knapska, and J. Rudolph, Sampling of long lived trace gases in the middle and upper stratosphere, in *Sixth ESA Symposium on European Rocket and Balloon Programmes and Related Research—Conferences*, ESA SP-183, edited by W. R. Burke, pp. 141-145, European Space Agency, Paris, 1983.
- Schmidt, U., A. Khedim, D. Knapska, G. Kulesa, and F. J. Johnen, Stratospheric trace gas distributions observed in different seasons, *Adv. Space Res.*, 4, 131-134, 1984.

REFERENCES

- Schmidt, U., D. Knapska, and S. A. Penkett, A study of the vertical distribution of methyl chloride (CH_3Cl) in the midlatitude stratosphere, *J. Atmos. Chem.*, in press, 1985a.
- Schmidt, U., P. Fabian, and R. Borchers, Intercomparison of balloon-borne cryogenic whole air samplers during the MAP/Globus campaign, *Planet. Space Sci.*, in press, 1985b.
- Schneider, S. H., On the carbon dioxide-climate confusion, *J. Atmos. Sci.*, **32**, 2060-2066, 1975.
- Schneider, S. H., and S. L. Thompson, Atmospheric CO_2 and climate: Importance of the transient response, *J. Geophys. Res.*, **86**, 3135-3147, 1981.
- Schneider, W. H., P. K. Bhartia, K. F. Klenk, and C. L. Mateer, An optimum statistical technique for ozone profile retrieval from backscattered UV radiances, paper presented at Fourth Conference on Atmospheric Radiation, Am. Meteorol. Soc., Toronto, Ontario, Canada, June 16-18, 1981.
- Schoeberl, M. R., Stratospheric warmings: Observations and theory, *Rev. Geophys. Space Phys.*, **16**, 521-538, 1978.
- Schoeberl, M. R., Medium-scale disturbances in total ozone during Southern Hemisphere summer, *Bull. Amer. Meteorol. Soc.*, **64**, 1358-1365, 1983.
- Schoeberl, M. R., On the penetration of mountain waves into the middle atmosphere, *J. Atmos. Sci.*, **42**, 2856-2864, 1985.
- Schoeberl, M. R., and M. A. Geller, A calculation of the structure of stationary planetary waves in winter, *J. Atmos. Sci.*, **34**, 1235-1255, 1977.
- Schoeberl, M. R., and D. F. Strobel, The response of the zonally averaged circulation to stratospheric ozone reductions, *J. Atmos. Sci.*, **35**, 1751-1757, 1978a.
- Schoeberl, M. R., and D. F. Strobel, The zonally averaged circulation of the middle atmosphere, *J. Atmos. Sci.*, **35**, 577-591, 1978b.
- Schoeberl, M. R., and D. F. Strobel, Nonzonal gravity wave breaking in the winter mesosphere, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 45-64, D. Reidel, Dordrecht, 1984.
- Schoeberl, M. R., D. F. Strobel, and J. Apruzese, A numerical model of gravity wave breaking and stress in the mesosphere, *J. Geophys. Res.*, **88**, 5249-5259, 1983.
- Schryer, D. R., *Heterogeneous Atmospheric Chemistry*, *Geophysical Monograph 26*, American Geophysical Union, Washington, DC, 1982.
- Schwab, J. J., D. W. Toohey, W. H. Brune, and J. G. Anderson, Reaction kinetics of $\text{O} + \text{ClO} \rightarrow \text{Cl} + \text{O}_2$ between 252-347K, *J. Geophys. Res.*, **89**, 9581-9587, 1984.
- Schwartz, P. R., C. L. Croskey, R. M. Bevilacqua, and J. J. Olivero, Microwave spectroscopy of H_2O in the stratosphere and mesosphere, *Nature*, **305**, 294-295, 1983.
- Schwartz, S. E., Gas- and aqueous-phase chemistry of HO_2 in liquid-water clouds, paper presented at the meeting of the American Chemical Society, Division of Environmental Chemistry, Washington, DC, September, 1983.
- Secroun, C., A. Barbe, P. Jouve, P. Arcas, and E. Arie, Intensity of the ν_3 band of ozone from a study of its anomalous dispersion at $10 \mu\text{m}$, *J. Molec. Spectrosc.*, **85**, 8-15, 1981.
- Sehmel, G. A., Particle and gas dry deposition: A review, *Atmos. Environ.*, **14**, 983-1011, 1980.
- Seiler, W., The cycle of carbon monoxide in the atmosphere, in *Proceedings of the ICESA Conference*, Vol. 2, I.E.E.E., New York, 1976.
- Seiler, W., Contributions of biological processes to the global budget of CH_4 in the atmosphere, in *Current Perspectives in Microbial Ecology*, American Soc. for Microbiology, Washington, DC, edited by M. J. Klug and C. A. Reddy, 710 pp., 1984.
- Seiler, W., and R. Conrad, Field measurements of natural and fertilizer-induced N_2O release rates from soils, *APCA Journal*, **31**, 767-772, 1981.

REFERENCES

- Seiler, W., and R. Conrad, Contributions of tropical ecosystems to the global budgets of trace gases, especially CH₄, H₂, CO and N₂O, in *Geophysiology of Amazonia*, edited by R. Dickinson, Wiley, New York, in press, 1985.
- Seiler, W., and P. Crutzen, Estimates of the gross and net flux of carbon between the biosphere and the atmosphere from biomass burning, *Climate Change*, 2, 207-247, 1980.
- Seiler, W., and J. Fishman, The distribution of carbon monoxide and ozone in the free troposphere, *J. Geophys. Res.*, 86, 7255-7265, 1981.
- Seiler, W., and U. Schmidt, New aspects of CO and H₂ cycles in the atmosphere, in *Proceedings of the Int'l Conf. on the Structure, Composition, and Gen'l Circulation of the Upper and Lower Atmospheres and Possible Anthropogenic Perturbations*, pp. 192-222, IAMAP, Melbourne, 1974.
- Seiler, W., F. Muller, and H. Oeser, Vertical distribution of chlorofluoromethanes in the upper troposphere and lower stratosphere, *Pure Appl. Geophys.*, 116, 554-566, 1978.
- Seiler, W., A. Holzafel-Pschorn, R. Conrad, and D. Scharffe, Methane emissions from rice paddies, *J. Atmos. Chem.*, 1, 241-268, 1984a.
- Seiler, W., H. Giehl, E. Brunke, and E. Halliday, The seasonality of CO abundance in the Southern Hemisphere, *Tellus*, 36B, 219-231, 1984b.
- Seiler, W., R. Conrad, and D. Scharffe, Field studies of CH₄ emissions from termite nests into the atmosphere and measurements of CH₄ uptake by tropical soils, *J. Atmos. Chem.*, 1, 171-187, 1984c.
- Seinfeld, J. H., *Air Pollution: Physical and Chemical Fundamentals*, 523 pp., McGraw-Hill Book Co., New York, 1975.
- Senum, G. I., Y. N. Lee, and Gaffrey, Ultraviolet absorption spectrum of peroxyacetyl nitrate and peroxypropionyl nitrate, *J. Phys. Chem.*, 88, 1269-1270, 1984.
- Sexstone, A. J., N. P. Reusbeck, T. B. Parkin, and J. M. Tiedje, Direct measurement of oxygen profiles and denitrification rates in soil aggregates, *Soil Sci. Am. J.*, 49, 645-651, 1985.
- Sexton, K. and H. Westberg, Nonmethane HC composition of urban and rural atmospheres, *Atmos. Environ.*, 18, 1125-1132, 1984.
- Shapiro, M. A., A multiple-structured frontal zone-jet stream system as revealed by meteorologically instrumented aircraft, *Mon. Weather Rev.*, 102, 244-253, 1974.
- Shapiro, M. A., Simulation of upper level frontogenesis with a 20-level isentropic coordinate primitive equation model, *Mon. Weather Rev.*, 103, 591-604, 1975.
- Shapiro, M. A., The role of turbulent heat flux in the generation of potential vorticity in the vicinity of upper level jetstream systems, *Mon. Weather Rev.*, 102, 892-896, 1976.
- Shapiro, M. A., Further evidence of the mesoscale and turbulent structure of upper jet stream-frontal zone systems, *Mon. Weather Rev.*, 106, 1101-1111, 1978.
- Shapiro, M. A., Turbulent mixing within tropopause folds as a mechanism for exchange of chemical constituents between the stratosphere and troposphere, *J. Atmos. Sci.*, 37, 994-1004, 1980.
- Shapiro, M. A., Frontogenesis and geostrophically forced secondary circulations in the vicinity of jetstream-frontal zone systems, *J. Atmos. Sci.*, 38, 954-973, 1981.
- Shapiro, M. A., E. R. Reiter, R. D. Cadle, and W. A. Sedlacek, Vertical mass and trace constituent transports in the vicinity of jet streams, *Arch. Met. Geoph. Biokl.*, B28, 193-206, 1980.
- Shapiro, M. A., A. J. Krueger, and P. J. Kennedy, Nowcasting the position and intensity of jet streams using a satellite-borne total ozone mapping spectrometer, in *Nowcasting*, edited by K. A. Browning, pp. 137-145, Academic Press, New York, 1982.
- Shapiro, M. A., R. C. Schnell, F. P. Parungo, S. J. Oltmans, and B. A. Bodhaine, El Chichon volcanic debris in an Arctic tropopause fold, *Geophys. Res. Lett.*, 11, 421-424, 1984.
- Shardanand, and A. D. Prasad Rao, Collision induced absorption of O₂ in the Herzberg continuum, *J. Quant. Spectrosc. Radiat. Transfer*, 17, 433-439, 1977.

