DATA DIGITIZATION

NOAA Central Library
Climate Data Imaging Project

The goal of the Climate Data Imaging Project is to preserve and disseminate unique climatological data from historical sources in the NOAA Central Library. The images are provided in PDF and multi-page TIFF formats. The PDF files require an Acrobat reader; the TIFF files require use of a reader capable of reading multi-page TIFF files. For assistance please contact the Library staff members listed below.

Links to climatological data arranged by Country or Region*

Africa

Algeria
Angola
Cameroon
Djibouti
Egypt
Guinea-Bissau
Kenya
Libya
Madagascar
Mozambique
Namibia
South Africa
Tunisia
Uganda

Asia

Afghanistan
China
India
Iraq
Japan
Pakistan
Thailand
Turkey

Europe

Germany
Hungary
Norway
Poland
Russia
Yugoslavia

North America

Canada
Costa Rica

Time Period, Frequency, and Parameters

The time period of coverage ranges from the 1830s through the 1970s with most data from the period prior to 1960. Each series typically includes observations for a number of meteorological and other geophysical parameters. These *may* include daily and monthly observations, as well as monthly and annual means, for:

- surface temperature
- precipitation
- atmospheric pressure
- wind speed and direction
- soil temperature
- radiation
- sunshine
- cloudiness
- upper air measurements
- geomagnetism

How to Find the Data

To locate the desired data set, select a country or region from the list on the left, then select a title and year.

Credit

Please credit the NOAA Central Library Data Imaging Project when using the data. Share the results of your research with any of the staff members below.

Contact Information

If you have questions or comments concerning the images, or you need further assistance, please contact:
Doria.Grimes@noaa.gov, 301-713-2600 ext. 142, or
Diana.L.Abney@noaa.gov, 301-713-2600 ext. 121, or

Russia

List of publications containing climatological and geophysical data for the Russian Empire

The publications shown below contain climatological and other geophysical data for the Russian Empire including Central Asia, Siberia,and Alaska. The description shows the dates of coverage of the publication, the parameters you can find in the data, and a list of the volumes that the Library holds with links to the years for which images are available.

Annuaire magnétique et météorologique du Corps des ingénieurs des mines de Russie, ou Recueil d'observations magnétiques et météorologiques faites dans l'étendue de lémpire de Russie
Continued by: *Annales de l'observatoire physique central de Russie*
Subject term: Geomagnetism--Russia
Subject term: Magnetic declination--Russia
Subject term: Atmospheric pressure--Russia
Subject term: Atmospheric temperature--Russia
Subject term: Precipitation (Meteorology)--Russia
Subject term: Cloudiness--Russia
Subject term: Humidity--Russia
Subject term: Winds--Russia
Volumes available:

- 1837 (PDF format) (TIFF format)
- 1838 (PDF format) (TIFF format)
- 1839 (PDF format) (TIFF format)
- 1840 (PDF format) (TIFF format)
- 1841 (PDF format) (TIFF format)
- 1842 (PDF format) (TIFF format)
- 1843 (PDF format) (TIFF format)
- 1844 (PDF format) (TIFF format)
- 1845 (PDF format) (TIFF format)
- 1846 (PDF format) (TIFF format)

Annales de l'observatoire physique central de Russie
Continues: *Annuaire magnétique et météorologique du Corps des ingénieurs des mines de Russie*
Continued by: *Svod? nabl´i`udeni*i proizvedennykh? v? Glavno*i fizicheskoi i podchinennykh? e*i observatoriiâkh?*
Subject term: Geomagnetism--Russia
Subject term: Magnetic declination--Russia
Subject term: Atmospheric pressure--Russia
Subject term: Atmospheric temperature--Russia
Subject term: Precipitation (Meteorology)--Russia
Subject term: Cloudiness--Russia
Subject term: Humidity--Russia
Subject term: Winds--Russia
Volumes available:

United States

List of publications containing climatological data for the United States

The publications shown below contains climatological and geophysical data for various locations within the United States. The description under each title shows the dates of coverage of the publication, the parameters you can find in the data, and a list of the volumes that the Library holds with links to the years for which images are available.

Results of meteorological observations made at Brunswick, Maine, between 1807 and 1859
Subject term: Atmospheric pressure--Maine
Subject term: Atmospheric temperature--Maine
Subject term: Winds--Maine
Subject term: Cloudiness--Maine
Subject term: Precipitation (Meteorology)--Maine
Note: Contains daily and monthly means of temperature, actual monthly extreme temperatures, and other derived values for the parameters listed. Does not contain actual observations other than extreme temperatures.
Volume available:

- (PDF format) (TIFF format)

Meteorological observations made at Providence, R.I., extending over a period of twenty-eight years and a half, from December 1831 to May 1860
Subject term: Atmospheric pressure--Rhode Island
Subject term: Atmospheric temperature--Rhode Island
Subject term: Winds--Rhode Island
Subject term: Cloudiness--Rhode Island
Subject term: Precipitation (Meteorology)--Rhode Island
Note: Contains daily observations as well as monthly and annual means of the parameters listed.
Volume available:

- (PDF format) (TIFF format)

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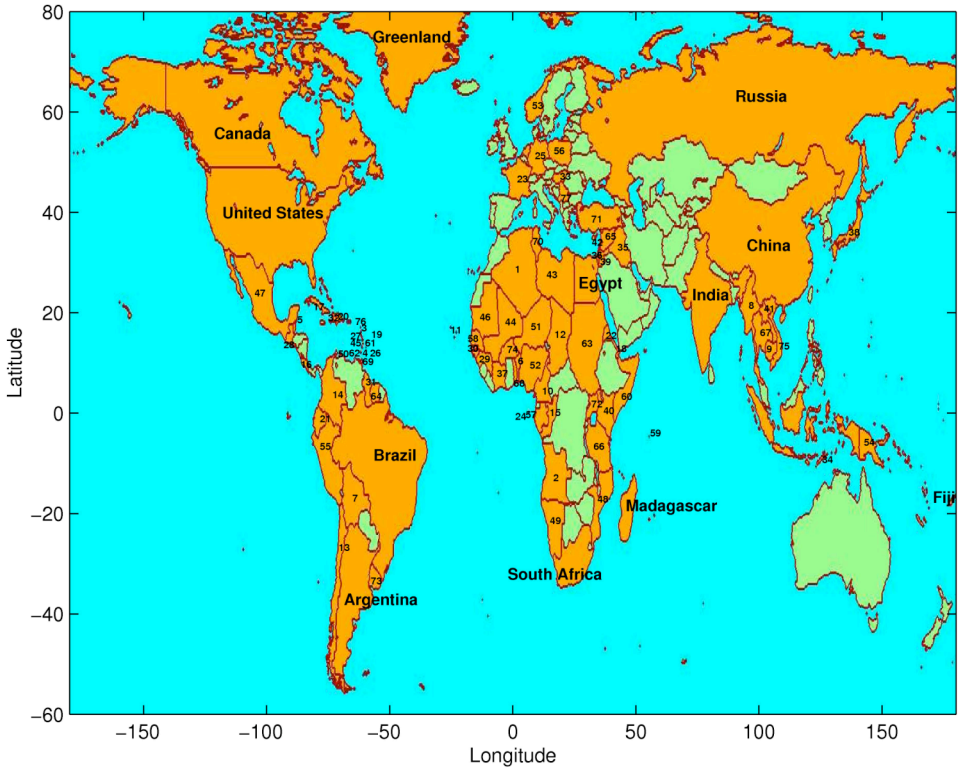
Scanned Images with Climate Data in NOAA Central Library

(reflects images available on the server as of January 2004)



Numbers on the map indicate the following countries:

1 - Algeria
2 - Angola
3 - Antigua and Barbuda
4 - Barbados
5 - Belize
6 - Benin
7 - Bolivia
8 - Burma
9 - Cambodia
10 - Cameroon
11 - Cape Verde
12 - Chad
13 - Chile
14 - Colombia
15 - Congo
16 - Costa Rica
17 - Cuba
18 - Djibouti
19 - Dominica
20 - Dominican Republic
21 - Ecuador
22 - Eritrea
23 - France
24 - Gabon
25 - Germany
26 - Grenada
27 - Guadeloupe
28 - Guatemala
29 - Guinea
30 - Guinea-Bissau
31 - Guyana
32 - Haiti
33 - Hungary
34 - Indonesia
35 - Iraq
36 - Israel
37 - Ivory Coast
38 - Japan
39 - Jordan
40 - Kenya
41 - Laos
42 - Lebanon
43 - Libya
44 - Mali
45 - Martinique
46 - Mauritania
47 - Mexico
48 - Mozambique
49 - Namibia
50 - Netherlands
51 - Niger
52 - Nigeria
53 - Norway
54 - Papua New Guinea
55 - Peru
56 - Poland
57 - Sao Tome and Principe
58 - Senegal
59 - Seychelles
60 - Somalia
61 - St. Lucia
62 - St. Vincent and the Grenadines
63 - Sudan
64 - Suriname
65 - Syria
66 - Tanzania
67 - Thailand
68 - Togo
69 - Trinidad and Tobago
70 - Tunisia
71 - Turkey
72 - Uganda
73 - Uruguay
74 - Upper Volta - Burkina Faso
75 - Vietnam
76 - Virgin Islands
77 - Yugoslavia

[The map was produced in the LDEO of Columbia University;
Contact: A.Kaplan alexeyk@ldeo.columbia.edu]

CATHERINENBOURG. JANVIER 1837.

BAROMÈTRE À 15°½ R.

DATE	8 HEURES DU MATIN	10 HEURES DU MATIN.	MIDI.	2 HEURES APRÈS MIDI.	4 HEURES APRÈS MIDI.	6 HEURES DU SOIR.	8 HEURES DU SOIR.	10 HEURES DU SOIR.
1	595,13	594,66	594,09	593,53	593,40	592,84	592,25	591,30
2	587,75	586,85	585,77	584,92	584,60	584,02	583,20	582,88
3	574,03	579,64	578,08	577,88	577,24	575,79	575,29	574,39
4	577,67	578,17	578,69	578,81	578,72	578,10	576,33	574,50
5	571,50	572,27	573,23	574,86	577,11	578,43	580,36	582,10
6	588,70	589,89	590,38	590,63	591,14	591,16	590,86	590,40
7	589,96	589,98	589,33	588,37	588,97	588,82	588,77	589,43
8	592,16	593,13	593,74	594,05	594,69	594,81	594,69	594,70
9	593,29	593,39	593,03	592,54	592,54	592,49	592,01	591,71
10	589,49	589,09	588,39	587,45	586,92	586,56	586,14	585,52
11	582,31	581,84	580,92	580,42	580,41	580,45	580,22	580,22
12	580,38	580,67	580,69	580,74	581,49	581,79	582,37	582,99
13	585,29	585,83	585,93	585,96	586,63	586,71	586,56	586,78
14	584,54	584,10	583,40	582,54	582,37	581,89	581,85	581,96
15	580,62	580,65	580,50	580,03	580,30	580,21	579,84	579,80
16	580,74	581,07	580,58	580,04	579,54	579,37	578,90	577,76
17	570,15	568,09	566,23	565,04	565,00	565,17	565,39	565,72
18	570,91	571,41	572,15	572,69	572,53	573,36	573,89	574,93
19	572,90	571,49	569,18	567,66	566,50	565,32	564,32	562,46
20	564,23	566,10	567,34	568,63	571,18	571,81	572,37	572,96
21	575,73	576,17	576,95	577,58	579,18	580,98	582,12	582,92
22	581,68	579,12	577,42	576,72	575,25	575,07	574,99	574,85
23	584,34	585,69	586,99	586,99	587,43	587,59	587,38	586,80
24	583,04	582,28	581,78	581,40	581,24	581,12	580,95	580,72
25	578,37	578,03	577,19	576,54	576,13	575,54	575,02	574,17
26	570,19	569,79	569,64	569,72	569,58	569,68	570,57	571,63
27	573,61	573,51	573,36	573,00	573,15	573,43	573,69	573,94
28	574,57	574,37	574,19	573,94	574,09	574,99	573,95	574,23
29	574,43	574,55	573,79	572,71	572,63	572,25	572,51	572,73
30	574,43	574,64	574,87	575,13	575,34	576,09	576,43	576,65
31	577,28	577,10	577,68	577,71	578,04	578,77	579,20	579,90
MOYENNES	579,98	580,12	579,85	579,63	579,79	579,79	579,75	579,71

1

Figure 2: A typical table of Russian pressure data in 1836-1840s [*von Kupffer*, 1837].

