Rift Valley fever Monitor
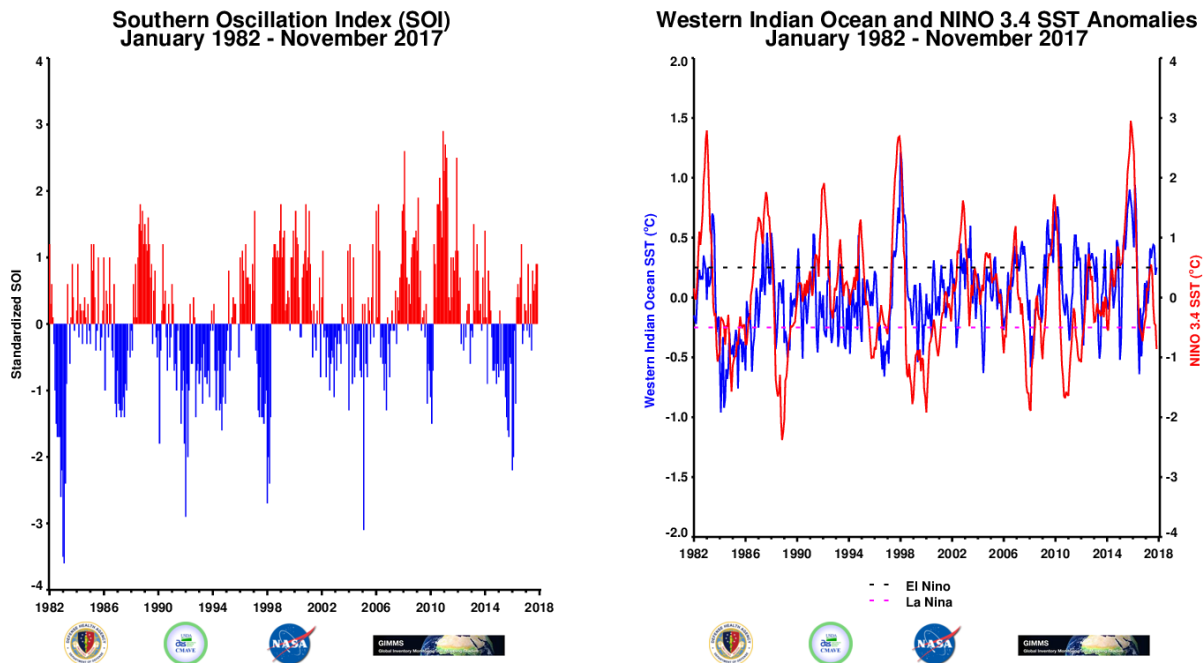
This section of the report will provide a rolling three month update on a monthly basis of the state of the climatic and ecological indicators used in monitoring areas at risk to RVF activity. These indicators include, global SST anomalies patterns, Equatorial Western Indian Ocean (WIO) and Eastern Pacific 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.
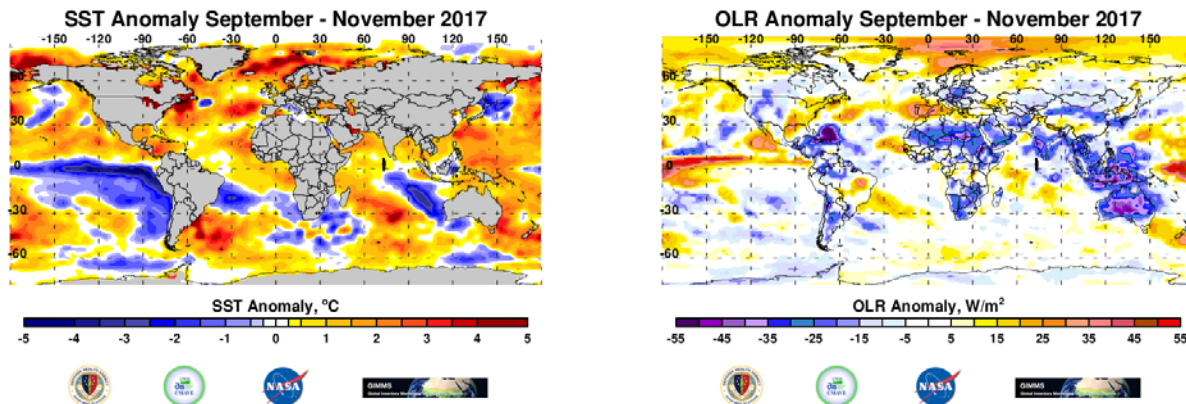
November 2017

1. SOI and SST Indices

The SOI has sustained its value 0.9 in November as had been in October, indicating a continued shift and enhancement of the developing La Niña conditions. Sustained positive SOI is correlated with colder than normal ocean temperatures in the eastern tropical Pacific Ocean typical of La Niña events.