REFERENCES

- Sharma, R. D., and R. M. Nadile, Carbon dioxide (v_2) radiative results using a new non-equilibrium model, *AIAA 81-0426*, paper presented at AIAA 19th Aerospace Sciences meeting, St. Louis, MO, 1981.
- Shaw, Napier Sir, *Manual of Meteorology, The Physical Processes of Weather, Vol. III*, 445 pp., Cambridge University Press, Cambridge, 1942.
- Shiotani, M., and I. Hirota, Planetary wave-mean flow interaction in the stratosphere: A comparison between the Northern and Southern Hemisphere, *Quart. J. Roy. Meteorol. Soc.*, *111*, 309-334, 1985.
- Siegenthaler, U., and H. Oeschger, Transient temperature changes due to increasing CO_2 using simple models, *Ann. of Glaciology*, *5*, 153-159, 1984.
- Silver, J. A., and C. E. Kolb, Measurement of molecular sodium species in the upper atmosphere, *Report No. ARI-RP-199*, Aerodyne Research, Inc., Billerica, MA, May, 1985.
- Silver, J. A., A. C. Stanton, M. S. Zahniser, and C. E. Kolb, Gas phase reaction rate of sodium hydroxide with hydrochloric acid, *J. Phys. Chem.*, *88*, 3123-3129, 1984a.
- Silver, J. A., M. S. Zahniser, A. C. Stanton, and C. E. Kolb, Temperature dependent thermolecular reaction rate constants for potassium and sodium superoxides formation, paper presented at 20th Symposium (International) on Combustion, Ann Arbor, MI, August, 1984b.
- Simmonds, P. G., F. N. Alyea, C. A. Cardelino, A. J. Crawford, D. M. Cunnold, B. C. Lane, J. E. Lovelock, R. G. Prinn, and R. A. Rasmussen, The atmospheric lifetime experiment, 6, Results for carbon tetrachloride based on 3 years data, *J. Geophys. Res.*, *88*, 8427-8441, 1983.
- Simmons, A. J., and R. Struefing, Numerical forecasts of stratospheric warming events using a model with a hybrid vertical coordinate, *Quart. J. Roy. Meteorol. Soc.*, *109*, 81-111, 1983.
- Simon, P. C., Balloon measurements of solar fluxes between 1960 and 2300 Å, in *Proceedings of the Third Conference on the Climatic Impact Assessment Program, DOT-TSC-OST-74-15*, edited by A. J. Broderick and T. M. Hard, pp. 137-140, Dept. of Transp., Washington, DC, 1975.
- Simon, P. C., Solar irradiance between 120 and 400 nm and its variations, *Solar Physics*, *74*, 273-291, 1981.
- Simon, P. C., and G. Brasseur, Photodissociation effects of solar UV radiation, *Planet. Space Sci.*, *31*, 987-999, 1983.
- Simon, P. C., R. Pastiels, and D. Nevejans, Balloon observations of solar ultraviolet irradiance at solar minimum, *Planet. Space Sci.*, *30*, 68-71, 1982.
- Simonaitis, R., Oxidation of the CH_3 radical and some halomethyl and haloethyl radicals of atmospheric interest, in *Proceedings of the NATO Advanced Study Institute on Atmospheric Ozone, Rep. FAA-EE-80-20*, edited by A. C. Aikin, pp. 501-515, DOT, FAA, Washington, DC, 1980.
- Simonaitis, R., and J. Hecklen, Temperature dependence of the reactions of HO_2 with NO and NO_2 , *Int. J. Chem. Kinet.*, *10*, 67-87, 1978.
- Simons, J. W., R. J. Paur, H. A. Webster III, and E. J. Bair, Ozone ultraviolet photolysis. VI. The ultraviolet spectrum, *J. Chem. Phys.*, *59*, 1203-1208, 1973.
- Singh, H. B., Atmospheric halocarbons: Evidence in favour of reduced average hydroxyl radical concentration in the troposphere, *Geophys. Res. Lett.*, *4*, 101-104, 1977a.
- Singh, H. B., Preliminary estimates of average tropospheric OH concentrations in the Northern and Southern Hemispheres, *Geophys. Res. Lett.*, *4*, 453-456, 1977b.
- Singh, H. B., and L. J. Salas, Measurement of selected light hydrocarbons over the Pacific Ocean: Latitudinal and seasonal variations, *Geophys. Res. Lett.*, *9*, 842-845, 1982.
- Singh, H. B., and L. J. Salas, Methodology for the analysis of peroxyacetyl nitrate (PAN) in the unpolluted troposphere, *Atmos. Environ.*, *17*, 1507-1516, 1983a.
- Singh, H. B., and L. J. Salas, Peroxyacetylnitrate in the free troposphere, *Nature*, *302*, 326-328, 1983b.
- Singh, H. B., L. J. Salas, H. Shigeishi, and A. Crawford, Urban-nonurban relationships of halocarbons, SF_6 , N_2O and other atmospheric trace constituents, *Atmos. Environ.*, *11*, 819-823, 1977.
- Singh, H. B., L. J. Salas, H. Shigeishi, and E. Scibner, Atmospheric halocarbons, hydrocarbons, and sulfur hexafluoride: Global distributions, sources, and sinks, *Science*, *203*, 899-903, 1979.

