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in Africa
Kick-off Report

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STATE OF AFRICAN CLIMATE FOR 2014

ACMAD-MESA

CLIMATE CHANGE ASSESSMENT SERVICE

Version 1.0

December 2015

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Version history	Details	Date
V 0.1	**Draft circulated for review**	**20 October 2015**
V 1.0	**Reviewed version**	**20 November 2015**

TEMPERATURE

The assessment of the annual global temperatures indicates that the year 2014 was comparable to the warmest years in the last 165-years, with a global land and ocean surface temperature that was 0.57°C above the 1961–1990 average and 0.08°C higher than the most recent decadal average anomaly 2005–2014 (source: WMO statement on the status of the global climate in 2014).

The assessment of the annual temperature anomalies over African land areas indicates that 2014 was the second warmest year in the records since 1950 (see figure 1). 2010 was the warmest year in the record over the African continent.

Since 1950, the temperature trend over Africa shows an increase of 2°C per century. This rate reaches 3°C per century from 1990 to 2014 (see Figure 2).

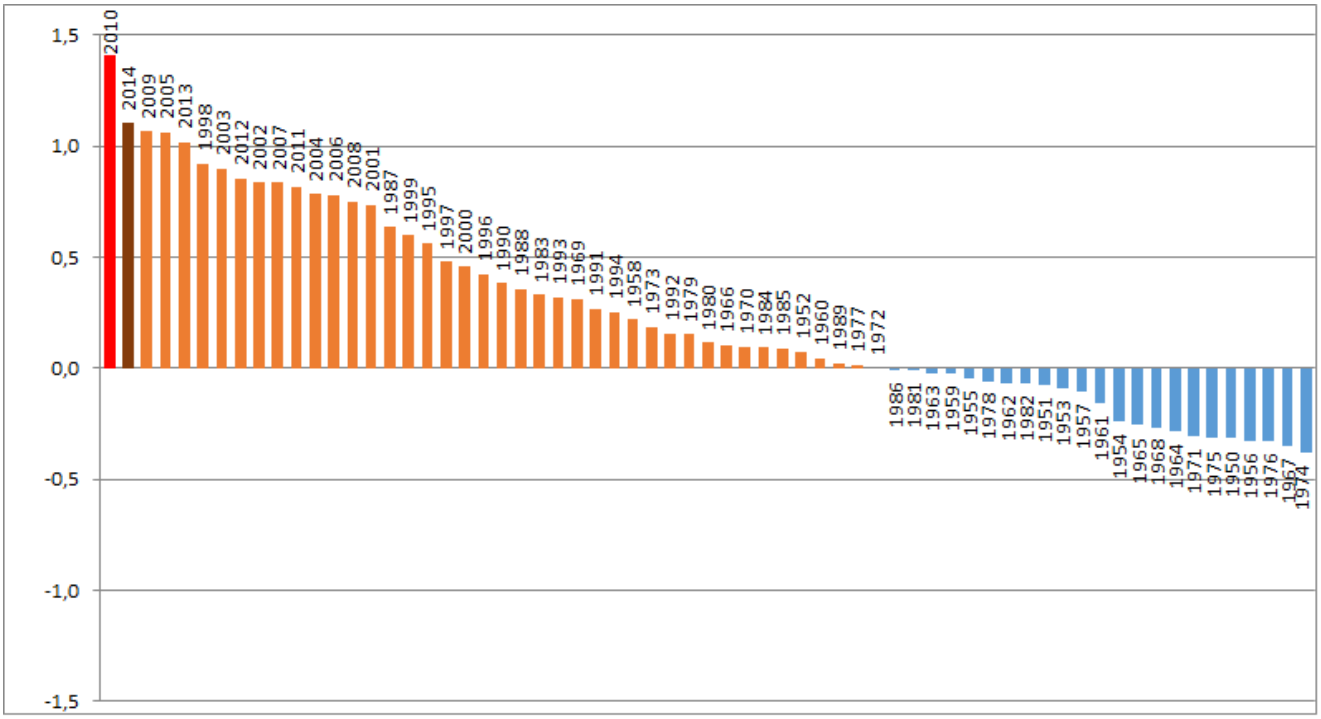

Figure 1: Ranked temperature anomalies (°C) for Africa for 1950-2014 relative to 1961-1990; gridded data based on station observations. (Data source: NOAA/NCEP/CPC/ CAMS)