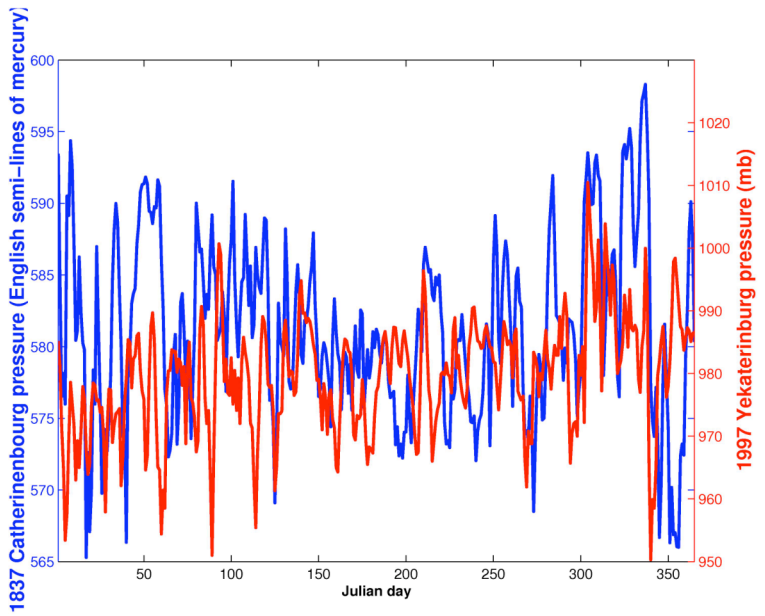
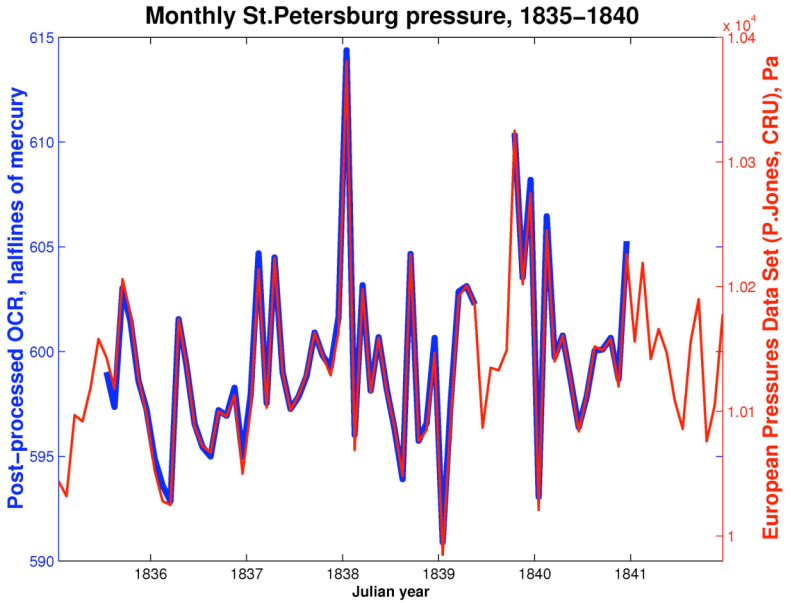
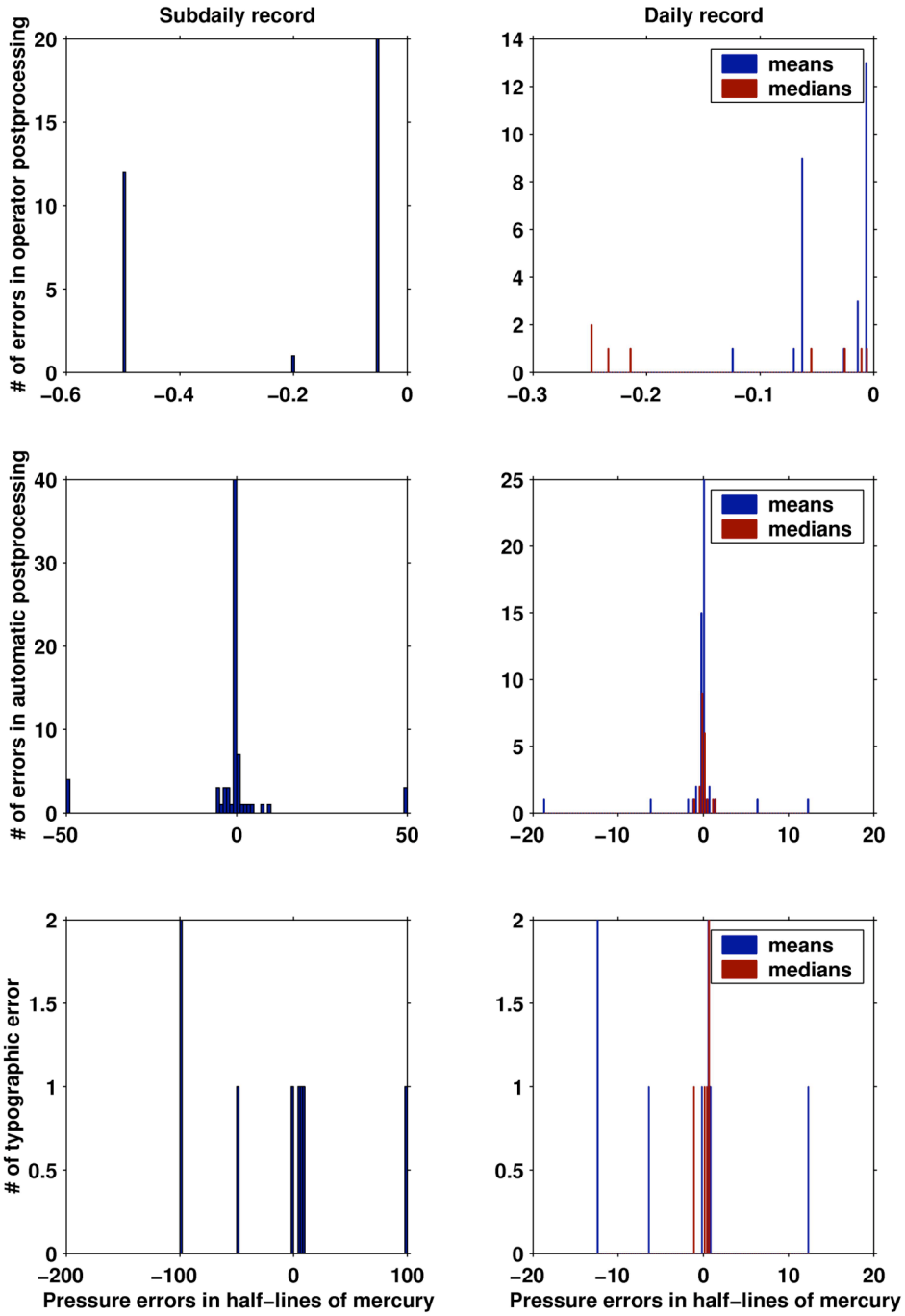
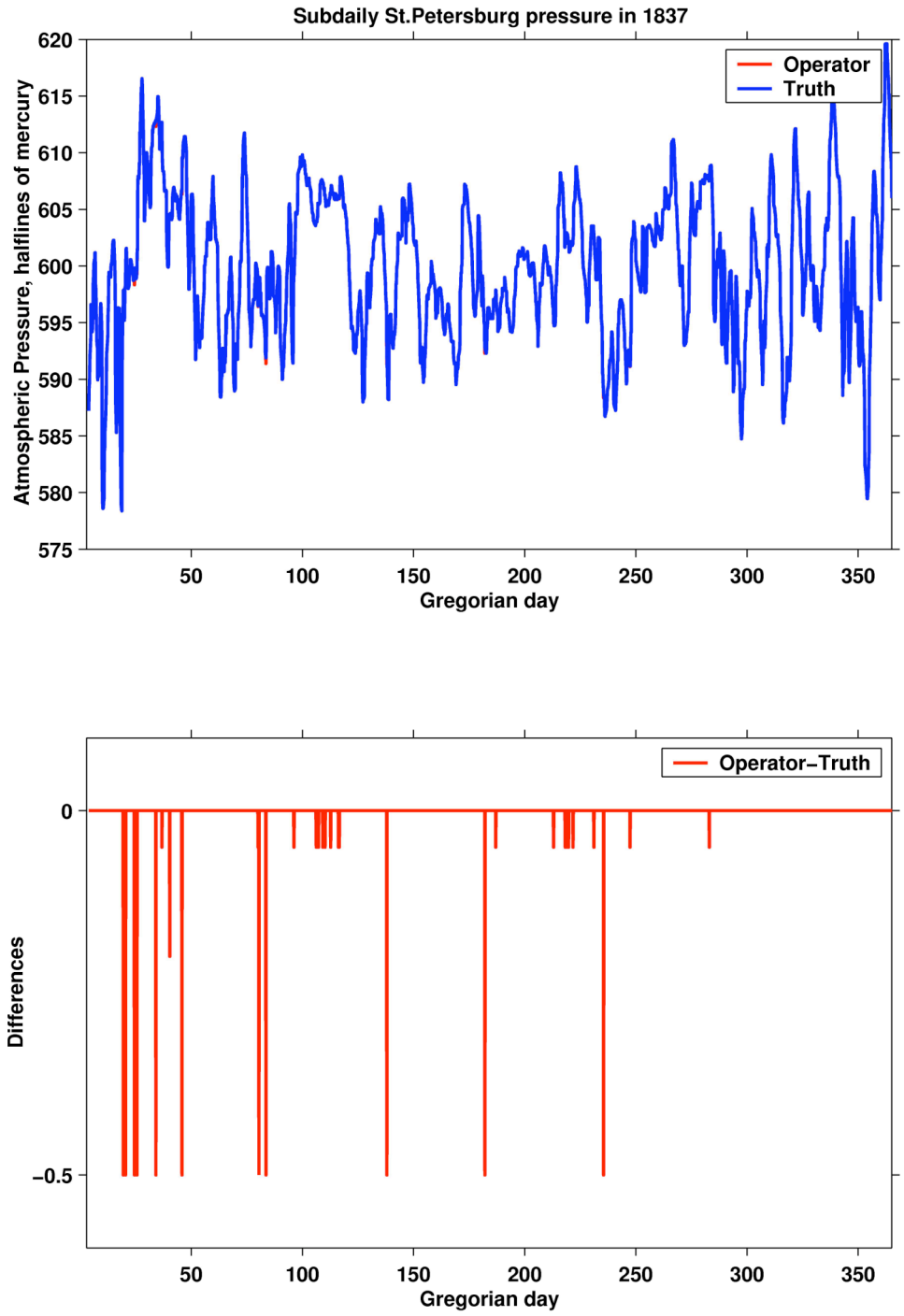