REFERENCES

- Singh, H. B., L. J. Salas, and R. E. Stiles, Methyl halides in and over the eastern Pacific (40°N-32°S), *J. Geophys. Res.*, **88**, 3684-3690, 1983a.
- Singh, H. B., L. J. Salas, and R. E. Stiles, Selected man-made halogenated chemicals in the air and oceanic environment, *J. Geophys. Res.*, **88**, 3675-3683, 1983b.
- Singh, H. B., L. J. Salas, B. A. Ridley, J. Shetter, N. M. Donahue, F. C. Fehsenfeld, D. W. Fahey, D. D. Parrish, E. J. Williams, S. C. Liu, G. Hubler, P. C. Murphy, Relationship between peroxyacetyl nitrate (PAN) and nitrogen oxides in the clean troposphere, in press, 1985.
- Slemr, F., and W. Seiler, Field measurements of NO and NO₂ emissions from fertilized and unfertilized soils, *J. Atmos. Chem.*, **2**, 1-24, 1984.
- Smagorinsky, J. (Chairman), *Carbon Dioxide and Climate: A Second Assessment*, 92 pp., National Academy Press, Washington, DC, 1982.
- Smagorinsky, J., S. Manabe, and J. L. Holloway Jr., Numerical results from a nine-level general circulation model of the atmosphere, *Mon. Weather Rev.*, **93**, 727-788, 1965.
- Smith, A. K., An observational study of planetary wave propagation in the winter stratosphere, Ph.D. thesis, 71 pp., Washington Univ., Seattle, WA, 1982.
- Smith, A. K., Observations of wave-wave interactions in the stratosphere, *J. Atmos. Sci.*, **40**, 2484-2496, 1983.
- Smith, A. K., and L. V. Lyjak, An observational estimate of gravity wave drag from the momentum balance in the middle atmosphere, *J. Geophys. Res.*, **90**, 2233-2241, 1985.
- Smith, A. K., J. C. Gille, and L. V. Lyjak, Wave-wave interactions in the stratosphere: Observations during quiet and active wintertime periods, *J. Atmos. Sci.*, **41**, 363-373, 1984.
- Smith, C. J., R. D. DeLaure, and W. H. Patrick, Jr., Nitrous oxide emission from Gulf Coast wetlands, *Geochim. Cosmochim. Acta*, **47**, 1805-1814, 1983.
- Smith, M. A. H. (Ed.), Review of spectroscopic parameters for upper atmospheric measurements, *NASA Conference Publication 2396*, 28 pp., NASA, Langley Research Center, Hampton, VA, 1985.
- Smith, M. A. H., and C. P. Rinsland, Spectroscopic measurements of atmospheric HCN at northern and southern latitudes, *Geophys. Res. Lett.*, **12**, 5-8, 1985.
- Smith, M. A. H., C. P. Rinsland, D. Frieourch and K. Narahari Rao, Intensities and collision broadening parameters from infrared spectra, in *Molecular Spectroscopy in Modern Research*, Vol. 3, pp. 111-248, Academic Press, New York, 1985.
- Smith, P. L., H. E. Griesinger, J. H. Black, K. Yoshino, and D. E. Freeman, Interstellar O₂. II. VUV oscillator strengths of Schumann-Runge lines and prospects for space telescope observations, *Astrophys. J.*, **277**, 569-575, 1984.
- Smith, R. M., A preview of the detection of mass return flow of air and water into the stratosphere using tritium as a tracer, *Tellus*, **20**, 76-81, 1968.
- Smith, W. L., H. M. Woolf, C. M. Hayden, D. Q. Wark, and L. M. McMillin, The TIROS-N operational vertical sounder, *Bull. Amer. Meteor. Soc.*, **60**, 1177-1187, 1979.
- Solomon, P. M., R. L. de Zafra, A. Parrish, and J. W. Barrett, Diurnal variation of stratospheric chlorine monoxide: A critical test of chlorine chemistry in the ozone layer, *Science*, **224**, 1210-1214, 1984.
- Solomon, S., and P. J. Crutzen, Analysis of the August 1972 solar proton event including chlorine chemistry, *J. Geophys. Res.*, **86**, 1140-1146, 1981.
- Solomon, S., and R. R. Garcia, On the distribution of nitrogen dioxide in the high-latitude stratosphere, *J. Geophys. Res.*, **88**, 5229-5239, 1983a.
- Solomon, S., and R. R. Garcia, Simulation of NO_x partitioning along isobaric parcel trajectories, *J. Geophys. Res.*, **89**, 5497-5501, 1983b.
- Solomon, S., and R. R. Garcia, Transport of thermospheric NO to the upper stratosphere, *Planet. Space Sci.*, **32**, 399-409, 1984a.

REFERENCES

- Solomon, S., and R. R. Garcia, On the distribution of long-lived tracers and chlorine species in the middle atmosphere, *J. Geophys. Res.*, **89**, 11633-11644, 1984b.
- Solomon, S., D. W. Rusch, J.-C. Gerard, G. C. Reid, and P. J. Crutzen, The effect of particle precipitation events on the neutral and ion chemistry of the middle atmosphere: II. Odd hydrogen, *Planet. Space Sci.*, **29**, 885-892, 1981.
- Solomon, S., P. J. Crutzen, and R. G. Roble, Photochemical coupling between the thermosphere and the lower atmosphere 1. Odd nitrogen from 50 to 120 km, *J. Geophys. Res.*, **87**, 7206-7220, 1982.
- Solomon, S., D. W. Rusch, R. J. Thomas, and R. S. Eckman, Comparison of mesospheric ozone abundances measured by the Solar Mesosphere Explorer and model calculations, *Geophys. Res. Lett.*, **10**, 249-252, 1983a.
- Solomon, S., G. C. Reid, D. W. Rusch, and R. J. Thomas, Mesospheric ozone depletion during the solar proton event of July 13, 1983, Part II. Comparison between theory and measurements, *Geophys. Res. Lett.*, **10**, 257-260, 1983b.
- Solomon, P. M., R. de Zafra, A. Parrish and J. W. Barrett, Diurnal variation of stratospheric chlorine oxide: A critical test of chlorine chemistry in the ozone layer, *Science*, **224**, 1210-1214, 1984.
- Solomon, S., J. M. Russell III, M. P. McCormick, D. W. Rusch, and J. M. Zawodny, Intercomparison of satellite datasets for NO₂ and odd nitrogen photo-chemistry, in press, 1985a.
- Solomon, S., R. R. Garcia, and F. Stordal, Transport processes and ozone perturbations, *J. Geophys. Res.*, **90**, 12981-12990, 1985b.
- Solomon, S., J. T. Kiehl, R. R. Garcia, and W. Grose, Tracer transport by the diabatic circulation deduced from satellite observations, *J. Atmos. Sci.*, in press, 1986.
- Somerville, R. C. J., and L. A. Remer, Cloud optical thickness feedbacks in the CO₂ climate problem, *J. Geophys. Res.*, **89**, 9668-9672, 1984.
- Spelman, M. J., and S. Manabe, Influence of oceanic heat transport upon the sensitivity of a model climate, *J. Geophys. Res.*, **89**, 571-586, 1984.
- Speth, P., and R. Madden, Space-time spectral analyses of Northern Hemisphere geopotential heights, *J. Atmos. Sci.*, **40**, 1086-1100, 1983.
- Spicer, C. W., M. W. Holdren, and C. W. Keigley, The ubiquity of peroxyacetyl nitrate in the continental boundary layer, *Atmos. Environ.*, **17**, 1055-1058, 1983.
- Sridharan, U. C., L. X. Qui, and F. Kaufman, Kinetics and product channels of the reactions of HO₂ with O and H atoms at 296K, *J. Phys. Chem.*, **86**, 4569-4574, 1982.
- Sridharan, U. C., L. X. Qui, and F. Kaufman, Rate constant of the OH + HO₂ reaction from 252 to 420K, *J. Phys. Chem.*, **88**, 1281-1282, 1984.
- St. John, D., W. H. Bailey, W. H. Fellner, J. M. Minor, and R. D. Sull, Time series analysis of stratospheric ozone, *Commun. Statist. Theory Methods*, **11**, 1293-1333, 1982.
- Staff, Upper Air Branch National Weather Service, Synoptic analyses, 5-, 2-, and 0.4-millibar surfaces for July 1974 through June 1976, *NASA Ref. Publ. 1023*, 330 pp., National Weather Service, Camp Springs, MD, 1978.
- Staffensen, F. L., S. Kikkawa, and R. G. Phibbs, Meteorological rocket data processor and results from the solar eclipse of 7 March 1970, *J. Appl. Meteorol.*, **11**, 722-730, 1972.
- Staley, D. O., Evaluation of potential vorticity changes near the tropopause and the related vertical motions, vertical advection of vorticity, and transfer of radioactive debris from stratosphere to troposphere, *J. Meteorol.*, **17**, 591-620, 1960.
- Staley, D. O., On the mechanism of mass and radioactivity transport from stratosphere to troposphere, *J. Atmos. Sci.*, **19**, 450-467, 1962.
- Starr, W. L., R. A. Craig, M. Loewenstein, and M. E. McGhan, Measurements of NO, O₃, and temperature at 19.8 km during the total solar eclipse of 26 February 1979, *Geophys. Res. Lett.*, **7**, 553-555, 1980.