Ocean temperatures also continued to cool in most NINO regions from October to November, particularly in the NINO1&2 region just west of Ecuador and Peru (0°-10°S, 80°-90°W) where the anomaly increased slightly but remained negative from -1.34°C in October to -1.16°C in November. The NINO3.4 and NINO4 regions cooled slightly, with NINO3.4 decreasing from -0.46°C to -0.86°C and NINO4 decreasing from 0.11°C to -0.18°C. The NINO3 region continued to cool, decreasing from -0.64°C to -1.05°C. Temperatures have slightly increased in the western Indian Ocean, where the anomaly went from +0.19°C in October to +0.25°C in October, which is lower than conditions that prevailed during the summer. Overall, the

indicators show the ocean-atmosphere system is shifting from ENSO-neutral to La Niña conditions. This shift is reflected in the latest observations and climate model predictions, where a weak to moderate La Niña is forecast to continue (exceeding ~80%) through the Northern Hemisphere winter 2017-2018, with a transition to ENSO-neutral most likely during the mid-to-late spring.
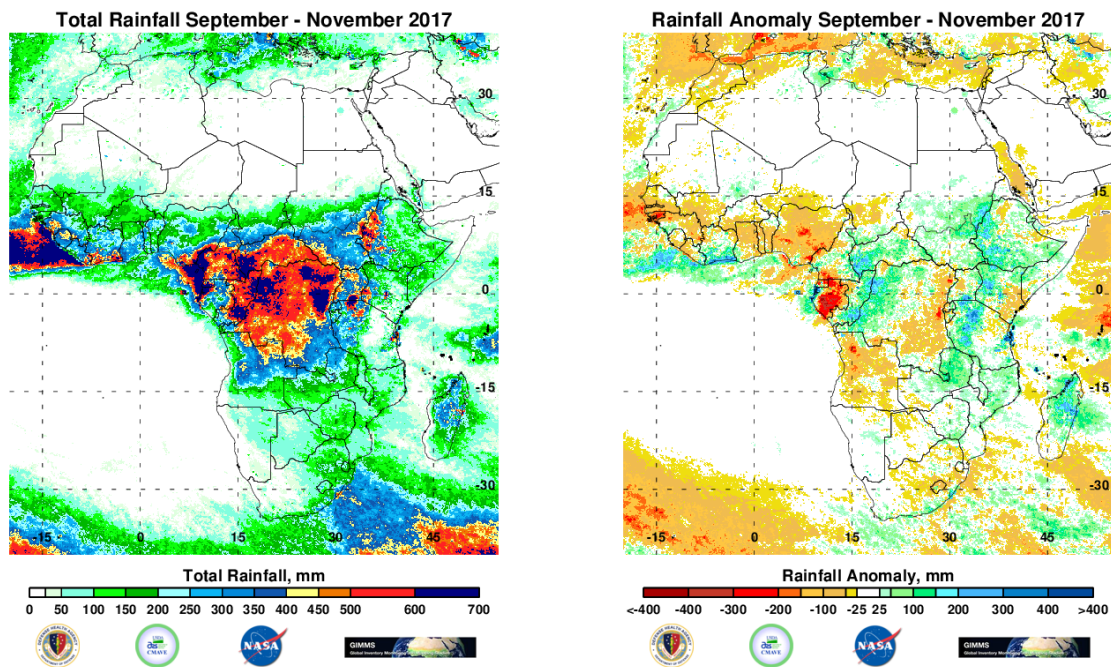
2. Global SST and OLR Anomalies

The September - November SST anomalies show an increased cooling in the equatorial Pacific Ocean over , with temperatures approaching 3.5°C colder than normal along the equator off the South American coast. Western Indian Ocean temperatures cooled slightly but remained above normal. The southeastern Indian Ocean cold anomaly observed in July-September also persists with a maximum value of 3.5°C below normal. Monthly and weekly SST anomalies can be found here.

