African Centre of Meteorological Application for Development
Centre Africain pour les Applications de la Météorologie au Développement

EL NINO BULLETIN SPECIAL

SEPTEMBER, 2009

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 Nino" in English "The Christ Child" because it occurred in late December around Christmas. El Nino 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)

A major warming condition prevailed in most of the central and east Pacific Ocean extending northward while in the south eastern part the cooling conditions prevailed.

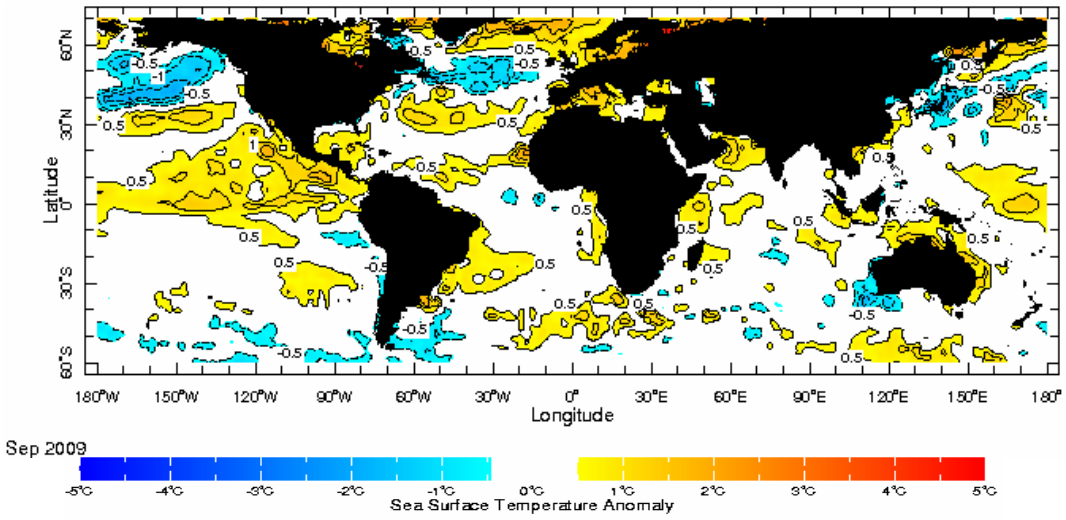

Figure 1: Sea Surface Temperature Anomalies (Source: IRI)

1.2 Thermal Index Regime

In the month of September, 2009, the Thermal Index (TI) regime at 300hPa, Figure 2, had a near-threshold value of 242°K and above isotherms over Africa covering the Sahel, Gulf of Guinea countries, most parts of central Africa and GHA countries with the highest TI regime epicenter of 246°K over Asia spreading into western Pacific Ocean maintaining the highest conditional instability resulting in heavy rainfall with floods. The September, 2009 TI pattern compared to the past El Niño 1997 evolution (Figures 3), shows high degree of similarity.

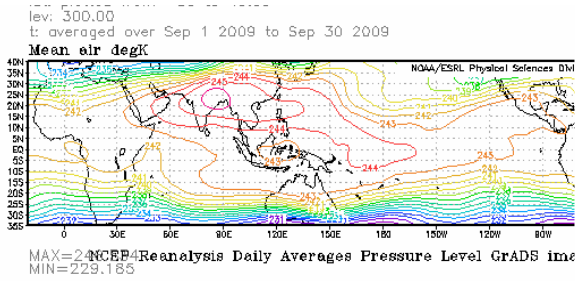

Figure 2: August, 2009 TI regime (Source: NOAA/ESRL-PSD)