REFERENCES

- Stauffer, B., A. Neftel, H. Oeschger, and J. Schwander, CO₂ concentrations in air extracted from Greenland ice samples, in *Greenland Ice Core: Geophysical Geochemistry, and the Environment*, American Geophysical Union Monograph No. 33, edited by C. C. Langway, H. Oeschger, and W. Dansgaard, pp. 83-89, Washington, DC, 1985.
- Stedman, D. H., and J. O. Jackson, The photostationary state in photochemical smog, *Int. J. Chem. Kinetics Symposium, 1*, 493-501, 1975.
- Steed, J. M., A. J. Owens, C. D. Miller, D. L. Filkin, and J. P. Jesson, Two-dimensional model calculations of potential ozone perturbation by chlorofluorocarbons, *Nature*, 295, 308-311, 1982.
- Steele, L. P., P. J. Fraser, R. A. Rasmussen, M. A. K. Khalil, T. J. Conway, A. J. Crawford, R. H. Gammon, K. A. Masarie, and K. W. Thoning, The global distribution of methane in the troposphere, *J. Atmos. Chem.*, in press, 1985.
- Stelson, A. W., and J. H. Seinfeld, Relative humidity and temperature dependence of the ammonium nitrate dissociation constant, *Atmos. Environ.*, 16, 983-993, 1982.
- Stephens, G. L., and P. J. Webster, Sensitivity of radiative forcing to variable cloud and moisture, *J. Atmos. Sci.*, 36, 1450-1466, 1979.
- Stephens, G. L., S. Ackerman and E. A. Smith, A shortwave parameterization revised to improve cloud absorption, *J. Atmos. Sci.*, 41, 687-690, 1984.
- Stern, A. C., *Air Pollution, Vol. III*, Academic Press, New York, 1977.
- Stevens, C. M., and A. Engelkemeir, *J. Geophys. Res.*, in press, 1986.
- Stockwell, W. R., and J. G. Calvert, The mechanism of the HO-SO₂ reaction, *Atmos. Environ.*, 17, 2231-2235, 1983.
- Stolarski, R. S., Impact of large amounts of chlorine on stratospheric ozone, paper presented at the International Workshop on Current Issues in our Understanding of the Stratosphere and the Future of the Ozone Layer, BMFT, NASA, FAA, WMO, Feldafing, FRG, June 11-16, 1984.
- Stolarski, R. S., and R. J. Cicerone, Stratospheric chlorine: A possible sink for ozone, *Can. J. Chem.*, 52, 1610-1615, 1974.
- Stolarski, R. S., and A. R. Douglass, Parameterization of the photochemistry of stratospheric ozone including catalytic loss processes, *J. Geophys. Res.*, 90, 10709-10718, 1985.
- Stolarski, R. S., D. M. Butler, and R. D. Rundel, Uncertainty propagation in a stratospheric model. 2. Monte Carlo analysis of imprecisions due to reaction rates, *J. Geophys. Res.*, 83, 3074-3078, 1978.
- Stordal, F., I. S. A. Isaksen, and K. Horntveit, A diabatic circulation two-dimensional model with photochemistry: Simulations of ozone and ground released tracers, *J. Geophys. Res.*, 90, 5757-5776, 1985.
- Stout, J., E. B. Rogers, and E. Nunez, abst, 16th Conf. Hurricanes and Tropical Meteorol 14-17 May 1985, Houston, Texas., 1985.
- STRAC, Chlorofluorocarbons and their effects on stratospheric ozone, *Pollution Paper No 15*, HMSO, 1979.
- Stratospheric Analysis Group, *Meteor. Abh. Met. Inst. Berlin*, 1980.
- Strickland, A. C. (Ed.), *COSPAR International Reference Atmosphere*, Akademie-Verlag, Berlin, 1972.
- Strobel, D. F., Parameterization of the atmospheric heating from 15-120 km due to O₂ and O₃ absorption of solar radiation, *J. Geophys. Res.*, 83, 6225-6230, 1978a.
- Strobel, D. F., Photochemical radiative damping and instability in the stratosphere, II. Numerical results, *Geophys. Res. Lett.*, 5, 523-525, 1978b.
- Strobel, D. F., D. M. Hunten, and M. B. McElroy, Production and diffusion of nitric oxide, *J. Geophys. Res.*, 75, 4307-4321, 1970.
- Susskind, J., and J. E. Searl, Atmospheric absorption near 2400 cm⁻¹, *J. Quant. Spectrosc. Radiat. Transfer*, 18, 581-589, 1977.
- Swanson, D., K. Brian, and H. S. Johnston, NO₃ quantum yield from N₂O₅ photolysis, *J. Phys. Chem.*, 88, 3115-3115, 1984.

REFERENCES

- Swider, W., and T. J. Keneshea, Decrease of ozone and atomic oxygen in the lower mesosphere during a PCA event, *Planet. Space Sci.*, *21*, 1969-1973, 1973.
- Swider, W., T. J. Keneshea, and C. I. Foley, An SPE-distributed D-region model, *Planet. Space Sci.*, *26*, 883-892, 1978.
- Syed, M. Q., and A. W. Harrison, Ground based observations of stratospheric nitrogen dioxide, *J. Canad. Phys.*, *58*, 788-802, 1980.
- Syed, M. Q., and A. W. Harrison, Seasonal trend of stratospheric NO₂ over Calgary, *Can. J. Phys.*, *59*, 1278-1279, 1981.
- Sze, N. D., Anthropogenic CO emissions: Implications for the atmospheric CO-OH-CH₄ cycle, *Science*, *195*, 673-675, 1977.
- Sze, N. D., paper presented at CMA Workshop on Stratospheric Chemistry, Gottingen, FRG, October, 1984.
- Sze, N. D., and M. K. Ko, CS₂ and COS in the stratospheric sulfur budget, *Nature*, *280*, 308-310, 1979.
- Sze, N. D., M. K. W. Ko, W. Swider, and E. Murad, Atmospheric sodium chemistry. 1. The altitude region 70-100 km, *Geophys. Res. Lett.*, *9*, 1187-1190, 1982.
- Sze, N. D., M. K. W. Ko, M. Livshits, W. C. Wang, P. B. Ryan, R. E. Specht, M. B. McElroy, and S. C. Wofsy, *Annual Report on the Atmospheric Chemistry, Radiation and Dynamics Program*, Atmospheric and Environmental Research, Inc., Cambridge, MA, 1983.
- Taine, J., and F. LePoutre, A photoacoustic study of the collisional deactivation of the first vibrational levels of CO₂ by N₂ and CO, *Chem. Phys. Lett.*, *65*, 554-558, 1979.
- Takahashi, M., A two-dimensional numerical model of the semi-annual zonal wind oscillation, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 253-269, Terrapub, Tokyo, 1984.
- Tang, I. N., On the equilibrium partial pressures of nitric acid and ammonia in the atmosphere, *Atmos. Environ.*, *14*, 819-828, 1980.
- Telegades, K., The seasonal stratospheric distribution and inventory of excess carbon-14 from March 1955 to July 1969, *Rep. 243*, Health and Safety Lab., U.S. Atomic Energy Comm., Washington, DC, 1971.
- Tenenbaum, J., Integrated and spectral energetics studies of the GLAS general circulation model, *Mon. Weather Rev.*, *110*, 962-980, 1982.
- Terry, R. E., R. L. Tate, and J. M. Duxbury, Nitrous oxide emissions from drained, cultivated organic soils of S. Florida, *J. Air Poll. Control Assoc.*, *31*, 1173-1176, 1981.
- Thacker, D. L., C. J. Gibbins, P. R. Schwartz, and R. M. Bevilacqua, Ground-based microwave observations of mesospheric H₂O in January, April, July, and September, 1980, *Geophys. Res. Lett.*, *8*, 1059-1062, 1981.
- Theon, J. S., W. Nordberg, C. B. Katchen, and J. J. Horvath, Some observations on the thermal behavior of the mesosphere, *J. Atmos. Sci.*, *24*, 428-438, 1967.
- Thomas, M. E., and R. J. Nordstrum, The N₂-broadened water vapor absorption line shape and infrared continuum absorption, I. Theoretical development, *J. Quant. Spectrosc. Radiat. Transfer*, *28*, 81-101, 1982.
- Thomas, R. J., C. A. Barth, G. J. Rottman, D. W. Rusch, G. H. Mount, G. M. Lawrence, R. W. Sanders, G. E. Thomas, and L. E. Clemens, Ozone density distribution in the mesosphere (50-90 km) measured by the SME Limb Scanning Near Infrared Spectrometer, *Geophys. Res. Lett.*, *10*, 245-248, 1983a.
- Thomas, R. J., C. A. Barth, G. J. Rottman, D. W. Rusch, G. H. Mount, G. M. Lawrence, R. W. Sanders, G. E. Thomas, and L. E. Clemens, Mesospheric ozone depletion during the solar proton event of July 13, 1982, Part I-Measurement, *Geophys. Res. Lett.*, *10*, 253-255, 1983b.
- Thomas, R. J., C. A. Barth, D. W. Rusch, and R. W. Sanders, Solar Mesosphere Explorer Near Infrared Spectrometer: Measurements of 1.27 μm radiances and the inference of mesospheric ozone, *J. Geophys. Res.*, *89*, 9569-9580, 1984a.

