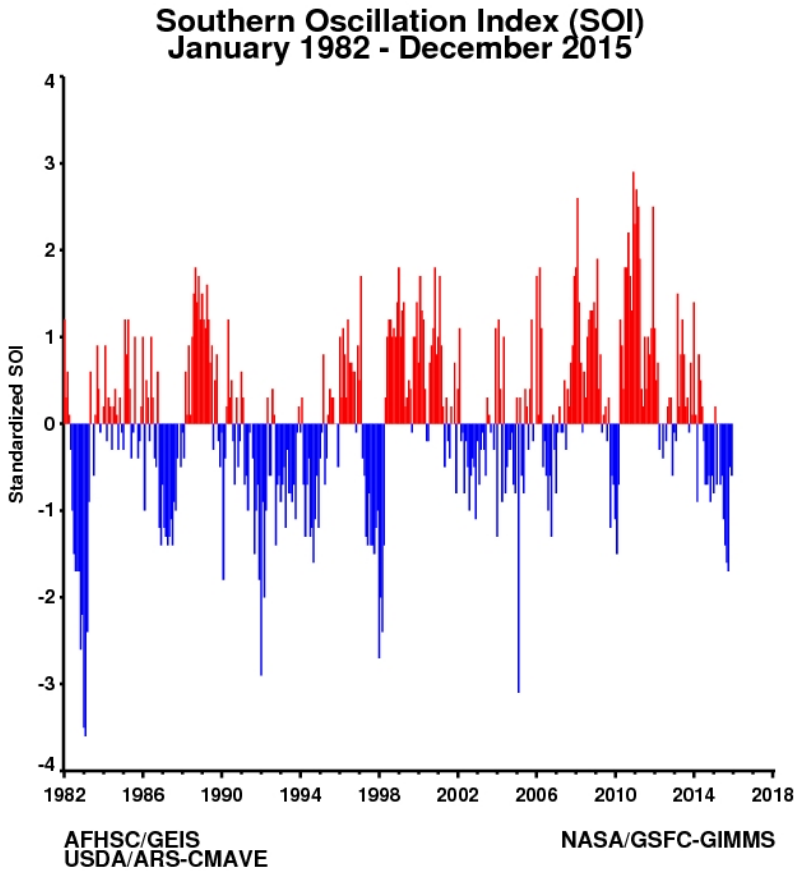
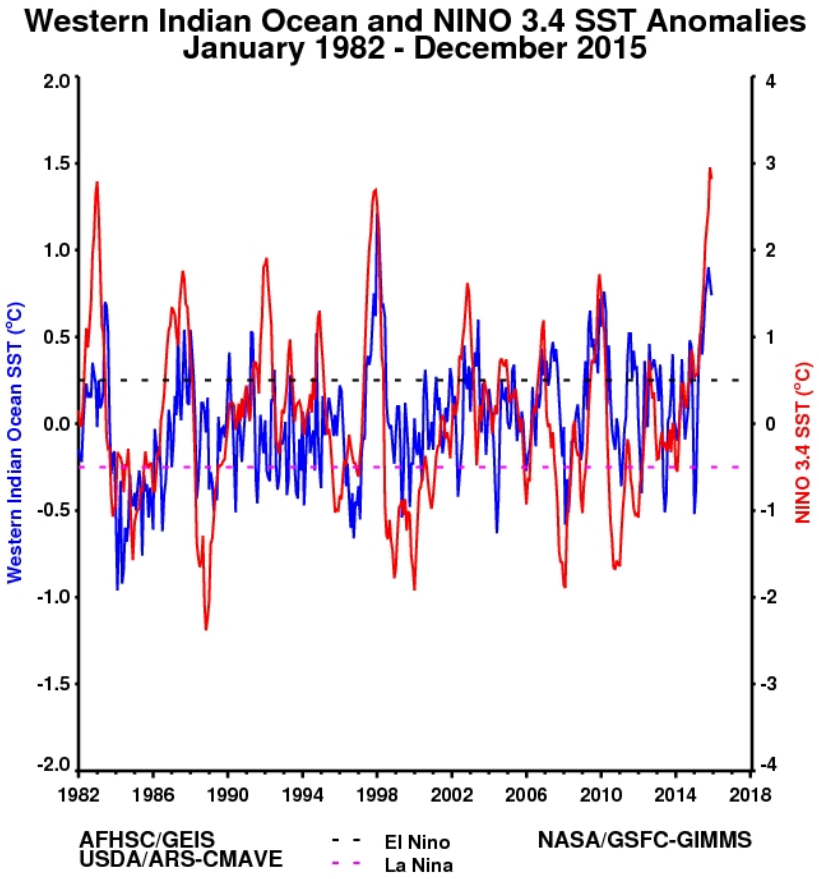
This section of the report will provide a rolling three month update on a monthly basis of the state of the climatic and ecological indicators used in monitoring areas at risk to RVF activity. These indicators include, global SST anomalies patterns, Equatorial Western Indian Ocean (WIO) and Eastern Pacific Ocean (EPO: NINO 3.4) SST anomalies, Southern Oscillation Index (SOI) and Outgoing Longwave Radiation (OLR) anomalies, Rainfall and anomalies, Normalized Difference Vegetation index anomalies and RVF risk map for Africa and the Arabian Peninsula.