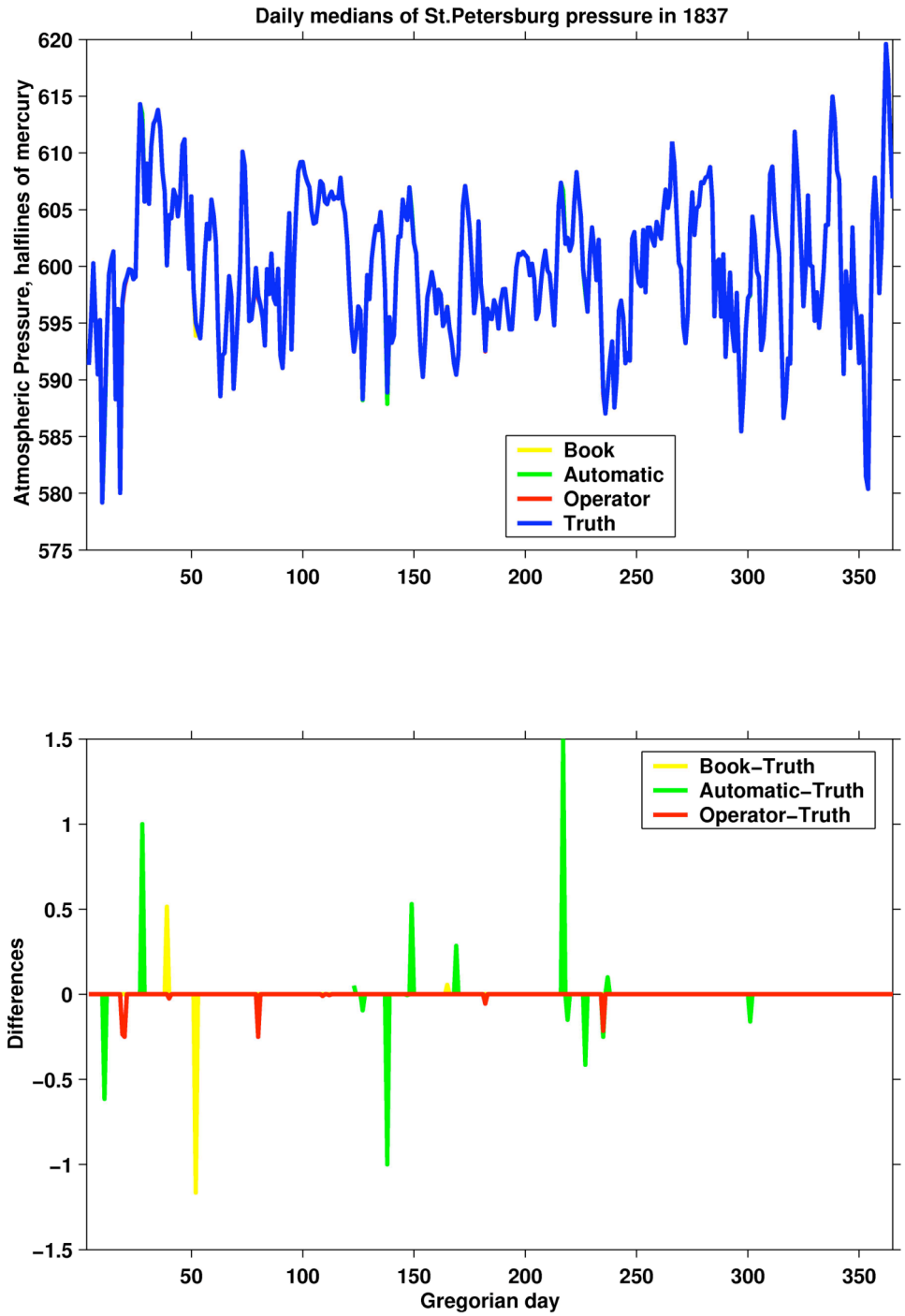
Figure 3: Two daily records for Catherinenbourg, 1837 and 1997



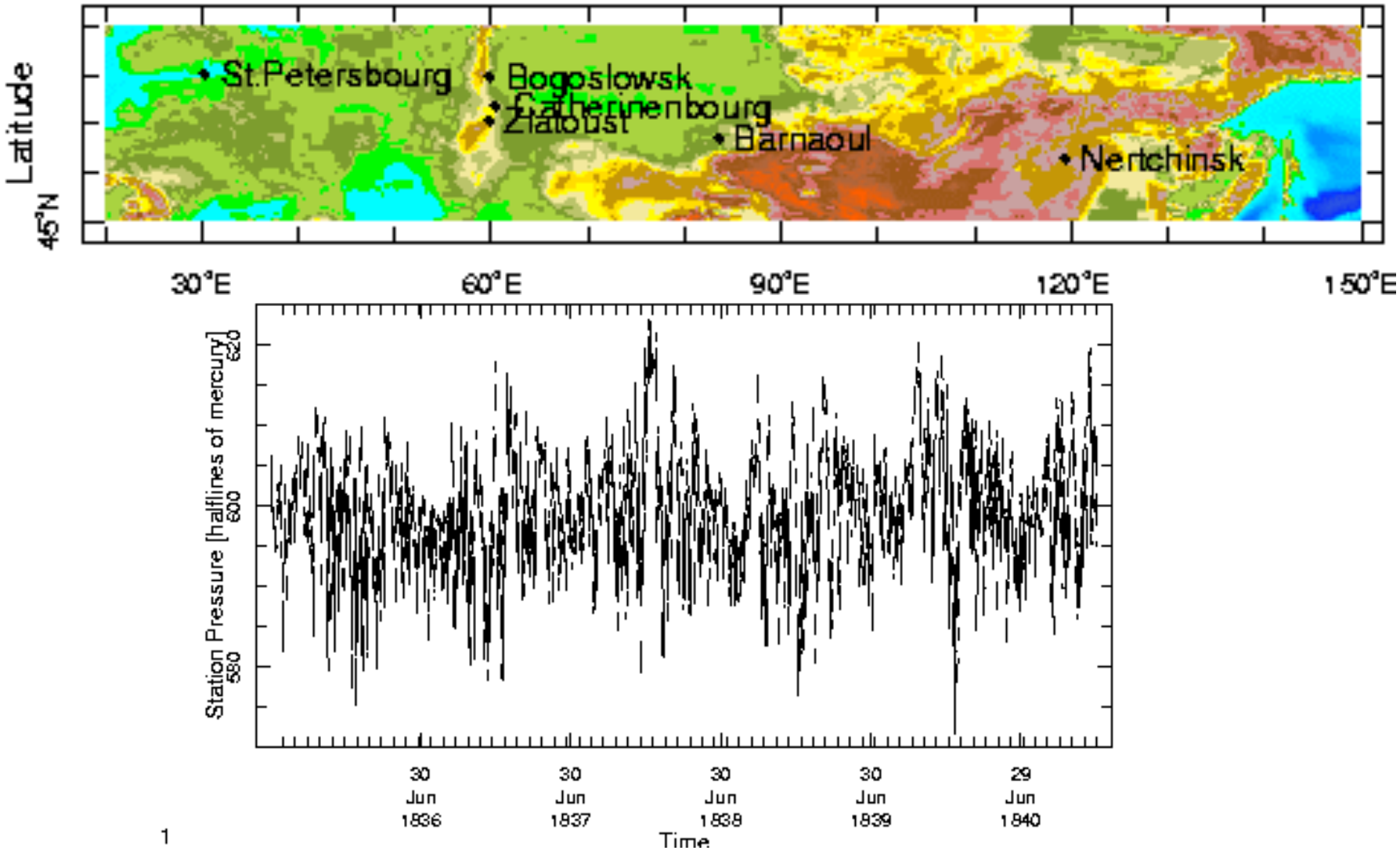
4: Comparison of monthly averages from newly digitized data with those
ʒ monthly database


Subdaily record
Daily record
means
medians
# of errors in operator postprocessing
# of errors in automatic postprocessing
# of typographic error
Pressure errors in half−lines of mercury
Pressure errors in half−lines of mercury

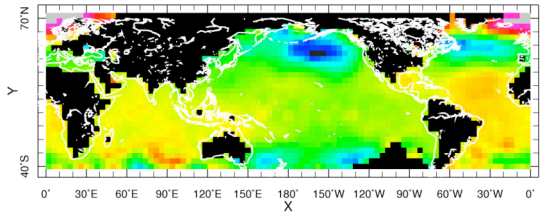

Subdaily St.Petersburg pressure in 1837
Operator
Truth
Atmospheric Pressure, halflines of mercury
620
615
610
605
600
595
590
585
580
575
50
100
150
200
250
300
350
Gregorian day
Operator−Truth
0
−0.5
Differences
50
100
150
200
250
300
350
Gregorian day


Daily medians of St.Petersburg pressure in 1837
Atmospheric Pressure, halflines of mercury
620
615
610
605
600
595
590
585
580
575
50
100
150
200
250
300
350
Book
Automatic
Operator
Truth
Differences
1.5
1
0.5
0
−0.5
−1
−1.5
Book−Truth
Automatic−Truth
Operator−Truth
Gregorian day

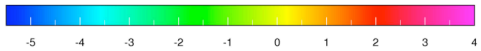
Possibility of using OCR for digitizing historical data

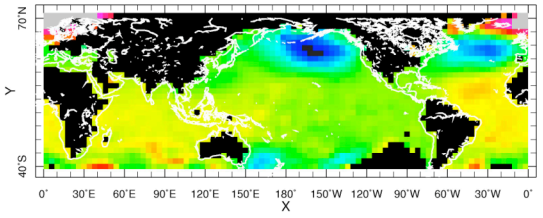


GRIDDED HISTORICAL MSLP PRODUCTS

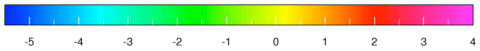


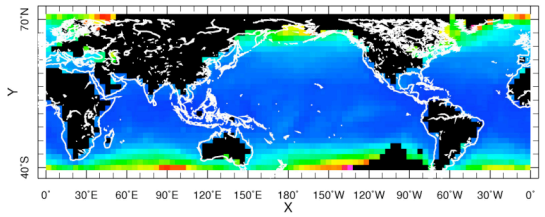
RSA_COADS_slp OI mslpa
point mean: -0.67816 ± 1.4616 range [-5.8622 to 5.6844]
Reduced space (80 EOFs) analysis of COADS mslp data
Averaged over T[Jul 1939, Feb 1940] minimum 0.0% data present