REFERENCES

- Thomas, R. J., C. A. Barth, and S. Solomon, Seasonal variations of ozone in the upper mesosphere and gravity waves, *Geophys. Res. Lett.*, *11*, 673-676, 1984b.
- Thompson, A. M., and D. H. Lenschow, Mean profiles of trace reactive species in the unpolluted marine surface layer, *J. Geophys. Res.*, *89*, 4788-4796, 1984.
- Thompson, A. M., and O. C. Zafiriou, Air-sea fluxes of transient atmospheric species, *J. Geophys. Res.*, *88*, 6696-6708, 1983.
- Tolson, R. H., Spatial and temporal variations of monthly mean total columnar ozone derived from 7 years of UV data, *J. Geophys. Res.*, *86*, 7312-7330, 1981.
- Tomatsu, K., Spectral energetics of the troposphere and lower stratosphere, *Advances in Geophysics*, *21*, 189-205, 1979.
- Torabi, A., An investigation of the kinetics and excited state dynamics of the nitrate free radical, Ph.D. thesis, Georgia Institute of Technology, Atlanta, Georgia, 1985.
- Torres, A. L., Tropospheric nitric oxide measurements during GTE/CITE, *Eos Trans. AGU*, *65*, 835, 1984.
- Torres, A. L., and A. R. Bandy, Performance characteristics of the electrochemical concentration cell ozonesondes, *J. Geophys. Res.*, *83*, 5501-5504, 1978.
- Torres, A. L., P. J. Maroulis, A. B. Goldberg, and A. R. Bandy, Atmospheric OCS measurements on Project Gametag, *J. Geophys. Res.*, *85*, 7357-7360, 1980.
- Townsend, R. D., A diagnostic study of the zonally-averaged global circulation in isentropic coordinates. Ph.D. thesis, 221 pp., University of Wisconsin, Madison, 1980.
- Townsend, R. D., and D. R. Johnson, The mass and angular momentum balance of the zonally averaged general circulation, paper presented at Int. Conf. Prelim. FGGE Data Anal. Res., pp. 542-552, Bergen, 23-27 June 1980.
- Townsend, R. D., and D. R. Johnson, A diagnostic study of the isentropic zonally-averaged mass circulation during the first GARP global experiment, *J. Atmos. Sci.*, *42*, 1565-1579, 1985.
- Traub, W. A., "An upper limit for stratospheric hydrogen peroxide" and "Measurements of OH from 18 to 48 km", papers presented at the International Workshop on Current Issues in our Understanding of the Stratosphere and the Future of the Ozone Layer, BMFT, NASA, FAA, WMO, Feldafing, FRG, June 11-16, 1984.
- Traub, W. A., and K. V. Chance, Stratospheric HF and HCl observations, *Geophys. Res. Lett.*, *8*, 1075-1077, 1981.
- Traub, W. A., K. V. Chance, J. C. Brasunas, J. M. Vrtilik, and N. P. Carleton, Use of a Fourier Transform spectrometer on a balloon borne telescope and at the MMT, in *Proc. Soc. Photo-Opt. Instrum. Eng. Instrumentation in Astronomy IV*, *331*, 209-218, 1982.
- Tsao, C. J., and B. Curnutte, Line widths of pressure broadened spectral lines, *J. Quant. Spectrosc. Radiat. Transfer*, *2*, 41-91, 1962.
- Tsay, C. Y., Analysis of large scale wave disturbances simulated by an NCAR global circulation model, *J. Atmos. Sci.*, *31*, 330-339, 1974.
- Tuazon, E. C., R. Atkinson, C. N. Plum, A. M. Winer, and J. N. Pitts, The reaction of gas phase N_2O_5 with water vapor, *Geophys. Res. Lett.*, *10*, 953-956, 1983.
- Tuazon, E. C., A. M. Winer, and J. N. Pitts, Jr., Trace pollutant concentrations in a multiday smog episode in the California South Coast air basin by long path length fourier transform infrared spectroscopy, *Environ. Sci. Technol.*, *15*, 1232-1237, 1981.
- Tuazon, E. C., R. Atkinson, H. MacLeod, H. W. Biermann, A. M. Winer, W. P. L. Carter, and J. N. Pitts, Jr., Yields of glyoxal and methylglyoxal from the NO_x-air photooxidations of toluene and m- and p- xylene, *Environ. Sci. Technol.*, *18*, 981-984, 1984.
- Tuck, A. F., Production of nitrogen oxides by lightning discharges, *Quart. J. Roy. Meteorol. Soc.*, *102*, 749-755, 1976.

REFERENCES

- Tuck, A. K., A comparison of one- two- and three-dimensional model representations of stratospheric gases, *Phil. Trans. Roy. Soc. London*, *A290*, 477-494, 1979.
- Tucker, B. J., P. J. Maroulis, and A. R. Bandy, Free tropospheric measurements of CS₂ over a 45°N to 45°S latitude range, *Geophys. Res. Lett.*, *12*, 9-11, 1983.
- Tucker, C. J., I. Y. Fung, C. D. Keeling, and R. H. Gammon, The relationship of global spectral vegetation indices to atmospheric CO₂ concentrations, *Nature*, in press, 1985.
- Tung, Ka Kit, On the two-dimensional transport of stratospheric trace gases in isentropic coordinates, *J. Atmos. Sci.*, *39*, 2330-2355, 1982.
- Tung, Ka Kit, Modeling of tracer transport in the middle atmosphere, in *Dynamics of the Middle Atmosphere*, edited by J. R. Holton and T. Matsuno, pp. 417-444, Terrapub, Tokyo, 1984.
- Tung, Ka Kit, and R. S. Lindzen, A theory of stationary long waves. Part II: Resonant Rossby waves in the presence of realistic vertical shears, *Mon. Weather Rev.*, *107*, 735-750, 1979.
- Turco, R. P., R. C. Whitten, O. B. Toon, J. B. Pollack, and P. Hamill, OCS stratospheric aerosols and climate, *Nature*, *283*, 283-286, 1980.
- Turco, R. P., O. B. Toon, R. C. Whitten, R. G. Keesee, and P. Hamill, Importance of heterogeneous processes to tropospheric chemistry: Studies with a one-dimensional model, in *Heterogeneous Atmospheric Chemistry, Geophysical Monograph 26*, edited by David R. Schryer, pp. 231-240, American Geophysical Union, Washington, DC, 1982.
- Turner, N. C., S. Rich, and P. E. Waggoner, Removal of ozone by soil, *J. Environ. Qual.*, *2*, 259-264, 1973.
- Turner, N. C., P. E. Waggoner, and S. Rich, Removal of ozone from the atmosphere by soil and vegetation, *Nature*, *250*, 486-489, 1974.
- Twomey, S. A., M. Piepgrass and T. L. Wolfe, An assessment of the impact of pollution on global albedo, *Tellus*, *36B*, 356-366, 1984.
- Tyndall, J., On radiation through the Earth's atmosphere, *Philos. Mag.*, *4*, 200, 1863.
- Tyson, B. J., J. C. Arvesen, and D. O'Hara, Interhemispheric gradients of CF₂Cl₂, CFC₁₃, CCl₄, and N₂O, *Geophys. Res. Lett.*, *5*, 535-538, 1978b.
- Uccellini, L. W., and D. R. Johnson, The coupling of upper and lower tropospheric jet streaks and implications for the development of severe convective storms, *Mon. Weather Rev.*, *107*, 682-702, 1979.
- Uchino, O., M. Maeda, and M. Hirono, Applications of excimer lasers to laser-radar observations of the upper atmosphere, *IEEE J. Quant. Elec.*, *QE-15*, 1094-1107, 1979.
- U.S. Dept. of HEW, Public Health Service, *Air Quality Criteria for Photochemical Oxidants, NAPCA-PUB-AP-63*, 202 pp., National Air Pollution Control Administration, Arlington, VA, 1970.
- U.S. Standard Atmosphere Supplements*, Superintendent of Documents, 289 pp., U.S. Government Printing Office, Washington, DC, 1966.
- U.S. Standard Atmosphere, 1976*, U.S. Government Printing Office, Washington, DC, 1976.
- van Loon, H. K., K. Labitzke, and R. L. Jeene, Half-yearly wave in the stratosphere, *J. Geophys. Res.*, *77*, 3846-3855, 1972.
- van Loon, H., C. S. Zerefos, and C. C. Repapis, Evidence of the southern oscillation in the stratosphere, *Publication No.3*, Academy of Athens, Research Center for Atmospheric Physics and Climatology, Athens, 1981.
- Varanasi, P., and F. K. Ko, Intensity and transmission measurements in the nu-3 fundamental of N₂O at low temperatures, *J. Quant. Spectros. Radiat. Transfer*, *18*, 465-470, 1977.
- Varanasi, P., L. P. Giver, and F. P. J. Valero, Intensity measurements in the V₄-fundamental of ¹³CH₄ at planetary atmospheric temperatures, *J. Quant. Spectros. Radiat. Transfer*, *30*, 491-495, 1983.
- Vassy, A., Radiosonde speciale pour la mesure de la repartition verticale de l'ozone atmosferique, *J. Sci. Meteorol.*, *10*, 63-75, 1958.
- Vaughan, G., and A. F. Tuck, Aircraft measurements near jet streams, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 572-579, D. Reidel, Dordrecht, 1985.