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. The September - November 2017 OLR anomalies show drier than average conditions throughout the eastern equatorial Pacific coincident with the cooling ocean temperatures, with a maximum anomaly of -55 watts per square meter in the western equatorial Pacific. In the higher latitudes drier than normal conditions persist, particularly in northern Canada and eastern Russia. Conversely, OLR anomalies in Indonesia and Australia are negative indicating wetter than average conditions. OLR anomalies also indicate wetter than average conditions in most of Africa, the Middle East, southern Asia, the western United States, Central America, and the southern portion of South America.

3. Seasonal Rainfall and Cumulative Rainfall Anomalies.

Total Rainfall September - November 2017

Total Rainfall, mm

0 50 100 150 200 250 300 350 400 450 500 600 700

Rainfall Anomaly September - November 2017

Rainfall Anomaly, mm

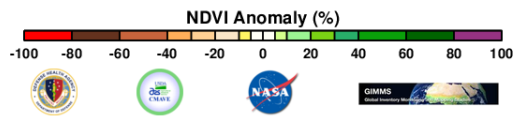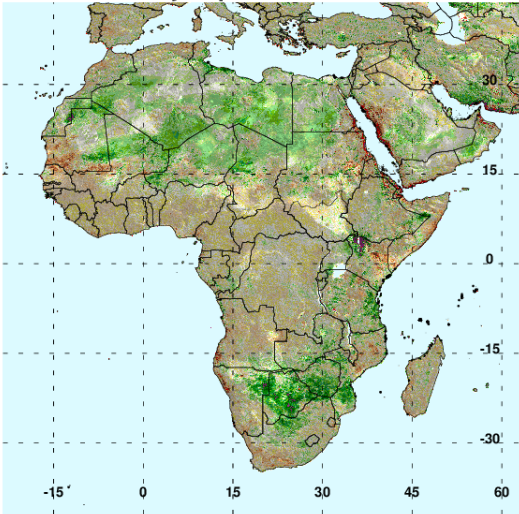<-400 -400 -300 -200 -100 -25 25 100 200 300 400 >400

Total rainfall in Africa from September to November 2017 is now centered around the equator, with maximum totals of 700mm persisting from southern Nigeria to eastern Congo DR. Seasonal totals were near normal in most of the region, however pockets of above normal rainfall were located in the Sudan/Ethiopia border region, western Kenya, western Tanzania south into Zambia, western Congo DR, and along the coast in Guinea, Sierra Leone, and Ivory Coast.
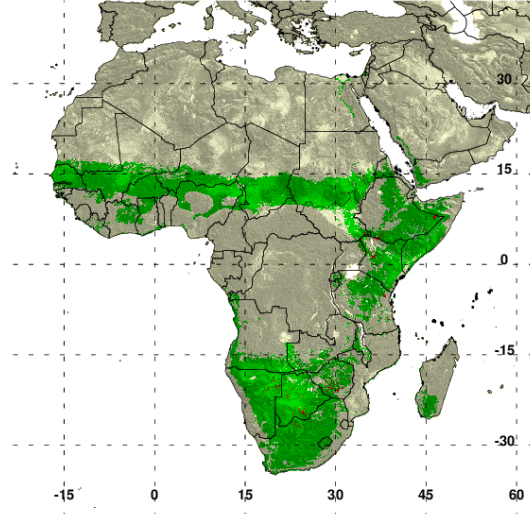
4. NDVI anomalies and RVF Risk Map.

September - November 2017 NDVI anomalies for Africa were closer to normal than in the preceding three months, with areas of greener than normal conditions persisting in Western Sahara, southeastern Mauritania, along the Mali/Niger border, east central Chad, northwestern Kenya, eastern Tanzania, and from northeastern Namibia through most of Botswana and northern South Africa, southern Zimbabwe, and southern Mozambique.

The RVF risk map in this report 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 of RVF vectors. During September- November 2017, the RVF persistence model identifies very small areas at risk projected for December scattered throughout the northwestern Kenya - southwestern Ethiopia transboundary region. Small areas of risk are also identified in northeastern Tanzania, NW Namibia, Botswana and a large area of southern Zimbabwe. Given the persistent elevated rainfall conditions in these areas enhanced surveillance is advised areas in December.

NDVI Anomaly September - November 2017

RVF Potential December 2017

NDVI Anomaly (%)

-100 -80 -60 -40 -20 0 20 40 60 80 100

RVF risk areas,
humans and livestock present

RVF potential risk areas,
humans and livestock absent

Documented RVF epizootic areas
(epidemic in animal populations in the past)

https://www.ars.usda.gov/southeast-area/gainesville-fl/center-for-medical-agricultural-and-veterinary-entomology/docs/rvf_monthlyupdates/