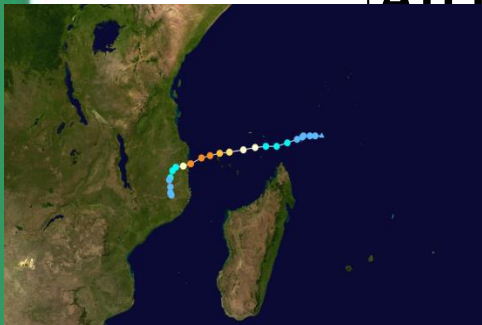
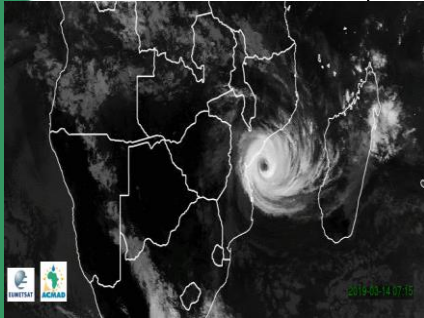




www.acmad.net

WEATHER AND CLIMATE SERVICES FOR DISASTER RISK MANAGEM ENT



Director General

Andre KAMGA FOAOUHOUE

**African Centre of Meteorological Applications for
Development (ACMAD)**

<http://www.acmad.net/new/NEWSITEACMAD/>

<https://acmad.net/rcc/>



OUTLINE

- ✓ **ACMAD CENTRE**
- ✓ **ACMAD'S FLOODS/DROUGHTS PRODUCTS**
- ✓ **CLIMATE VARIABILTY AND TRENDS**
- ✓ **SEASONAL OUTLOOKS**
- ✓ **DISCUSSIONS AND CONCLUSION**

ACMAD was created in 1985 following the droughts of the 1970s and early 80s through the Resolution 540 of the UNECA Conference of Ministers. It is established in Niamey-Niger since 1992

MISSION

A Continental weather and climate Watch institution and Centre of Excellence for the Applications of Meteorology

VISION

To be a World Class continental operational Centre of Excellence supporting African countries to be well resilient to extreme events with increased ability to adapt to climate change impacts



Examples of firefighting : 2015/16 Drought in Southern Africa

The Southern African Development Community (SADC) declared a regional drought emergency and launched a regional humanitarian appeal in *July 2016*

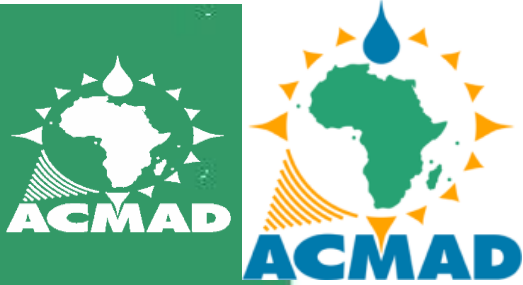
The Government of Mozambique activated the institutional Red alert due to drought on *April 12, 2016*

The Government of Madagascar declared a state of drought emergency for southern Madagascar on *March 22, 2016*

The Government of Zimbabwe, declared a State of Drought Disaster following the impact of El Niño induced erratic rainfall on *February 04, 2016*

Malawian government declared a state of disaster as a severe drought has caused a sharp decline in crop production across the country on *January 11 2016*.

On *22 December 2015*, the Government of Lesotho declared a state of drought emergency and appealed for assistance from the international community.



2014 Late onset in Westernmost Sahel and Firefighting

-FEWS alerted in Dec 2014 - This year 2019 we have the alert in July let's plan and act

-The ARC paid out \$26m in 2015 for the impacts of 2014 late onset

- This year we may prepare for impact earlier and therefore cheaper

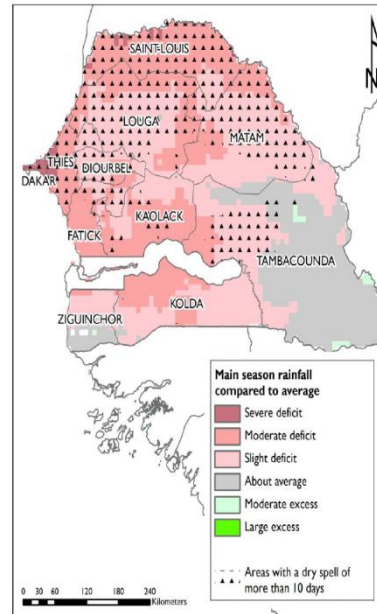


Figure 1: USGS/FEWS NET Seasonal Rainfall Estimate (RFE) with July and August dry spells indicated

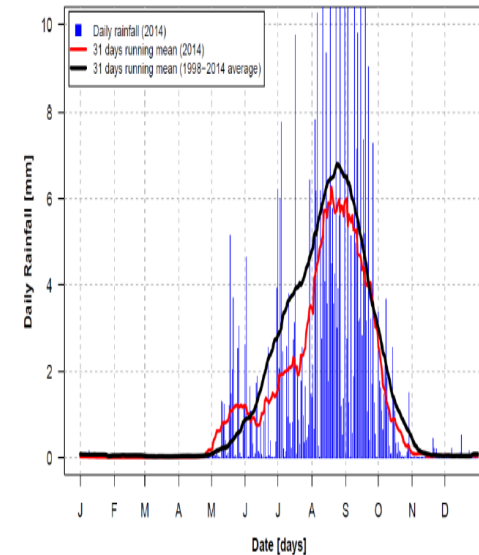
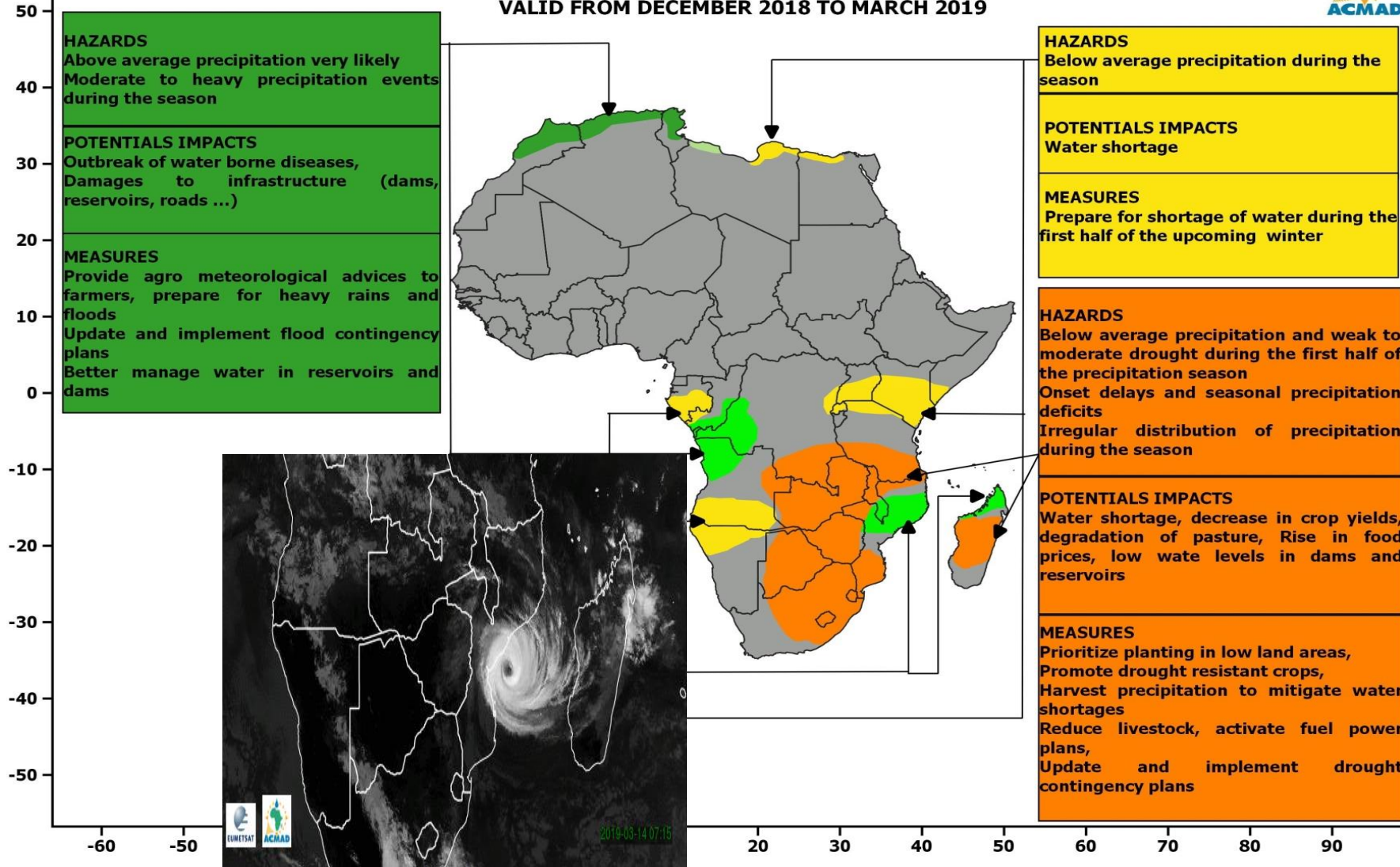


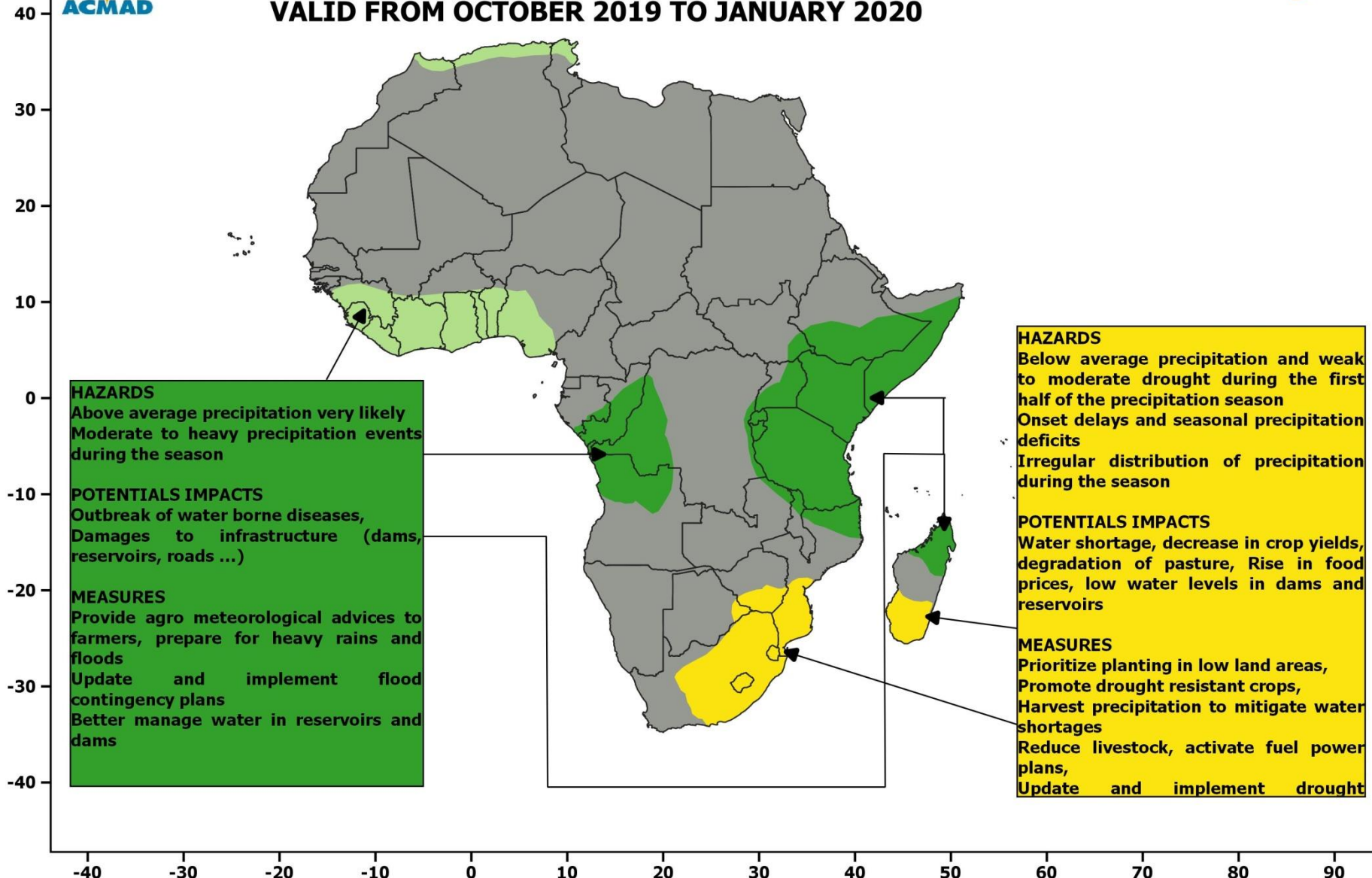
Figure 3: Evolution 2014 daily rainfall compared to the mean 1998-2014 over the western Sahel.

Weakness in CIS for early response to drought . There is a high value service to be developed with ARC, the global humanitarian networks and insurance industry.

BRIEF FOR POLICY AND DECISION MAKERS BASED ON SIGNIFICANT WEATHER AND CLIMATE EVENTS UPDATE VALID FROM DECEMBER 2018 TO MARCH 2019



**BRIEF FOR POLICY AND DECISION MAKERS BASED ON
SIGNIFICANT WEATHER AND CLIMATE EVENTS UPDATE
VALID FROM OCTOBER 2019 TO JANUARY 2020**



ACMAD TECHNICAL COORDINATION OF SWIOCOF WITH SERVICES FOR DISASTER RISK MANAGEMENT



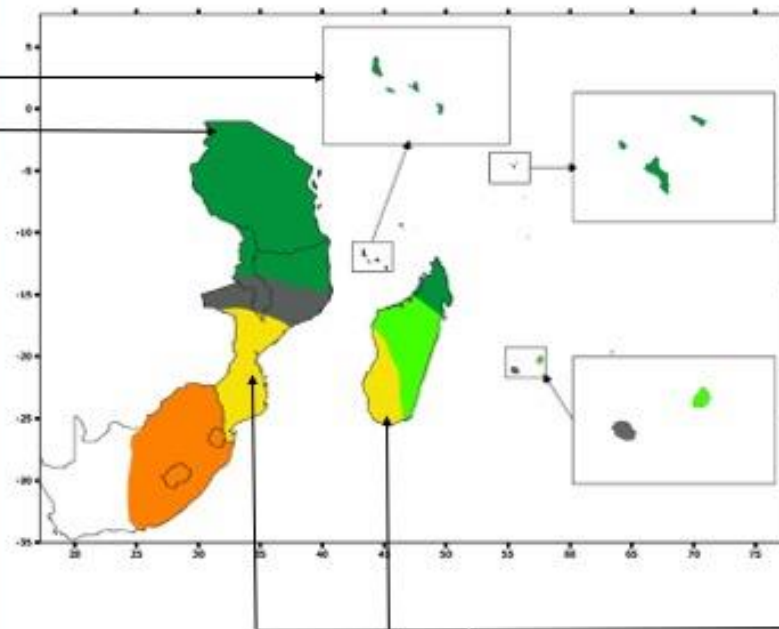
BRIEF FOR POLICY AND DECISION MAKERS OF SOUTH-WEST INDIAN OCEAN REGION
 BASED ON SIGNIFICANT WEATHER AND CLIMATE EVENTS UPDATE
 VALID FROM OCTOBER 2019 TO JANUARY 2020



HAZARDS
 Moderate to heavy precipitation events during the season

POTENTIALS IMPACTS
 Outbreak of water borne diseases, Flood/Flash Flood, Land slide, Food Security, population displacement
 Damages to infrastructure (dams, reservoirs, roads ...)

