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## ESRL Atmospheric Chemistry Calibration & Database Services 2004 - 2007

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### Contributions to national/international calibration activities

- ESRL maintains the WMO calibration scales for CO<sub>2</sub>, CO, CH<sub>4</sub>, and N<sub>2</sub>O. The international community depends on reference gas mixtures linked to those scales to improve and maintain comparability of measurements. Stringent comparability is required for GHG measurements to be useful.
- ESRL is the logistics lead for the preparation of standards and shipment of the International HALocarbon Atmospheric Comparison Experiment (IHALACE) to intercompare halocarbon standards between the world's major monitoring networks.
- ESRL maintains calibration scales for additional climatically relevant gases. These include chlorofluorocarbons (CFCs) and their replacements (HCFCs and HFCs), sulfur hexafluoride (SF<sub>6</sub>), chloro- and bromocarbons among others. Some of these (CFCs) are currently being considered as WMO scales, and most others are additionally used to develop standards for use by scientists around the world.
- ESRL Carbon Cycle Greenhouse Gases group is co-organizer of the international inter-comparison of radiocarbon in atmospheric CO<sub>2</sub> among 7 laboratories on 4 continents.
- ESRL maintains the world standard "calibration scale" for Dobson total column ozone measurement instruments in the form of Dobson instrument D083 (Primary World Standard). This scale is propagated into the WMO/GAW network through international intercomparison campaigns, and regional standards.
- ESRL utilizes irradiance calibrations from the ESRL Boulder and Mauna Loa UV spectroradiometers to produce UV calibration scales for the World Ozone UV Database Center, Toronto, Canada.
- The ESRL Central Ultraviolet Calibration Facility (CUCF) provides spectral irradiance scales for the European Union UV (ECUV) calibration center, Ispra, Italy.
- The CUCF provides yearly calibration of the USDA UV monitoring network of 35 broadband UV and 35 narrow-band filter radiometers, yearly calibrations of spectral irradiance and instruments for the NOAA-EPA UV-ozone Brewer network, provides irradiance standards for the NSF Polar UV monitoring

program, and standard calibrations for aerosol optical depth and UV measurements for NASA.

- The ESRL CUCF developed, transferred and supports radiation calibration and standards for Argentina, Australia, Canada, and New Zealand.

### **Contributions to national/international data bases**

- All ESRL greenhouse gas and isotopic data go to Carbon Dioxide Information Analysis Center in Oak Ridge, TN, as well as to the WMO World Data Center for Greenhouse Gases in Tokyo. In both cases, the ESRL data constitute the majority of publicly available data.
- All up-to-date carbon cycle data is made freely available to the global community at [www.esrl.noaa.gov/gmd/ccgg/iadv/](http://www.esrl.noaa.gov/gmd/ccgg/iadv/) where users can click on a global map of sites and plot data from that site. The data can also be downloaded as tables.
- Anyone working with global carbon cycle models that use real atmospheric observations can freely download a compilation of CO<sub>2</sub> time series at [www.esrl.noaa.gov/gmd/ccgg/globalview/](http://www.esrl.noaa.gov/gmd/ccgg/globalview/) as well as for sites maintained by thirteen other laboratories worldwide.
- ESRL halocarbon network data are archived at the WMO Greenhouse Gas Data Center and at the CDIAC. They are also available as data files on anonymous ftp at <ftp://ftp.cmdl.noaa.gov/hats/>.
- ESRL is the largest contributor to the World Ozone and UV Data Center (<http://www.woudc.org/>) for total column content and stratospheric ozone profiles derived from measurements of the Umkehr by Dobson Ozone spectrophotometers.
- All ESRL surface ozone network data are archived at the WMO Greenhouse Gas Data Center.
- ESRL total column ozone and ozone profiles from ozonesonde data at Network for Detection of Atmospheric Composition Change (NDACC) locations are archived at the NDACC Data Center.
- Aerosol data from ESRL baseline stations is provided to the Global Atmosphere Watch World Data Center for Aerosols.
- Aerosol data from the ESRL Barrow Baseline Observatory, the DOE/ARM Southern Great Plains site, the DOE/ARM Mobile Facility, and the In situ Aerosol Profiling aircraft platform are all provided to the DOE/ARM Data Archive.

- All ESRL halocarbon airborne data collected under the sponsorship of NASA are available as anonymous ftp at the NASA cloud1 data server: <http://cloud1.arc.nasa.gov>.
- The ESRL SURFRAD data is contributed to the GCOS database.
- ESRL Surface Radiation budget data are archived at NOAA/NCDC Asheville, NC; at the WMO/WRDC (World Radiation Data Center) St. Petersburg, Russia and at the WCRP/BSRN archives, Zurich, Switzerland.
- Thermal IR calibrations are submitted to the World Standard Infrared Reference Standard, World Radiation Centre, Davos, Switzerland.

### **Other research data products/services**

- Monthly updated CO<sub>2</sub> trends at Mauna Loa as well as a global marine surface air average are available at [www.esrl.noaa.gov/gmd/ccgg/trends/](http://www.esrl.noaa.gov/gmd/ccgg/trends/).
- **The NOAA Annual Greenhouse Gas Index (AGGI)**, a measure of changes in global climate forcing by all long-lived greenhouse gases, is produced annually by ESRL (<http://www.esrl.noaa.gov/gmd/aggi>).
- **The NOAA Ozone Depleting Gas Index (ODGI)**, a measure of changes in equivalent atmospheric chlorine for all the ozone-depleting gases, is produced annually by ESRL (<http://www.esrl.noaa.gov/gmd/odgi>).
- **The Halocarbon and other Atmospheric Trace Species Data Visualization (HATS DV)** shows in situ halocarbon and other atmospheric trace species which is updated weekly at <http://www.esrl.noaa.gov/gmd/dv/hats>.
- **The Interactive Atmospheric Data Visualization (IADV)** website (<http://www.esrl.noaa.gov/gmd/ccgg/iadv>) allows the observation and graphing of all the data collected by the ESRL Carbon Cycle & Greenhouse Gases research group.
- **GLOBALVIEW** (<http://www.esrl.noaa.gov/gmd/ccgg/globalview>) data products are designed to enhance the spatial and temporal distribution of atmospheric observations of CO<sub>2</sub>, CH<sub>4</sub> and other related atmospheric measurements. GLOBALVIEW products are specifically intended as tools for use in carbon cycle modeling studies.
- **CARBONTRACKER** (<http://www.esrl.noaa.gov/gmd/ccgg/carbontracker/>) is a data assimilation system used to keep track of carbon dioxide uptake and release at the Earth's surface over time. It is designed for policy makers,

industry, scientists, and the public to provide information for making informed decisions on greenhouse gas management.

- **Surface Radiation Budget data**, ancillary measured parameters, and aerosol optical depth, and other supporting products for the SURFRAD network are available in daily, station-specific files at;  
<http://www.srrb.noaa.gov/surfrad/index.html>.