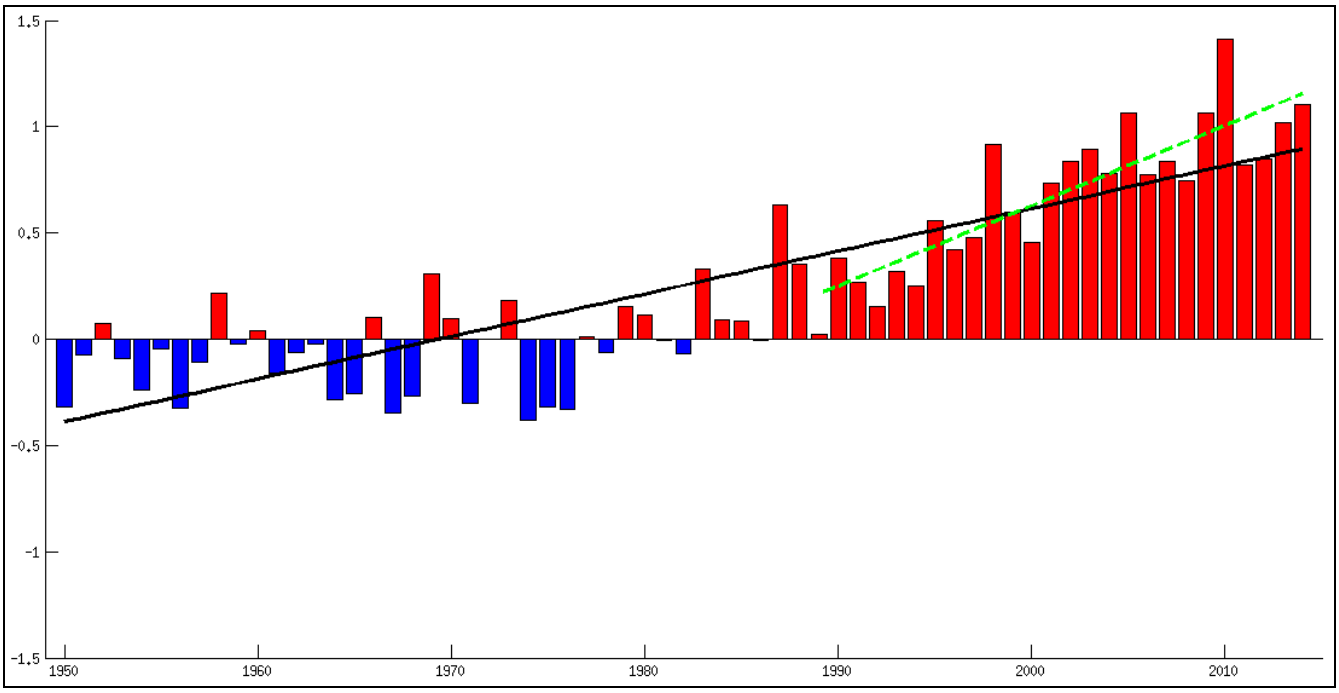

Figure 2: Temperature anomalies (°C) for Africa for 1950-2014 relative to 1961-1990; gridded data based on station observations. (Data source: NOAA/NCEP/CPC/ CAMS)

Significant temperature anomalies (+3C or above) were recorded in 2014 over Southern Angola and Southern Somalia.

From October to December 2014, well above average temperatures were recorded in North Africa. Most of Northern half of Algeria in October, most part of Tunisia in November, northern Sudan and southern Egypt in December recorded high temperatures. (See Figure 4).