MEASURES
 Provision of agro meteorological advices.
 Prepare against heavy rain and floods
 Revision and implementation of contingency plans
 Better manage water in reservoirs and dams,
 Raise health awareness and promotion.
 More specific actions to be taken according to the local context



HAZARDS
 Weak to moderate drought during the first half of the precipitation season
 Onset delays and seasonal precipitation deficits
 Significant dry spell likely to occur during the season

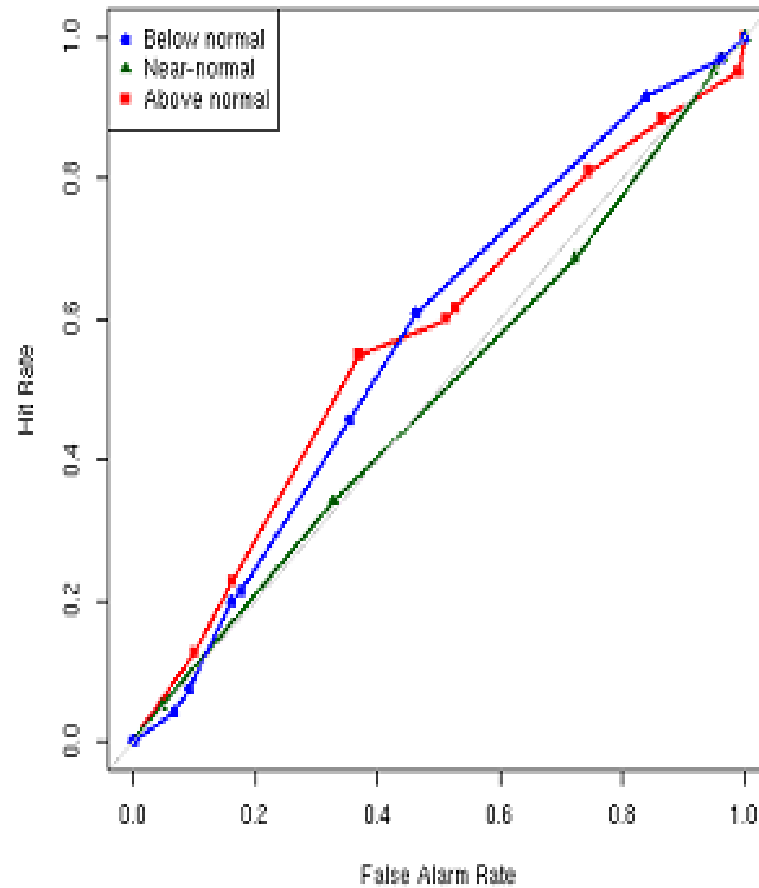
POTENTIALS IMPACTS
 Water shortage, decrease in crop yields, degradation of pasture, Rise in food prices, possible negative impact of power production, food security

MEASURES
 Prioritize planting in low land areas,
 Promote drought resistant crops/ appropriate seeds,
 Rain/water Harvest to mitigate water shortages
 Manage livestock, activate emergency power production plan
 Revision and implementation of drought contingency plans

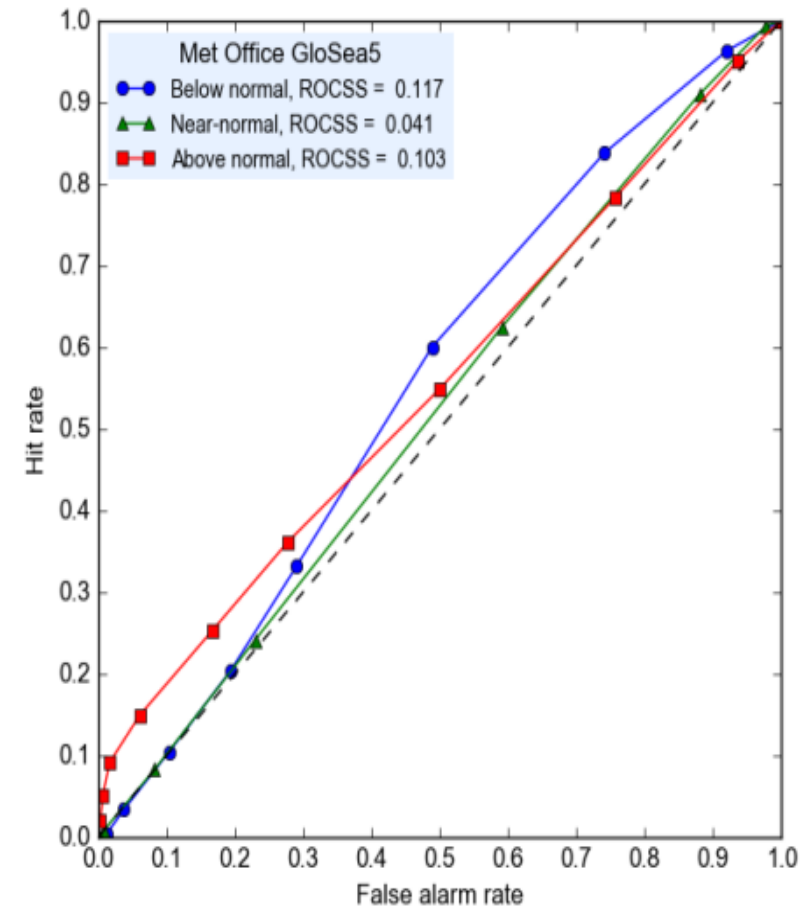
Normal to below normal cyclone activity is expected during the coming cyclonic season. The privileged cyclogenesis area may be shifted west of Diego Garcia region.

QUALITY OF SEASONAL FORECASTS PRODUCTS – RCOF products are more skillful compared to Dynamical models Outputs

PRESASS

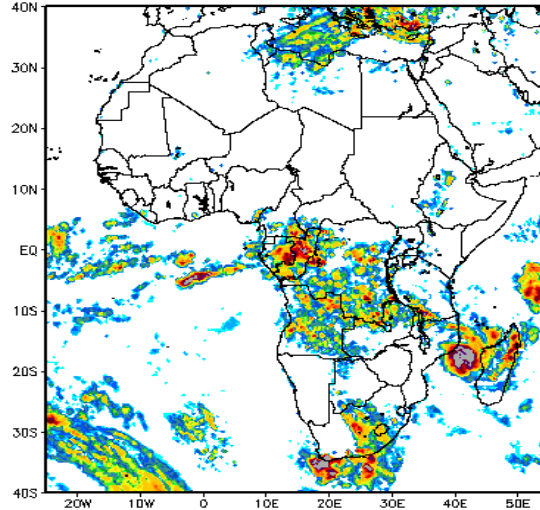


GloSea5

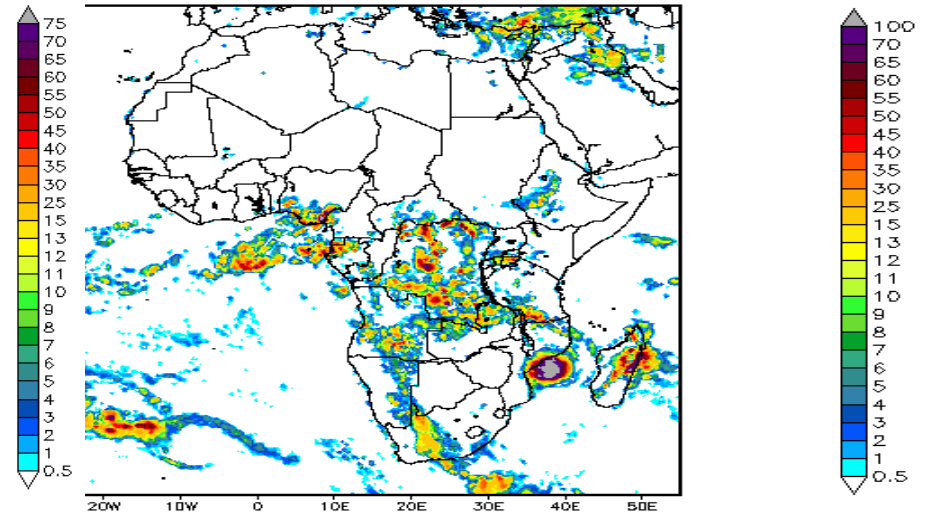


CYCLONE IDAI PRECIPITATION MONITORING – REAL TIME SUPPORT TO EARLY RESPONSE. GPM Product FROM NASA

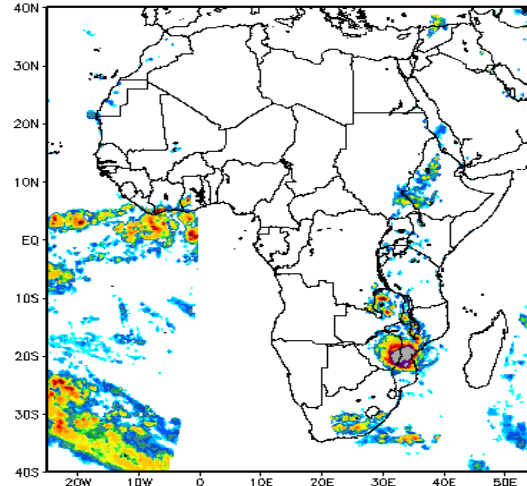
TRMM daily Cumulative rainfall (mm)
 on 11 October 2019



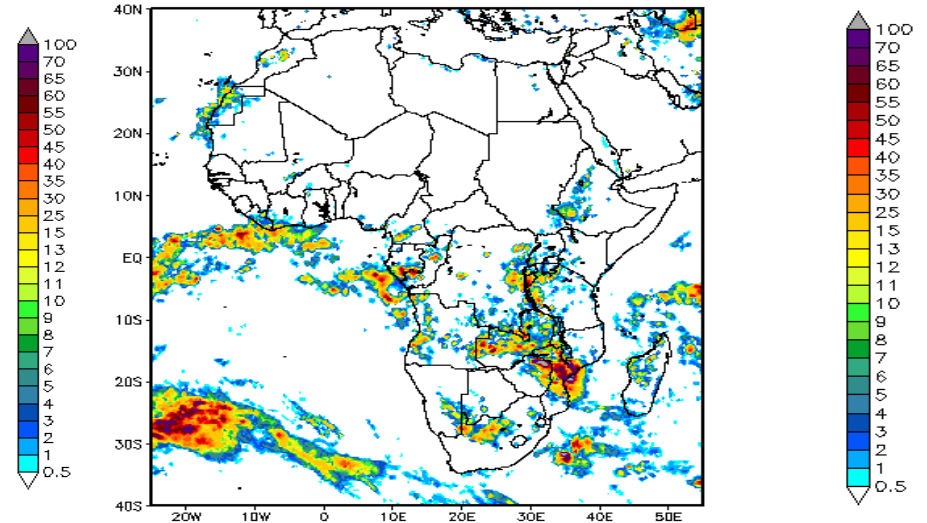
TRMM daily Cumulative rainfall (mm)
 on 13 March 2019



TRMM daily Cumulative rainfall (mm)
 on 15 March 2019



TRMM daily Cumulative rainfall (mm)
 on 17 March 2019



OCCURRENCE PROBABILITY OF EXTREME WEEKLY PRECIPITATIONS
From March 12, 2019 to March 18, 2019

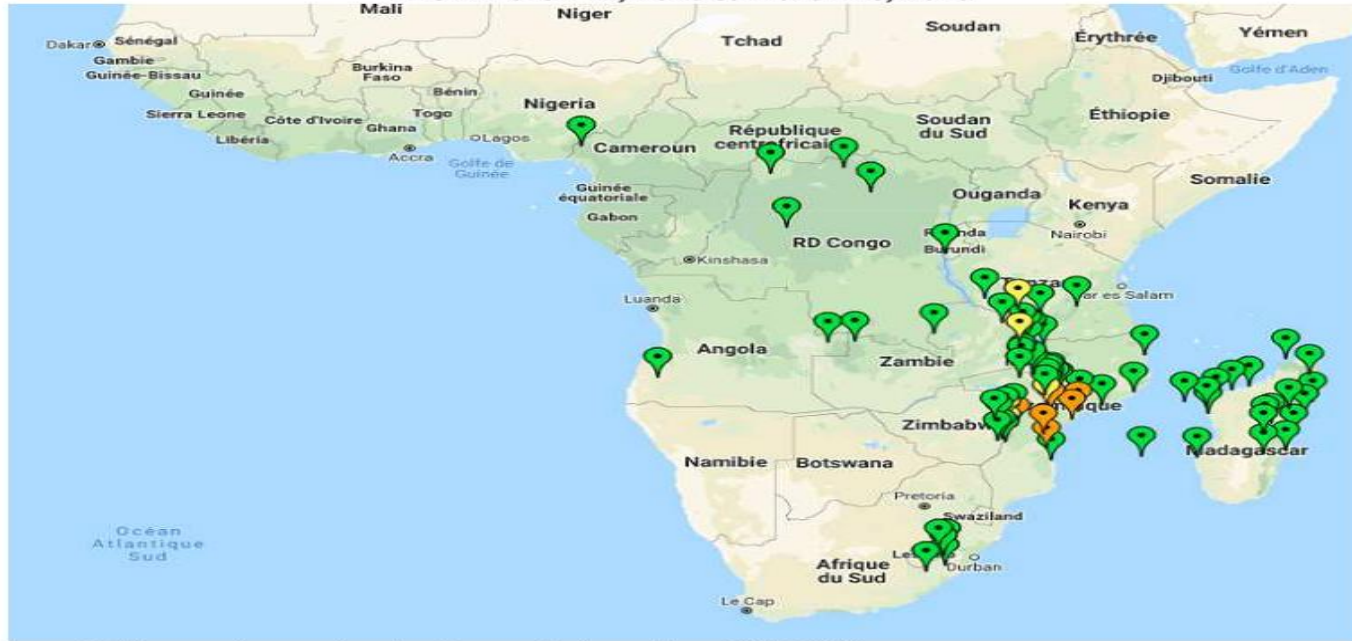



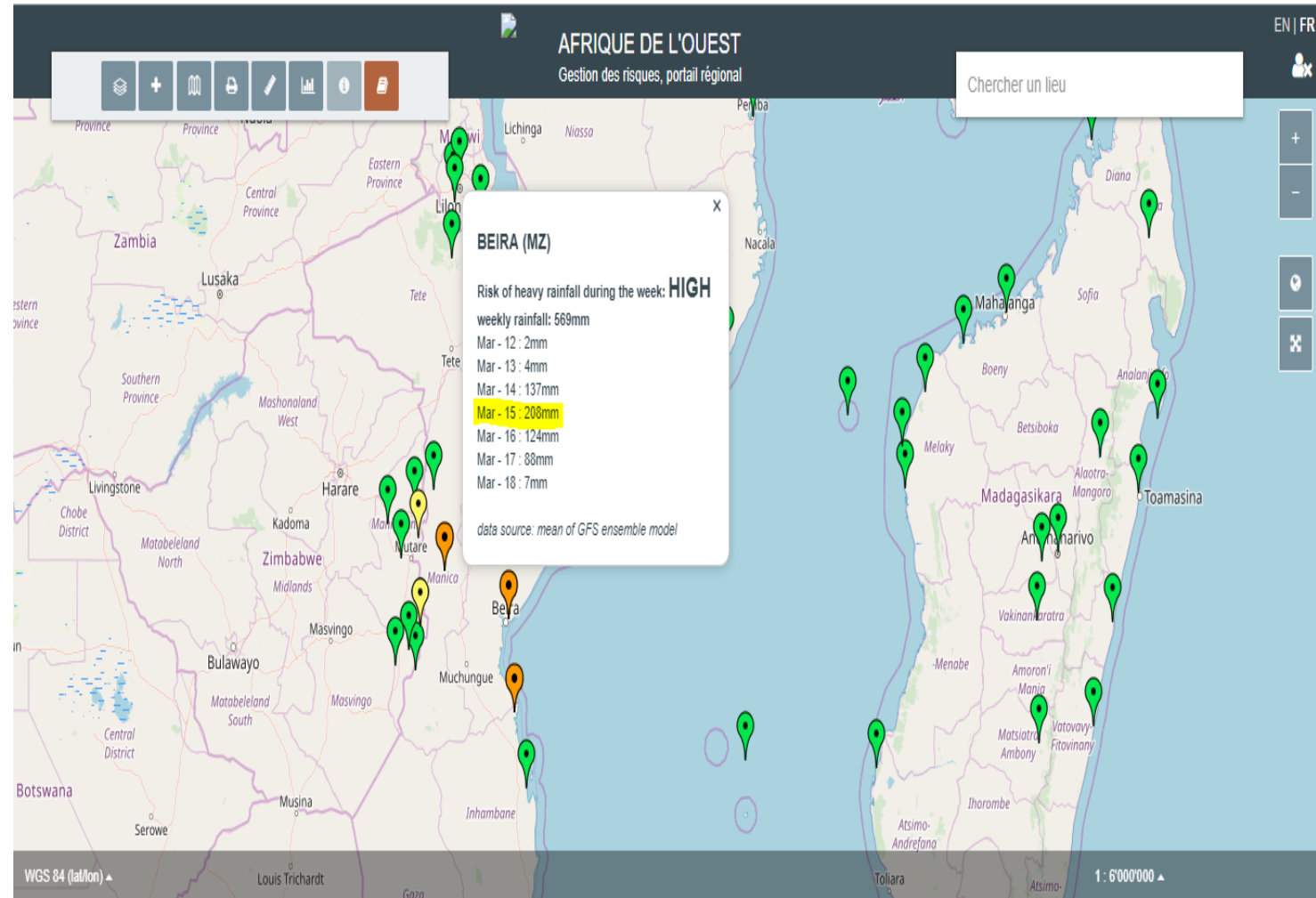


Figure 2: Heavy rain warning for the week, issued on: 20190312
Data Source: Mean of GFS ensemble model
Details: <http://41.203.146.53:8080/thredds/fileServer/FIT/RISK.html>

Table 1: The symbols, their meanings and the actions expected to be taken by Disaster Risk reduction personnel according to the level of risk.