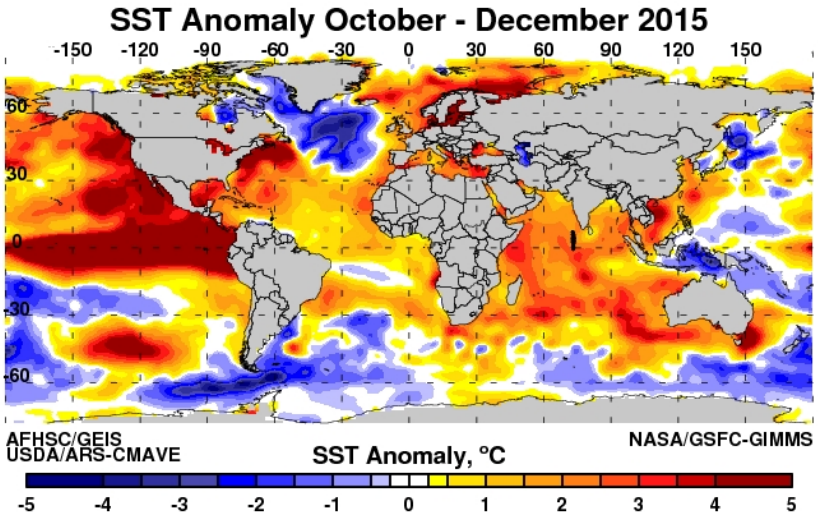
December 2015

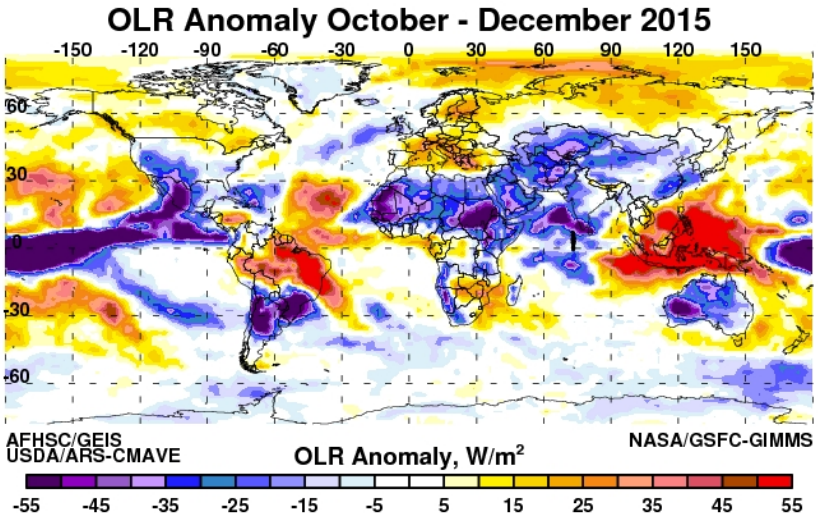
1. SOI and SST Indices





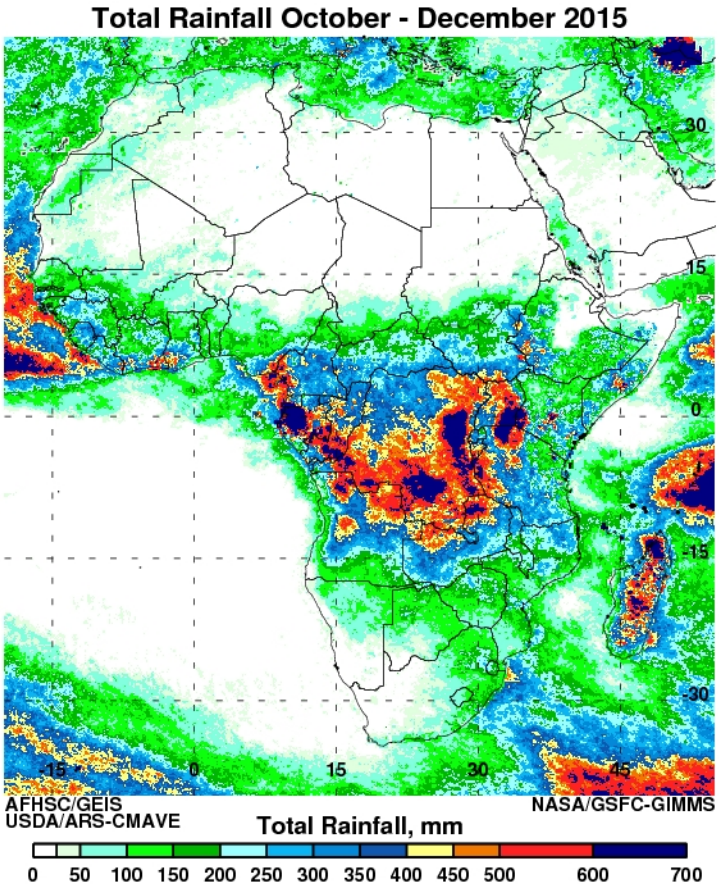
The SOI has increased in magnitude of negative values to -0.6 from -0.5 in November; indicating a continuation of El Niño conditions. This is supported by the continued anomalous positive SSTs in NINO 3.4, NINO 4 and NINO1&2 monitoring regions have decreased slightly from the previous month but continue to show significant positive departures with values of +2.82°C, 1.63°C and 2.19°C respectively in December. The SST anomalies in western Indian Ocean have decreased but still show record values at +0.74°C in December indicating continued warmer than normal conditions over this ocean basin. The persistent above-average sea surface temperatures (SST) (below) in the central equatorial Pacific region indicate that strong El Niño conditions are maturing at this time of the year. Enhanced convection is amplified over the central and eastern equatorial Pacific and suppressed convection over the Indonesian basin is fully entrenched. Collectively, these atmospheric and oceanic conditions reflect continuation of strong El Niño conditions. According to NOAA, a majority models indicate that a strong El Niño will weaken with a transition to ENSO-neutral during the late spring or early summer, however the exact timing of this transition is difficult to predict.

