Negative COADS 1c sea−level pressure anomalies in the 1850s

Todd Mitchell and John M. Wallace
University of Washington, Seattle, USA
mitchell@atmos.washington.edu

For a study of historical ENSO variability we calculated a Southern Oscillation index from COADS 1c sea−level pressure (SLP) anomalies. Two indices were defined: one as the average SLP anomaly over the central and eastern Pacific Ocean (within 20−degrees of the equator), called T*, and the other as the average SLP anomaly over the Atlantic, Indian, and western Pacific Oceans (within 20−degrees of the equator), called D*. The averaging regions, and the time series for these averages are shown in Figures 1 and 2, respectively. Also shown in Fig. 2 is the difference, D* minus T*, which is our Southern Oscillation index, and the mean marine SLP anomaly for the 20N−20S latitude band.

Fig.1: T* (light shading) eastern Pacific; and D* (dark shading) Indian and Atlantic

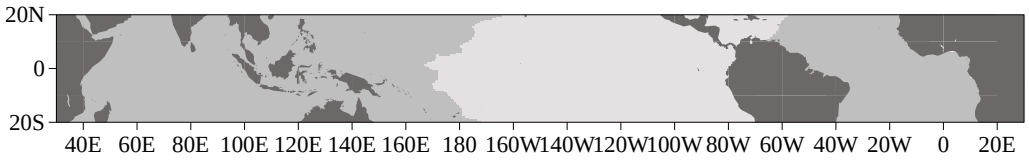
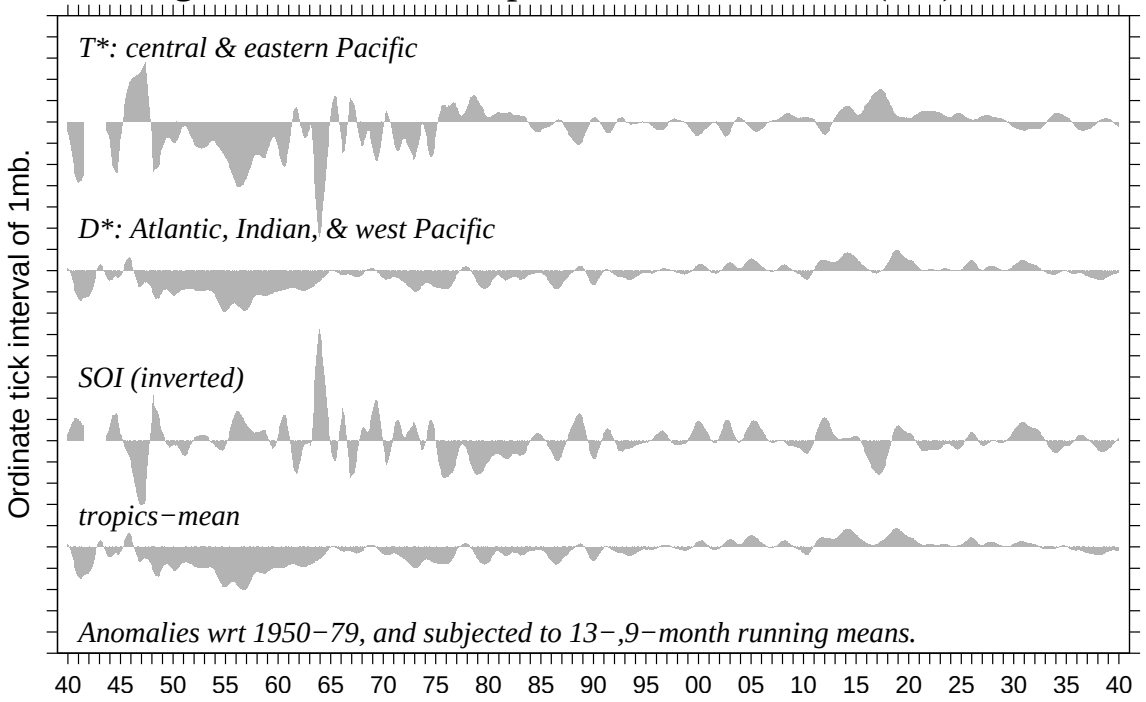