Symbol	Implication	Advisories/ Actions
	-7 days rainfall is expected to be less than 100mm. - There is Low risk of heavy rainfall	Disaster Risk Management Authorities: - Keep informed; - Monitor the next 7days forecast.
	-7days rainfall is expected to be more than 150mm. -Be aware of the existing risk of heavy rainfall; -There is a potential flash flood in the coming days.	DRR Management Authorities : - Taking action is more likely; - The situation needs to be monitored closely with National Meteorological Service.
	-7days rainfall is expected to be more than 250mm. -There is High risk of flash flood due to the high ground saturation and continued heavy rains.	DRR Management Authorities : - Prepare to be ready to take action; - Meet with National Meteorological Service to identify vulnerable area.

DAY -3





HAZARDS OVER WEST AND CENTRAL AFRICA

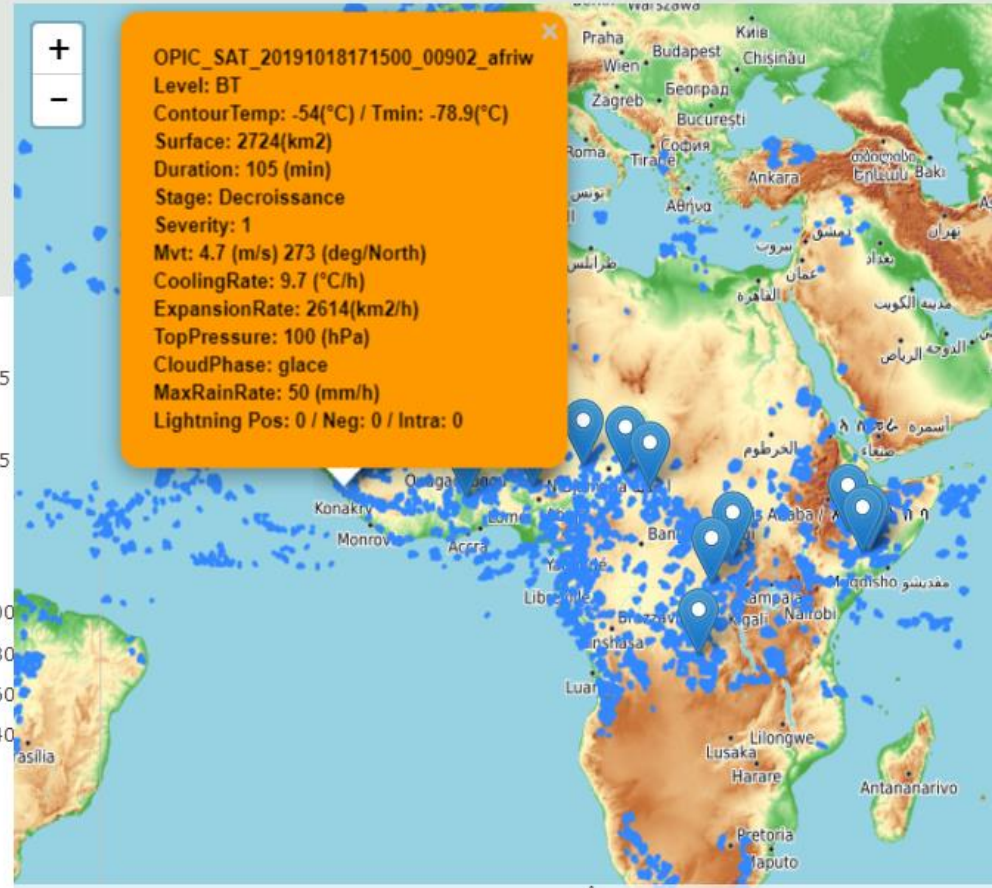
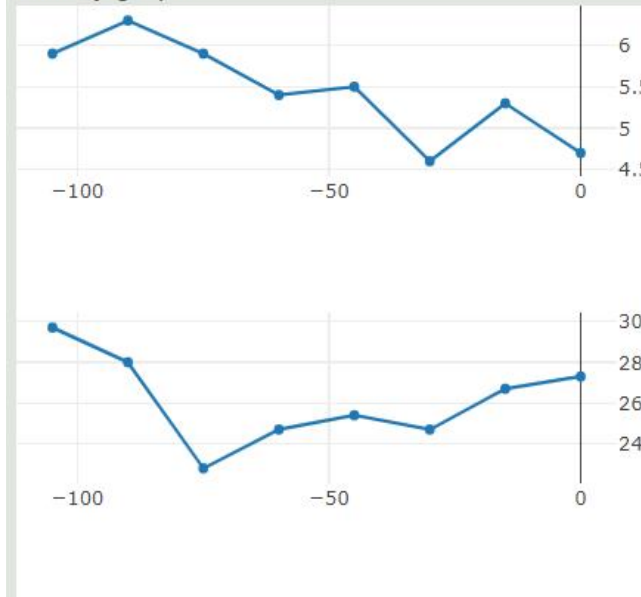
High Impact weather watch services every 15 in for Africa to support early response and recovery



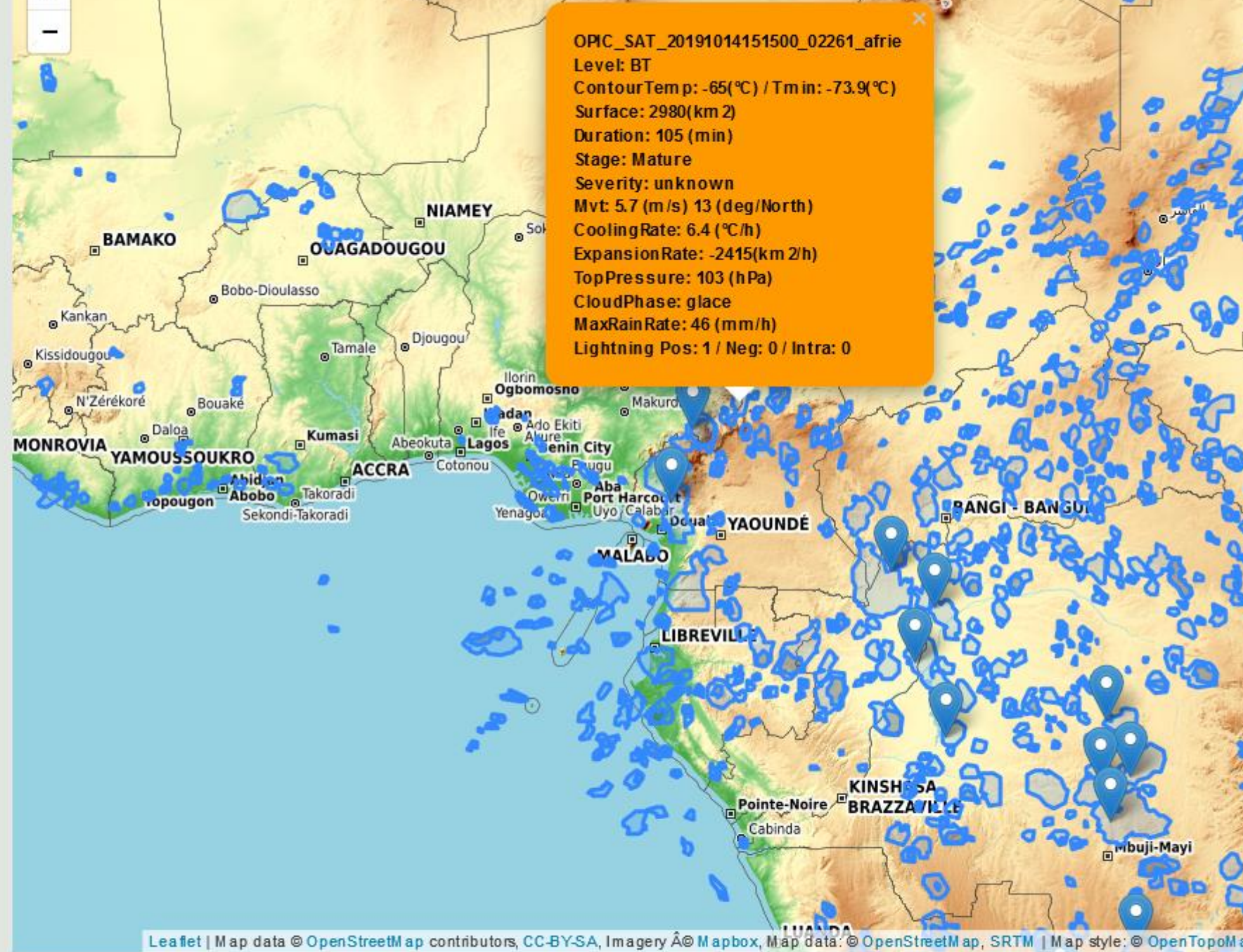
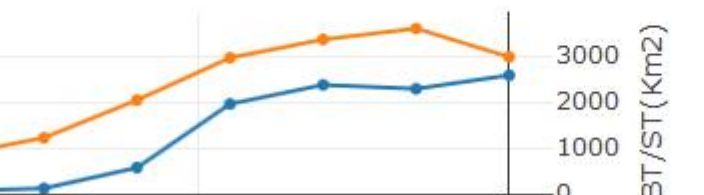
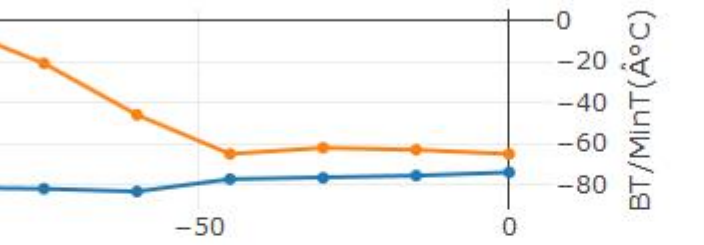
MSG 2019-10-18T17:15:00Z : RDT and overshoot



History graphs



History graphs



OPIC_SAT_20191014151500_02261_afrie
 Level: BT
 ContourTemp: -65(°C) / Tmin: -73.9(°C)
 Surface: 2980(km 2)
 Duration: 105 (min)
 Stage: Mature
 Severity: unknown
 Mvt: 5.7 (m/s) 13 (deg/North)
 CoolingRate: 6.4 (°C/h)
 ExpansionRate: -2415(km 2/h)
 TopPressure: 103 (hPa)
 CloudPhase: glace
 MaxRainRate: 46 (mm/h)
 Lightning Pos: 1 / Neg: 0 / Intra: 0

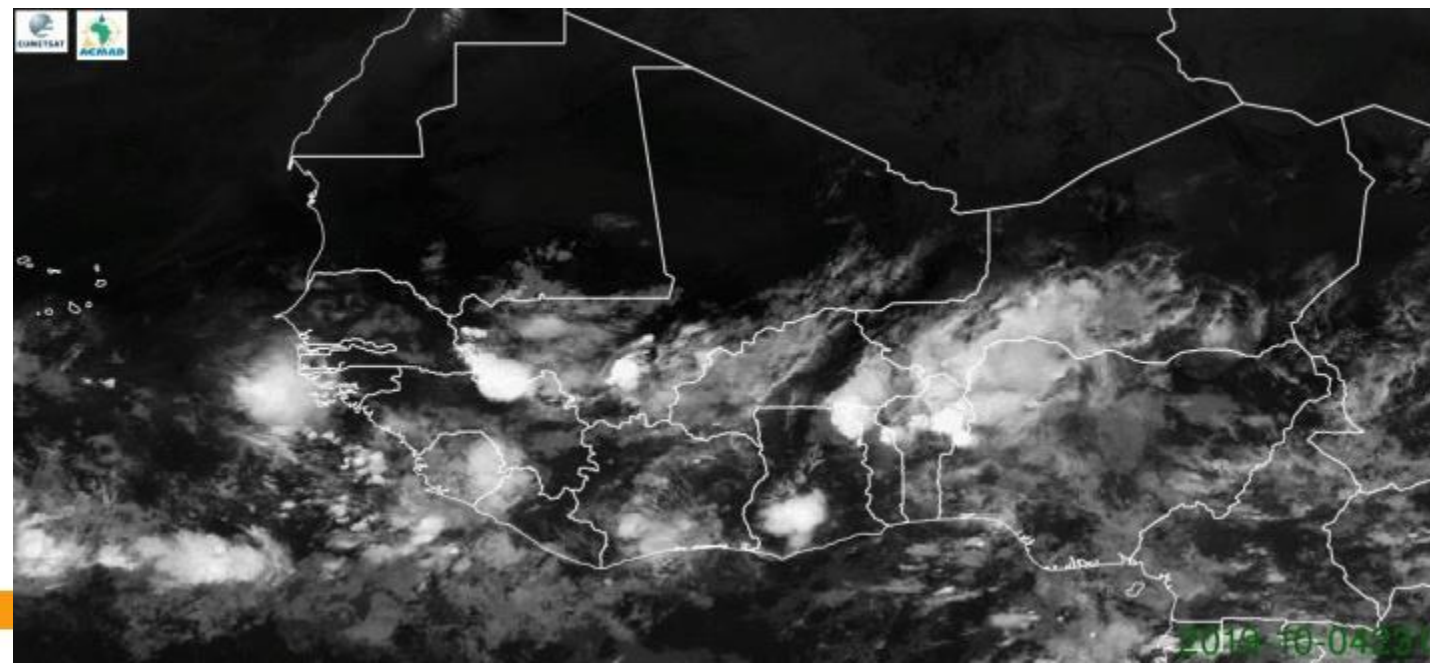
Inondations à Abidjan: la pluie a encore tué ce 5 octobre 2019

Par Vincent Toh Bi Irié - 5 octobre 2019



Une personne est décédée suite à l'effondrement d'un mur à Yopougon Gesco, causé par les pluies et les inondations ce 5 octobre 2019 à Abidjan.

Les pluies ce jour Samedi 05 Octobre 2019 ont eu des conséquences dramatiques.



