DEKADAL TECHNICAL NOTE FOR THIRD DEKAD OF NOVEMBER, 2021
AND PRECIPITATION FORECAST FOR WEEK 1 AND 2

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Edited by: Hubert KABENGELA, Pierre KAMSU

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   - Precipitation Onset (Observed and Projected)
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   - IRI SubX precip forecast
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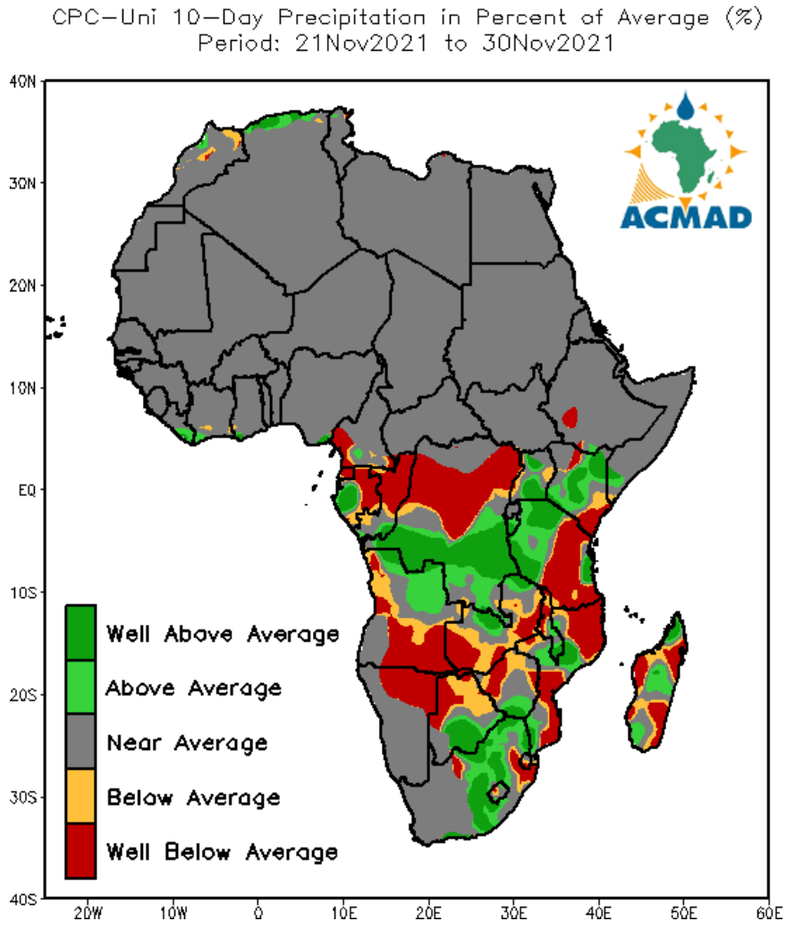
   - Two weeks precip forecast

1. Monitoring Climate Element

Estimated Cumulative Precipitation in % of average for the Third Dekad of November 2021