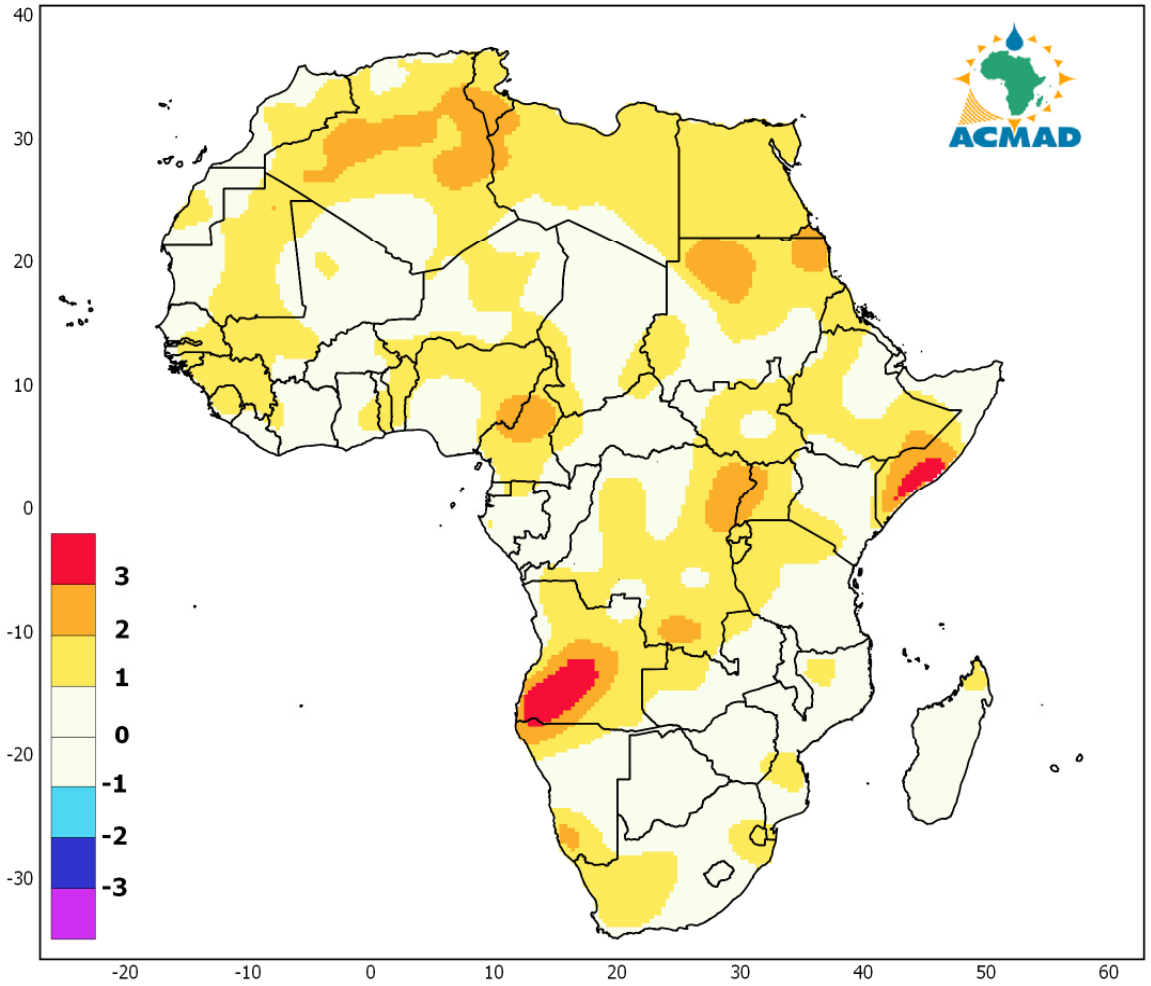

Figure 3: Annual temperature anomalies (°C) for Africa for 2014 relative to 1961-1990; gridded data based on station observations. (Data source: NOAA/NCEP/CPC/ CAMS)

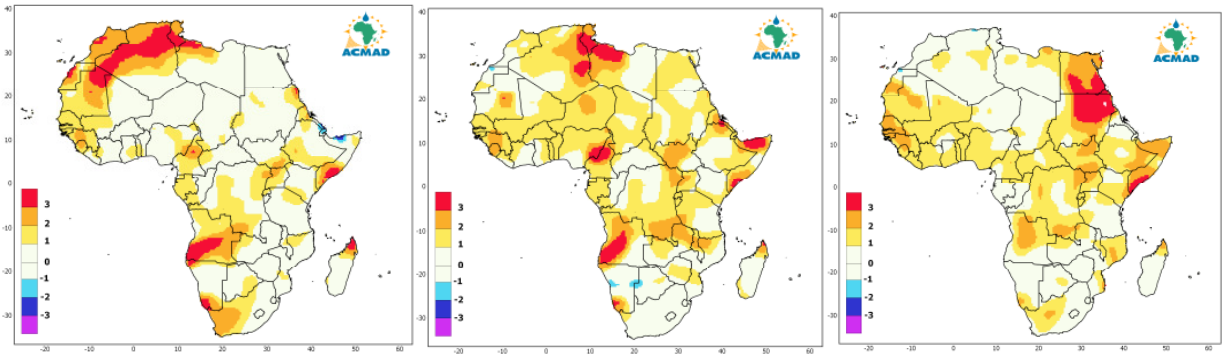

Figure 4: Temperature anomalies (°C) for Africa for October, November and December (left to right) 2014; gridded data based on station observations. (Data source: NOAA/NCEP/CPC/ CAMS).

PRECIPITATION

For the second consecutive year, global precipitation during 2014 was near the long-term 1951–2000 average of 1033 mm for land-based rain gauges around the world, according to the WMO annual statement on the status of the global climate in 2014.

Over Africa, above to well above precipitation was recorded over northern Mali, southern Algeria, southern half Morocco, southern part of Sudan and adjacent areas in Eritrea, parts of Botswana and Namibia. Drought of moderate severity over southern Mauritania and northern Senegal.