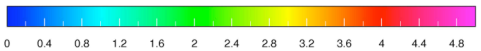


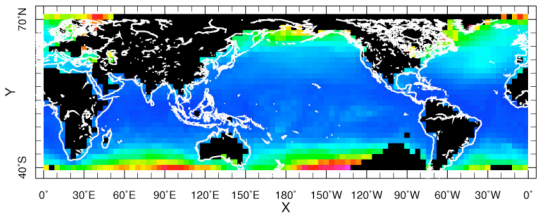
KAPLAN RSA_COADS_SLP1 OI slpa
point mean: -0.79472 ± 1.5676 range [-5.8212 to 6.9925]
Averaged over T[Jul 1939, Feb 1940] minimum 0.0% data present



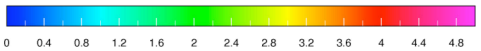


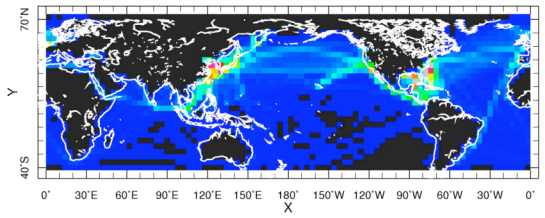
RSA_COADS_slp OI err
point mean: 0.71496 ± 0.75219 range [0.12084 to 4.9536]
Reduced space (80 EOFs) analysis of COADS mslp data
Averaged over T[Jul 1939, Feb 1940] minimum 0.0% data present



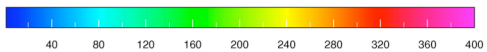


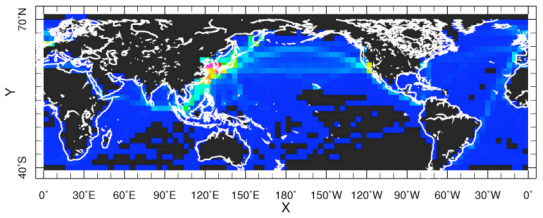
KAPLAN RSA_COADS_SLP1 OI err
point mean: 0.82551 ± 0.83665 range [0.13813 to 4.9387]
Averaged over T[Jul 1939, Feb 1940] minimum 0.0% data present



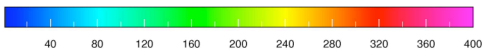


RSA_COADS_slp obs Nobs
point mean: 13.195 ± 40.128 range [0.0 to 588.13]
COADS observations
Averaged over T[Jul 1939, Feb 1940]





KAPLAN RSA_COADS_SLP1 obs Nobs
point mean: 7.5907 ± 26.503 range [0.0 to 394.5]
Averaged over T[Jul 1939, Feb 1940]



INCLUSION OF WINDS

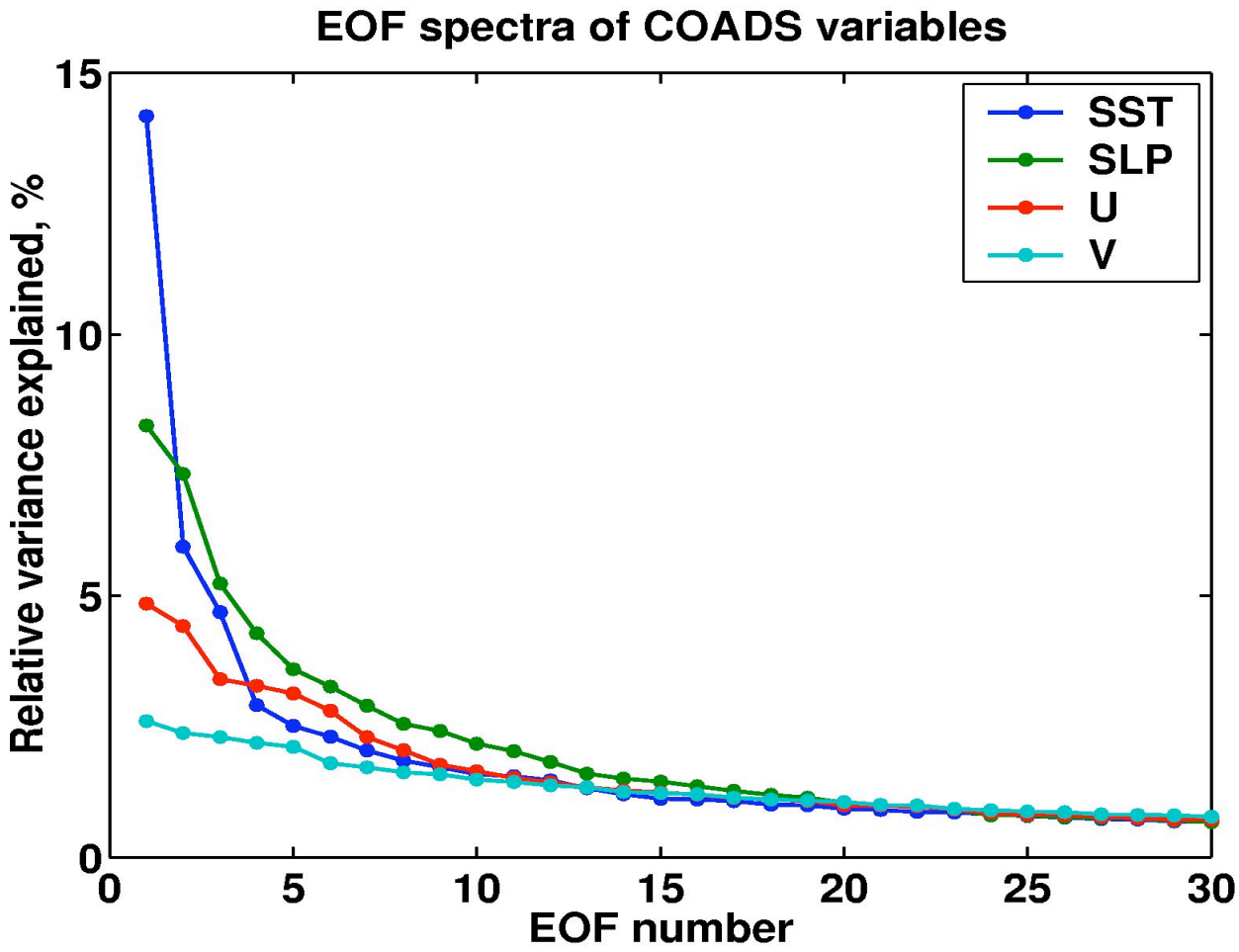


Figure 1: Eigenvalue spectra of climate variables from COADS, 1950-2000

EOFs of zonal wind anomaly

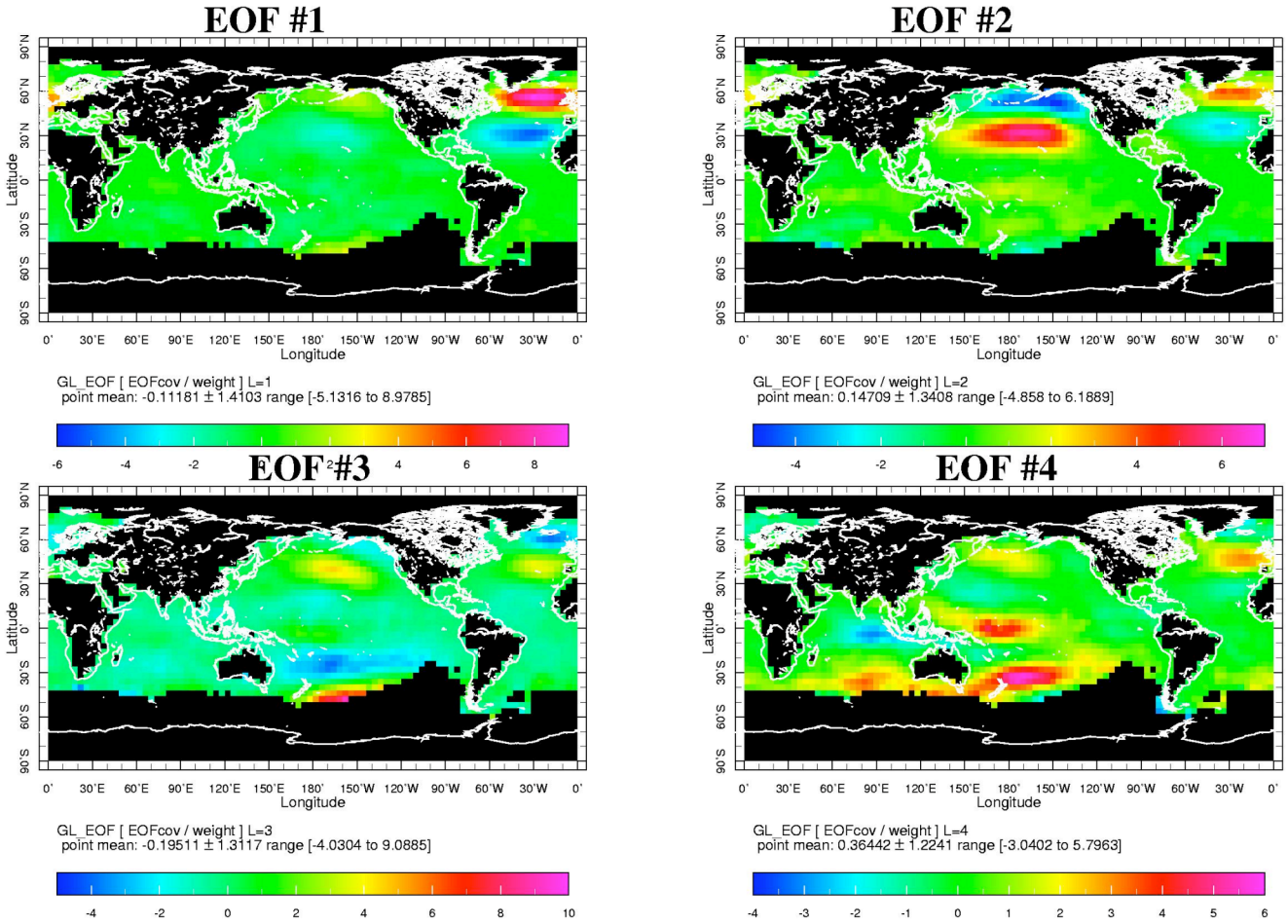


Figure 2: Leading EOF patterns of zonal wind anomalies from COADS, 1950-2000

Independent ENSO indices

[Evans and Kaplan, 2004]