REFERENCES

- Vedder, J. F., B. J. Tyson, R. B. Brewer, C. A. Boitnott, and E. C. Y. Inn, Lower stratospheric measurements of variation with latitude of CF_2Cl_2 , CFCl_3 , CCl_4 , and N_2O profiles in the Northern Hemisphere, *Geophys. Res. Lett.*, **5**, 33-36, 1978.
- Venne, D., The horizontal structure of traveling planetary-scale waves in the upper stratosphere, *J. Geophys. Res.*, 1984.
- Venne, D., and J. Stanford, An observational study of high-latitude stratospheric planetary waves in winter, *J. Atmos. Sci.*, **39**, 1026-1084, 1982.
- Veryard, R. G., and R. A. Ebdon, Fluctuations in tropical stratospheric winds, *Meteor. Mag.*, **90**, 125-143, 1961.
- Vienkorn-Rudolph, B., K. Bachmann, and B. Schwartz, Vertical profiles of hydrogen chloride in the troposphere, *J. Atmos. Chem.*, **2**, 47-63, 1984.
- Vigroux, E., Contribution a l'etude experimentale de l'absorption de l'ozone, *Ann. Phys.*, **8**, 709-762, 1953.
- Vincent, D. G., Mean meridional circulation in the Northern Hemisphere lower stratosphere during 1964 and 1965, *Quart. J. Roy. Meteorol. Soc.*, **94**, 333-349, 1968.
- Vincent, R. A., Gravity wave motions in the mesosphere, *J. Atmos. Terr. Phys.*, **46**, 119-128, 1984a.
- Vincent, R. A., MF/HF radar measurements of the dynamics of the mesopause region-A review, *J. Atmos. Terr. Phys.*, **46**, 961-974, 1984b.
- Vincent, R. A., Planetary and gravity waves in the mesosphere and lower thermosphere, in *Handbook for MAP, Vol. 16*, edited by K. Labitzke, J. J. Barnett, and B. Edwards, pp. 269-277, SCOSTEP Secretariat, Univ. of Illinois, Urbana, 1985.
- Vincent, R. A., and I. M. Reid, HF Doppler measurements of mesospheric gravity wave momentum fluxes, *J. Atmos. Sci.*, **40**, 1321-1333, 1983.
- Volz, A., U. Schmidt, J. Rudolph, D. H. Ehhalt, F. J. Johnen, and A. Khedim, Vertical profiles of trace gases at mid latitudes, *Jul-Report 1742*, Kernforschungsanlage Julich GmbH, D-5170 Julich, FRG, 1981.
- Vukovich, F. M., J. Fishman and E. V. Browell, The reservoir of ozone in the boundary layer of the eastern United States and its potential impact on the global tropospheric ozone budget, *J. Geophys. Res.*, **90**, 5687-5690, 1985.
- Vupputuri, R. K. R., The structure of the natural stratosphere and the impact of chlorofluoromethanes on the ozone layer investigated in a 2-D time dependent model, *Pure Appl. Geophys.*, **117**, 448-485, 1978/79.
- Vupputuri, R. K. R., Study the effect of El Chichon volcanic cloud on the stratospheric temperature structure and ozone distribution in a 2-D model, in *Atmospheric Ozone*, edited by C. S. Zerefos and A. Ghazi, pp. 59-60, D. Reidel, Dordrecht, 1985.
- Vyas, N., Numerical modelling of atmospheric processes, Ph.D. thesis, Oxford University, Oxford, 1984.
- Wale, M. J., and G. D. Peskett, Some aspects of the design and behavior of the Stratospheric and Mesospheric Sounder, *J. Geophys. Res.*, **89**, 5287-5293, 1984.
- Wallace, J. M., General circulation of the tropical lower stratosphere, *Rev. Geophys. Spa. Phys.*, **11**, 191-222, 1973.
- Wallace, J. M., The climatological mean stationary waves: Observational evidence, in *Large-scale Dynamical Processes in the Atmosphere*, edited by B. J. Hoskins and R. Pearce, pp. 27-53, Academic Press, New York, 1983.
- Wallace, J. M., and V. Kousky, Observational evidence of Kelvin waves in the tropical stratosphere, *J. Atmos. Sci.*, **25**, 900-907, 1968.
- Wallington, T. J., R. Atkinson, and A. M. Winer, Rate constants for the gas phase reaction of OH radicals with peroxyacetyl nitrate (PAN) at 273 and 297K, *Geophys. Res. Lett.*, **11**, 861-864, 1984.
- Wang, P.-H., M. P. McCormick, and W. P. Chu, A study on the planetary wave transport of ozone during the late February 1979 stratospheric warming using the SAGE ozone observation and meteorological information, *J. Atmos. Sci.*, **40**, 2419-2431, 1983.

