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Title: El Niño/Southern Oscillation and Earth rotation variations
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Call for
Investigations of interactions between El Niño/Southern Oscillation and Earth rotation variations

The El Niño/Southern Oscillation (ENSO) phenomena is a large-scale process in the ocean-atmosphere system, primarily in the tropical Pacific. During ENSO, the normal tropical atmospheric and oceanic states are disturbed. Each El Niño event includes increases of sea surface temperature (SST) long the west coast of South America and elsewhere. This oceanic warming is part of one phase of the so-called Southern Oscillation (SO), a shifting of atmospheric mass across the breadth of the Pacific Ocean. In the El Niño phase, the oscillation typically produces anomalously high pressures over the West Pacific-Australian-Indonesian region and low pressures further to the east, over the central Pacific. Modifications of zonal winds during an El Niño episode are observed over the entire equatorial Pacific. Easterly winds collapse and westerlies usually increase. The influence of ENSO phenomena on atmospheric processes go beyond the tropics to connect to middle latitude regions.

Motion and redistribution of masses in the atmosphere and ocean may be accompanied by noted variations of Earth rotation. Strong positive anomalies of length of day occur during ENSO events; such signals have been investigated by many past studies. The impact on polar motion can be important as well. The global ENSO signal in Earth rotation may be related to other climate phenomena. Additionally, the correlation between geodetic and atmospheric excitation Earth rotation functions may be particularly high during times of active El Niño activity.

It is clear that a new strong El Niño is presently unfolding with important climatic consequences. Given past results, detailed investigation of ENSO influences on Earth rotation variations is a timely pursuit. Because each El Niño event has separate characteristics, different analyses might be done for individual cases. Study of recent cases, as well as the current 1997 event, are particularly important because their occurrence during a period of high accuracy of Earth rotation parameters (EOP). An understanding of the relationships between lengthy records of ENSO and EOP is also important.

Weekly updates for relevant climate parameters, including SST, 850-hPa wind, and outgoing longwave radiation (OLR), a measure related to SO phase, are available on the Climate Prediction Center homepage:

http://nic.fb4.noaa.gov (ENSO Update)

We ask that observers of geophysical fluids (atmosphere and ocean) and of the various techniques for Earth rotation/polar motion consider the details of their products keeping in mind the analysis and possible forecast of the geodetic impacts of El Nino, especially for the recent and current El Niño events. We will coordinate the results of such investigations on this topic. Discussions of this topic will be included at the 1998 IERS Workshop at other relevant science conferences.