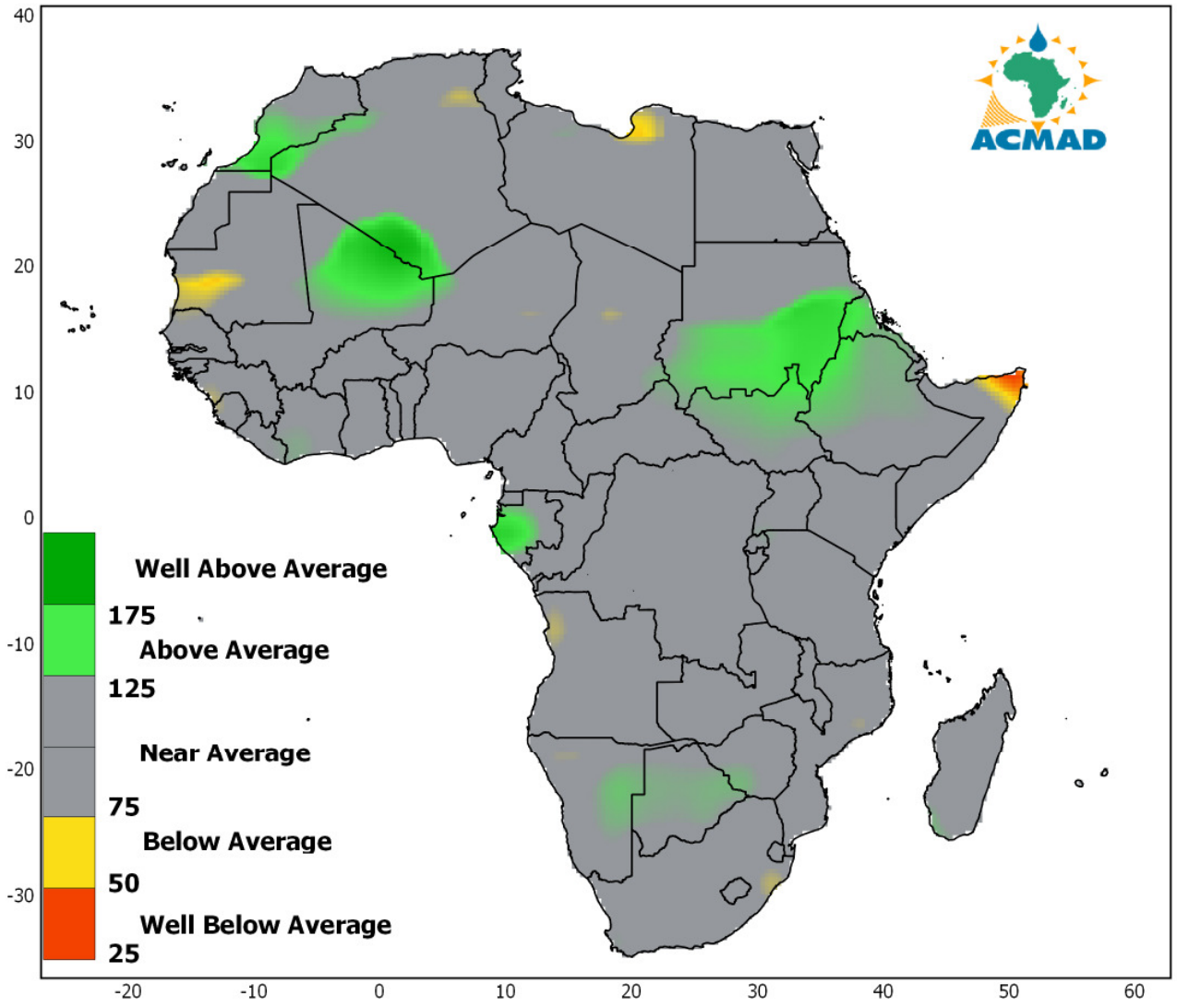

Figure 5: African annual precipitation in percentage of average for 2014; gridded data based on precipitation estimates from rain gauge and satellite data analysis with respect to 1981-2010. (Data source: NOAA/NCEP/CPC/CAMS-OPI).

SUBREGIONAL ASSESSMENT

For this assessment the continent of Africa was divided into six sub-regions: Southern Africa, Central Africa, Western Africa, Eastern Africa, Northern Africa and Indian Ocean islands.

In Figure 6, temperature rankings for all regions are shown which will be further discussed under each subsection. Except for the Indian Ocean islands, 2014 ranked among the five warmest years in all the sub-regions with 0.9°C or more above average. When ranking the warmest years in record since 1950, the year 2010 ranks the warmest at continental level and in Western, Northern and Eastern African regions.

