

1. El Niño Diagnostics

The evolution of El Niño starts after every 2 to 7 years with warming in western Pacific Ocean around March/April and spreads to the central and eastern Pacific Ocean attaining its peak late in November-December. This phenomenon occurs off the coast of Peru and Ecuador (South America coast between the equator and 12°S) when the cool and nutrient rich water which normally upwells from several hundred meters below sea level, is suppressed by the sudden appearance of abnormally warm and less nutrient rich surface waters. The Peruvian anchovy fisherman ruefully christened the phenomenon “El Niño” in English “The Christ Child” because it occurred in late December around Christmas. El Niño events were recorded in 1877, 1918, 1925, 1940, 1941, 1957-58, 1965, 1969, 1972-73, 1976, 1982-83, 1987, 1991, 1994, 1997-98, 2002, 2004 and 2006.

The monitoring and prediction of the El Niño as one of the most important coupled ocean-atmosphere phenomenon that cause major global climate variability on seasonal to interannual timescales is of crucial importance due to its impacts on regional rainfall over several parts of the Globe. Studies have revealed that the rainfall patterns of many parts in Africa respond in a varied manner to different phases of the El Niño cycle forcing. The parts of Greater Horn of Africa (GHA) countries continue to experience severe rainfall deficits and drought while putting in place mitigation strategies to cope with coming heavy rains and floods in November-December at the peak of El Niño. The El Niño in 2009 has been confirmed and models consensus is strong with 85% probability.

1.1 Sea Surface Temperature (SST)

In Figure 1, the August, 2009 warming condition was quite high in the eastern equatorial Pacific Ocean typical of El Niño evolution. The high SST was characterized by high relative humidity at 700hPa resulting from large scale moisture convergence resulting in heavy rainfall.

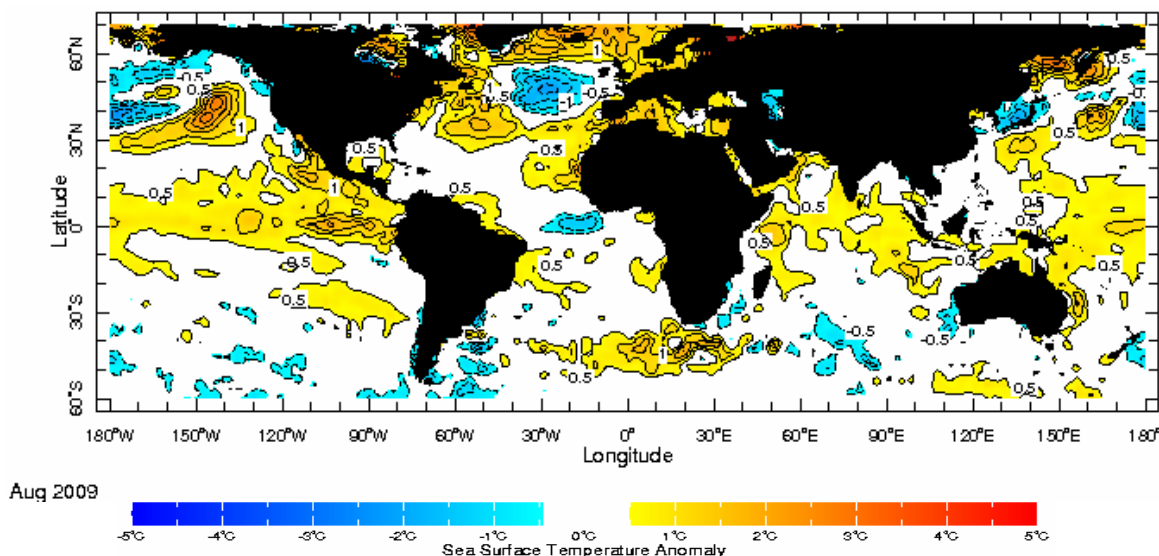


Figure 1: Sea Surface Temperature Anomalies (Source: IRI)

1.2 Thermal Index Regime

The thermal index (TI) regime at 300hPa is currently being used in this analysis as a feedback mechanism on SSTs anomalies. The TI analysis is used in the determination of the best analogue El Niño event to the 2009 El Niño evolution from the past 3 major El Niño events of 1997, 1982 and 1972.

In the month of August, 2009, the TI regime at 300hPa, Figure 2, had value of 242°K isotherm over north of equator from 5°N extending northwards maintaining reasonably high conditional instability associated with heavy rainfall over parts characterized by high relative humidity. The threshold value of 243°K with the peak of and 248°K maintained the highest conditional instability associated with heavy convective rainfall with floods over Asia, north Australia, western and central Pacific Ocean. The August, 2009 TI pattern (Figures 2) compared to the past El Niño evolutions of 1997, 1982, and 1972 showed the highest degree of similarity to the 1997 El Niño event evolution (Figures 3).