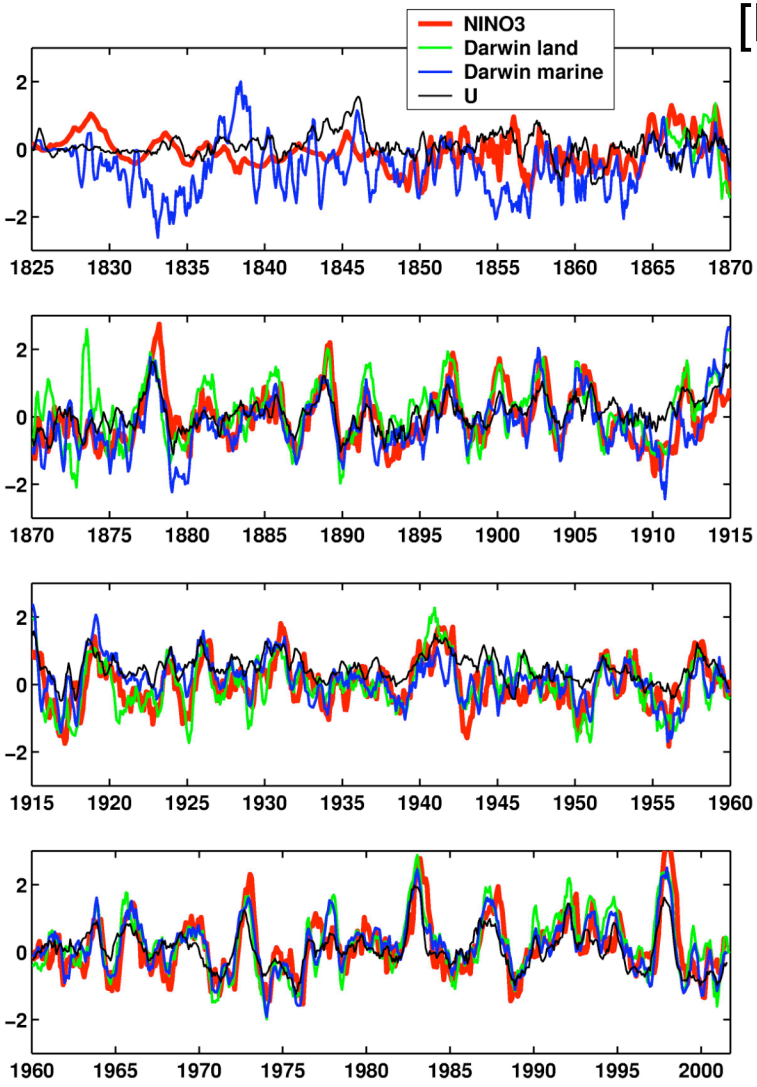


Figure 3: Intercomparison of ENSO indices: NINO3, °C, by *Kaplan et al.* [1998]; Darwin station SLP, mb, [*Allan et al.*, 1991; *Können et al.*, 1998]; Darwin area SLP estimate from ship-based RSOI, mb, [*Kaplan et al.*, 2000]; and Central Equatorial Pacific zonal wind anomaly (5°N-5°,160°E-120°W), 5m/s [*Kaplan et al.*, 2001]. Pressure and wind data are 5 month running means.

Testing geostrophic constraint

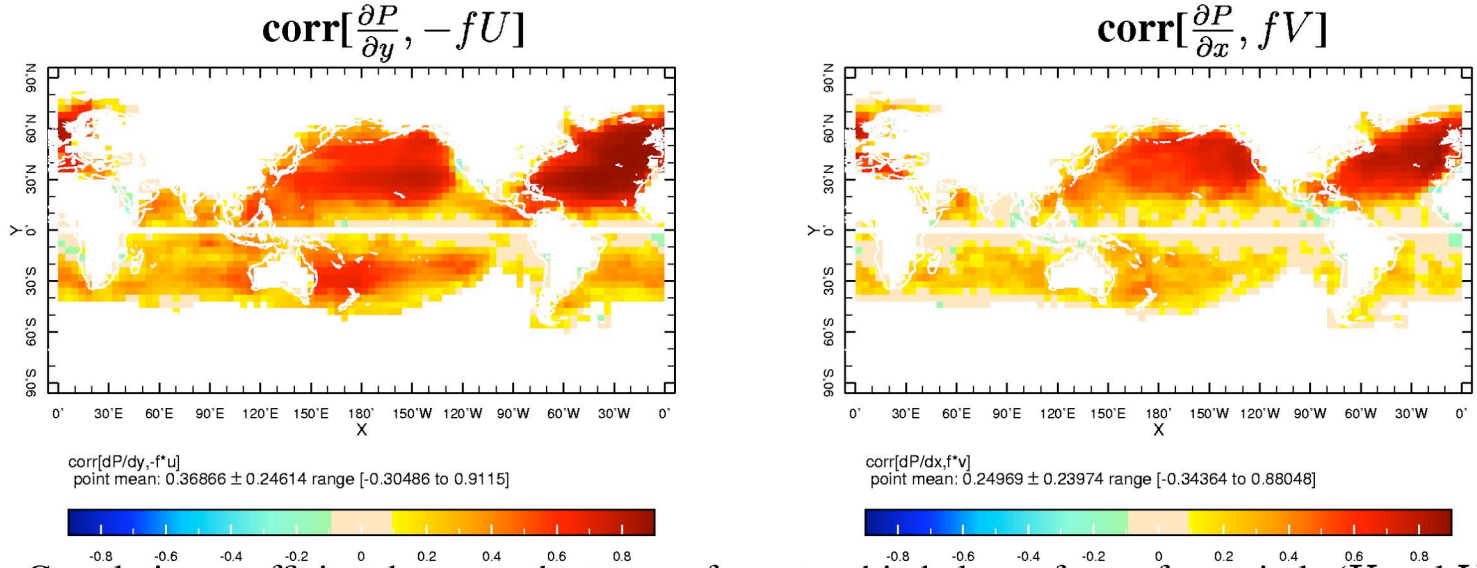


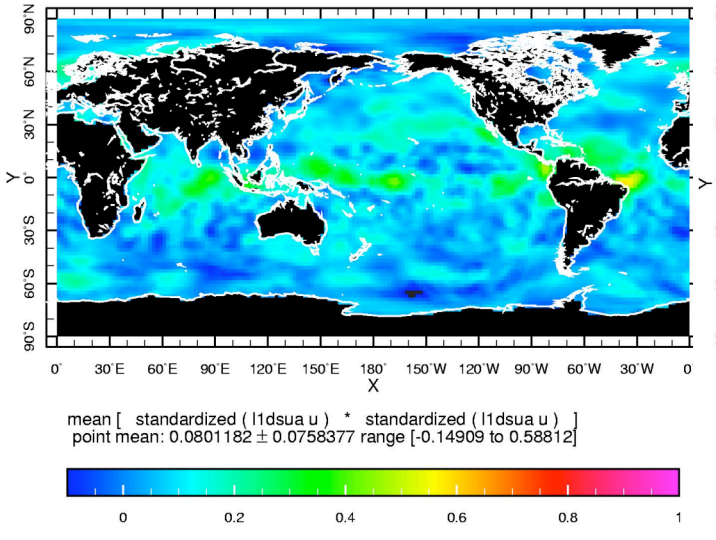
Figure 5: Correlation coefficient between the terms of geostrophic balance for surface winds (U and V) and sea level pressure P. Data comes from the univariate RS OI analyses of COADS data [*Kaplan et al.*, 2001]. Correlation coefficients are computed for all months from 1900 to 2000.

Persistence in SST anomalies is traditionally used to constrain historical analyses, but there is no persistence in monthly wind or pressure anomalies, right?

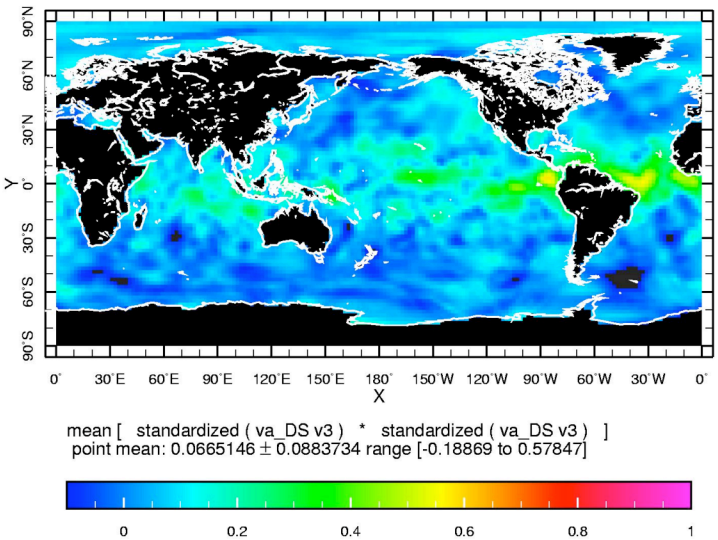
Data sets used below: Da Silva's successive-correction analyses of COADS data NCEP-NCAR Reanalysis; WOCE surface winds derived from the ERS Scatterometry; FSU subjective analysis of the tropical Pacific winds; Xie and Arkin precipitation analysis.