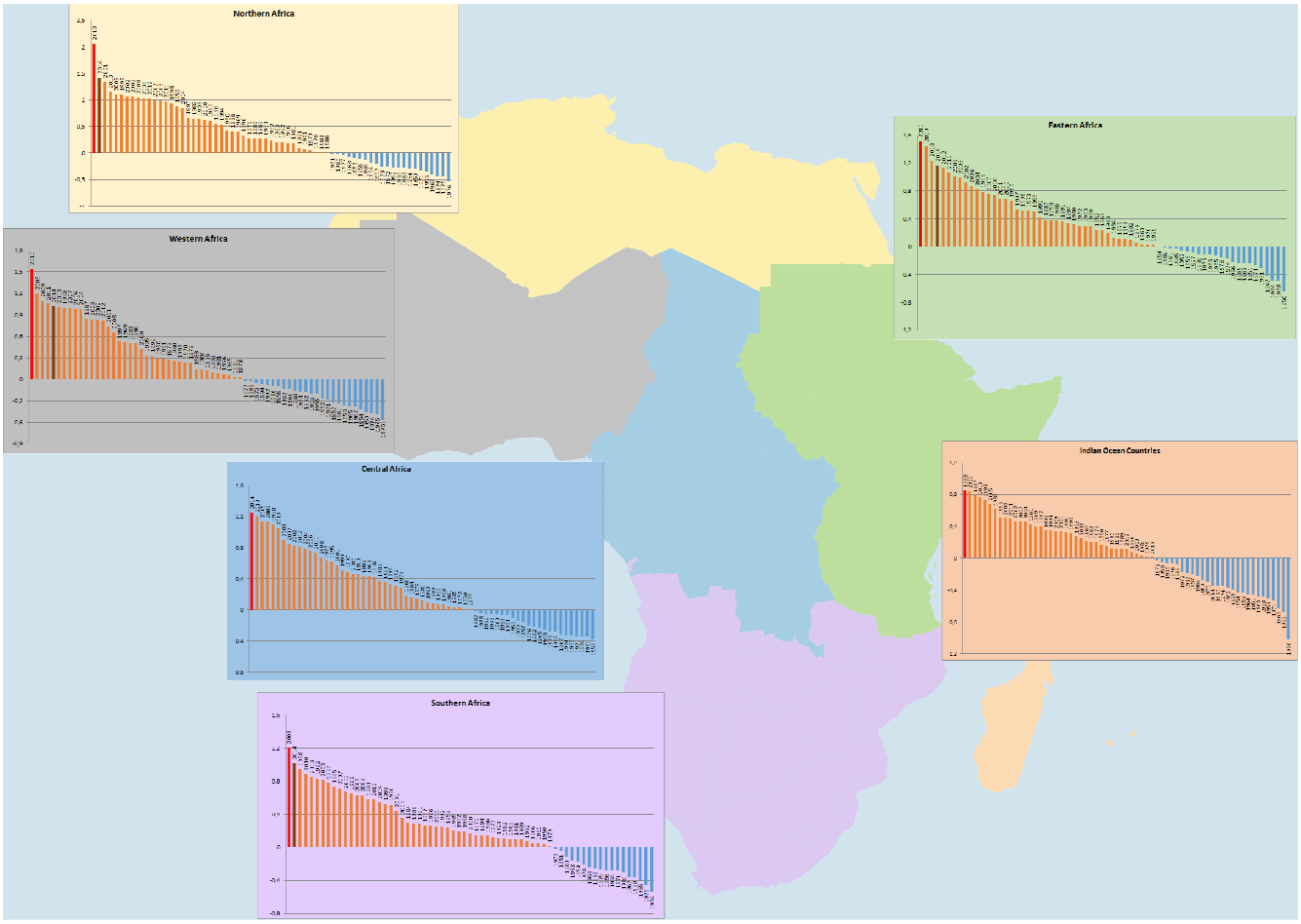

Figure 6: Ranked subregional temperature anomalies (°C) for 1950-2014 relative to 1961-1990 based period; gridded data based on station observations. (Data source: NOAA/NCEP/CPC/CAMS)

SOUTHERN AFRICA

The *southern African* part is characterized by tropical and subtropical climate and has a long coastline, from the Indian Ocean to the Atlantic Ocean. The most influential climate factors for this region are ocean currents, the ITCZ and quasi-stationary pressure systems. The region is mainly characterized by a wet and hot season from October to March (summer) and a cool and dry season from April to September (winter). In January 2014 below to well below average precipitation was recorded along the coastal parts of northern Namibia and Angola. The JFM 2014 season was characterize by above average precipitation over eastern Namibia, Botswana and southern Zimbabwe (figure 7).

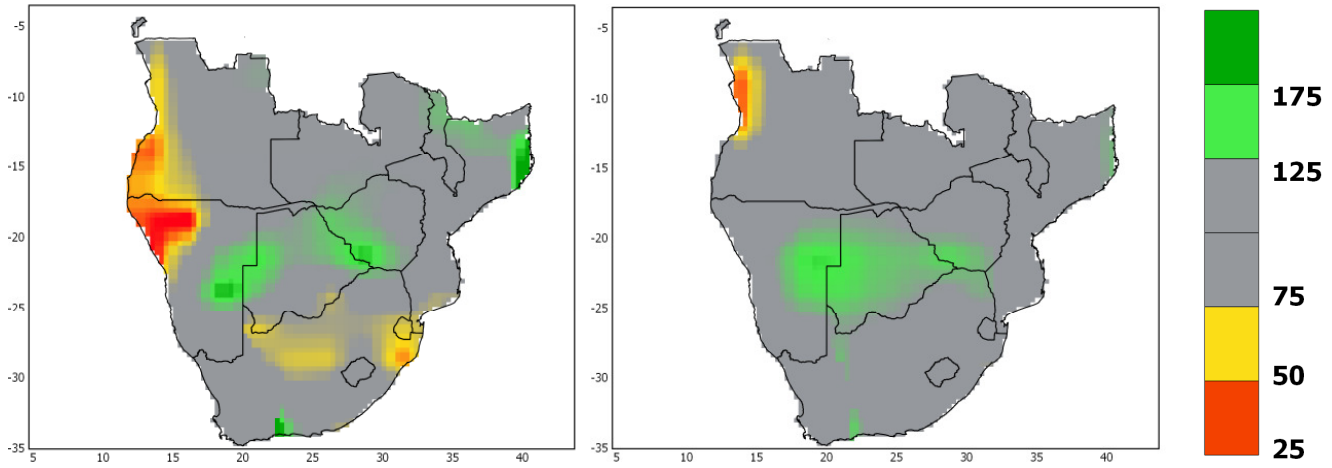

Figure 7: Southern African precipitation in percent of average for January (left) and for JFM 2014 (right) focusing on the 1981-2010 base period; gridded data based on precipitation estimates from rain gauge and satellite data (Data source: NOAA/NCEP/CPC/CAMSOPI).

