

Surface Currents and Evolution of the 2006-2007 El Niño

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Abstract: The OSCAR surface current data (www.oscar.noaa.gov) were shown to be very useful in diagnosing the evolution of the previous two El Niños 1997-98 and 2002-03 (Lagerloef, et al., *Geophys. Res. Lett.*, 30, 2003). Equatorial Surface Current (SC) anomalies led Sea Surface Temperature (SST) anomalies by ~2 months. We apply the most recent data to describe the current 2006-07 El Niño life cycle through February 2007. These data now indicate that the SST anomalies peaked in late November – early December 2006, very similar in phase with the previous two events. As of early January 2007, the surface current anomalies had abruptly reversed direction and become westward at 0.5-0.8 m/s in the Niño 3.4 region. This portended the rapid SST anomaly decrease that we projected in early January and observed subsequently, resulting in the termination of 2006-07 El Niño and appearance of negative SST anomalies in February 2007. Some weakening of the SC anomalies in the western Pacific during February may slow the rate of SST cooling in the months ahead. In general, the SC and SST phasing was very similar to the previous two El Niños (1997-98 and 2002-03) with rapid SC reversal coinciding with peak SST anomaly during December-January, followed by declining SST anomalies in the early months of the year.

Figure 1: The first EOF modes of SC and SST anomalies for the period January 1997 through February 2007. Top panel shows the amplitude time series normalized by their respective standard deviations, and SC sign change coinciding with peak SST in late 2006, similar to the previous two El Niños (Arrows). Bottom panel shows the corresponding EOF maps scaled accordingly for SC (vectors) and SST (color).

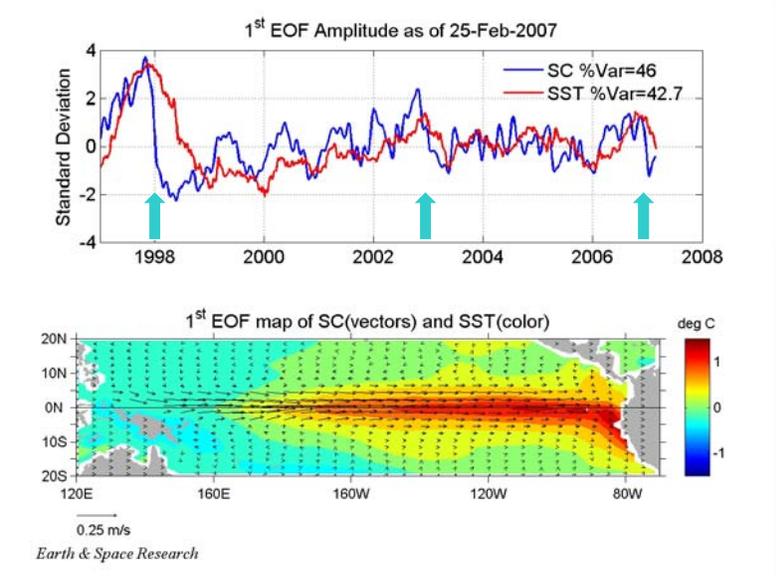


Figure 2: February 2007 monthly mean SC (vectors) and SST (color) anomalies showing the recent anomalous westward SC and negative SST anomalies appearing in the eastern Pacific cold tongue.

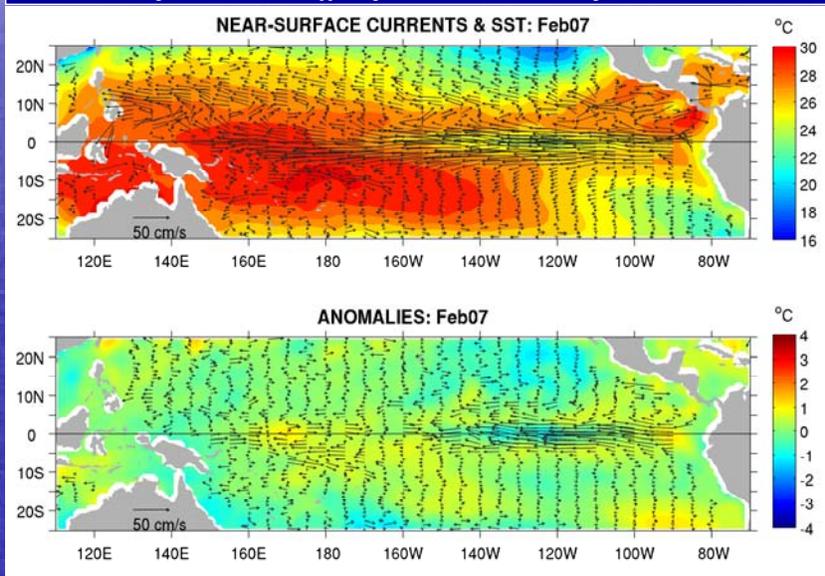


Figure 3: The progression of monthly mean SC and SST anomalies between August 2006 and January 2007.

- August 2006: Strong eastward SC anomalies during the onset of warm SST
- September 2006: Warm SST anomalies appear in the east
- December 2006: Near peak SST anomalies occur while SC anomalies weaken
- January 2007: Strong westward SC anomalies appear as SST anomalies fade
- February 2007 (Figure 2): Cool SST anomalies appear.

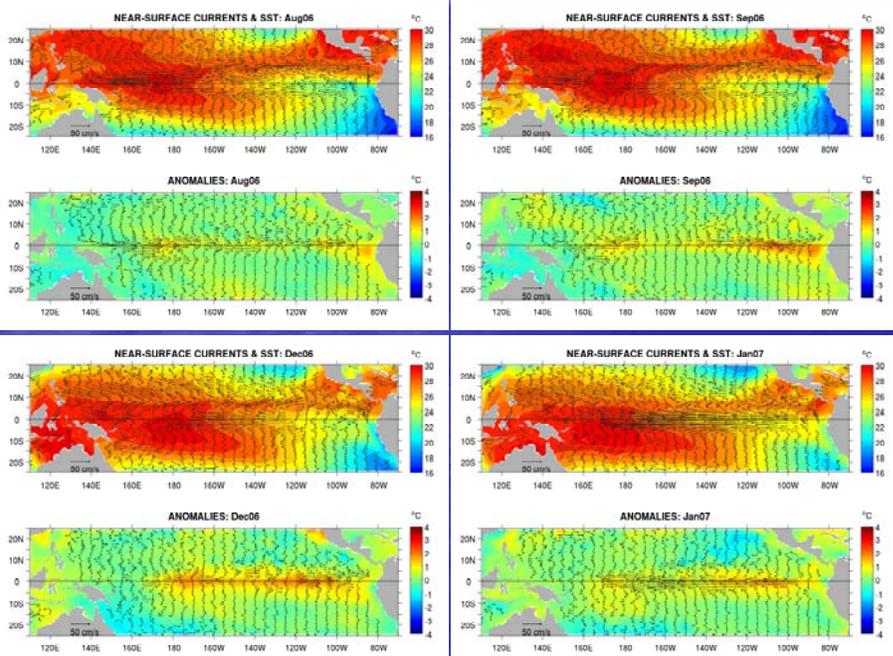


Figure 4: Compared progressions of the 1997-98, 2002-03 and 2006-07 (to date) El Niño events. The abscissa indicates the month starting in the respective year. Top panel: SST anomalies in the Niño 3.4 index regions (the area average between 5°N to 5°S and 170°W to 120°W). Lower panel: SC EOF-1 time series (from Fig. 1). The 2006-07 warm episode is clearly over by February 2007.