Fig.2: COADS 1c tropical SLP anomalies (mb) 1840−193

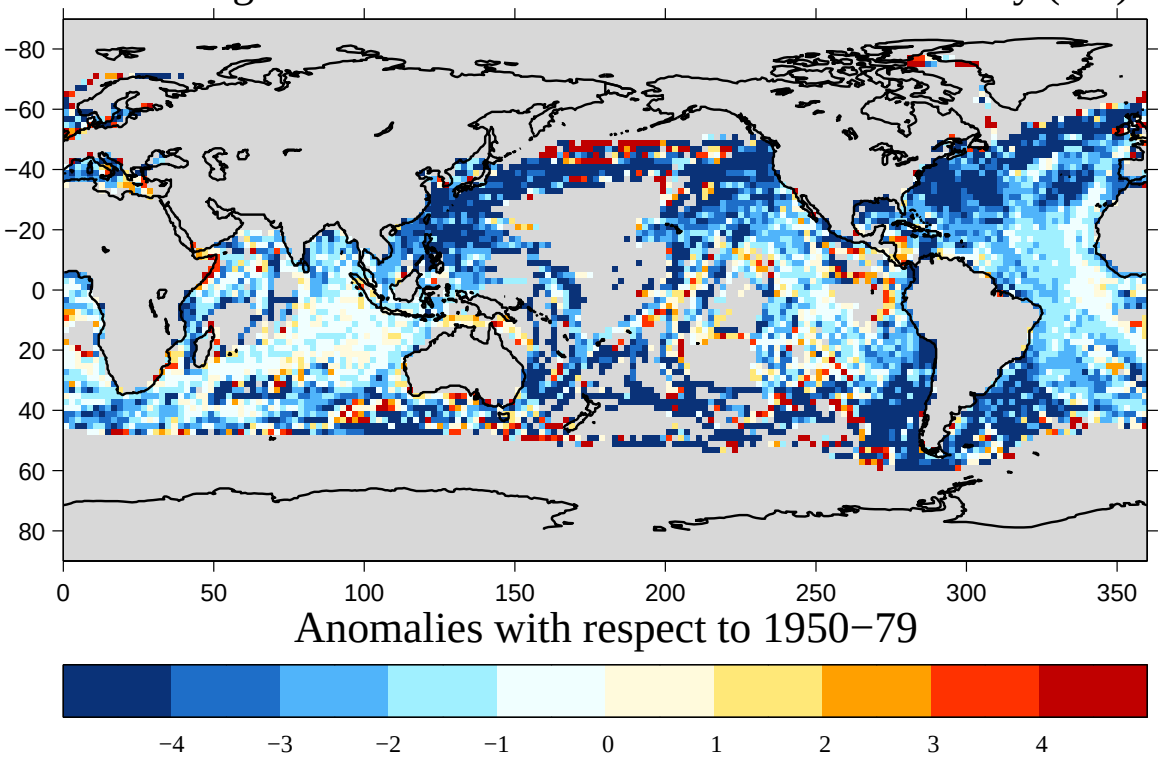


Anomalies are with respect to 1950−79, they have been smoothed with successive 13− and 9−month running means, and the ordinate tics are at 1mb interval. The average

anomalies for both indices are typically < −1mb in the 1850s.

Figure 3 is the average SLP anomaly for 1850−59 (again with respect to 1950−79). The average anomaly is large and negative over substantial portions of the work oceans.

Fig.3: Mean 1855−59 COADS 1c SLP anomaly (mb)



Observations for a better sampled grid box with a large mean negative SLP anomaly in the tropics are examined next. The 2−degree COADS grid box I picked is 7985, which is 0−2N, 128−130E, and is just east of Halmahera in the maritime continent. The mean 1855−59 anomaly is something like −2.4 mb for this grid box. A map and time series of this grid box are given in Figures 4 and 5, respectively.