INDIAN OCEAN COUNTRIES

The Indian Ocean countries consist of many islands grouped into five countries, including Comoros, Madagascar, Mauritius, the Mayotte Island (France), the Reunion Island (France) and Seychelles.
The region has a warm and wet season from November to April and a cooler and dry season from May to October and is mainly influenced by the southeastern trade winds. Above average precipitation characterized coastal parts of western half of Madagascar in JFM 2014.

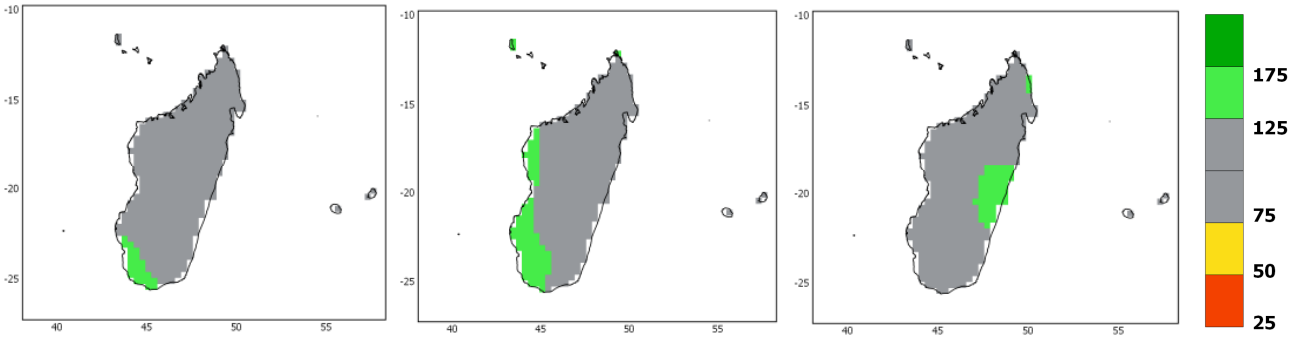

Figure 8: Percentage of normal precipitation over the Indian Ocean region for 2014 (left), JFM (middle) and JJA (right) 2014 with respect to 1981-2010; gridded data based on precipitation estimates from rain gauge and satellite data (Data source: NOAA/NCEP/CPC/CAMSOPI).

CENTRAL AFRICA

Central Africa is one of the wettest parts of the continent and influenced by the position of the Intertropical Convergence Zone (ITCZ). Three peak rainfall periods are considered for the region: MAM (March-April-May), JAS (July-August-September) and OND (October-November-December). The length of the rainy season varies from the coastal area (more than 8 months) to the desert area in

the north. Equatorial Guinea Most of Gabon and coastal part of Cameroon recorded above to well above normal rainfall in OND 2014.

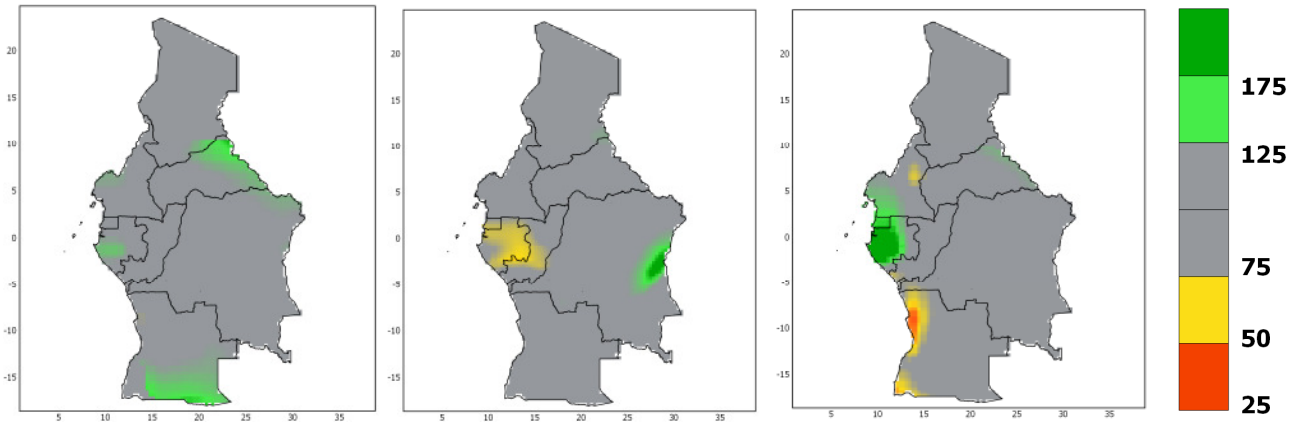

Figure 9: Percentage of normal precipitation over Central Africa for MAM (left), JAS (middle) and OND (right) with respect to 1981-2010; gridded data based on precipitation estimates from rain gauge and satellite data (Data source: NOAA/NCEP/CPC/CAMSOPI).