MSG 2019-10-05T07:30:00 UTC



Alert for heavy rains
 potentially leading to flooding in Abidjan
possible 2 hours ahead
 based on weather monitoring products

MSG 2019-10-05T09:30:00 UTC

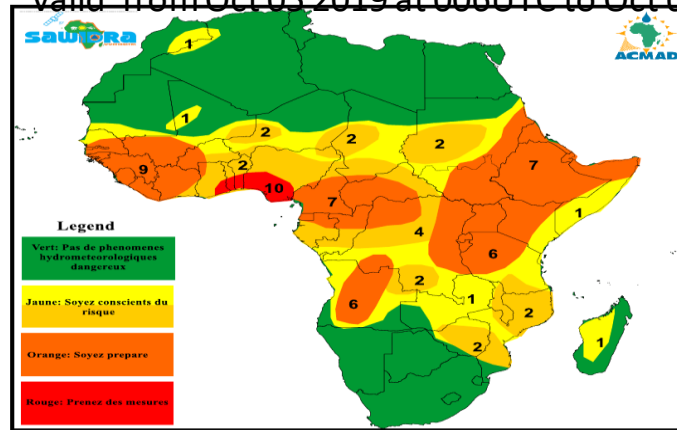


Vigilance for heavy rains over Cote d'Ivoire 2

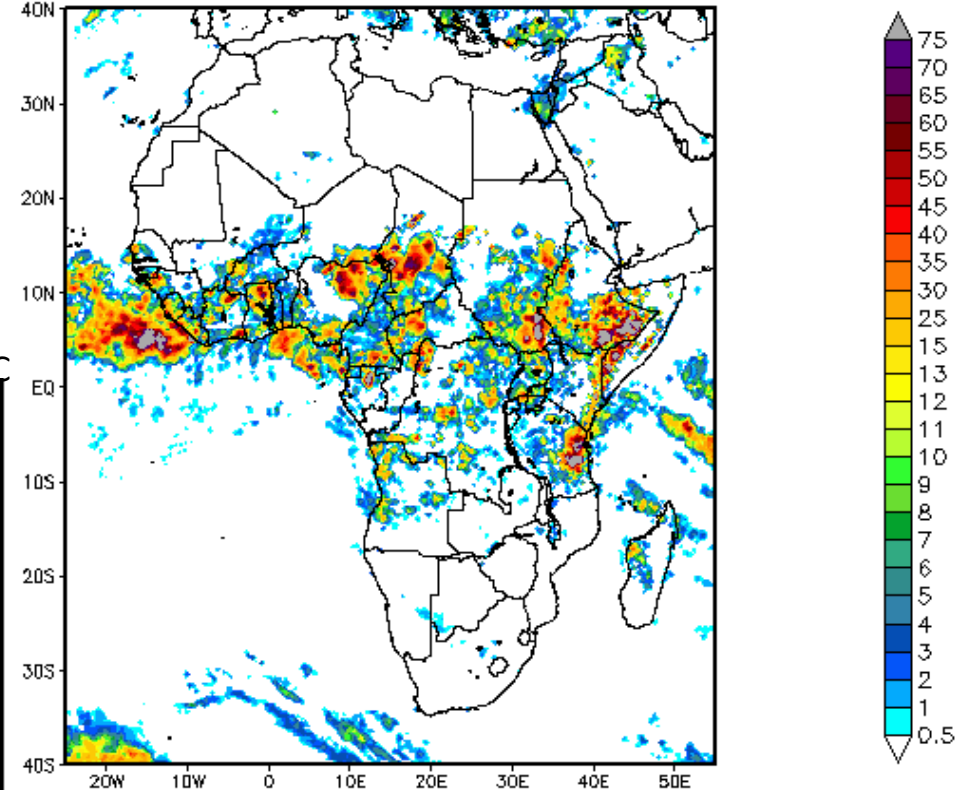
Vigilance map issue on 4th October, 2019

Valid from Oct 05 2019 at 006UTC to Oct 06, 006UTC

days and one day ahead available

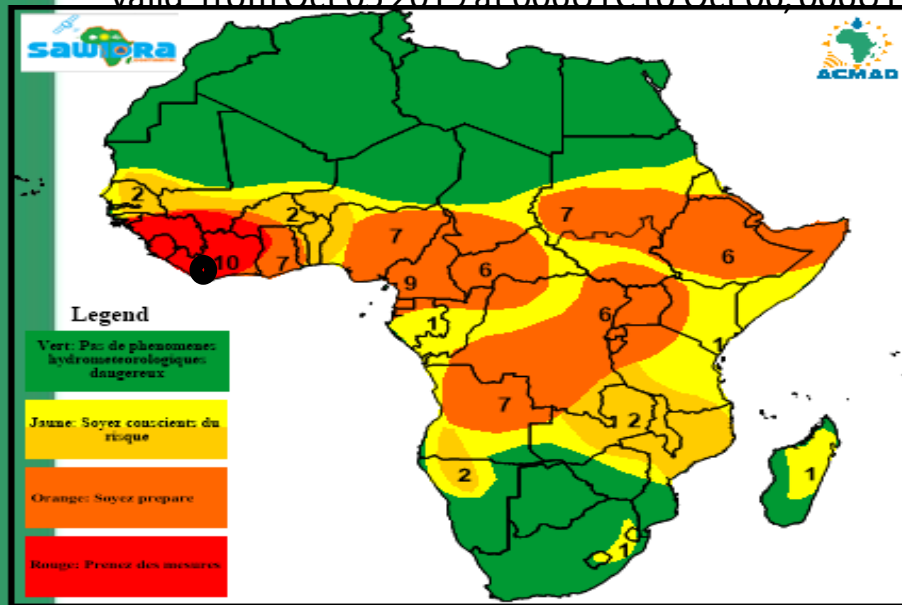


TRMM daily Cumulative rainfall (mm) on 05 October 2019



Vigilance map issue on 3rd October, 2019

Valid from Oct 05 2019 at 006UTC to Oct 06, 006UTC

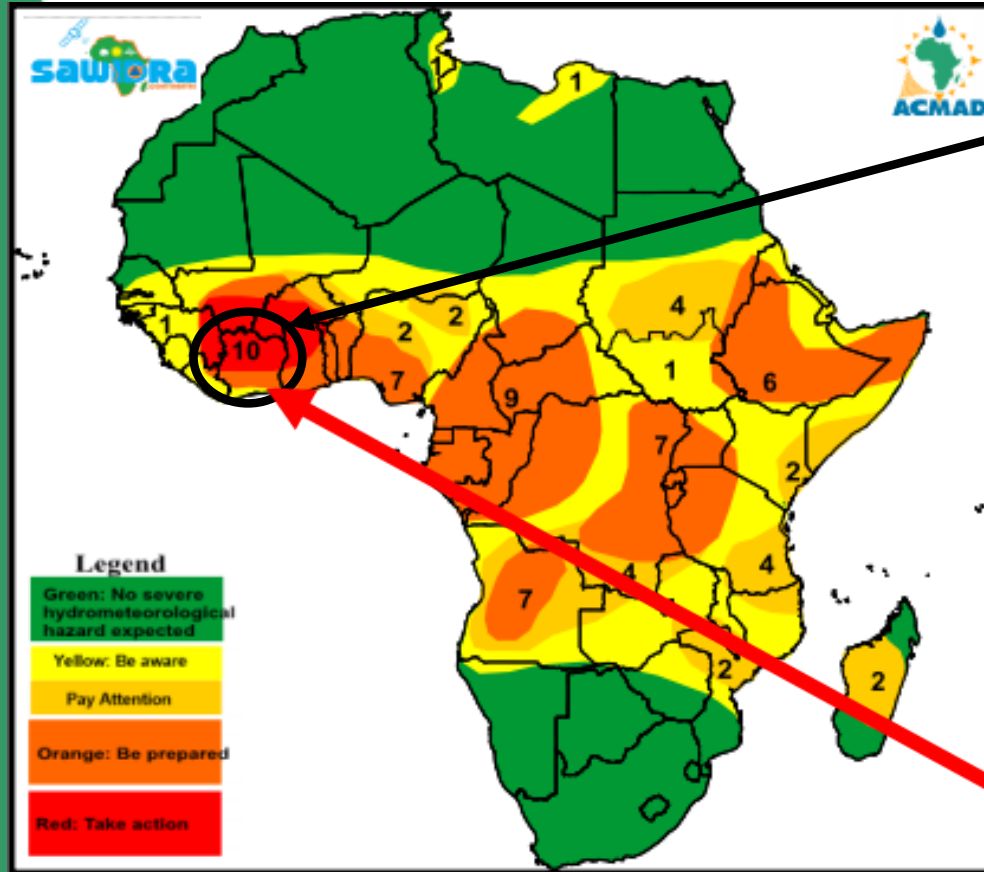


Heavy rain over Abidjan on 5 October 2019 associated by 3 deaths [lightning]



WEATHER WARNING BULLETIN
ISSUED ON 11th October 2019 at 12h00 UTC

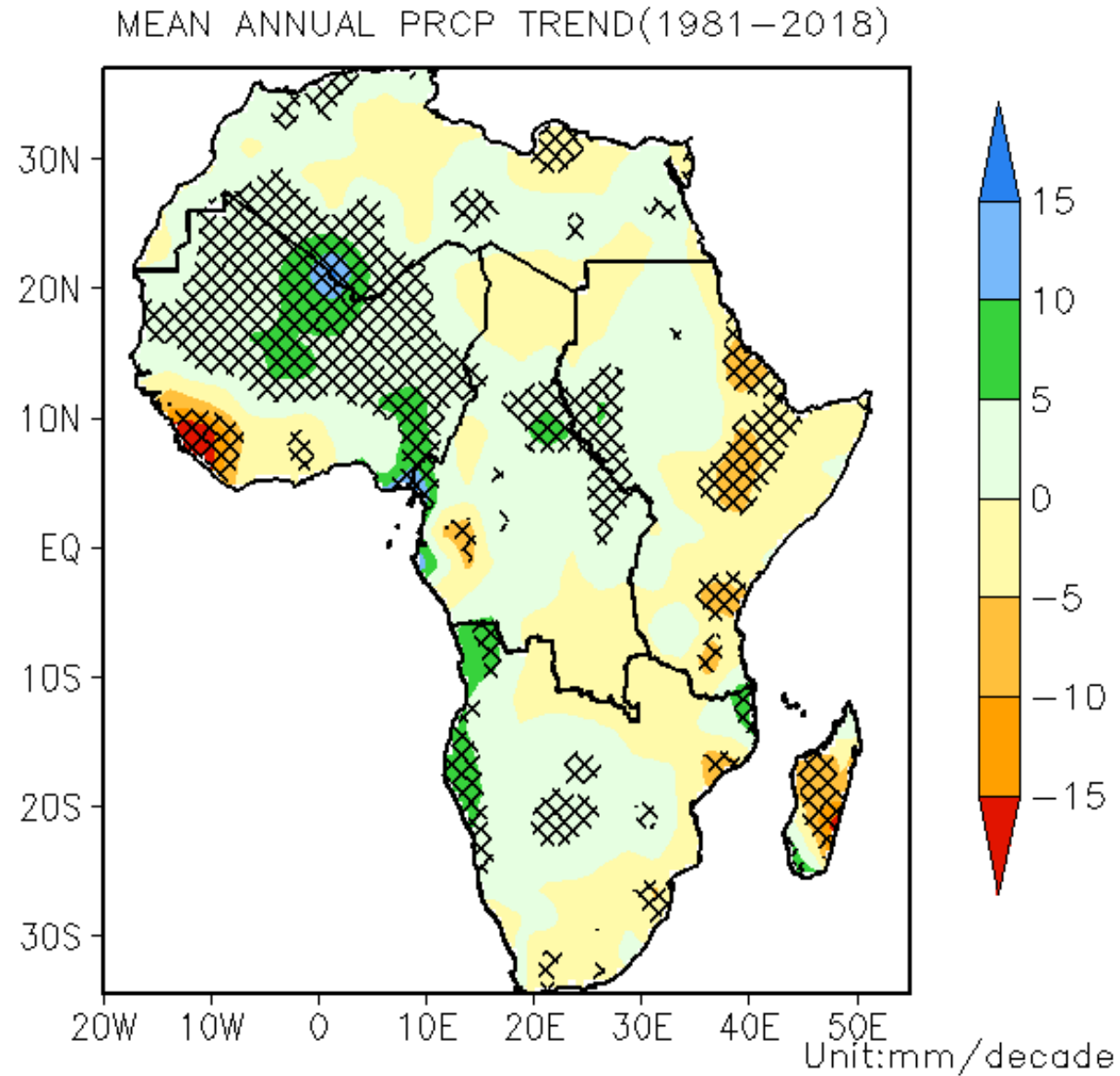
Valid: From 12h00 UTC to 18h00 UTC on 11th October, 2019



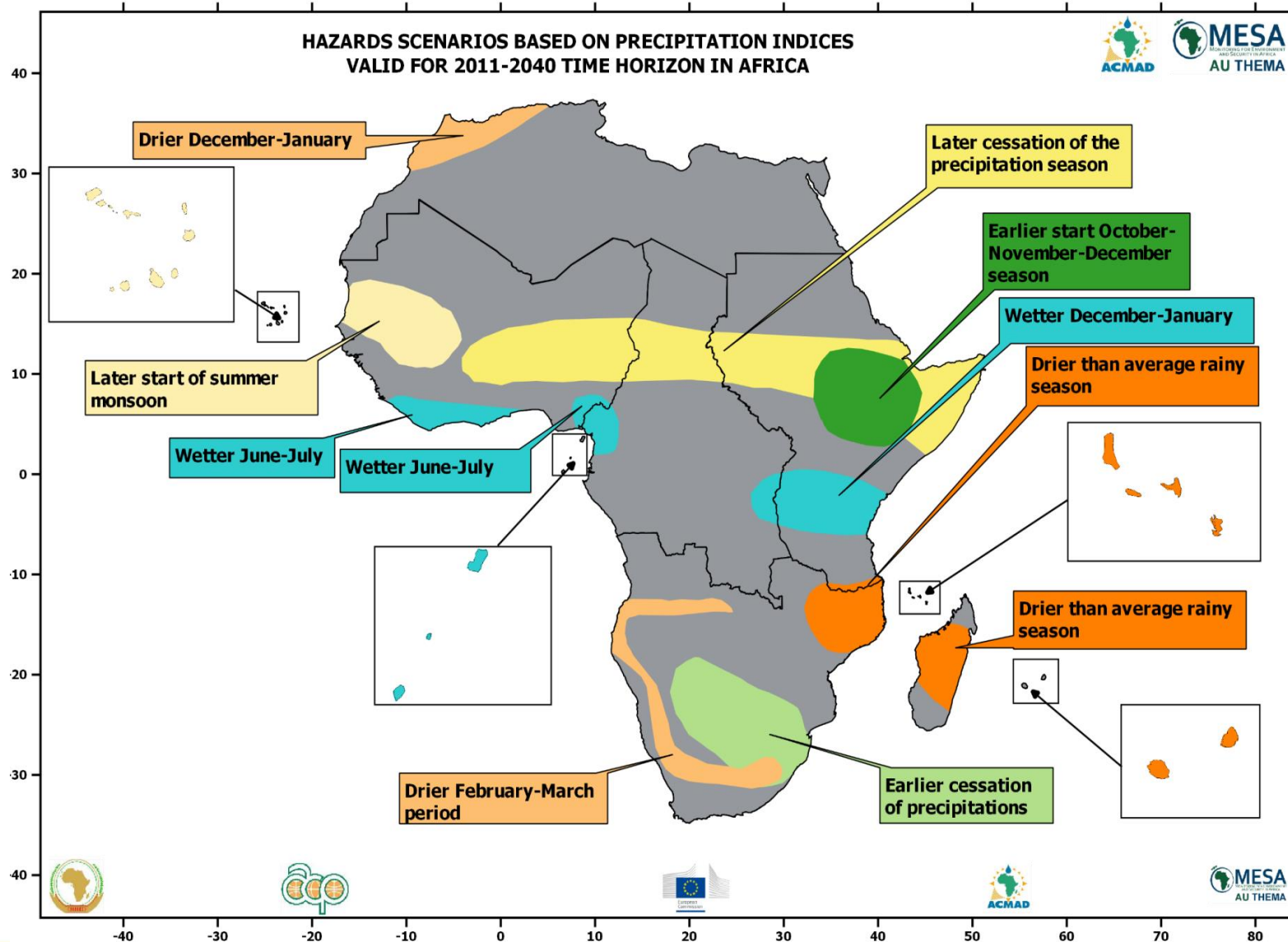
Flood reported in Abidjan



Annual precipitation trend over Africa for the period from 1981-2018. Hatched areas show significant increase (positive) or decrease (negative) at 95% level of confidence.



