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

# EL NINO BULLETIN SPECIAL

July, 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 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 80% probability.

### 1.1 Sea Surface Temperature (SST)

In Figure 1, the warming condition was highest in the central and eastern equatorial Pacific Ocean. The high SST was characterized by high relative humidity at 700hPa resulting from large scale convergence associated with heavy rainfall.

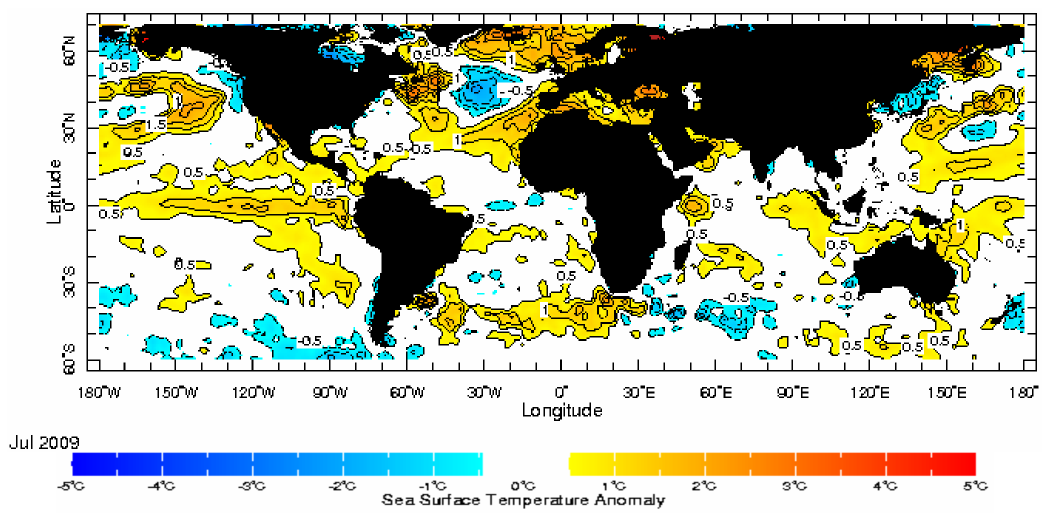


**Figure 1: Sea Surface Temperature Anomalies (Source: IRI)**

### 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 July, 2009, the thermal index (TI) regime at 300hPa, Figure 2, had value of 242°K isotherm over equatorial Africa extending about 10°N to 10°S maintaining reasonable conditional instability associated with heavy rainfall over parts with high relative humidity. The threshold value of 243°K with the peak of and 249°K maintained the highest conditional instability associated with heavy convective rainfall with floods over

Asia, north Australia and western Pacific Ocean. The July, 2009 TI pattern compared to the past El Niño evolution of 1997, 1982, and 1972 (Figures 3, 4 and 5) showed the highest degree of similarity to the 1972 El Niño evolution.