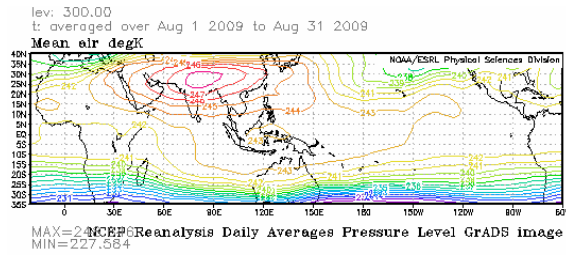


Figure 2: August, 2009 TI regime (Source: NOAA/ESRL-PSD)

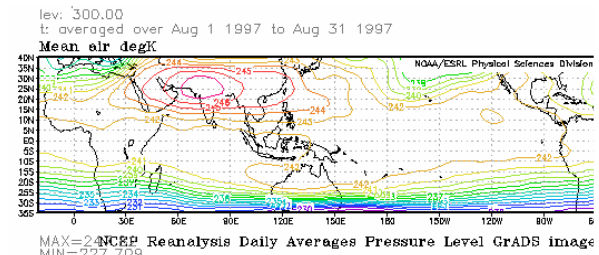


Figure 3: August, 1997 TI regime (Source: NOAA/ESRL-PSD)

1.3 Relative Humidity

The mean relative humidity at 700hPa (Figure 4) shows the month of August, 2009, high relative humidity (RH) ranging from 60% to 100% pattern with reasonable degree of similarity to the August, 1997 RH, (Figure 5).

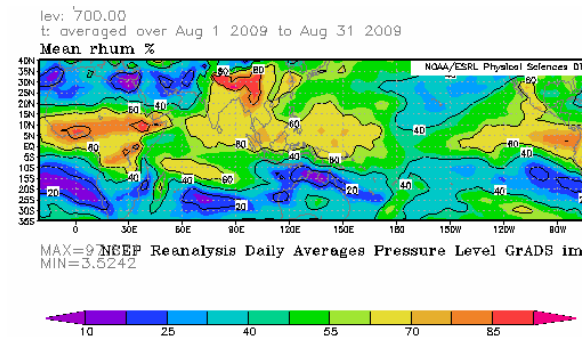


Figure 4: August, 1997 RH at 700hPa (Source: NOAA/ESRL-PSD)

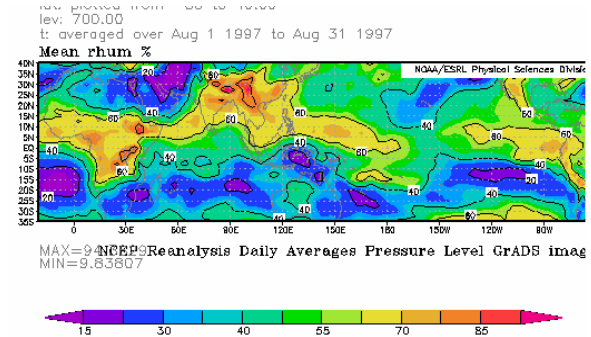


Figure 5: August, 2009 RH 700hPa (Source: NOAA/ESRL-PSD)

1.4 Zonal Wind (U)

The comparison between August, 2009 (Figure 6) and August, 1997 (Figure 7) shows high degree of similarity in the zonal wind patterns.

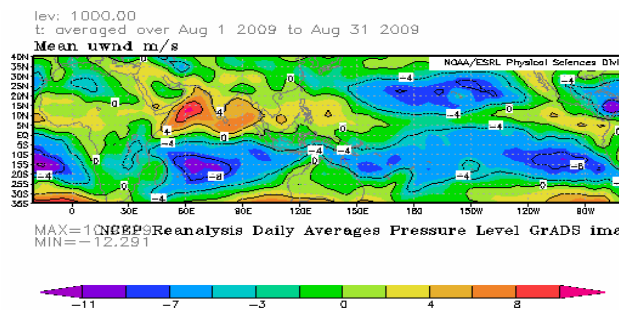


Figure 6: August, 2009 zonal wind (Source: IRI)

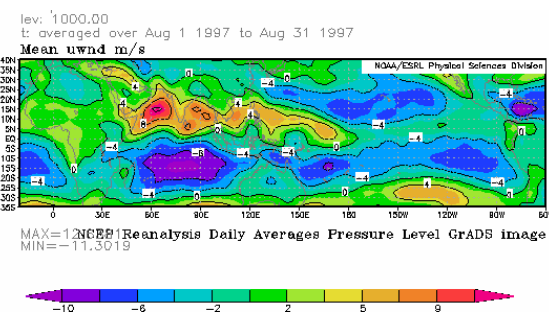


Figure 7: August, 1997 zonal wind (Source: IRI)