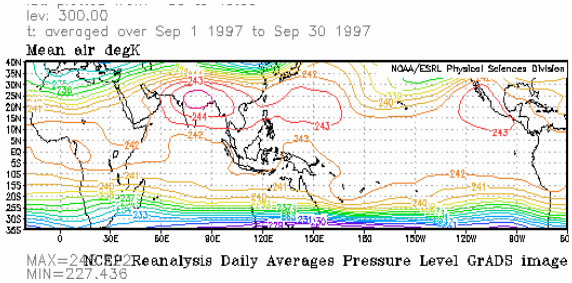

Figure 3: August, 1997 TI regime (Source: NOAA/ESRL-PSD)

1.3 Relative Humidity

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

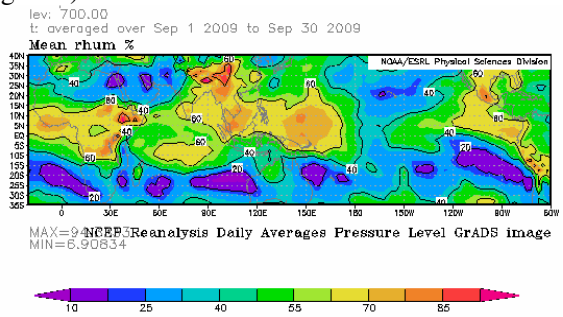

Figure 4: August, 1997 RH at 700hPa (Source: NOAA /ESRLPSD)

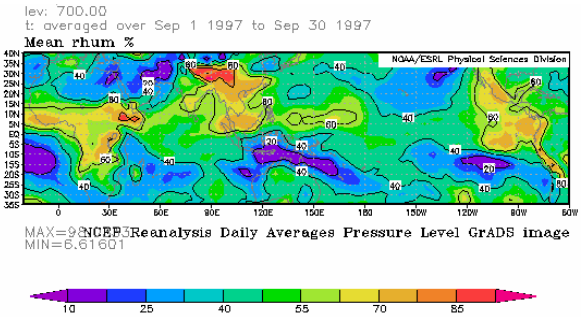

Figure 5: August, 2009 RH 700hPa (Source: NOAA/ESRL-PSD)

1.4 Zonal Wind (U)

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

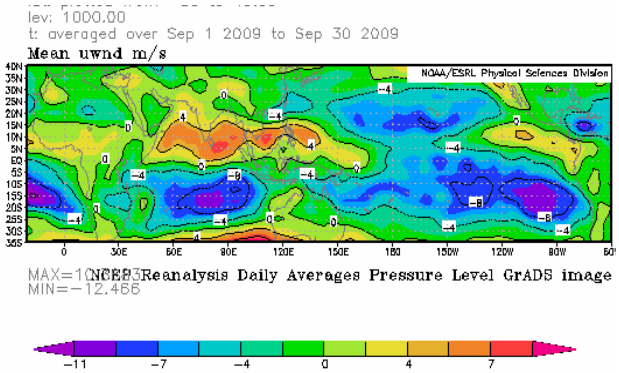

Figure 6: August, 2009 zonal wind (Source: IRI)

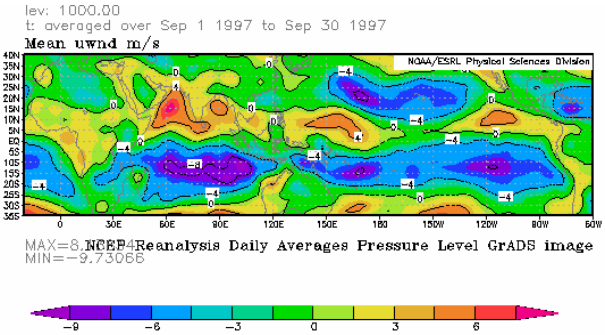

Figure 7: August, 1997 zonal wind (Source: IRI)

2. Forecast

Figure 8 shows highest forecast positive SST anomalies in the central and eastern Pacific Ocean for October-November-December, 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 a probability of about 85% for maintaining weak to moderate El Nino conditions through the end of the year.