Persistence: Anomaly autocorrelations with 1 month lag

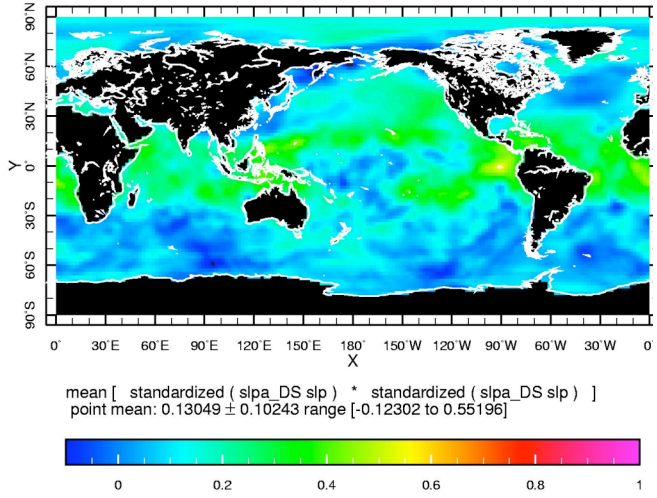
Da Silva U



Da Silva V



Da Silva SLP



Persistence: Anomaly autocorrelations with 1 month lag

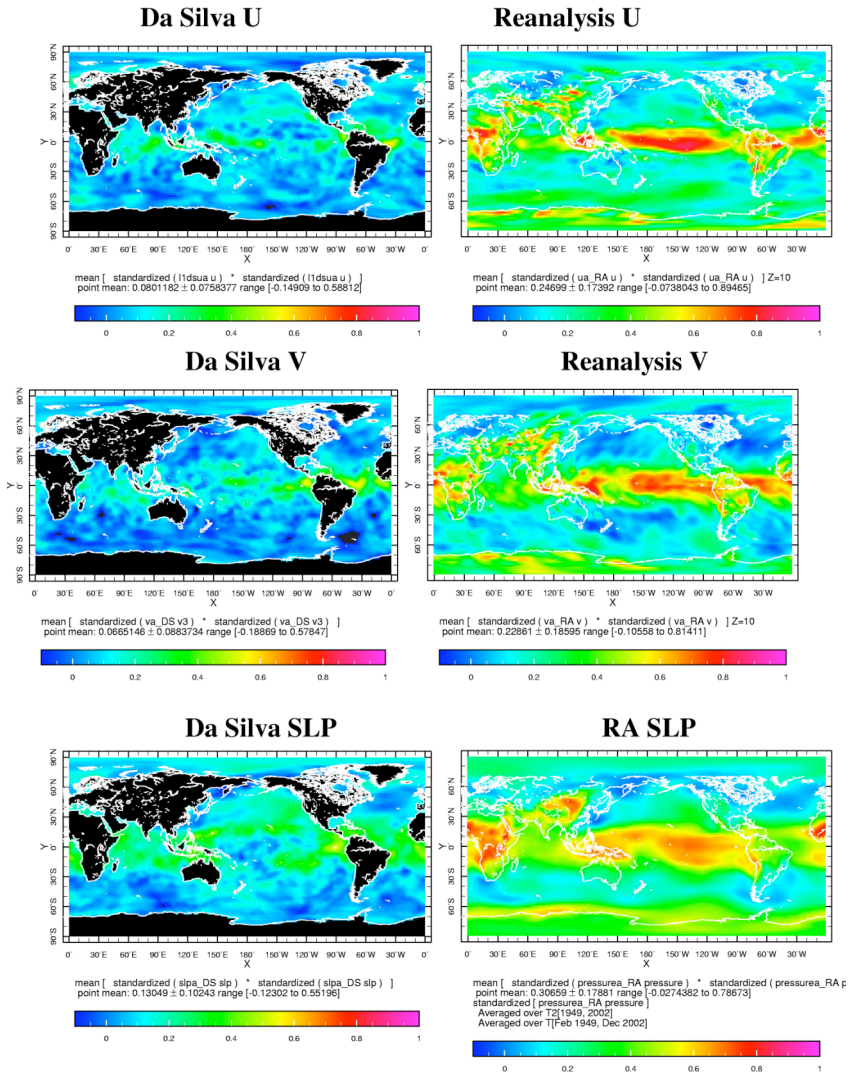
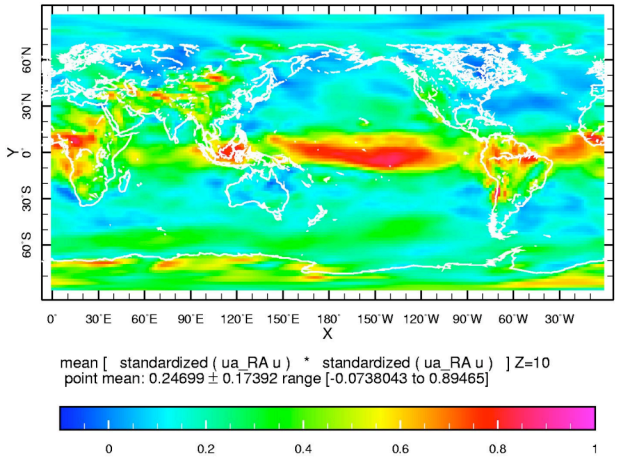


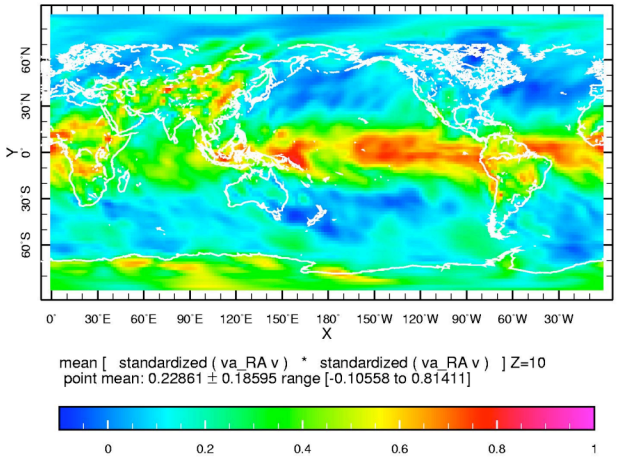
Figure 6: One month autocorrelation of monthly wind anomalies Da Silva et al [1994] and NCEP-NCAR reanalysis data sets

Verification by satellite data

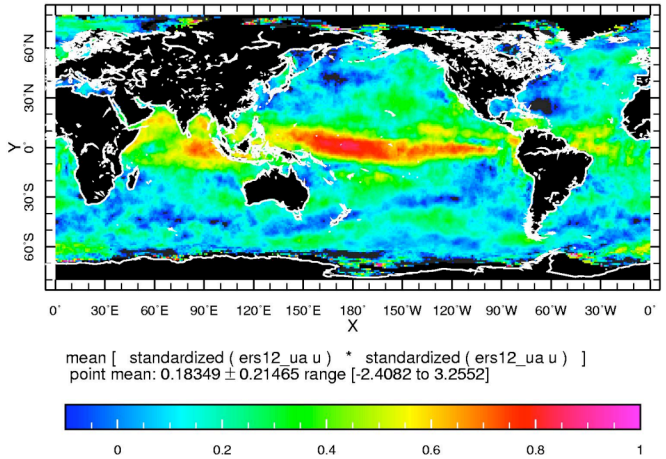
Reanalysis U



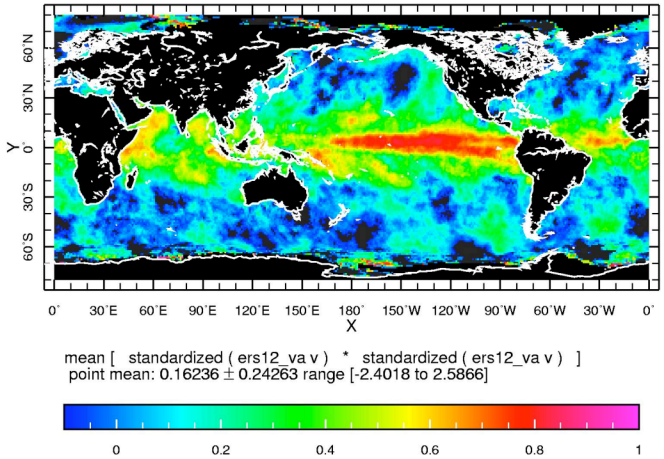
Reanalysis V



ERS U



ERS V



John Chiang's [*et al.*, 2001] approach to surface wind modeling: linearized dynamical core of a GCM [*Seager and Zebiak*, 1995] is set up to take both sea surface temperature and elevated atmospheric heating as forcings. The latter is parameterized via precipitation.

Persistence of the actual forcings

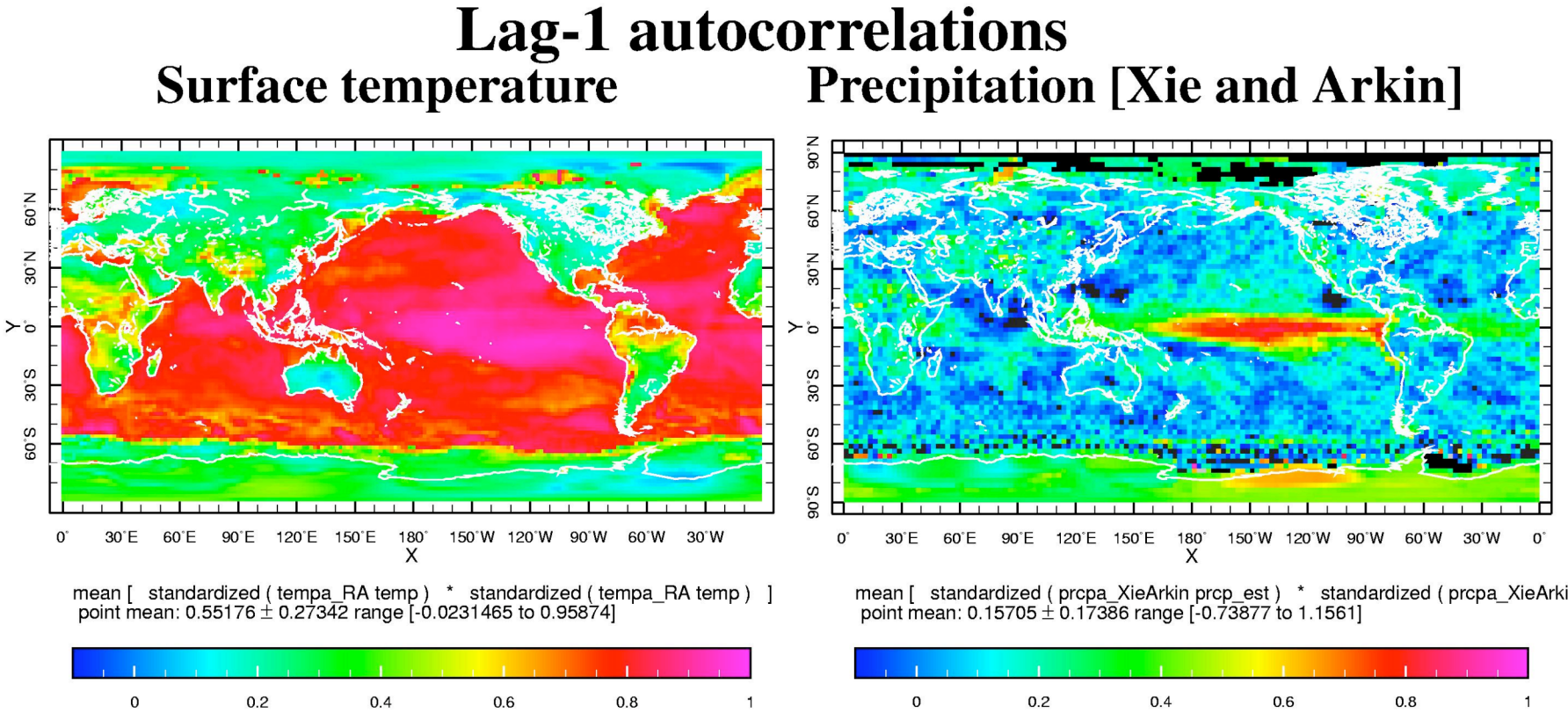


Figure 8: One month lagged autocorrelations of interannual monthly anomalies for RA surface temperature and for *Xie and Arkin* [1986] precipitation

Simulation skill

Consistency of persistence pattern in ERS (colors) and simulation (contours)