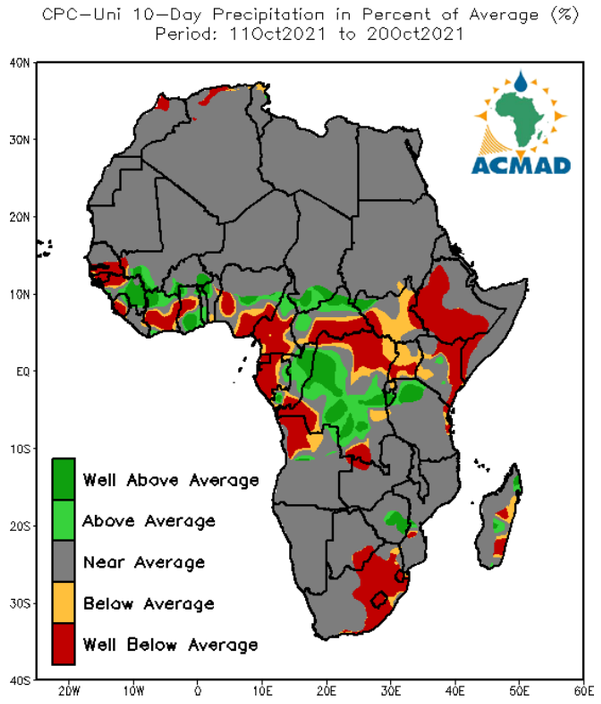


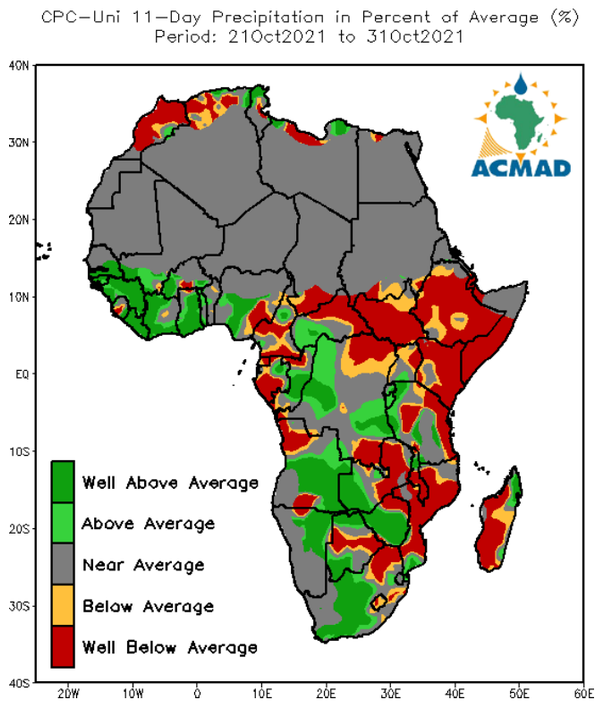
The rains retreated completely from northern and western Africa except over few areas such as the northern edges of North Africa, south west of Ivory Coast and south east of Liberia. The season was effectively implemented further south of the Equator, with above-average precipitation recorded over parts of central, eastern and southern Africa. Below-average rainfall was observed over large portions of the DRC, Congo, Gabon, Angola, Namibia, Tanzania, Mozambique, Zambia, South Africa and Madagascar.

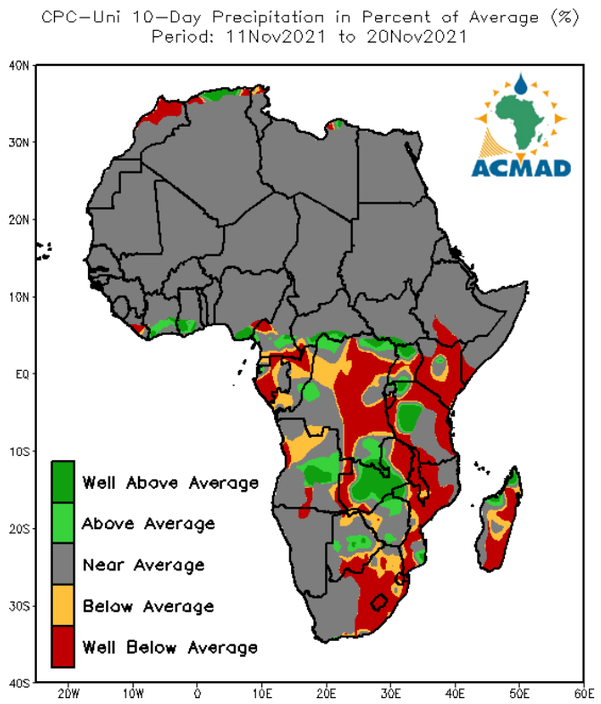
Figure 1: **This map displays decadal average precipitation in percent of average**

Data : SOURCES/.NOAA/.NCEP/.CPC/.FEWS/.Africa/.DAILY/.ARC2/.daily/.est_prcp/X/-20/0.5/70/GRID/Y/-40/0.5/40/GRID/T/%2821-31%20Jul%202014%20%29RANGE/T/SUM/