EASTERN AFRICA

The region of eastern Africa covers those coastal countries from Eritrea in the north, down to Tanzania in the south. The region has a huge range of terrains and climates. The two highest mountains in Africa, Mt. Kilimanjaro and Mt. Kenya, lie in East Africa as well as the second largest freshwater lake on the planet, Lake Victoria. The climate is typically equatorial with high temperatures year round and little seasonal variation, especially closer to the equator. Rainfall in the region is highest in the mountains and lowest in the north. It increases southwards. Northern Somalia is one of the driest regions with an annual rainfall of 130 mm due to the rain shadow effect caused by the mountain ranges in the east. The

coast and the mountains in the south of the region typically receive more than 1200 mm a year. There are two short rainy seasons: one around April, and the other in October and November.

Rainfall is strongly influenced by the Inter-tropical Convergence Zone (ITCZ) that streams low pressure around the equator. Rainfall in the region is also affected by El Niño, and in years when this weather phenomenon prevails, eastern Africa receives more rainfall especially during the first rainy season of the year.

In April-June (AMJ) 2015, above to well above average precipitation was recorded over Southern Sudan, Northern part of South Sudan and Northern Ethiopia. At the same season, Drought of moderate rate was recorded over Northern Tanzania and Western half of Kenya.

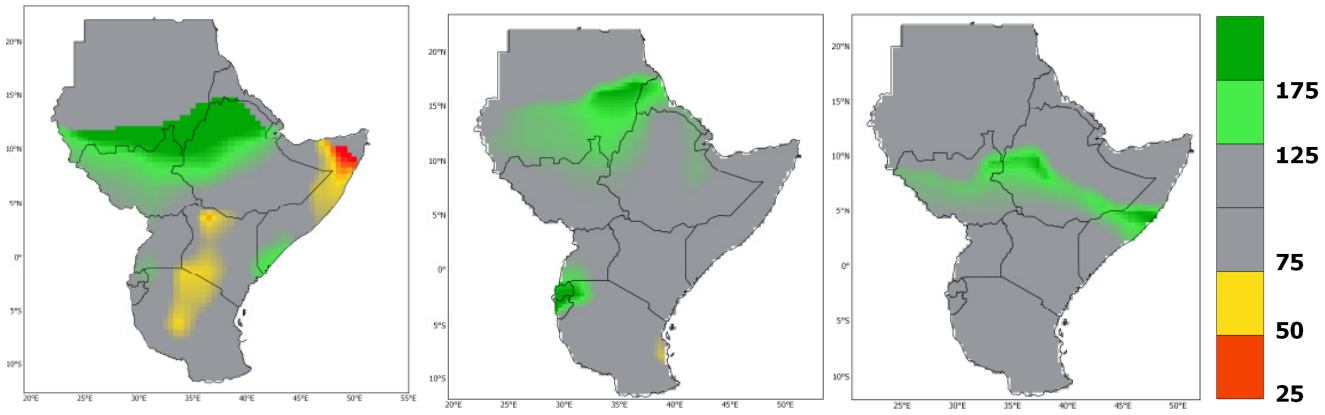

Figure 10: Percent of average precipitation over Eastern Africa for AMJ (left), JJAS (middle)and OND (right) with respect to 1981-2010; gridded data based on precipitation estimates from rain gauge and satellite data (Data source: NOAA/NCEP/CPC/CAMSOPI).

WESTERN AFRICA

Western Africa is influenced by the Inter-Tropical Discontinuity (ITD). The Sahelian region near the Saharan desert has its main rainy season from July to September.

In 2014, The Gulf of Guinea countries recorded above to well above average precipitation during the MAM season. Above average to well above average characterized Northern Mali in July August September (JAS) 2015. Localized drought was reported over Northern Senegal and Southern Mauritania.

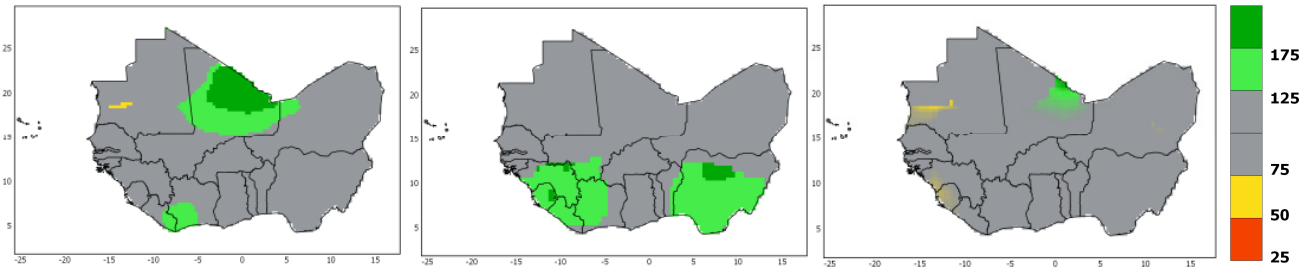

Figure 11: Percentage of normal precipitation over Western Africa for 2014 (left), MAM (middle) and JAS (right) 2014 with respect to 1981-2010; gridded data based on precipitation estimates from rain gauge and satellite data (Data source: NOAA/NCEP/CPC/CAMSOPI)