REFERENCES

- Wang, W.-C., and P. H. Stone, Effect of ice-albedo on global sensitivity in a one-dimensional radiative-convective climate model, *J. Atmos. Sci.*, 37, 545-552, 1980
- Wang, W.-C., and N. D. Sze, Coupled effects of atmospheric N₂O and O₃ on the Earth's climate, *Nature*, 268, 589-590, 1980.
- Wang, W.-C., J. P. Pinto and Y. L. Yung, Climatic effects due to halogenated compounds in the Earth's atmosphere, *J. Atmos. Sci.*, 37, 333-338, 1980.
- Wang, W.-C., Y. L. Yung, A. A. Lacis, T. Mo and J. E. Hansen, Greenhouse effects due to man-made perturbations of trace gases, *Science*, 194, 685-690, 1976.
- Wang, W.-C., W. B. Rossow, M.-S. Yao and M. Wolfson, Climate sensitivity of a one-dimensional radiative-convective model with cloud feedback, *J. Atmos. Sci.*, 38, 1167-1178, 1981.
- Wang, W.-C., D. J. Wuebbles, W. M. Washington, R. G. Isaacs and G. Molnar, Potential climatic effects of perturbations other than CO₂, Chapter 6, in *State-of-the-art report*, edited by M. C. MacCracken and F. M. Luther, Dept. of Energy, Washington, DC, 1985
- Warmbt, W., Results of long term measurements of near surface ozone in the GDR, *Zeit. fuer Met.*, 29, 24-31, 1979.
- Warneck, P., On the role of OH and HO₂ radicals in the troposphere, *Tellus*, 26, 39-46, 1974.
- Washington, W. M., and G. A. Meehl, General circulation model experiments on the climatic effects due to a doubling and quadrupling of carbon dioxide concentration, *J. Geophys. Res.*, 88, 6600-6610, 1983.
- Washington, W. M., and G. A. Meehl, Seasonal cycle experiment on the climate sensitivity due to a doubling of CO₂ with an atmospheric general circulation model coupled to a simple mixed-layer ocean model, *J. Geophys. Res.*, 89, 9475-9503, 1984.
- Watanabe, K., M. Zelikoff, and E. C. Y. Inn, Absorption coefficients of several atmospheric gases, *Geophysical Research Paper No. 21*, Air Force Cambridge Research Lab., Bedford, MA, 1953.
- Waters, J. W., J. J. Gustincic, R. K. Kakar, H. K. Roscoe, P. N. Swanson, T. G. Phillips, T. de Graauw, A. R. Kerr, and R. J. Mattauach, Aircraft search for millimeter wavelength emission by stratospheric ClO, *J. Geophys. Res.*, 84, 7034-7040, 1979.
- Waters, J. W., J. C. Hardy, R. F. Jarnot, and H. M. Pickett, Chlorine monoxide radical, ozone, and hydrogen peroxide: Stratospheric measurements by microwave limb sounding, *Science*, 214, 61-64, 1981.
- Waters, J. W., J. C. Hardy, R. F. Jarnot, H. M. Pickett, and P. Zimmermann, A balloon-borne microwave limb sounder for stratospheric measurements, *J. Quant. Spectrosc. Radiat. Transfer*, 32, 407-433, 1984.
- Watson, R. T., Rate constants of reactions of ClO_x of atmospheric interest, *J. Phys. Chem. Ref. Data*, 6, 871-918, 1977.
- Watson, R. T., Balloon intercomparison measurements of minor species, to be published, 1986.
- Watson, R. T., J. Rogers, L. Heidt, W. Pollock, K. Mauersberger, D. Kley, A. L. Schmeltekopf, D. L. Albritton, S. Oltmans, J. Mastenbrook, D. Murcray, W. F. J. Evans, C. Midwinter, N. Swann, and E. F. Danielsen, An intercomparison of stratospheric water vapor instruments, to be published, 1986.
- Wayne, R. P., *Chemistry of Atmospheres*, 361 pp., Clarendon Press, Oxford, 1985.
- WCP, Aerosols and their climatic effects, paper presented at World Climate Research Programme Report, WCP-55, Report of the experts meeting, Williamsburg, VA, 28-30 March 1983.
- Weaver, C., and R. Pearson, Ozone conservation and transport in cumulus clouds, *Eos Trans. AGU*, 65, 836, 1984.
- Weaver, H., M. J. Mumma, J. L. Faris, T. Kostiuik, and J. J. Hillman, Infrared heterodyne spectroscopy of seven gases in the vicinity of chlorine monoxide lines, *Appl. Opt.*, 22, 1562-1567, 1983.

REFERENCES

- Webster, C. R., and R. T. Menzies, In situ measurements of stratospheric nitric oxide using a balloon-borne tunable diode laser spectrometer, *Appl. Opt.*, **23**, 1140-1142, 1984.
- Webster, P. J., and G. L. Stephens, Tropical upper-tropospheric extended clouds: Inferences from Winter MONEX, *J. Atmos. Sci.*, **37**, 1521-1541, 1980.
- Weeks, L. H., and L. G. Smith, A rocket measurement of ozone near sunrise, *Planet. Space Sci.*, **16**, 1189-1195, 1968.
- Weeks, L. H., R. S. CuiKay, and J. R. Corbin, Ozone measurements in the mesosphere during the solar proton event of 2 November 1969, *J. Atmos. Sci.*, **29**, 1138-1142, 1972.
- Wehrbein, W. M., and C. B. Leovy, An accurate radiative heating and cooling algorithm for use in a dynamical model of the middle atmosphere, *J. Atmos. Sci.*, **39**, 1532-1544, 1982.
- Weiler, K. H., P. Fabian, G. Flentje, and W. A. Mathews, Stratospheric NO measurements: A new balloon-borne chemiluminescence instrument, *J. Geophys. Res.*, **85**, 7445-7452, 1980.
- Weinreb, M. P., W. A. Morgan, I-Lok Chang, L. D. Johnson, P. A. Bridges, and A. C. Neuendorffer, High-altitude balloon test of satellite solar occultation instrument for monitoring stratospheric O₃, H₂O and HNO₃, *J. Atmos. Oc. Tech.*, **1**, 87-100, 1984.
- Weinstock, E. M., M. J. Phillips, and J. G. Anderson, In situ observations of ClO in the stratosphere: A review of recent results, *J. Geophys. Res.*, **86**, 7273-7278, 1981.
- Weinstock, B., and H. Niki, Carbon monoxide balance in nature, *Science*, **176**, 290-292, 1972.
- Weinstock, J., Nonlinear theory of gravity waves: Momentum deposition, generalized Rayleigh friction and diffusion, *J. Atmos. Sci.*, **39**, 1698-1710, 1982.
- Weiss, R. F., The temporal and spatial distribution of tropospheric nitrous oxide, *J. Geophys. Res.*, **86**, 7185-7195, 1981.
- Weiss, R. F., and H. Craig, Production of atmospheric nitrous oxide by combustion, *Geophys. Res. Lett.*, **3**, 751-753, 1976.
- Wesely, M. L., Turbulent transport of ozone to surfaces common in the eastern half of the United States, in *Trace Atmospheric Constituents*, edited by S. E. Schwartz, pp. 345-370, Wiley, New York, 1983.
- Wesely, M. L., and B. B. Hicks, Some factors that affect the deposition rates of sulfur dioxide and similar gases on vegetation, *J. Air Poll. Control Assoc.*, **27**, 1110-1116, 1977.
- Wesely, M. L., J. A. Eastman, D. R. Cook, and B. B. Hicks, Daytime variations of ozone eddy fluxes to maize, *Boundary-Layer Meteorol.*, **15**, 361-363, 1978.
- Wesely, M. L., D. R. Cook, and R. M. Williams, Field measurement of small ozone fluxes to snow, bare wet soil, and lake water, *Boundary-Layer Meteorol.*, **20**, 459-471, 1981.
- Wesely, M. L., J. A. Eastman, D. H. Stedman, and E. D. Yalvac, An eddy correlation measurement of NO₂ flux to vegetation and comparison to O₃ flux, *Atmos. Environ.*, **16**, 815-820, 1982.
- Wetherald, R. T., and S. Manabe, The effects of changing the solar constant on the climate of a general circulation model, *J. Atmos. Sci.*, **32**, 2044-2059, 1975.
- Whitten, G. Z., H. Hogo, and J. P. Killus, The carbon bond mechanism: A condensed kinetic mechanism for photochemical smog, *Environ. Sci. Technol.*, **14**, 690-700, 1980.
- Whitten, R. C., W. J. Borucki, H. T. Woodward, L. A. Capone, C. A. Riegel, R. P. Turner, I. G. Poppoff, and K. Santhanam, Implications of smaller concentrations of stratospheric OH: A two-dimensional model study of ozone perturbations, *Atmos. Environ.*, **15**, 1583-1589, 1981.
- Wigley, T. M. L., and M. E. Schlesinger, Analytical solution for the effect of increasing CO₂ on global mean temperature, *Nature*, **315**, 649-652, 1985.
- Wilkniss, P. E., and R. E. Larson, Atmospheric radon measurements in the Arctic fronts, seasonal observations and transport of continental air to polar regions, *J. Atmos. Sci.*, **41**, 2347-2358, 1984.
- Wilkniss, P. E., R. A. Lamontagne, R. E. Larson, J. W. Swinnerton, C. R. Dickson, and T. Thompson, Atmospheric trace gases in the Southern Hemisphere, *Nature*, **245**, 45-47, 1973.