Temporal and Spatial Change of % of Average Precip for the Last Four Dekads







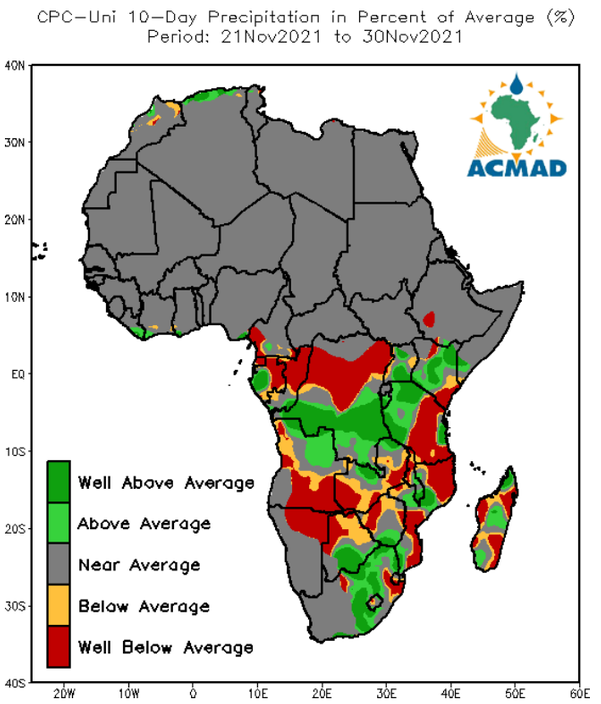
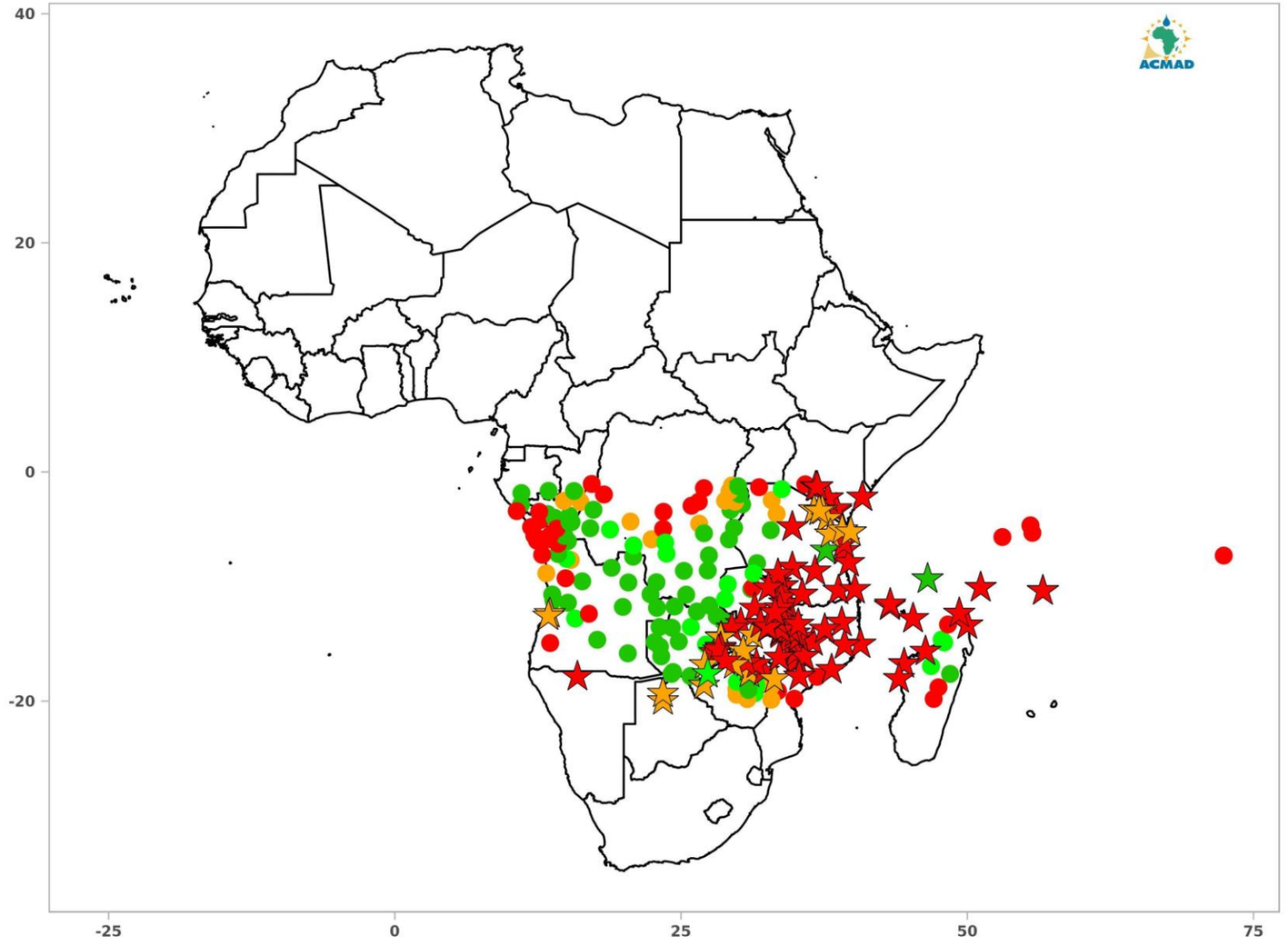


Figure 2: **This maps display decadal average precipitation in percent of average**

MONITORING OF OBSERVED ANOMALIES ON THE START OF THE AGRICULTURE SEASON AND OUTLOOK.
MONITORING PERIOD: JULY-DECEMBER 2021.
CURRENT MONITORING WEEK: LAST WEEK OF NOVEMBER.
OUTLOOK VALIDITY PERIOD: NOVEMBER 24 TO DECEMBER 07 2021.
DATE OF ISSUE: NOVEMBER 28-2021.