HAZARDS SCENARIOS FOR DISASTER RESILIENCE STRATEGY FORMULATION, PLANNING, DESIGN, BUILDING AND OPERATING RESILIENT INFRASTRUCTURE



INSTITUTIONAL INFRASTRUCTURE FOR CLIMATE SERVICES – GLOBAL-REGIONAL-NATIONAL WMO Designated Global Centers for Long Range Forecasts



WMO REGIONAL CLIMATE CENTRES STATUS

- **RCCs provide regional climate products in support of regional and national climate activities**
- **Mandatory Functions:**
 - Long Range Forecasting
 - Climate Monitoring
 - Data Services,
 - Training
 - **Coordination of RCCs (Additional Role for ACMAD)**
- **Highly Recommended Functions:**
 - Climate prediction and projection
 - Non-operational data services
 - Coordination functions
 - Training and capacity building
 - Research and development
- Two modes of Implementation: fully self-contained RCCs or distributed-function RCC-Networks



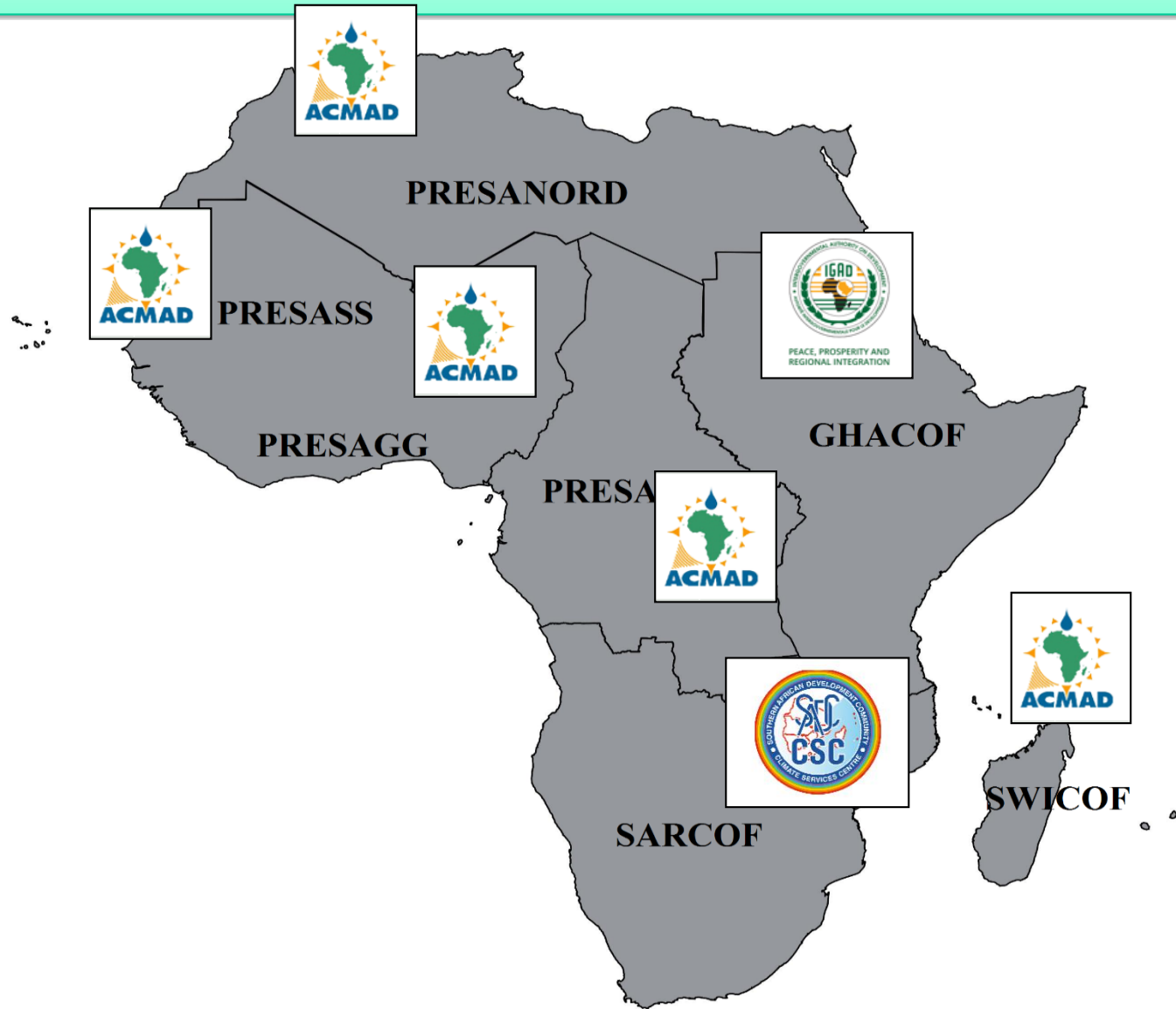
Legend

- designated RCC
- RCC in demonstration phase
- RCC proposed
- designated RCC-Network
- RCC-Network in demonstration phase
- RCC-Network proposed

ACMAD SPEARHEAD

Regional Climate Outlook Forums in AFRICA

CORE ACTIVITY OF RCCs



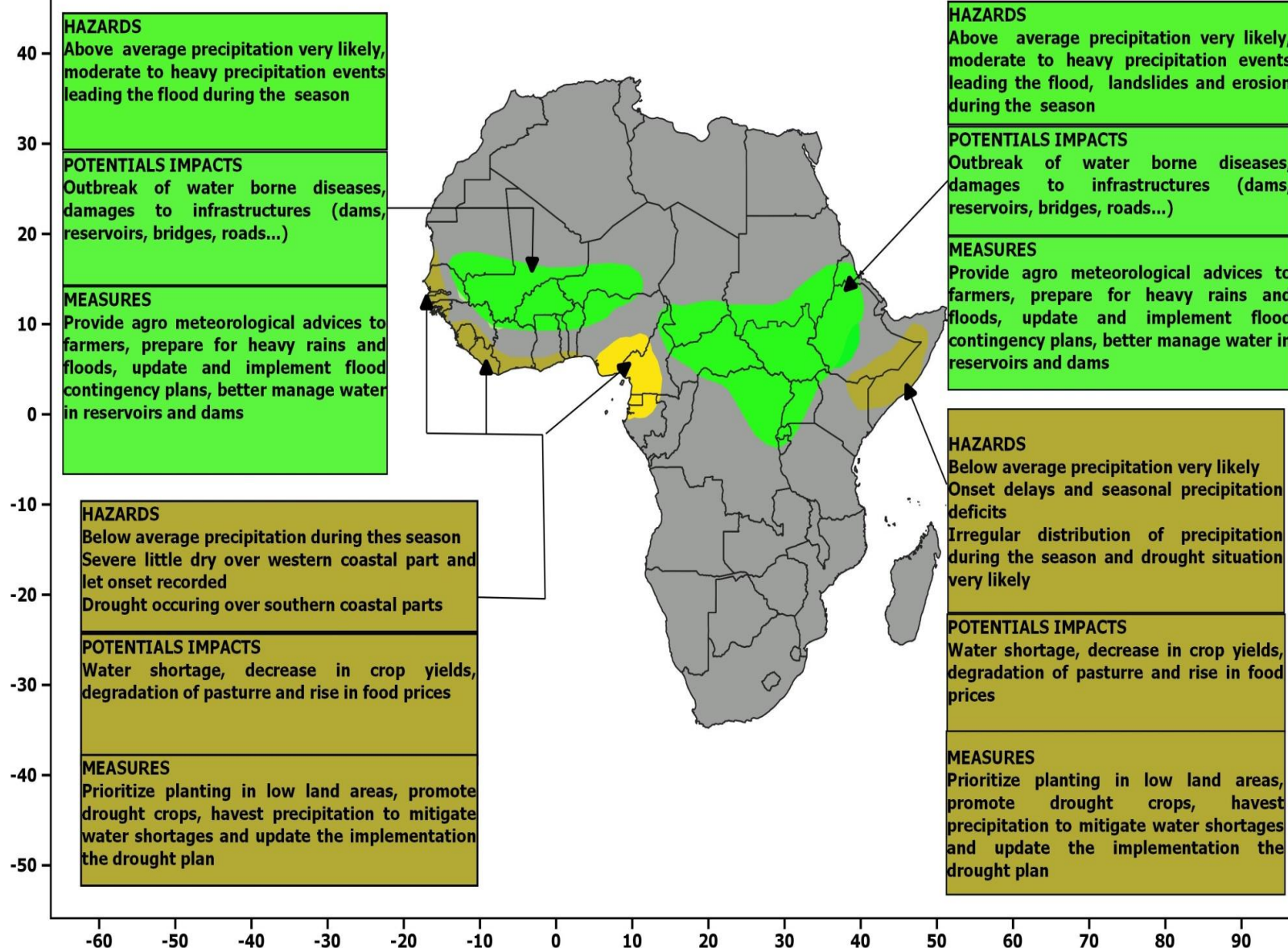
- **RCCs provide regional climate products in support of regional and national climate activities**
- **Mandatory Functions:**
 - Long Range Forecasting
 - Climate Monitoring
 - Data Services,
 - Training
 - ***Coordination of RCCs (Additional Role for ACMAD)***
- **Highly Recommended Functions:**
 - Climate prediction and projection
 - Non-operational data services
 - Coordination functions
 - Training and capacity building
 - Research and development
- Two modes of Implementation: fully self-contained RCCs or distributed-function RCC-Networks



Legend

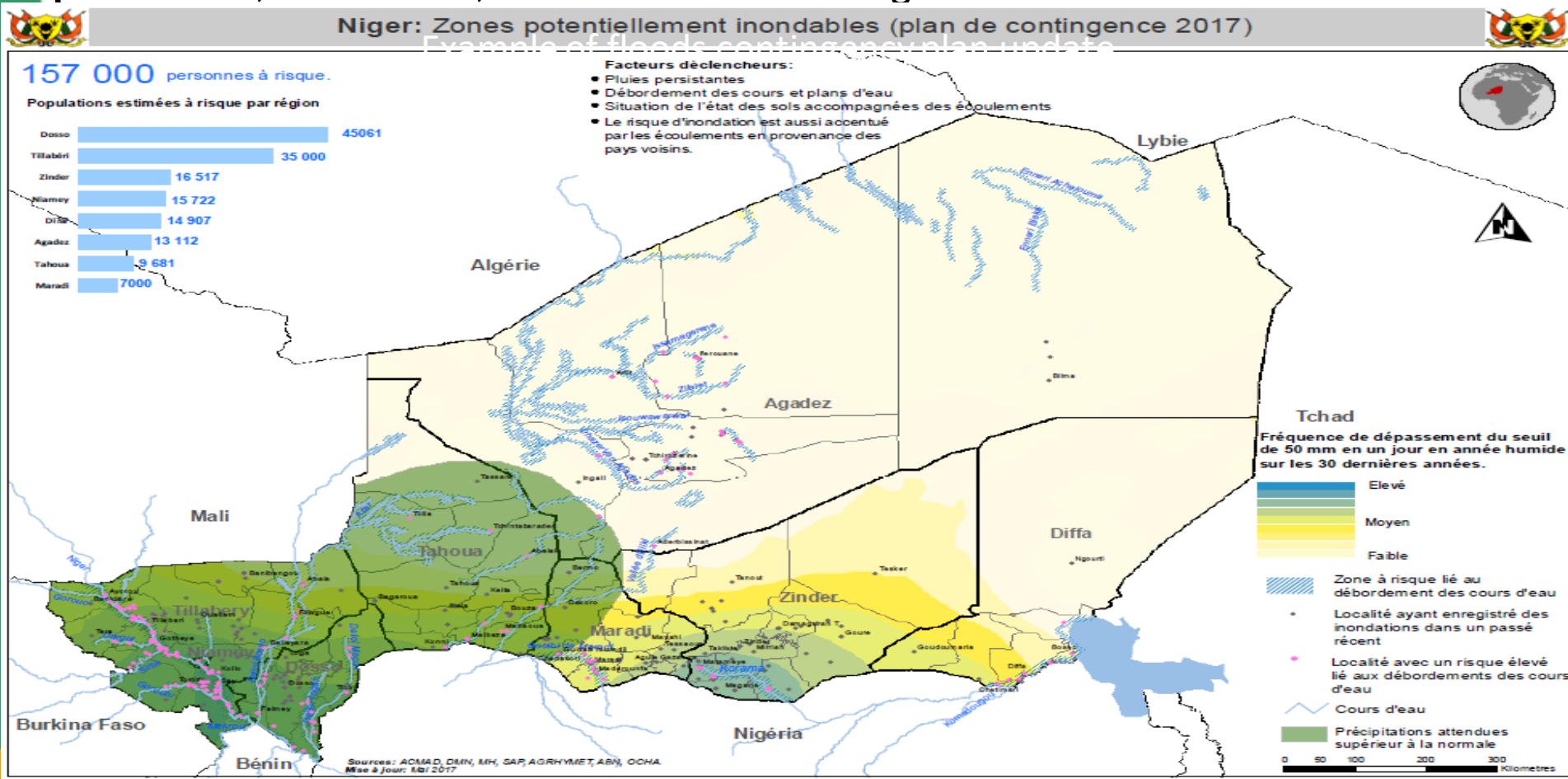
- designated RCC
- RCC in demonstration phase
- RCC proposed
- ▲ designated RCC-Network
- ▲ RCC-Network in demonstration phase
- ▲ RCC-Network proposed

BRIEF FOR POLICY AND DECISION MAKERS BASED ON SIGNIFICANT WEATHER AND CLIMATE EVENTS UPDATE VALID FROM JULY TO OCTOBER 2019

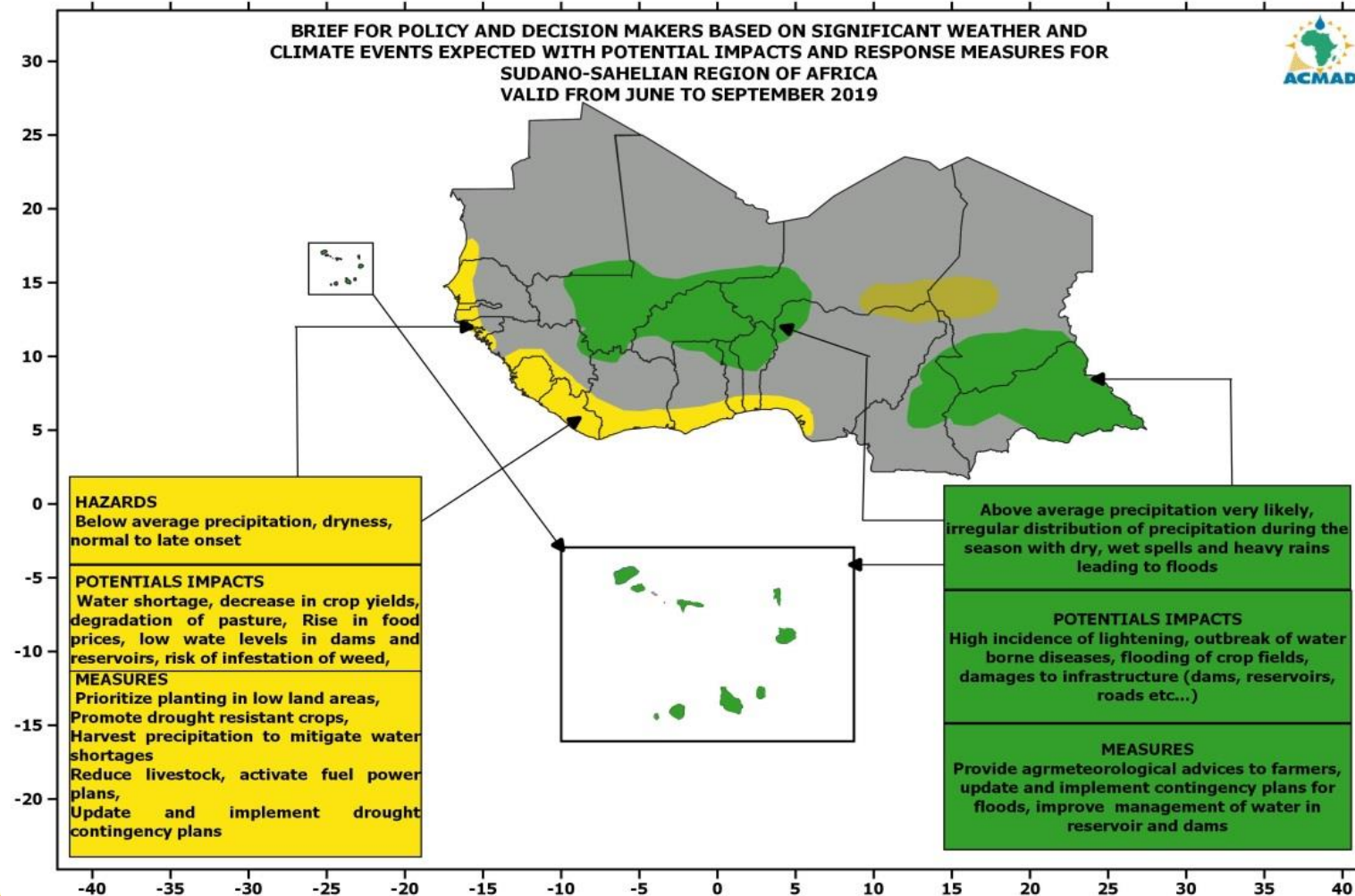


PRODUITS: Contingency plan updated with a pilot experieiment with UNOCHA Bureau in Niger