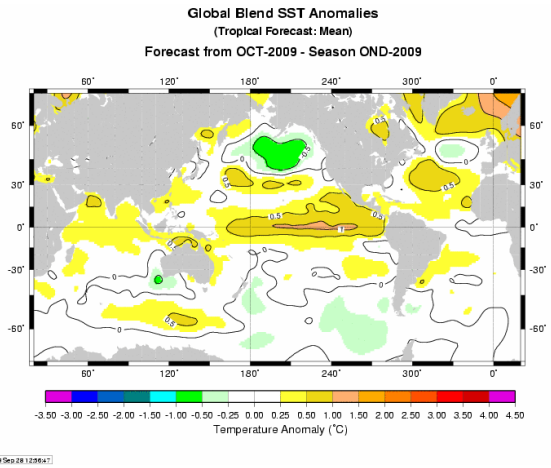

Figure 8: SST anomalies in Pacific Ocean (Source: IRI)

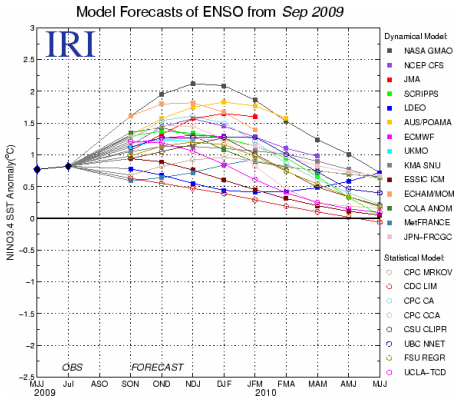

Figure 9 : Multi-model ENSO Forecast (source IRI)

3. Impacts

As shown on Figure 10 by the IRI seasonal rainfall forecast issued in September for the period of October-November-December (OND) 2009 shows excessive rainfall (above normal) over major parts in the Gulf of Guinea, North-eastern Central Africa and GHA countries with below normal rainfall is expected over southern part of Central Africa and southern Africa countries.

The prevailing rainfall anomalies are linked to evolving El Niño with expectation of severe anomalies at the peak El Niño by November-December, 2009. As observed during past major El Niño years, the following rainfall anomaly patterns are expected in 2009:

a) The GHA countries will start experiencing heavy rains in October intensifying by November-December floods over several parts.
b) The southern Africa countries will experience suppressed rainfall in coming months recording below average rainfall over several parts.
c) The Gulf of Guinea countries will experience heavy rainfall resulting in flooding in some parts.
d) 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 rainfall forecasts at regional, sub-regional levels have to be harmonized with national forecasts for effective national decision making.**

The climate information users need to consult climate outlooks and the downscaled forecasts at national and local levels. ACMAD will maintain Climate Watch and provide updates on the 2009 El Niño evolution and the expected impacts as we progress towards the mature phase of the El Niño by November/December, 2009. The ACMAD **El Niño Bulletin Special** is dedicated to this Alert.

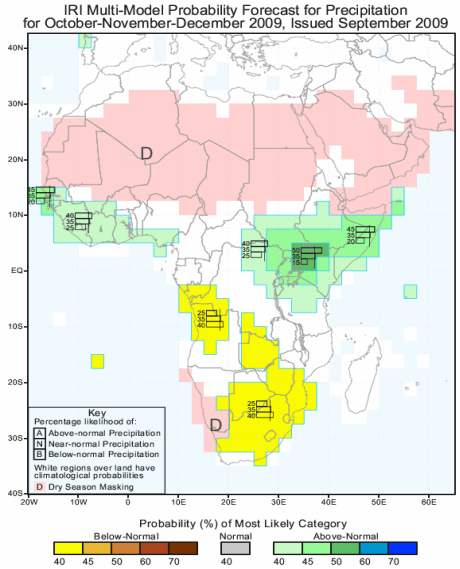

Figure 10 : Forecast rainfall anomalies over Africa (Source: IRI)

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey – Niger
Tél. (227) 20 73 49 92 , Fax : (227) 20 72 36 27 , E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org/