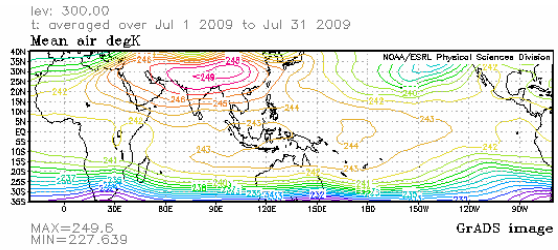


**Figure 2: July, 2009 TI regime (Source: NOAA/ESRL-PSD )**

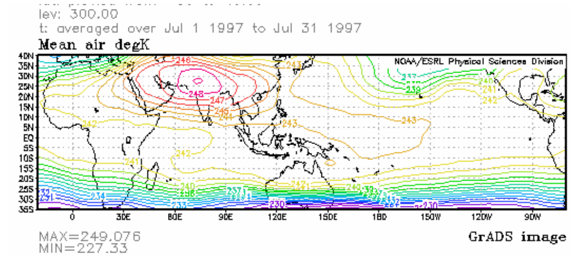


**Figure 3: July, 1997 TI regime (Source: NOAA/ESRL-PSD)**

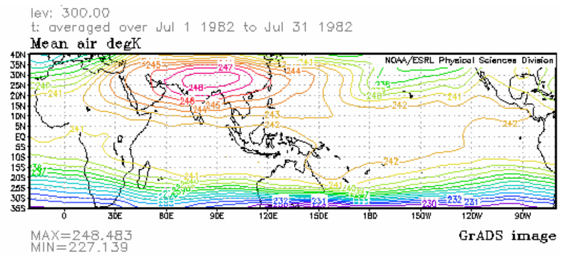


**Figure 4: July, 1982 TI regime (Source: NOAA/ESRL-PSD I)**

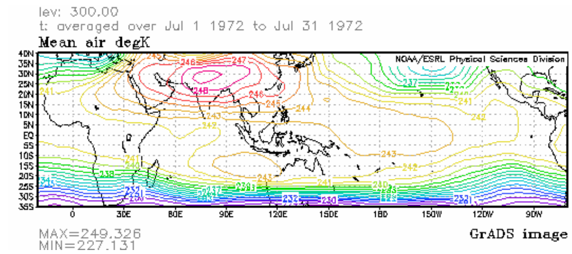


**Figure 5: July, 1972 TI regime (Source: NOAA/ESRL-PSD)**

## 1.3 Relative Humidity

The mean relative humidity at 700hPa (Figures 6,7,8 and 9) show the month of July, 2009, high relative humidity (RH) ranging from 60% to 100% pattern with reasonable degree of similarity to 1972.

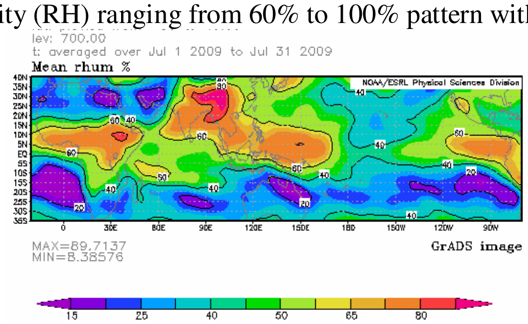


**Figure 6: July, 2009 RH 700hPa (Source: NOAA/ESRL-PSD)**

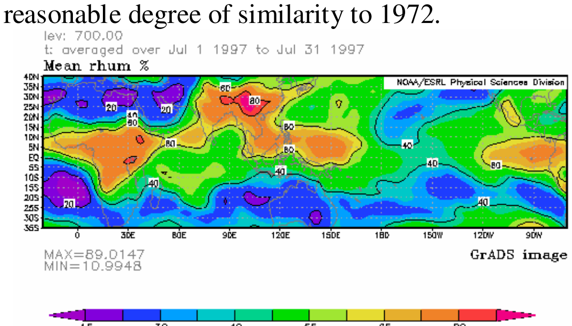


**Figure 7: July, 1997 RH at 700hPa (Source: NOAA/ESRL-PSD)**

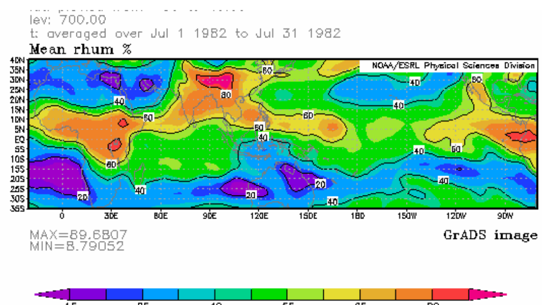


**Figure 8: July, 1982 RH 700hPa (Source: NOAA/ESRL-PSD)**

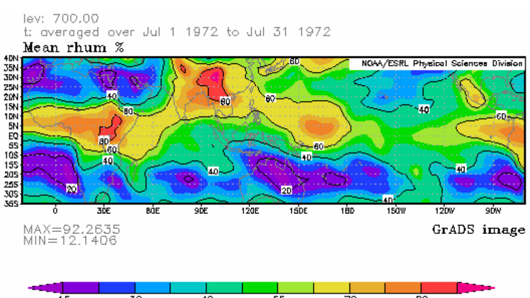


**Figure 9: July, 1972 RH 700hPa (Source: NOAA/ESRL-PSD)**

## 1.4 Zonal Wind (U)

The comparison between June, 2009 (Figure 12) and June, 1972 (Figure13) shows reasonable degree of similarity in the zonal wind patterns particularly along the tropical equatorial belt .