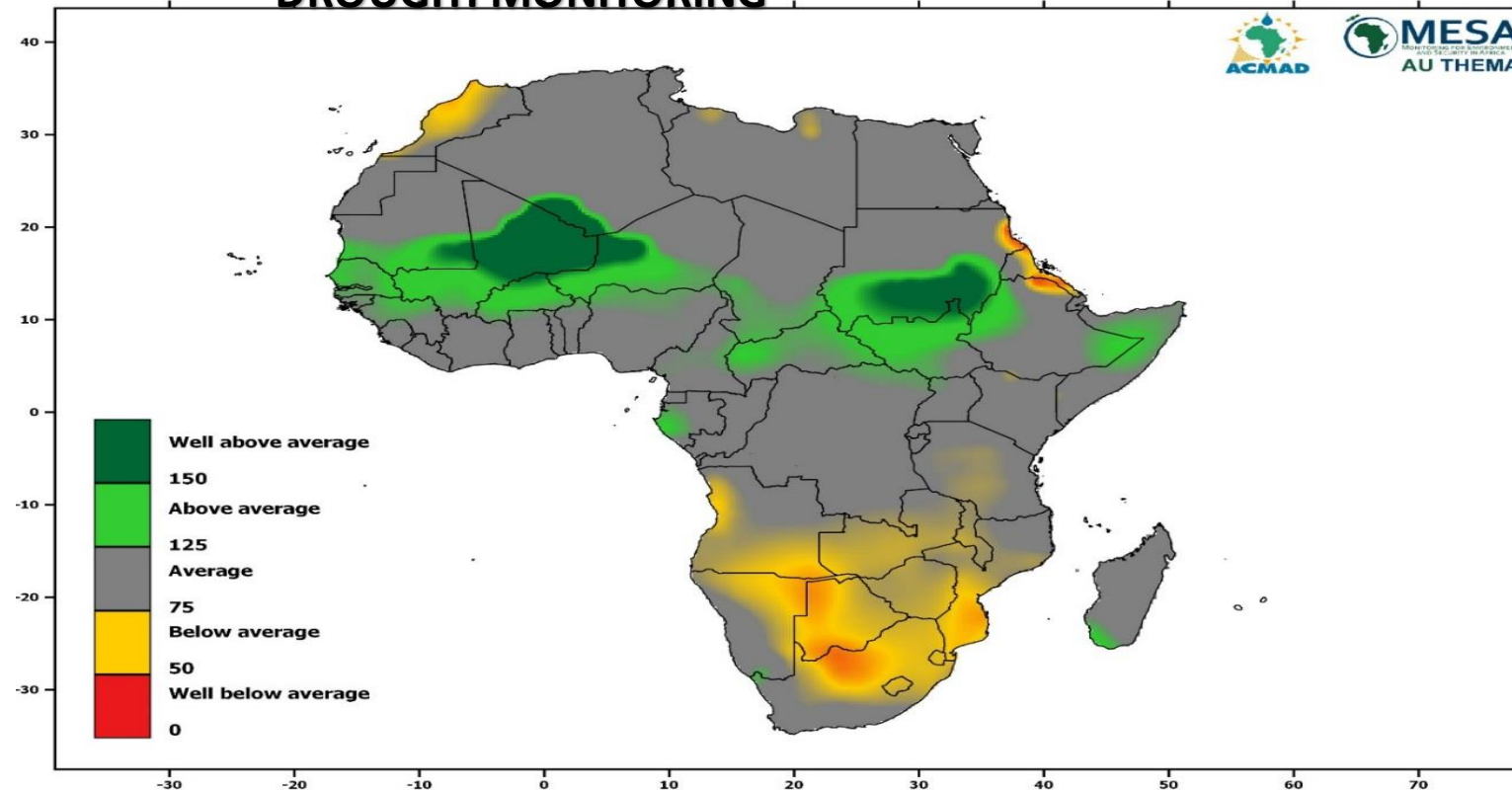
MoU between ACMAD and IFRC recently signed to provide Seasonal forecasts, advisories, watches and warnings for humanitarian action



Regional Seasonal Outlook update



DROUGHT MONITORING



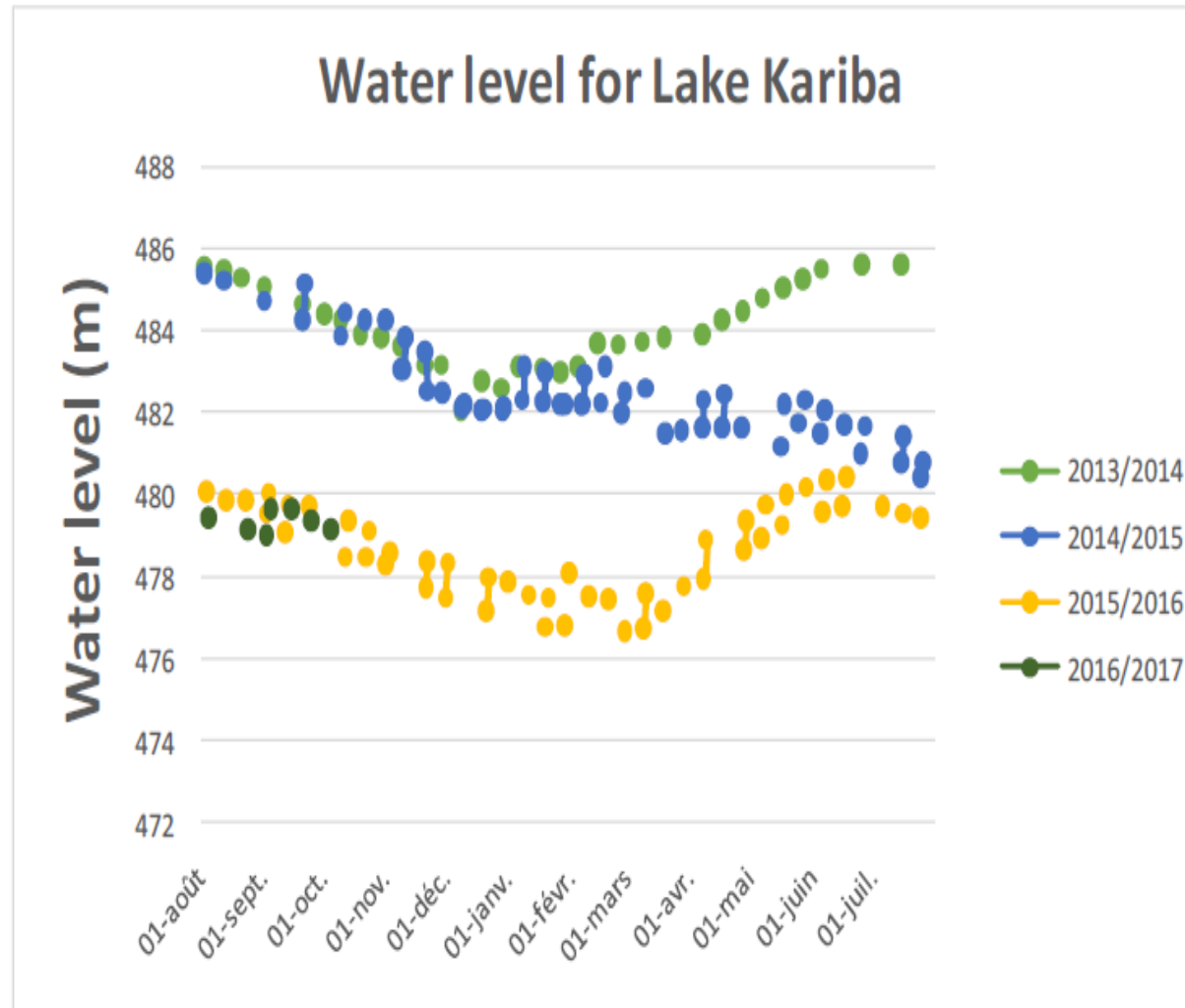
African annual precipitation in percent of average for 2015
Commodity (e.g Corn) reserve could be set up with excess production
over the Sahel, ECOWAS and ECCAS RECs in October-November 2015 to
reduce inflation on commodity markets in Southern Africa from December
2015 into 2016

A continental Free trade area would accelerate movement of commodities
desperately needed to reduce droughts, floods and other events impacts

C. HYDROLOGICAL DROUGHT MONITORING WITH SENTINEL 3A Satellite SENSOR

The hydrological situation of lakes and rivers reflects the relationship between supply and demand of water for human consumption, livestock forage or hydroelectric power production. On the supply side dependence on precipitation is obvious. Thus, meteorological drought has a direct impact on hydrological drought.

Figure 4:
Kariba Lake level fluctuations since 2013/2014 and reflecting the 2015/2016 drought ; 475 meters is the minimum level for hydropower production . This level was almost reached between February and March 2016 as detected by Sentinel 3A data.



D. The ACMAD-MESA African Drought Monitor as part of the Drought Service and Continental Seasonal Climate Forecast

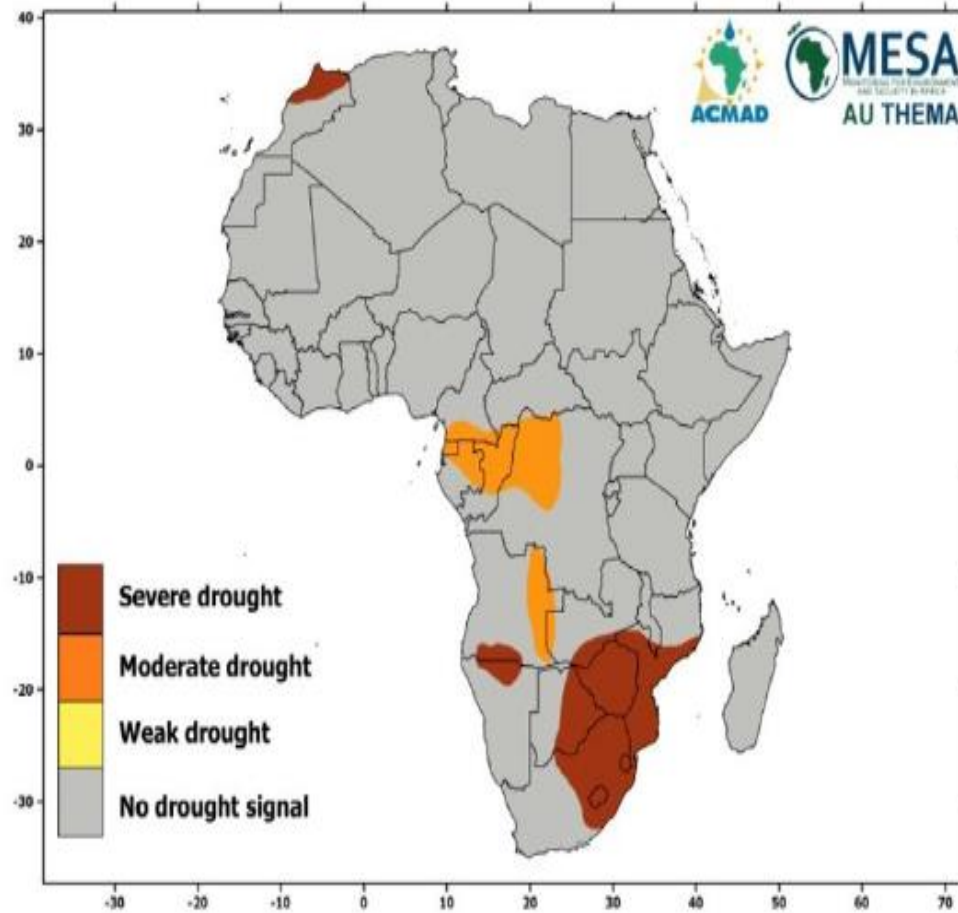


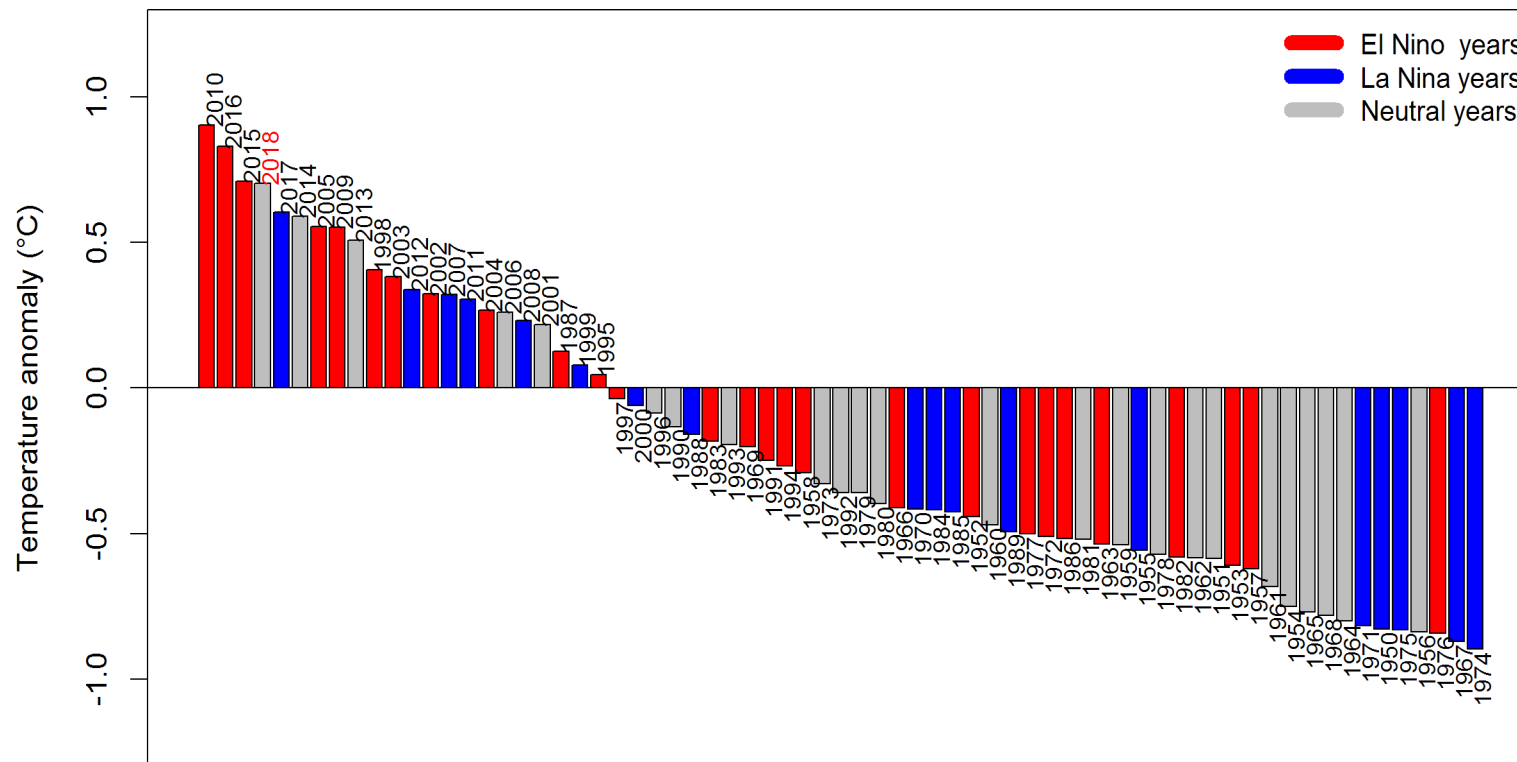
Figure 5: Drought Monitor product valid for February 2016.



Please visit: <http://www.acmad-au.org/products-services/drought-services-seasonal-climate-forecast/>

Mean annual temperature anomalies (°C) over Africa for 1950- 2018 period relative to 1981-2010.