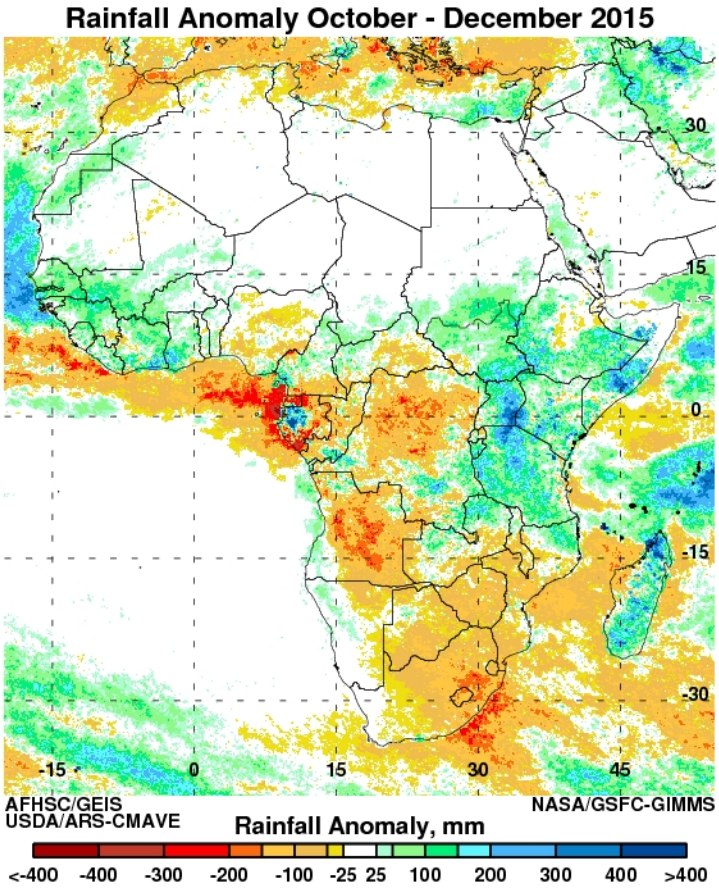




The central equatorial Pacific Ocean continues to show pronounced above normal seasonal SSTs (three month values: >+2.0°C to +5.0°C) except for the region from 30°S to 10°S in the southwestern Pacific Ocean with below-normal SSTs during the October 2015 to December 2015 period. The western Pacific Ocean especially the region of the Indonesian basin shows below normal SSTs indicating the continued reversal of ocean and atmospheric circulation across the equatorial Pacific Ocean. The entire equatorial Indian Ocean is anomalously warm with departures of ~ +1.5°C in western equatorial Indian Ocean and as high as +3.0°C (3-month values) in the southern Indian Ocean off the western Australian coast. Other regions of significant anomalies include the north Pacific Ocean, north Atlantic, equatorial Atlantic off the West African coast, the Pacific Ocean off the California coast, southwest Atlantic Ocean off Argentina and Brazil which show significant positive and negative anomalies on the order of -/+1.0°C to -/+2.0°C. Outgoing Longwave Radiation (OLR) anomalies are used here as a proxy for tropical deep convection (rainfall). Reduced convection is shown in yellow to light brown and brown shades and increased/intense convection is shown by shades of blue. Some impacts from the current SST anomaly patterns can be observed in the pattern of global convective

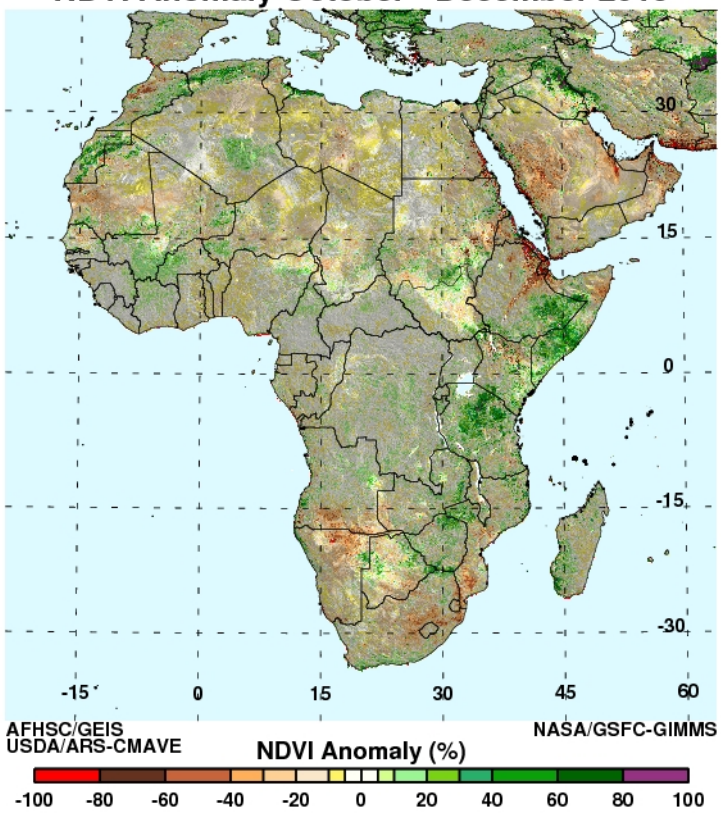