Fig. 4: 0−2N, 128−130E (2−degree box 7985)

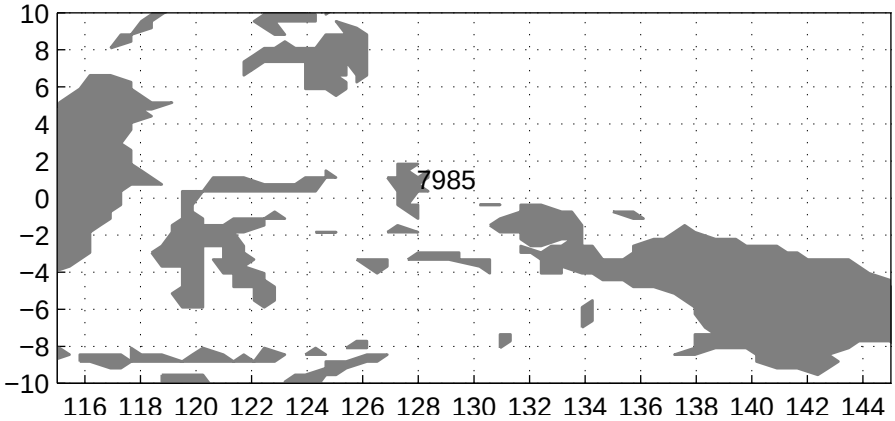
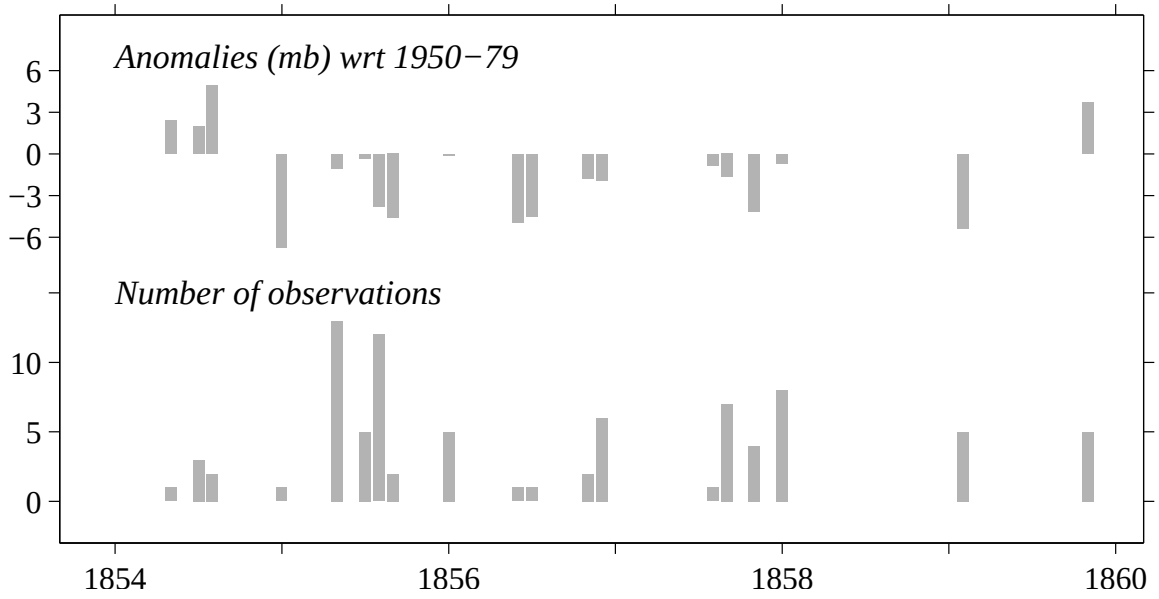


Fig. 5: COADS 1c SLP for 0−2N, 128−130E



Almost all of the monthly values are negative and large, and the months with data have at least a few observations.

David Parker of the UKMO seemed to think that these might be some of the Maury collection observations. I do not want to err in paraphrasing David so I won't go any farther in trying to identify the source of the problem. At the marine climate data workshop in Boulder CO in January 2002, the analyses that I presented were based on the data without the ZQ problem fixed (too many observations before 1860 were thrown out by a quality control step http://www.cdc.noaa.gov/coads/zq.html). The analyses in the present document are based on SLP data obtained post−ZQ problem. The conclusions are not affected by the ZQ problem.

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