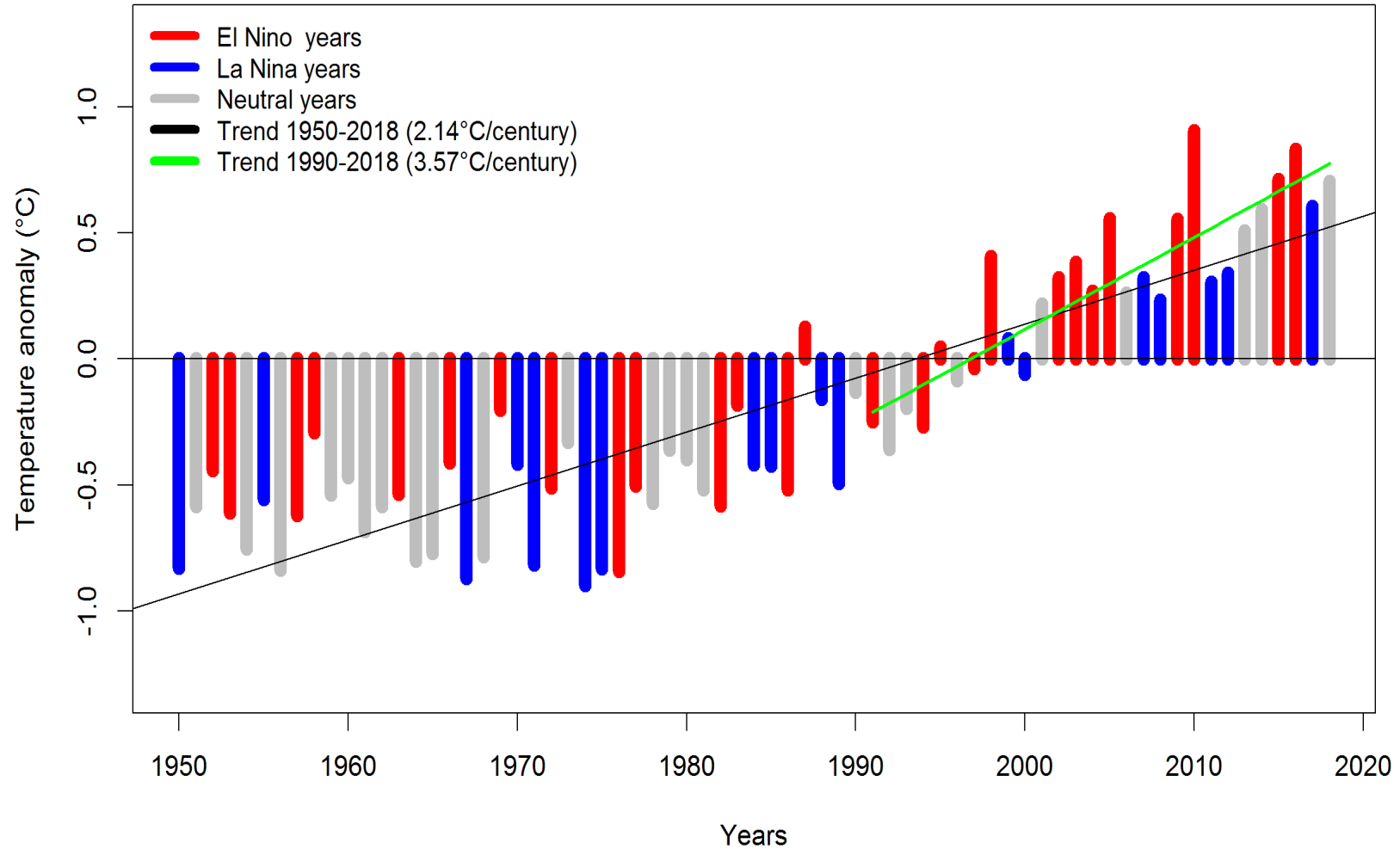
Ranked Temperature Anomaly over Africa

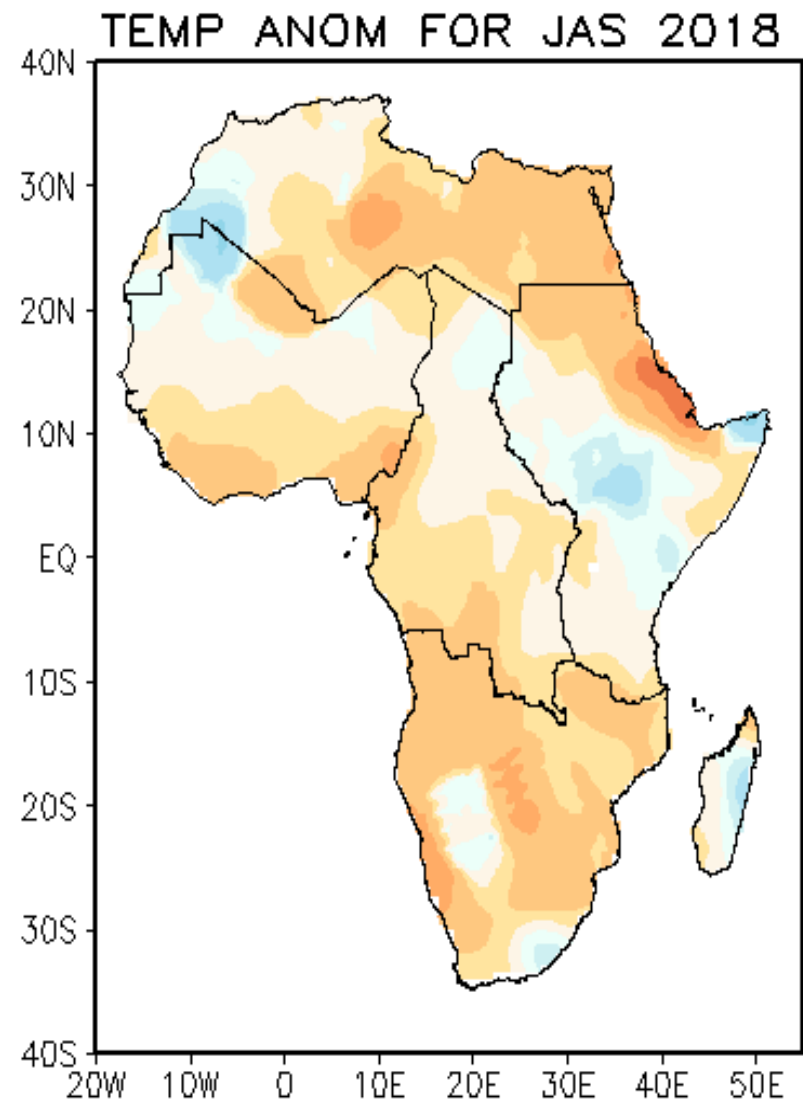
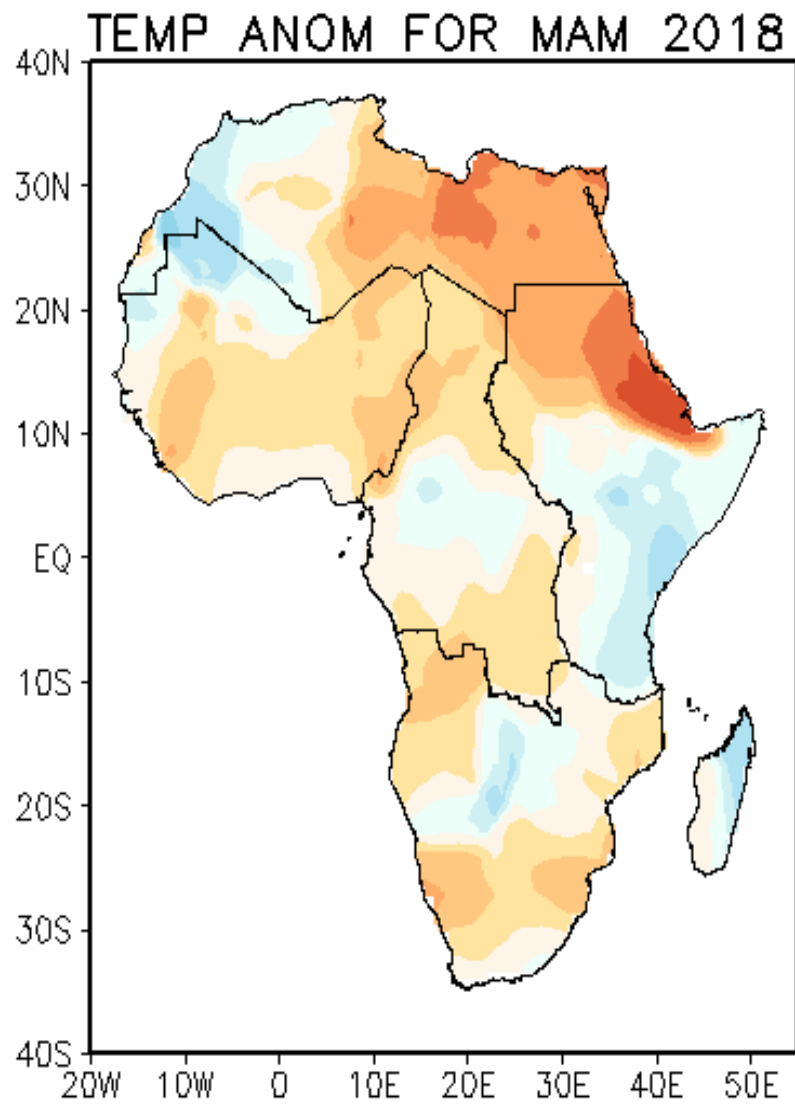


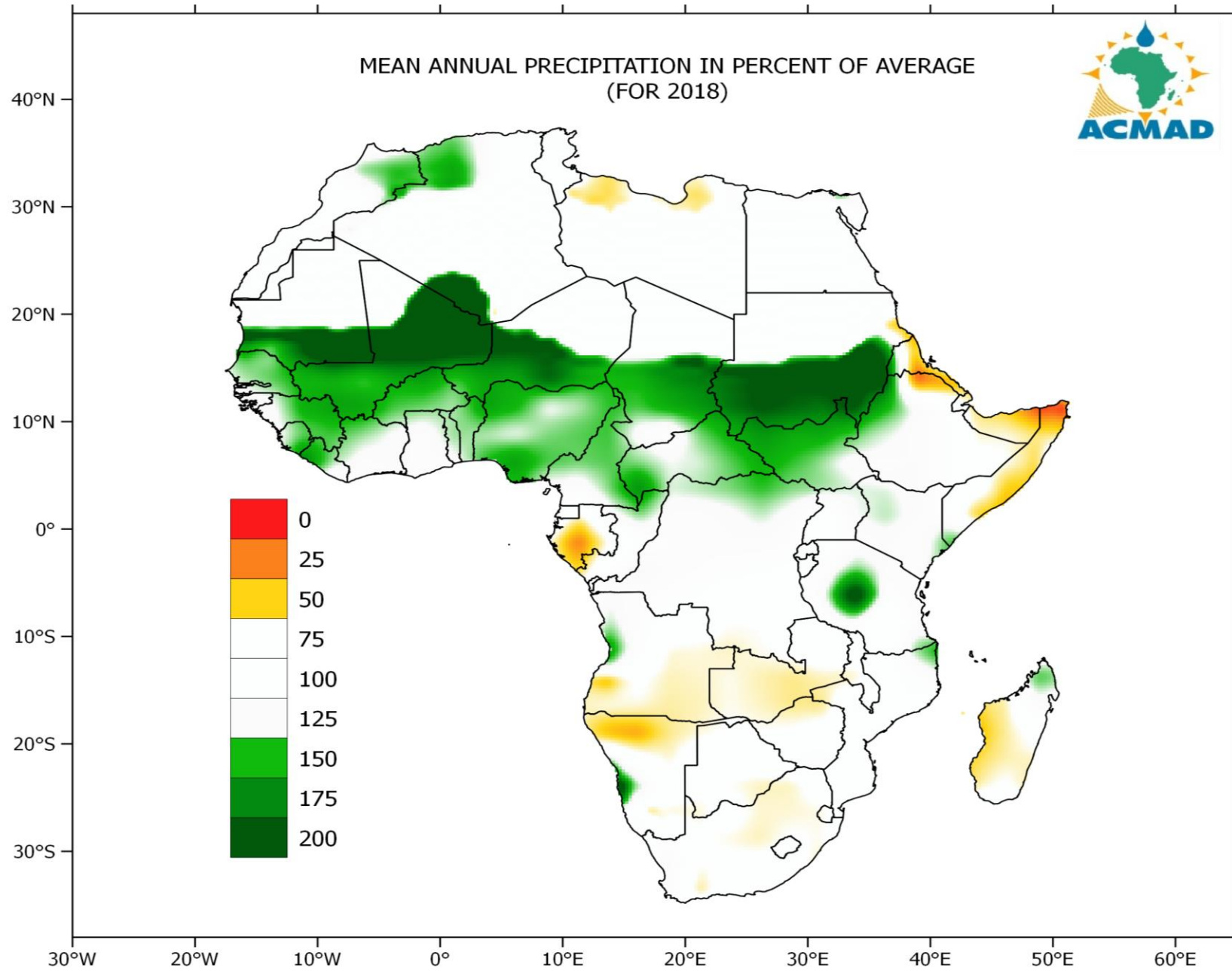
- **2018 is the 4th warmest year on record since 1950**
- **2017 was the 5th warmest year**
- **2010 is still the warmest year on record over the African Landmass**

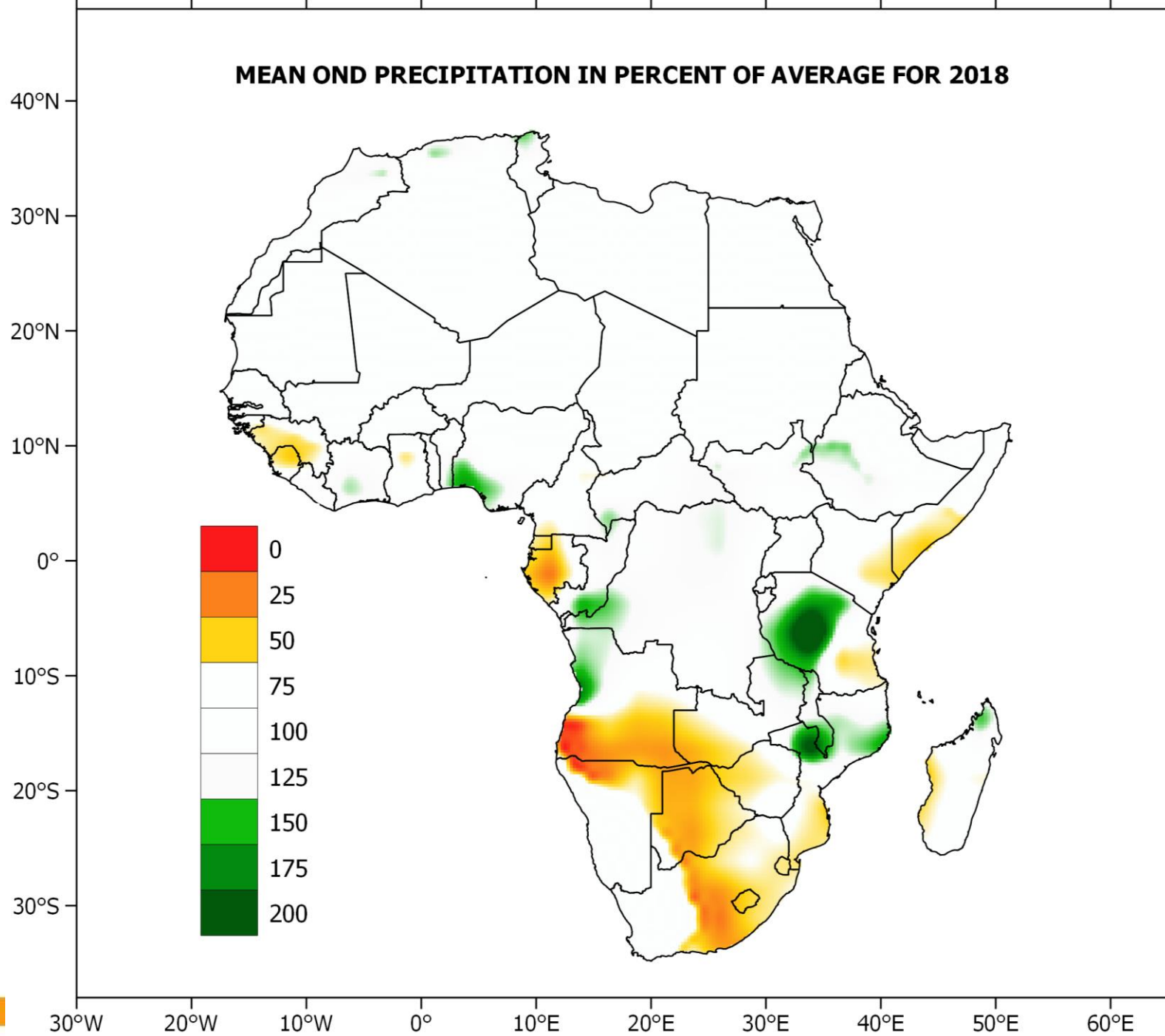
Trends in the mean annual temperature anomalies (°C) over Africa for 1950-2018 period.