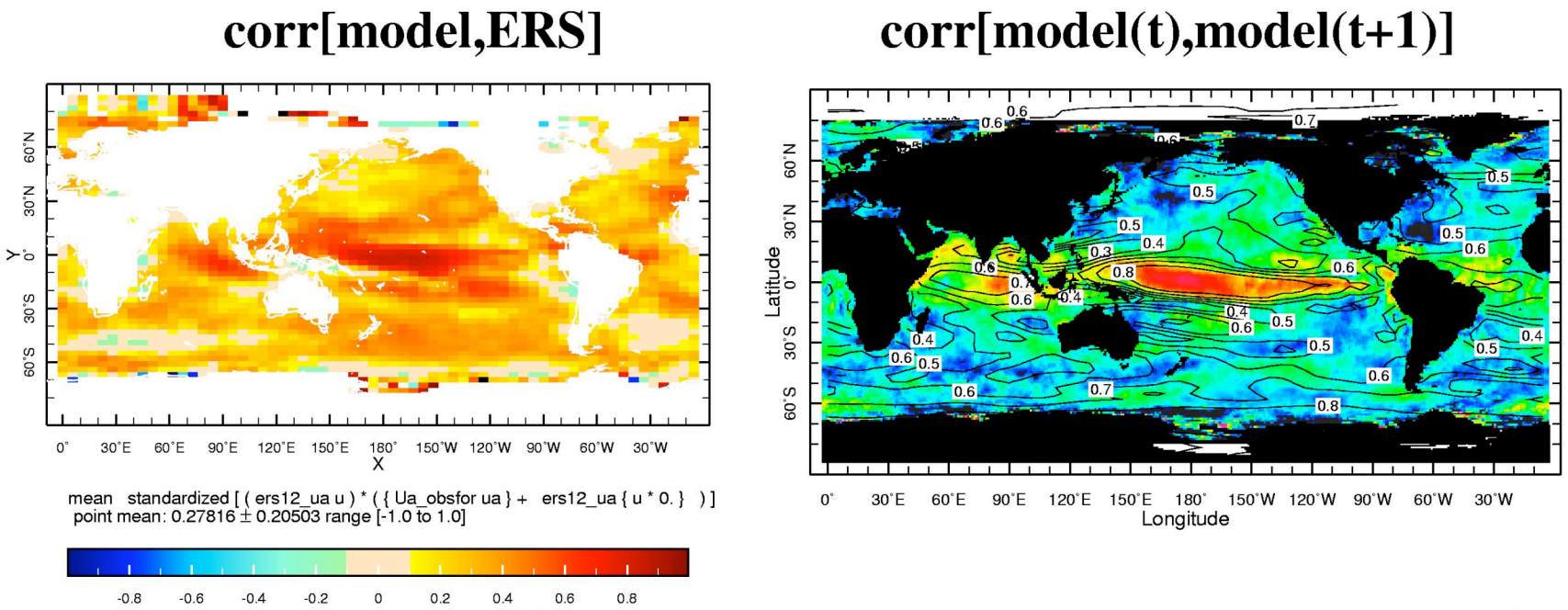
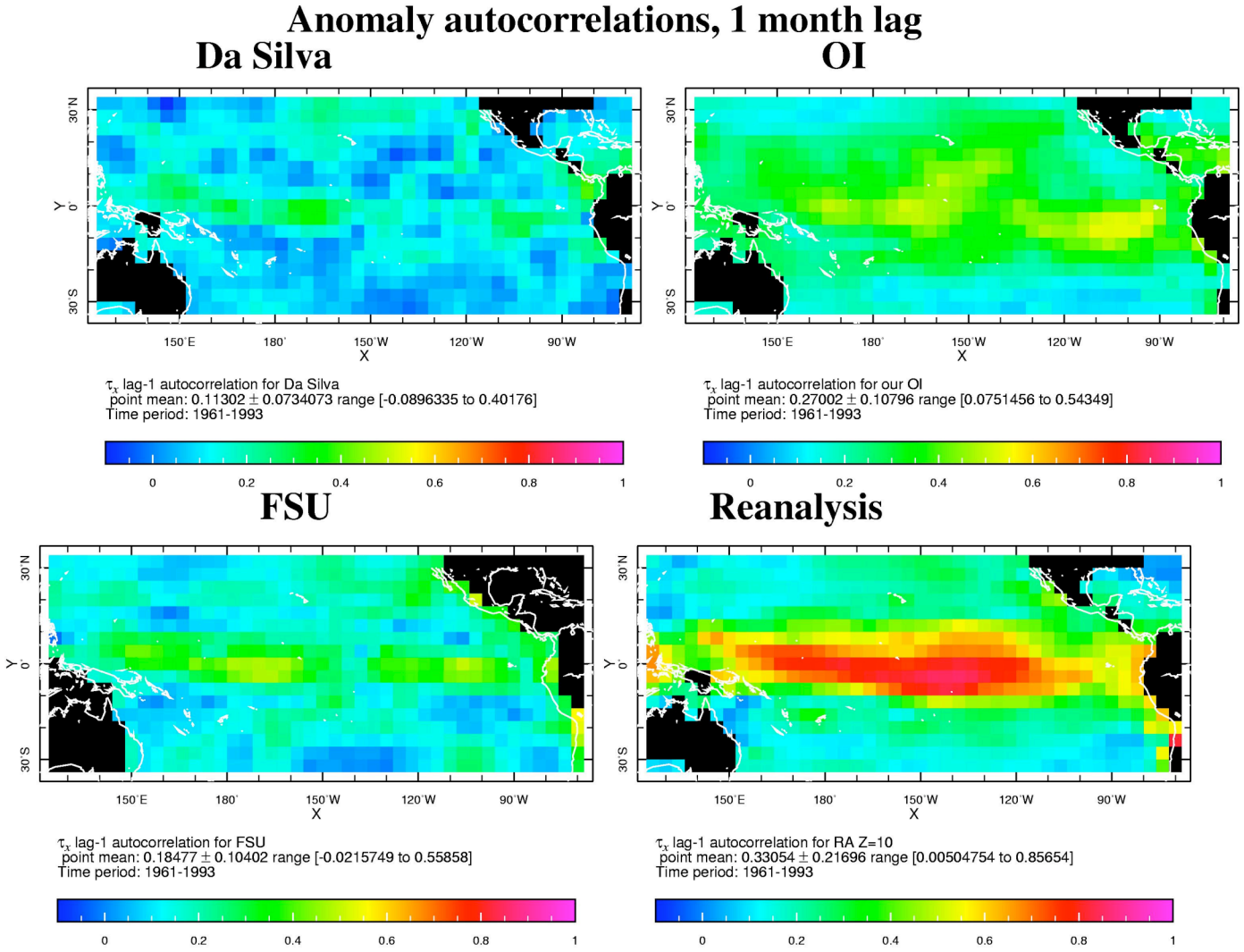


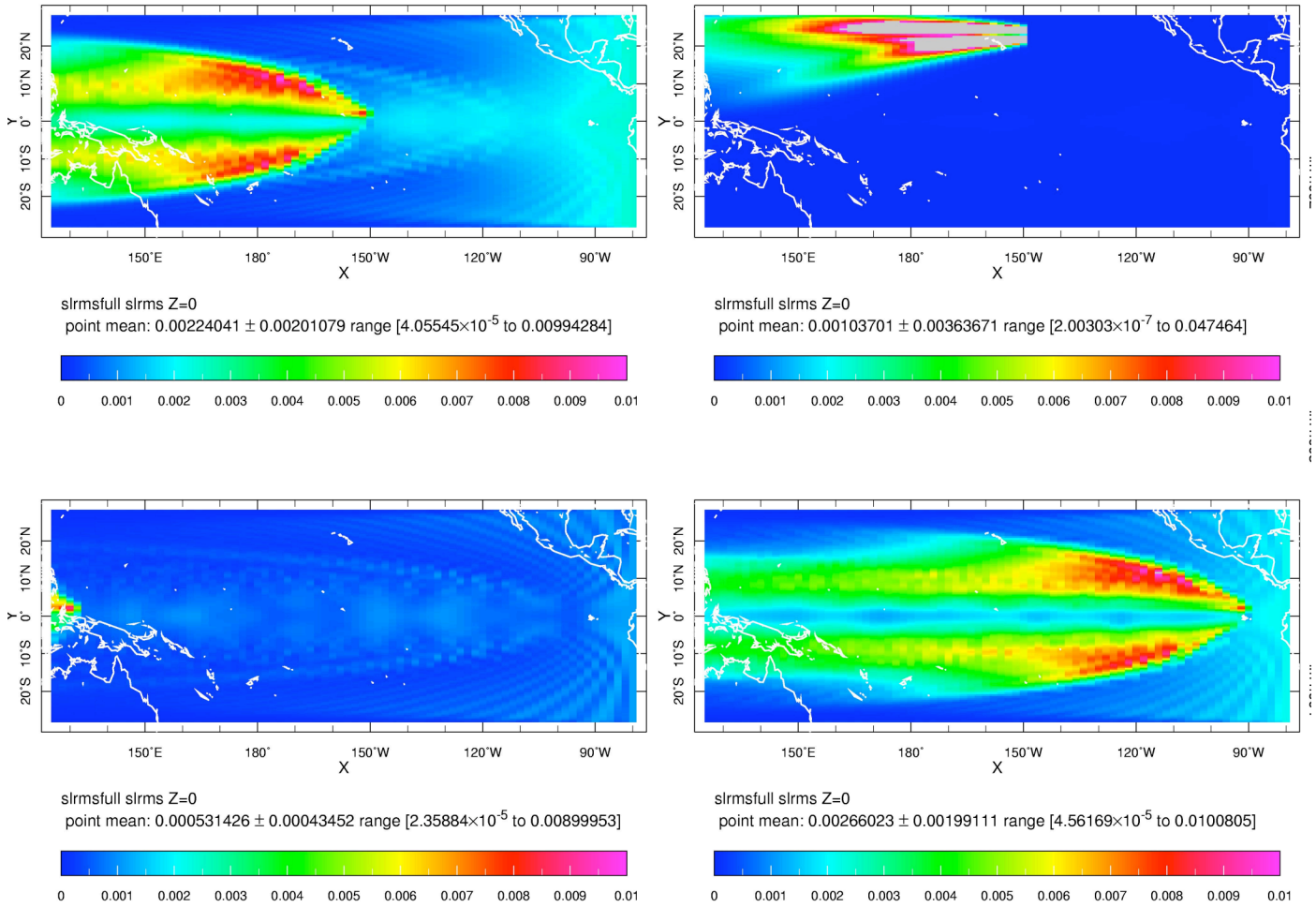
Figure 9: Use of *Chiang et al.* [2001] model to reproduce wind persistence. Zonal wind response of the model forced by observed SST and precipitation shows good correlation with ERS scatterometry in the tropics (left panel). Autocorrelations of model winds with 1 month lag (contours in the right panel), while generally higher than the autocorrelations in the ERS scatterometry data (colors in the right panel; same as bottom right panel in Figure 6) have a similar pattern in the tropics.

What is a good wind product from the tropical oceanographer's point of view?

Why equatorial persistence is so important?