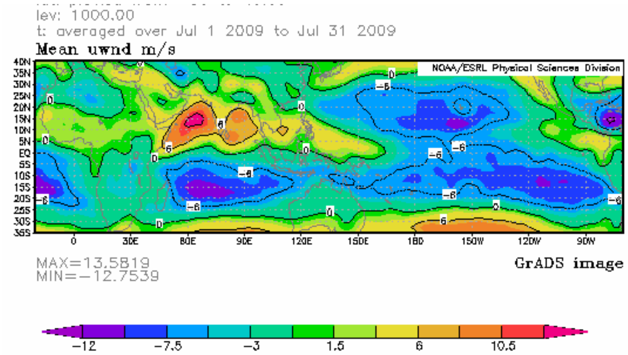


Figure 10: July, 2009 zonal wind (Source: IRI)

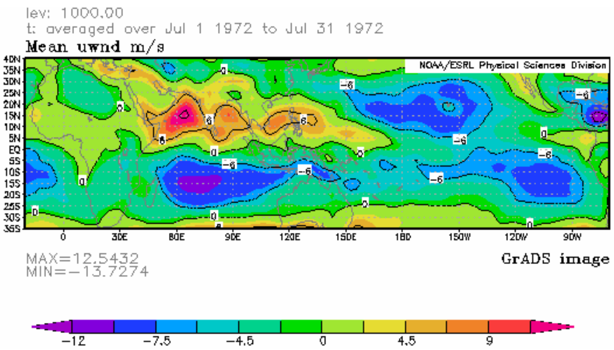


Figure 11: July, 1972 zonal wind (Source: IRI)

# 2. Forecast

Figure 13 shows highest positive SST anomalies in the eastern Pacific Ocean for JAS, 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 14 indicate maintenance of weak to moderate El Niño conditions as the most likely scenario through 2009 (with probability of 80% from JAS to NDJ seasons).

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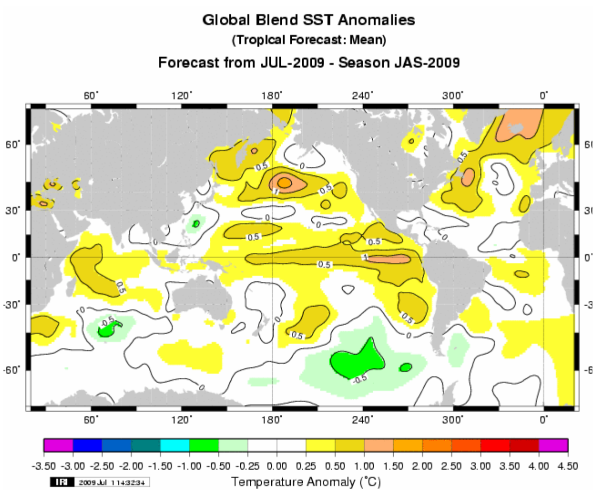


Figure 13 : SST anomalies in Pacific Ocean (Source: IRI)

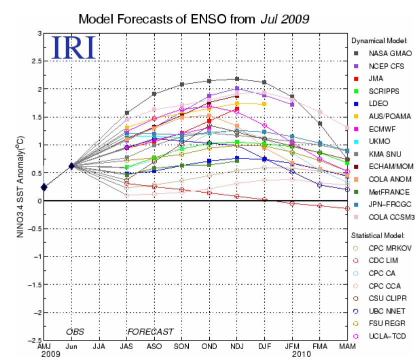


Figure 14 : Multi-model ENSO Forecast (source IRI)

# 3. Impacts

The evolution of El Niño in the Pacific Ocean is presently linked to the prevailing global rainfall anomalies over several parts of the globe with expectation of severe anomalies 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:

a) 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 severe floods.
b) The Sahel countries will experience suppressed rainfall in August-September recording below average with rainfall deficits in coming months and post El Niño drought.
c) The Gulf of Guinea countries will experience heavy rainfall over northern parts, and
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 phenomenon 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 El Niño evolution and expected intensity (weak, moderate or strong) including impacts as we progresses towards its mature phase by November/December, 2009. The **ACMAD El Niño Bulletin Special** is dedicated to this activity.