Temperature Anomaly in Africa











**Temperature Anomalies are close to one of the past 5 to 10 years years
Some degree of persistence???**

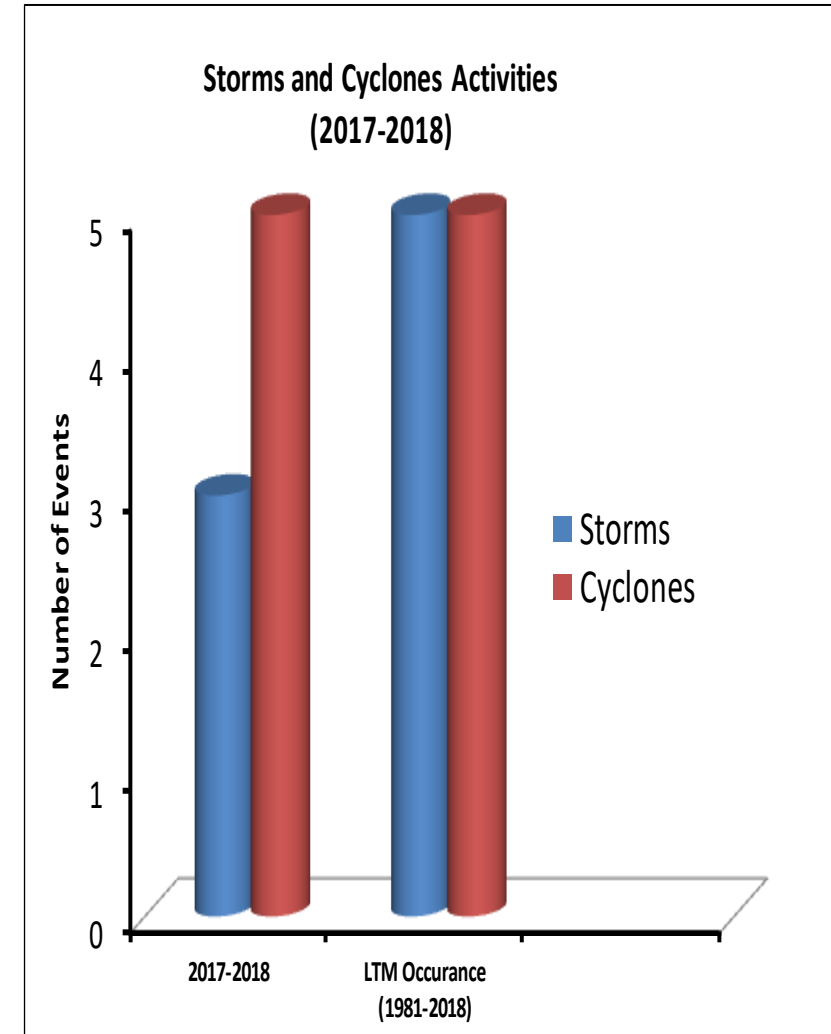
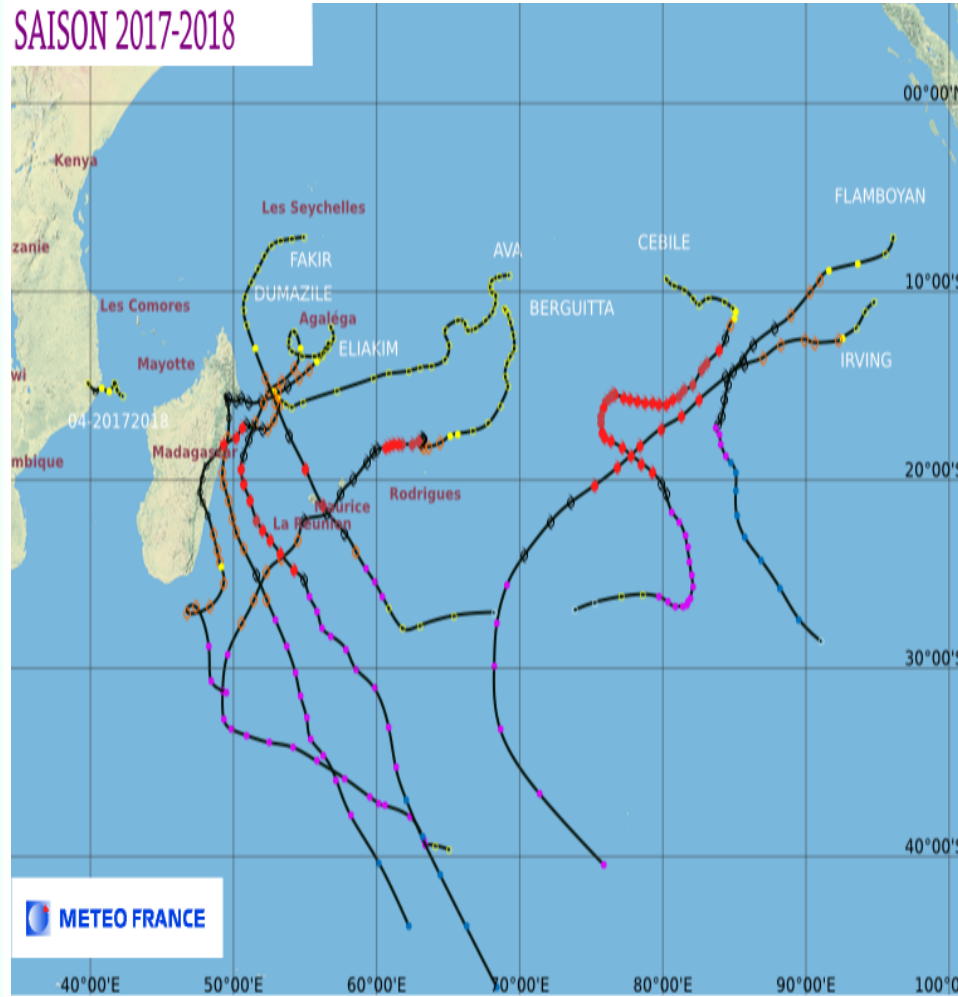
<i>Region</i>	<i>Anomaly (° C)</i>	<i>Ranking per region since 1950</i>
Africa	+0.70	4th
Northern Africa	+0.84	3rd
Southern Africa	+ 0.86	3rd
Western Africa	+0.52	7th
Eastern Africa	+ 0.70	5th
Central Africa	+0.82	3rd
Madagascar	-0.29	35th

Temperature Anomalies are close to one of the past 5 to 10 years

Some degree of persistence???

Formal partnerships for seamless forecasting from now casting to seasonal forecasting of tropical cyclones (AUC, IOC, SADC to attend)

SAISON 2017-2018



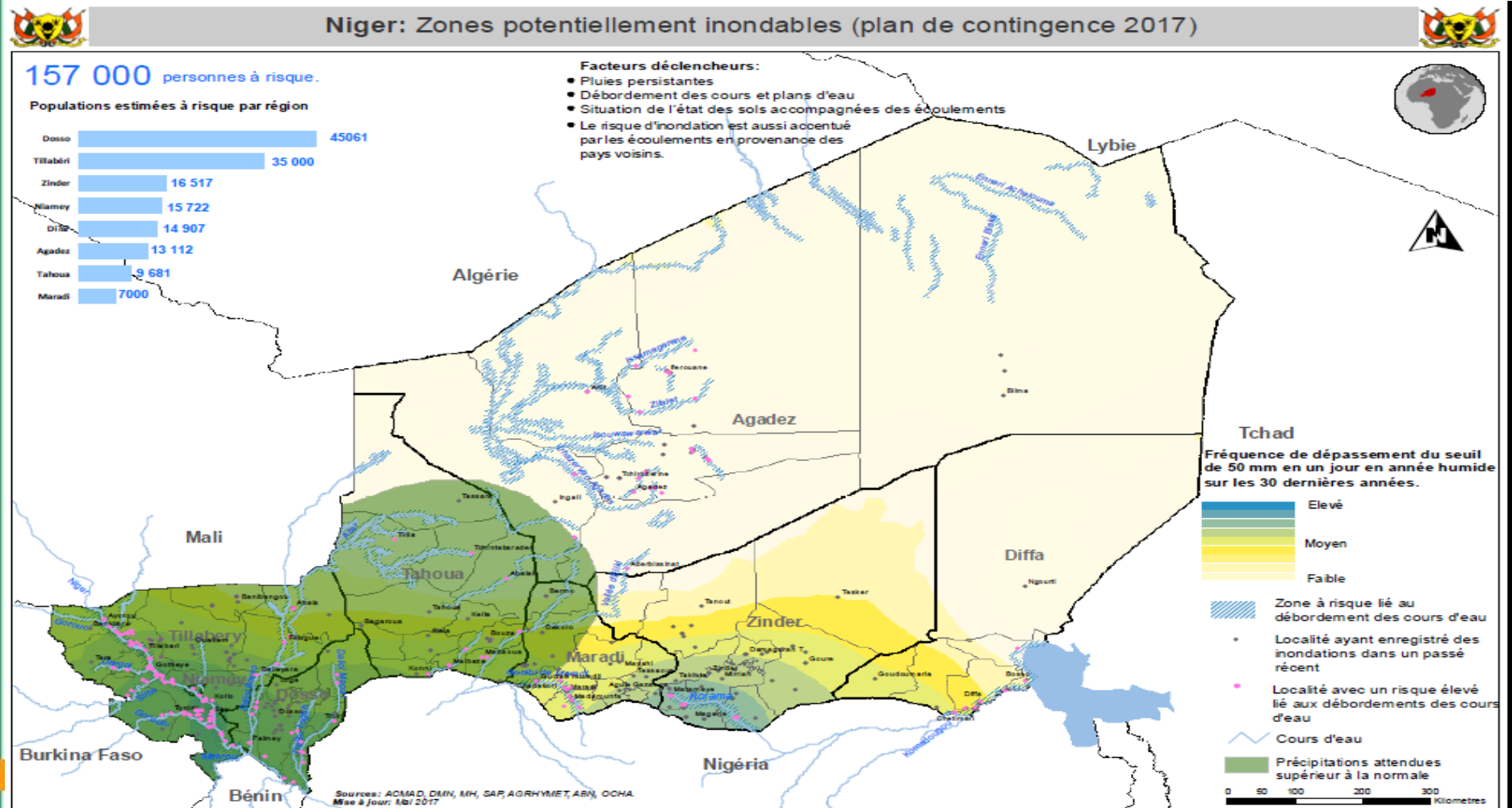
**SERVICES FOR DRM
REQUIRING
SUSTAINABILITY INITIATIVES**
By supporting *continued
production with donors* and
mobilizing policy and *country
budgets decision makers*

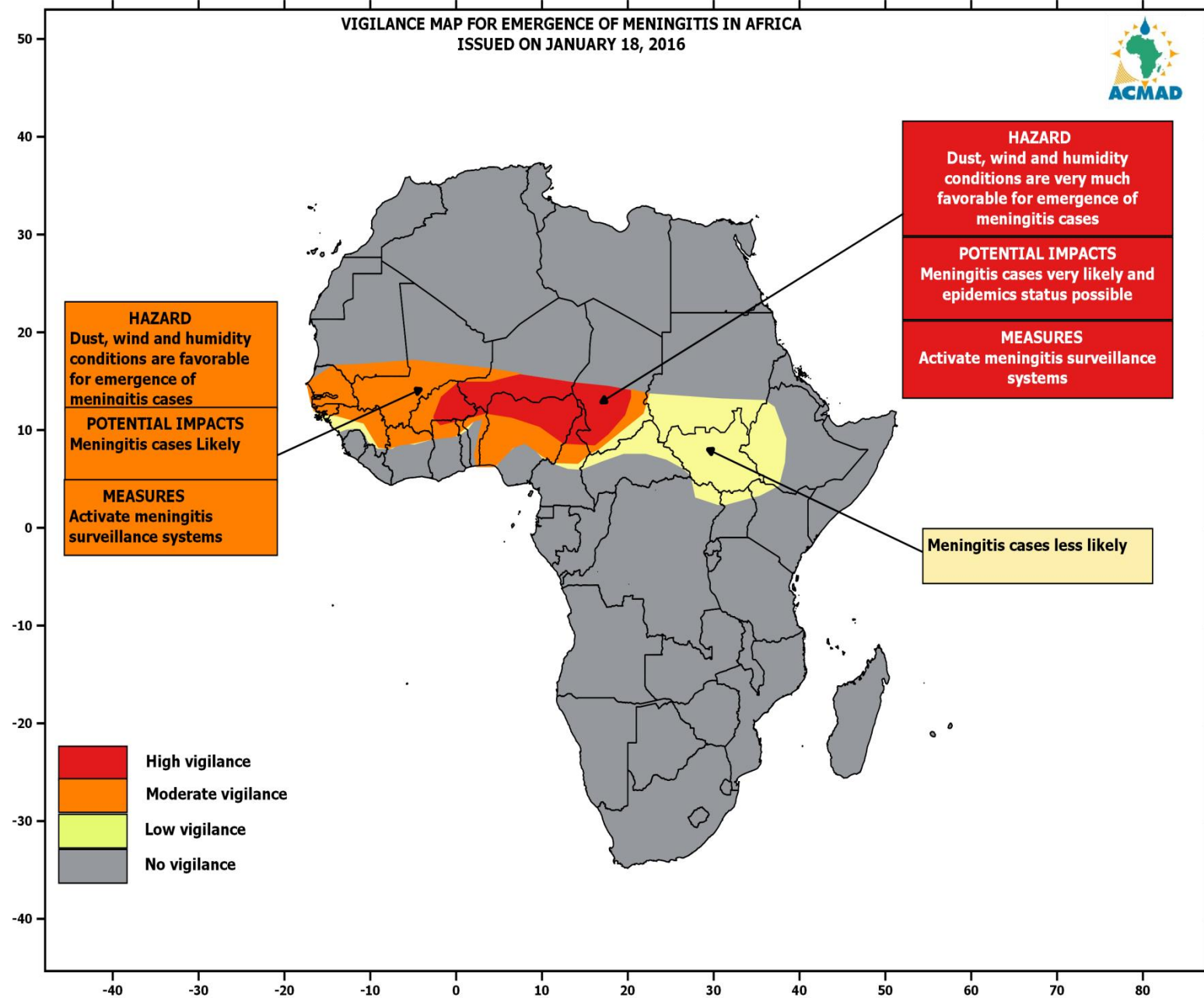
SERVICES TO MEET THE NEEDS

At planning level

Seasonal Forecasts are required to Update contingency plans , activate early warning mechanisms –

Potentially flooded zones in the contingency plan update in Niger based on seasonal forecasts for summer 2017





CONCEPT FOR A DEMONSTRATION PROJECT PROVIDING AND USING OPTIMAL CLIMATE SERVICES FOR RESILIENCE

- Major steps of the demonstration
- Climate advisory/watch and contingency planning
- Sub seasonal advisory/watch and preparation
- Medium/Short Range Forecasts/watch and early response
- Nowcasting // go-actions of response and recovery
- Forecasts, Outlooks, Advisories, watches and warnings are services dedicated for Disaster resilience



Main Activities of the pilot

- Document historical performance of WMCs products over Africa
 - verify WMC products
 - develop regionally tailored products
 - prepare **technical notes** to guide forecasts briefings at National level
 - deliver bulletins , pilot **advisories** and **watches**
 - support NMHS to deliver impact based forecasts and risk based warnings as part of **twining exercise** with WMCs-ACMAD-pilot NMHS
 - store data and products for post events studies
 - support SWFDP and MHEWS with forecasts of regional scales features driving severe or high impact **meso to local scale** weather or climate
 - organize on the job training and workshops
 - Organize joint forecasts discussions involving WMCs-ACMAD-pilot NMHSs with emphasis on potential emergency situations
 - Target users: NMHSs, RSMCs, RCCs, DRM Agencies, Humanitarian institutions, AUC and RECs**
- Institutions with expertise on risk identification and assessments, warning, communication, preparation and response are the ecosystem of institutions and actors needed for effective resilience***



Questions to DRM - recommendations and conclusions
✓ Based of **forecasts, advisories, watches and warnings** did authorities issued evacuation orders? If not why?

✓ Does the **national/regional contingency plans for floods** include prevention and preparation as well as early response measures? If yes, how did this worked?

✓

✓ Are the orders mandatory or can be ignored? If not why? Are they left to local official with little DRM experience?

✓ Is there **reluctance** to issue orders ? Are they issued in odd hours?

✓ With climate change, policies, strategies, rules and regulations crafted with old historical experience and empirism no longer apply.

✓ For better or for worse, Africa should innovate in the DRR field because we are the most vulnerable in the world.

✓ ACMAD, UNECA, WB, UNDRR, UNOCHA, IFRC, ARC, and AUC **effectively establish and operate the Continental Early Warning System**, a similar governance set up with RECs and Countries is highly recommended and urgent



The Challenging question is: **how does the Climate community more effectively let the public/User/DRM Managers know what we know, and how it may impact them?**

Trust better forecasts and heed warnings