activity illustrated by the OLR departure patterns here. During the October 2015 to December 2015 period, drier-than-average conditions (>+35W/M2) are fully enhanced over the northern Pacific Ocean covering the Indonesian basin, as well as drier the normal conditions are prevailing over central Europe, eastern Canada and northeastern US, Caribbean region, northern South America and southeastern Africa. The severe drought in western US (Californian) have eased up as shown by the negative departures in OLR extending from the eastern Pacific Ocean through Mexico into southwestern and southern US. Enhanced cooler than average conditions (-50W/M2) are observed over central to eastern equatorial Pacific and just east of the Date Line. Negative OLR anomalies dominate North Africa, Middle East and the Pakistan-Afghanistan and the surrounding region. Accordingly Southwestern Africa and the southern half of South America show negative OLR anomalies suggesting enhanced convective activity. These patterns of depressed and enhanced convective activity coincide well with the patterns of SST departures and reveal certain impacts often associated with El Niño. Monthly and weekly anomalies can be found here. Rainfall and associated anomalies (below) for Africa from October 2015 to December 2015 show rainfall concentrated over equatorial Africa with a maxima centered just south the equator. Areas of above normal rainfall (+50 to 200 mm) are limited to parts of western Sahel region, the Sudans, central Somalia and the Lake Victoria basin region and all of Tanzania.