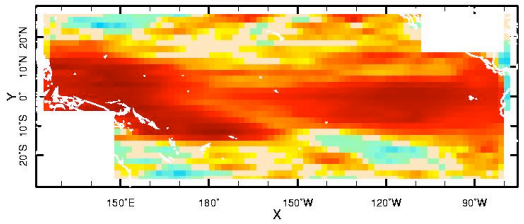


RMS of sea level response to the wind noise in a single location

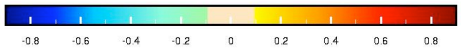


Correlation with TOPEX altimetry of ocean model sea level height responce to wind products

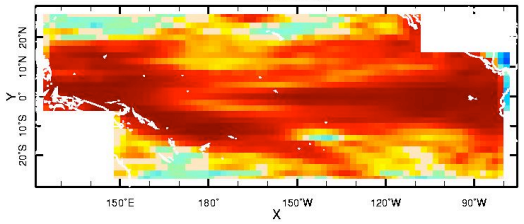
OI



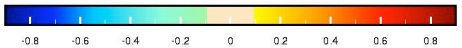
OI
point mean: 0.34439 ± 0.32224 range [-0.52142 to 0.86477]



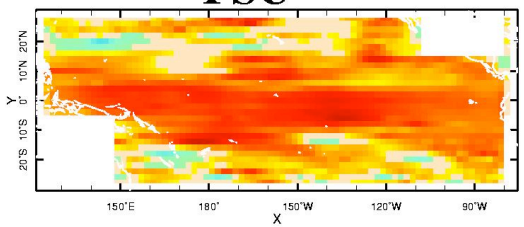
RA



RA
point mean: 0.44961 ± 0.34652 range [-0.67668 to 0.92057]

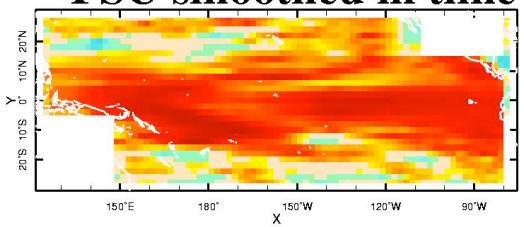


FSU



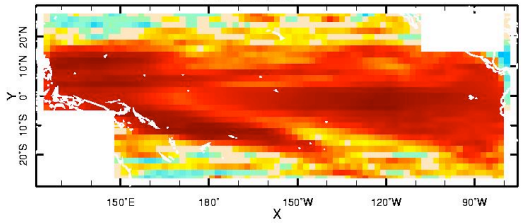
FSU raw
point mean: 0.30128 ± 0.22447 range [-0.3895 to 0.74195]

FSU smoothed in time

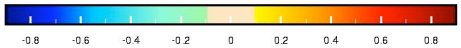


FSU smoothed
point mean: 0.34232 ± 0.27099 range [-0.42666 to 0.76556]

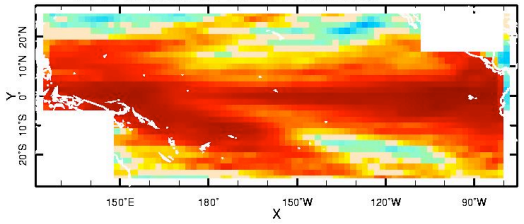
ERS



ERS
point mean: 0.42227 ± 0.35051 range [-0.56178 to 0.90786]



Modeled winds

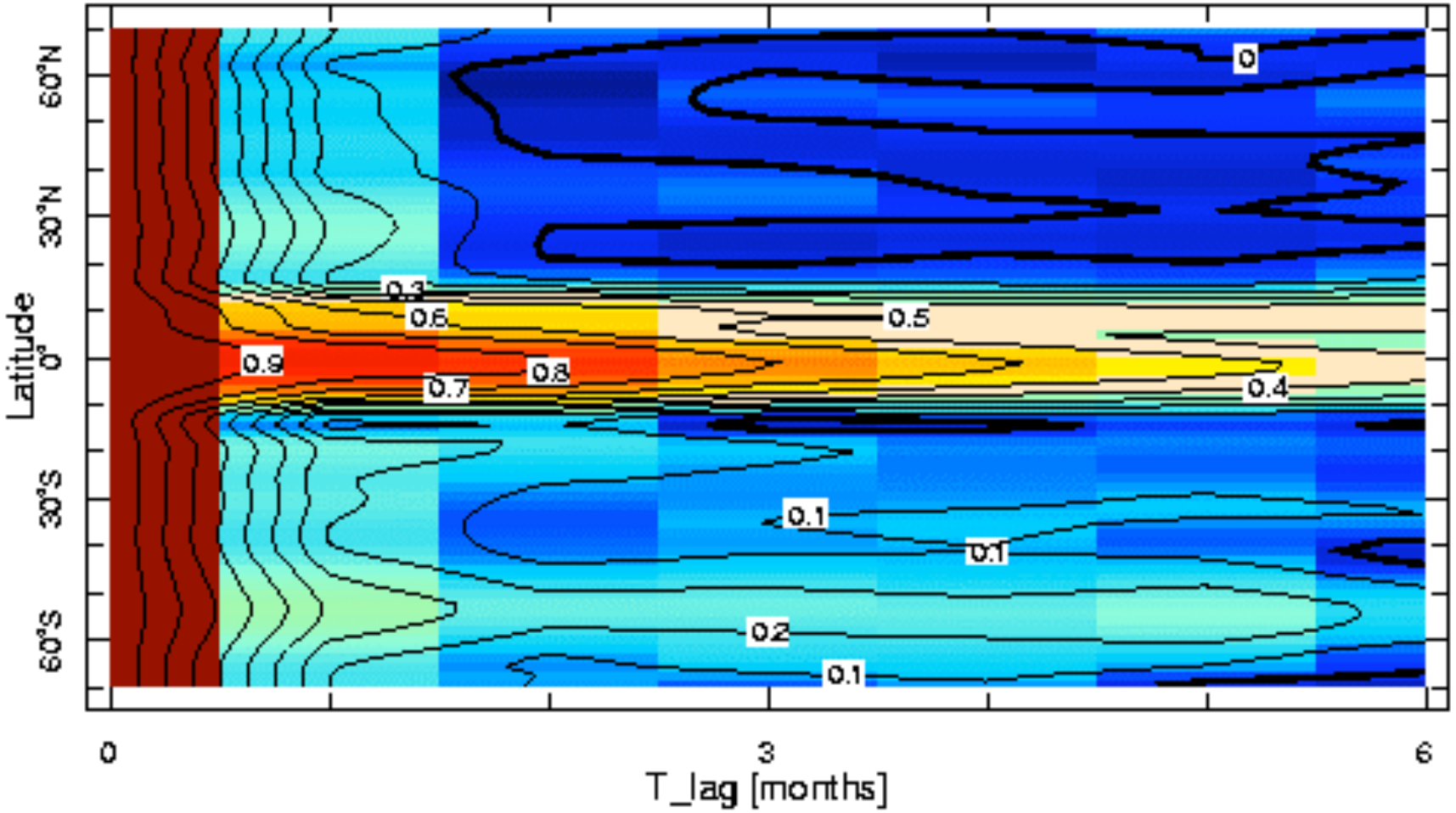


obsfor
point mean: 0.38023 ± 0.35446 range [-0.58309 to 0.88631]

- Within ~10 degree of Equator there is a persistence of surface wind and pressure anomalies.
- It is driven by the persistence in SST and precipitation (via elevated heating).
- It can be used in historical analyses of instrumental data by either fitting AR model to the wind or pressure data or by including temperature and precipitation in the analysis.
- Wind analyses suitable for driving ocean models must be persistent near Equator.

Persistence with longer lags

Zonal wind in Reanalysis: 160E-120W averages



Persistence of the actual forcings

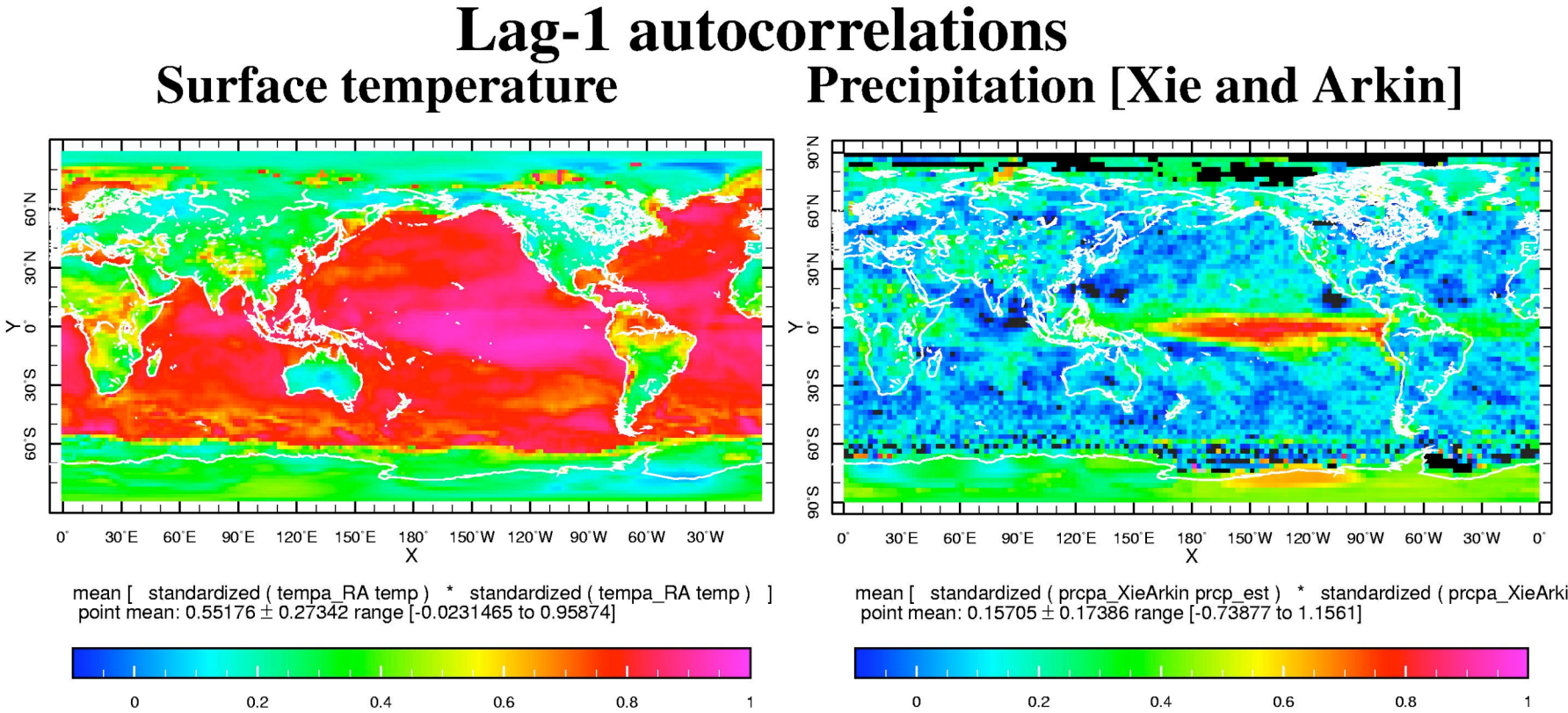


Figure 8: One month lagged autocorrelations of interannual monthly anomalies for RA surface temperature and for *Xie and Arkin* [1986] precipitation