REFERENCES

- Williams, A. P., Relaxation of the 2.7 γ and 4.3 γ bands of carbon dioxide, in *Mesospheric Models and Related Experiments*, edited by G. Fiocco, pp. 177-187, D. Reidel, Dordrecht, 1971.
- Williams, R. M., Uncertainties in the use of box models for estimating dry deposition velocity, *Atmos. Envir.*, 16, 2707-2708, 1982.
- Williams, W. J., J. J. Kusters, A. Goldman, and D. G. Murcray, Measurements of stratospheric halocarbon distributions using infrared techniques, *Geophys. Res. Lett.*, 3, 379-382, 1976.
- Wine, P. H., and A. R. Ravishankara, Kinetics of OH reactions with tropospheric sulfur compounds, in *2nd Symposium Composition of the Nonurban Troposphere*, pp. 258-260, May 25-28, 1982, Williamsburg, VA, AMS, Boston, MA, 1982.
- WMO, *The Stratosphere 1981. Theory and Measurements, WMO Global Ozone Research and Monitoring Project Report No. 11*, 516 pp., WMO, Geneva, 1982.
- WMO, Report of the WMO meeting of experts on potential climatic effects of ozone and other minor trace gases, *WMO Global Ozone Research and Monitoring Project, Report No. 14*, WMO, Geneva, 1983a.
- WMO, World Meteorological Organization project on research and monitoring of atmospheric CO₂, *Report No. 10*, edited by R. J. Bojkov, 42 pp., Geneva, 1983b.
- WMO, Report of the WMO (CAS) Meeting of Experts on the CO₂ Concentrations from Pre-Industrial Times to I.G.Y. World Climate Programme, *WCP-53*, WMO/ICSU, 34 pp., Geneva, 1983c.
- Wofsy, S. C., Interactions of CH₄ and CO in the earth's atmosphere, *Ann. Rev. Earth Planet. Sci.*, 4, 441-469, 1976.
- Wofsy, S. C., J. C. McConnell, and M. B. McElroy, Atmospheric CH₄, CO and CO₂, *J. Geophys. Res.*, 77, 4477-4493, 1972.
- Wofsy, S. C., M. B. McElroy, and Y. L. Yung, The chemistry of atmospheric bromine, *Geophys. Res. Lett.*, 2, 215-218, 1975.
- Wolff, G. T., and P. J. Lioy, Development of an ozone river associated with synoptic scale episodes in the eastern United States, *Environ. Sci. Tech.*, 14, 1257-1261, 1980.
- Woodman, R. F., and A. Giullen, Radar observations of winds and turbulence in the stratosphere and mesosphere, *J. Atmos. Sci.*, 31, 493-505, 1974.
- Wu, M. F., M. A. Geller, J. G. Olson, and M. E. Gelman, Troposphere-Stratosphere (surface-55 km) monthly general circulation statistics for the Northern Hemisphere; 4 year averages, *NASA Techn. Memo. 86182*, NASA Goddard Space Flight Center, Greenbelt, MD, 1984.
- Wuebbles, D. J., Chlorocarbon emission scenarios: Potential impact on stratospheric ozone, *J. Geophys. Res.*, 88, 1433-1443, 1983a.
- Wuebbles, D. J., A theoretical analysis of the past variations in global atmospheric composition and temperature structure, *UCRL-53423*, Lawrence Livermore National Laboratory, Livermore, CA, 1983b.
- Wuebbles, D. J., and P. S. Connell, Interpreting the 1-D model-calculated nonlinearities from chlorocarbon perturbations, paper presented at International Workshop on Current Issues in our Understanding of the Stratosphere and the Future of the Ozone Layer, BMFT, NASA, FAA, WMO, Feldafing, FRG, June 11-16, 1984.
- Wuebbles, D. J., F. M. Luther, and J. E. Penner, Effect of coupled anthropogenic perturbations on stratospheric ozone, *J. Geophys. Res.*, 88, 1444-1456, 1983.
- Wuebbles, D. J., M. C. MacCracken, and F. M. Luther, A proposed reference set of scenarios for radiatively active atmospheric constituents, *Carbon Dioxide Research Division Report DOE/NBB-0066*, U.S. Department of Energy, Lawrence Livermore National Laboratory, Livermore, CA, 1984.
- Wyngaard, J. C., Toward convective boundary layer parameterization: A scalar transport module, *J. Atmos. Sci.*, 41, 1959-1969, 1984.
- Yamazaki, K. and C. R. Mechoso, Observations of the final warming in the stratosphere of the Southern Hemisphere during 1979, *J. Atmos. Sci.*, 42, 1198-1205, 1985.

REFERENCES

- Yanai, M., J.-H. Chu, T. E. Stark, and T. Nitta, Response of deep and shallow tropical maritime cumuli to large-scale processes, *J. Atmos. Sci.*, **33**, 976-991, 1976.
- Yao, F., I. Wilson, and H. Johnston, Temperature dependent ultraviolet absorption spectrum for dinitrogen pentoxide, *J. Phys. Chem.*, **86**, 3611-3615, 1982.
- Yoshida, T., and M. Alexander, Nitrous oxide formations by nitrosomoses europsea and heterotrophic organisms, *Soil Sci. Soc. Am. Proc.*, **34**, 880-882, 1970.
- Yoshida, T., and M. Alexander, Hydroxylamine oxidation by nitrosomoses europea, *Soil Sci.*, **3**, 307-312, 1971.
- Yoshino, K., D. E. Freeman, J. R. Esmond, and W. H. Parkinson, High resolution absorption cross section measurements and band oscillator strengths of the (1,0) - (12-0) Schumann-Runge bands of O₂, *Planet. Space Sci.*, **31**, 339-353, 1983.
- Yung, Y. L., M. B. McElroy, and S. C. Wofsy, Atmospheric halocarbons: A discussion with emphasis on chloroform, *Geophys. Res. Lett.*, **2**, 397-399, 1975.
- Yung, Y. L., J. P. Pinto, R. T. Watson, and S. P. Sander, Atmospheric bromine and ozone perturbations in the lower stratosphere, *J. Atmos. Sci.*, **37**, 339-353, 1980.
- Zafiriou, O. C., and M. McFarland, Nitric oxide from nitrite photolysis in the central equatorial Pacific, *J. Geophys. Res.*, **86**, 3173-3182, 1981.
- Zander, R., Presence de HF dans la stratosphere superieure, *C. R. Acad. Sc. Paris*, **281B**, 213-214, 1975.
- Zander, R., Recent observations of HF and HCl in the upper stratosphere, *Geophys. Res. Lett.*, **8**, 413-416, 1981a, Corrections, *Geophys. Res. Lett.*, **8**, 850, 1981.
- Zander, R., Evidence for variability in the total column of HCl over the Jungfraujoch Station, to be published, 1986.
- Zander, R., Trend in HF above the Jungfraujoch Station, to be published, 1986.
- Zander, R., H. Leclerq, and L. D. Kaplan, Concentration of carbon monoxide in the upper stratosphere, *Geophys. Res. Lett.*, **8**, 365-368, 1981.
- Zander, R., G. M. Stokes, and J. W. Brault, Simultaneous detection of FC-11, FC-12, and FC-22 through 8 to 13 micrometers IR solar observations from the ground, *Geophys. Res. Lett.*, **10**, 521-524, 1983.
- Zander, R., G. M. Stokes, and J. W. Brault, Spectroscopic detection of acetylene and ethane in the earth's atmosphere, through ground-based solar observations, *C. R. Acad. Sc. Paris*, **295**, 583-586, 1982.
- Zander, R., N. Louisnard, and M. Bangham, Stratospheric methane concentration profiles measured during the Balloon Intercomparison Campaigns, to be published, 1986.
- Zangvil, A. and M. Yanai, Upper tropospheric waves in the tropics. Part I: Dynamical analysis in the wavenumber frequency domain, *J. Atmos. Sci.*, **37**, 283-298, 1980.
- Zawodny, J. M., Short-term variability of nitrogen dioxide in the winter stratosphere., *J. Geophys. Res.*, in press, 1985a.
- Zawodny, J. M., Short term variability of nitrogen dioxide in the winter stratosphere., Ph.D. thesis, University of Colorado, Boulder, CO, 1985b.
- Zipf, E. C., and S. S. Prasad, A mesosphere source of nitrous oxide, *Nature*, **295**, 133-135, 1982.
- Zumbrunn, R., A. Neftel, and H. Oeschger, CO₂ measurements on 1-cm³ ice samples with an IR laser spectrometer (IRLS) combined with a new dry extraction device, *Earth and Planetary Space Letters*, **60**, 318-324, 1982.