EXTREME WEATHER AND CLIMATE EVENTS IN 2014

According to the EM-DAT/CRED database, drought persisted trough the beginning 2014 over Southern Africa. On 27th March-1st April 2014, Cyclone Hellen was one of the strongest cyclones in the Mozambique channel with maximum winds speed of 250 km/hour. It affected thousands of people and damaged thousands of homes across the Comoros, Madagascar and Mozambique (Source, NOAA NCDC).

Heavy rains with severe floods were recorded during 21-24 November in southern Morocco, killing 47 people and destroying thousands of houses and more than 100 roads (source NOAA NCDC, WMO Global report 2014 and IFRC, 19 January 2015).

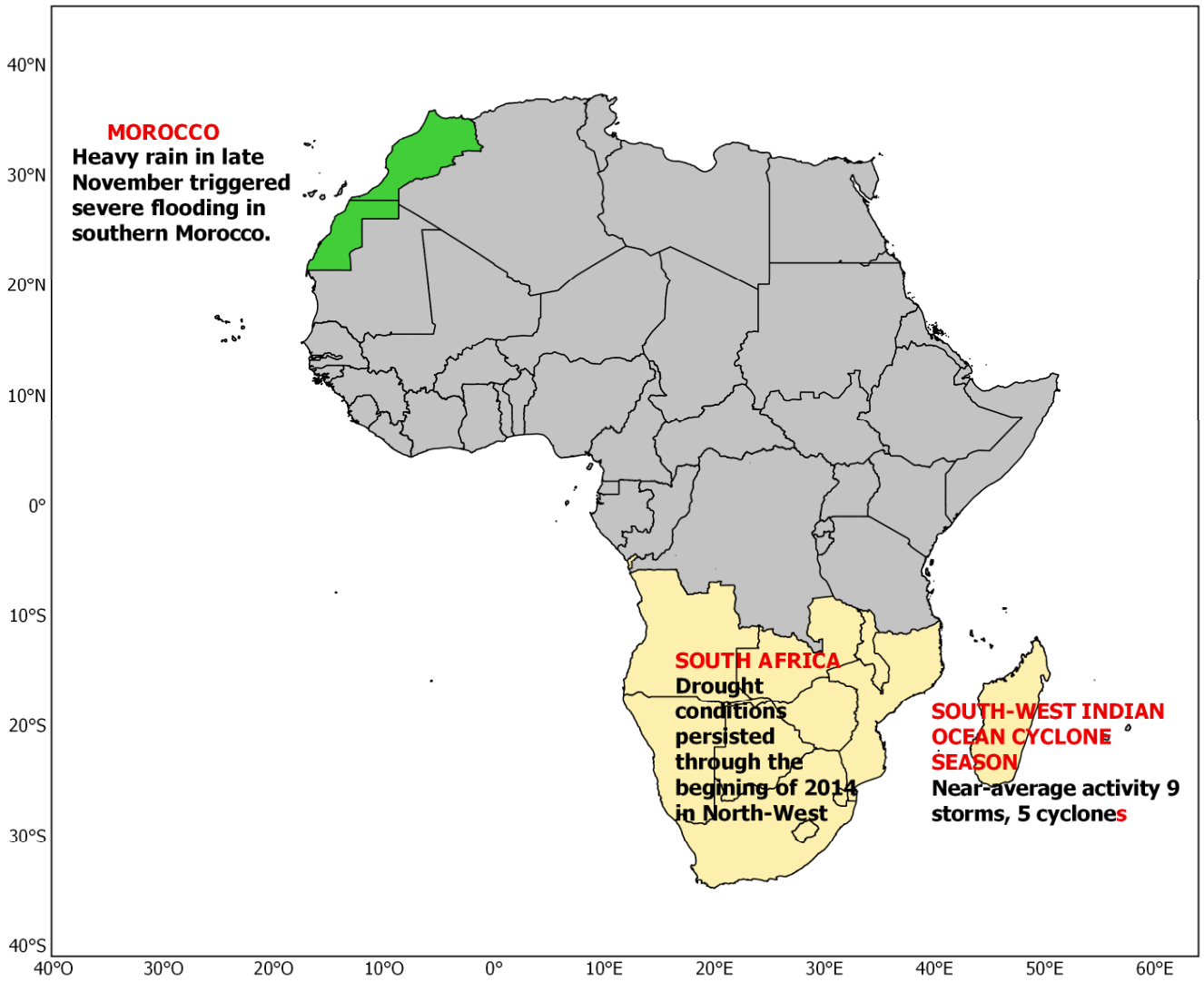

Figure 13: Extreme weather and climate events for Africa in 2014