2. Forecast

Figure 8 shows highest positive SST anomalies in the eastern Pacific Ocean for August-September-October (ASO), 2009 confirming the El Niño evolution. The set of dynamical and statistical models forecasts of ENSO over Nino 3.4 domain (5°N – 5°S, 120°W – 170°W) shown on Figure 9 indicate weak to moderate El Niño conditions (SST anomaly range 0.6°C to 1.6°C) as the most likely scenario through 2009, with probability of 80 to 85% for the ASO to NDJ seasons.

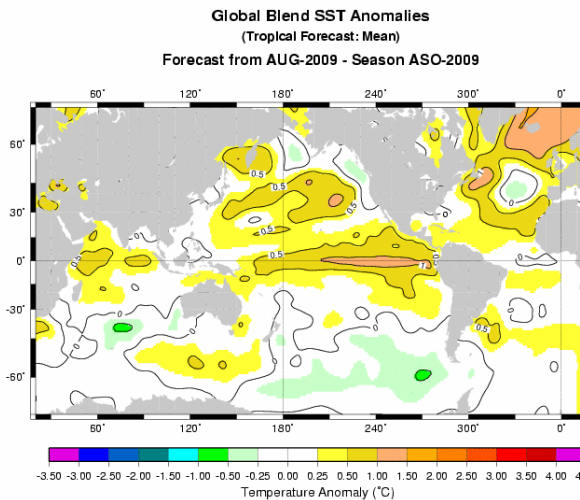


Figure 8: SST anomalies in Pacific Ocean (Source: IRI)

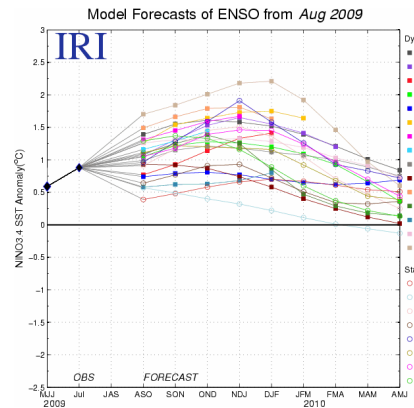


Figure 9 : Multi-model ENSO Forecast (source IRI)

3. Impacts

As shown on Figure 10 by the IRI seasonal rainfall forecast issued in August, 2009 for the period of September-October-November (SON), 2009, the evolution of El Niño in the Pacific Ocean is presently linked to the prevailing rainfall anomalies over several parts of the globe with expectation of severe anomalies expected at the peak El Niño by November-December, 2009. As observed during other major El Niño years, the following rainfall anomaly patterns are expected in 2009:

- Continued severe rainfall deficits and drought in parts of GHA countries in coming months with a drastic change in October-November-December (OND) season which will be characterized by heavy rains with floods over several parts.
- The southern Africa countries will experience suppressed rainfall in coming months recording below average rainfall with severe deficits and drought during the peak of El Niño.
- The Gulf of Guinea countries will experience heavy rainfall, and
- The hurricane activity in the Atlantic Ocean will remain suppressed

The NMHSs in Africa have to advise users of climate information and prediction products to guard against risks of climate extremes during the coming months as the El Niño moves to its mature phase. The climate information users need to consult climate outlooks for information updates during the coming weeks and months which will be characterized by extreme rainfall events such as floods and droughts. ACMAD will maintain Climate Watch and provide regular updates on the 2009 El Niño evolution and expected intensity (weak, moderate or strong) including expected impacts as we progresses towards its mature phase by November/December, 2009. The **ACMAD El Niño Bulletin Special** is dedicated to this Alert.

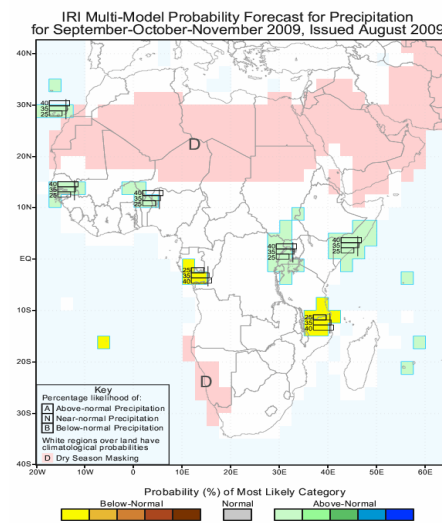


Figure 10 : Forecast rainfall anomalies over Africa (Source: IRI)