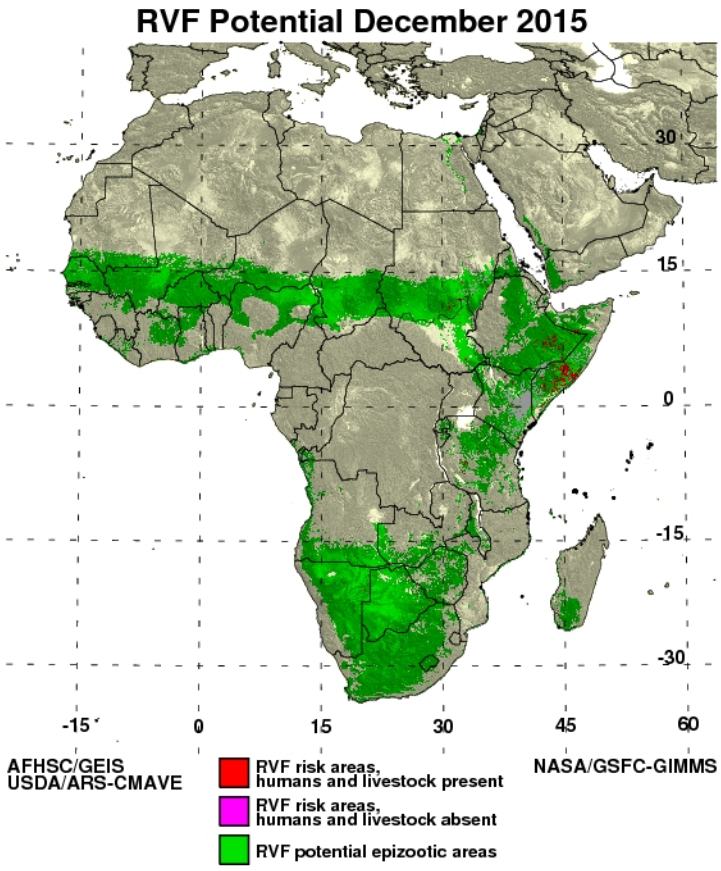




Cumulative NDVI anomalies for Africa for October 2015 to December 2015 show positive anomalies concentrated in parts of central Somalia and northern Tanzania. The RVF risk map below was derived from thresholding NDVI anomaly data to detect areas persistent of above normal NDVI. Periods of widespread and prolonged heavy rainfall lead to flooding of dambos and anomalous green up in vegetation, creating ideal ecological conditions for the emergence RVF vectors. For the period October 2015 to December 2015, the RVF persistence model identifies areas at risk in central Somalia and isolated areas of Kenya and Tanzania which have received above normal rainfall over the last two months where RVF. Given the elevated rainfall conditions in many areas East Africa enhanced continued enhanced surveillance is advised in these areas especially in the few months. The current East Africa seasonal rainfall under this El Niño event is evolving in a rather unique way compared to other previous El Niño events, in particular the western parts of the region that don't fall within the potential epizootic/epidemic (PEAM) region are currently receiving the bulk of excess rainfall. We therefore suggest that some surveillance activities be carried out in the western highlands of Kenya and Tanzania that border the Rift Valley system where some RVF activity has occurred sporadically the past. Rainfall in this western sector is approaching and surpassing the 2006/2007 season. The above normal rainfall conditions during this period could lead to outbreaks of other vector and water-borne diseases.

NDVI Anomaly October - December 2015




RVF Potential December 2015
30
15
0
-15
-30
-15
0
15
30
45
60
AFHSC/GEIS
USDA/ARS-CMAVE
RVF risk areas,
humans and livestock present
RVF risk areas,
humans and livestock absent
RVF potential epizootic areas
NASA/GSFC-GIMMS