Forecast start of the agriculture season departure from average.

- **LATE**
- **NEAR AVERAGE TO LATE**
- **NEAR AVERAGE TO EARLY**
- **EARLY**

Observed start of the agriculture season departure from average.

- **LATE**
- **NEAR AVERAGE TO LATE**
- **NEAR AVERAGE TO EARLY**
- **EARLY**

PAST 3 DEKADS OLR ANOMALIES

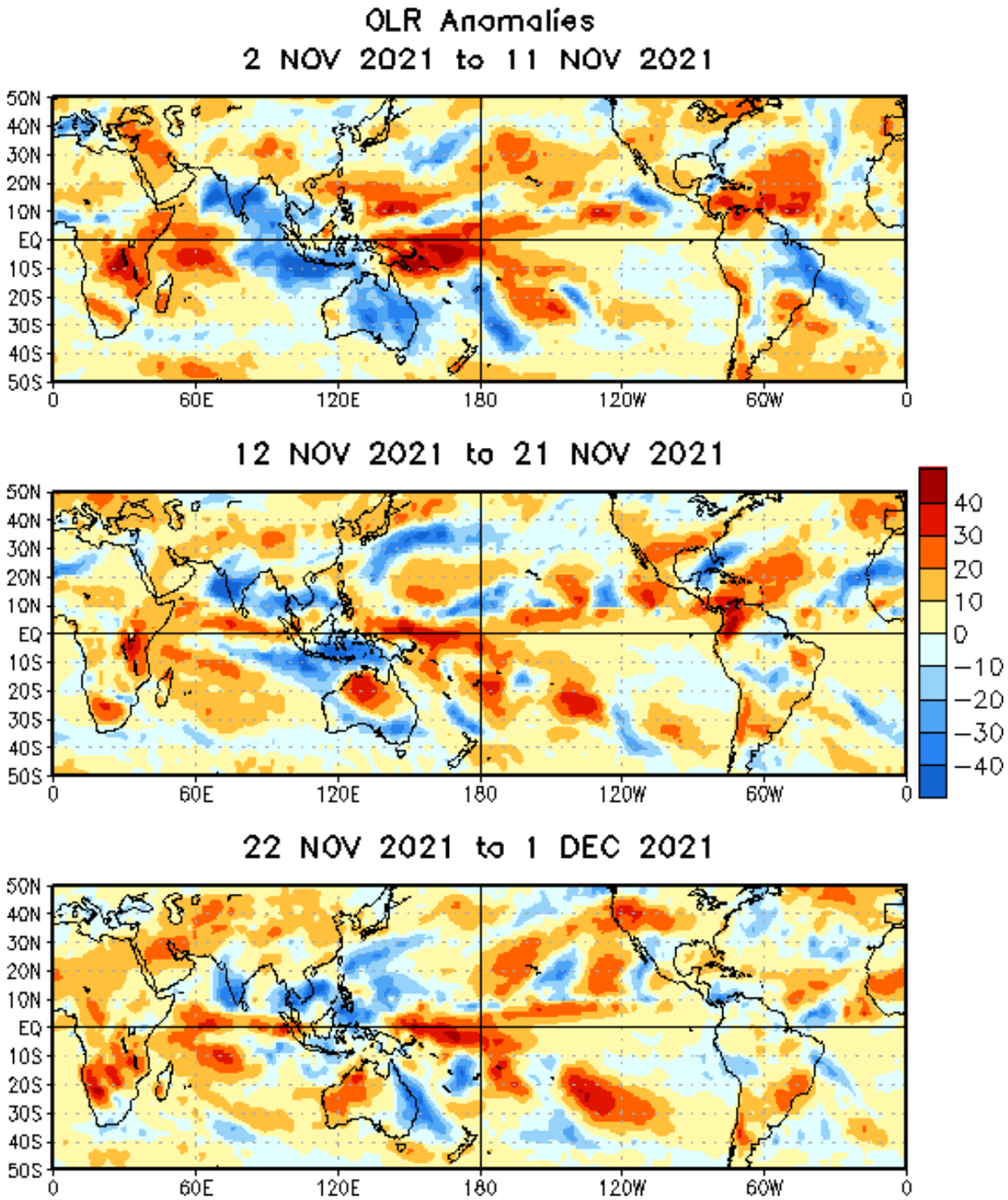


Figure 4: **Past 3 weeks OLR anomalies**

https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/olra_last30days-3plots.gif

Mean Sea Level Pressure (MSLP) Anomalies for the 3rd Dekad of Nov. 2021

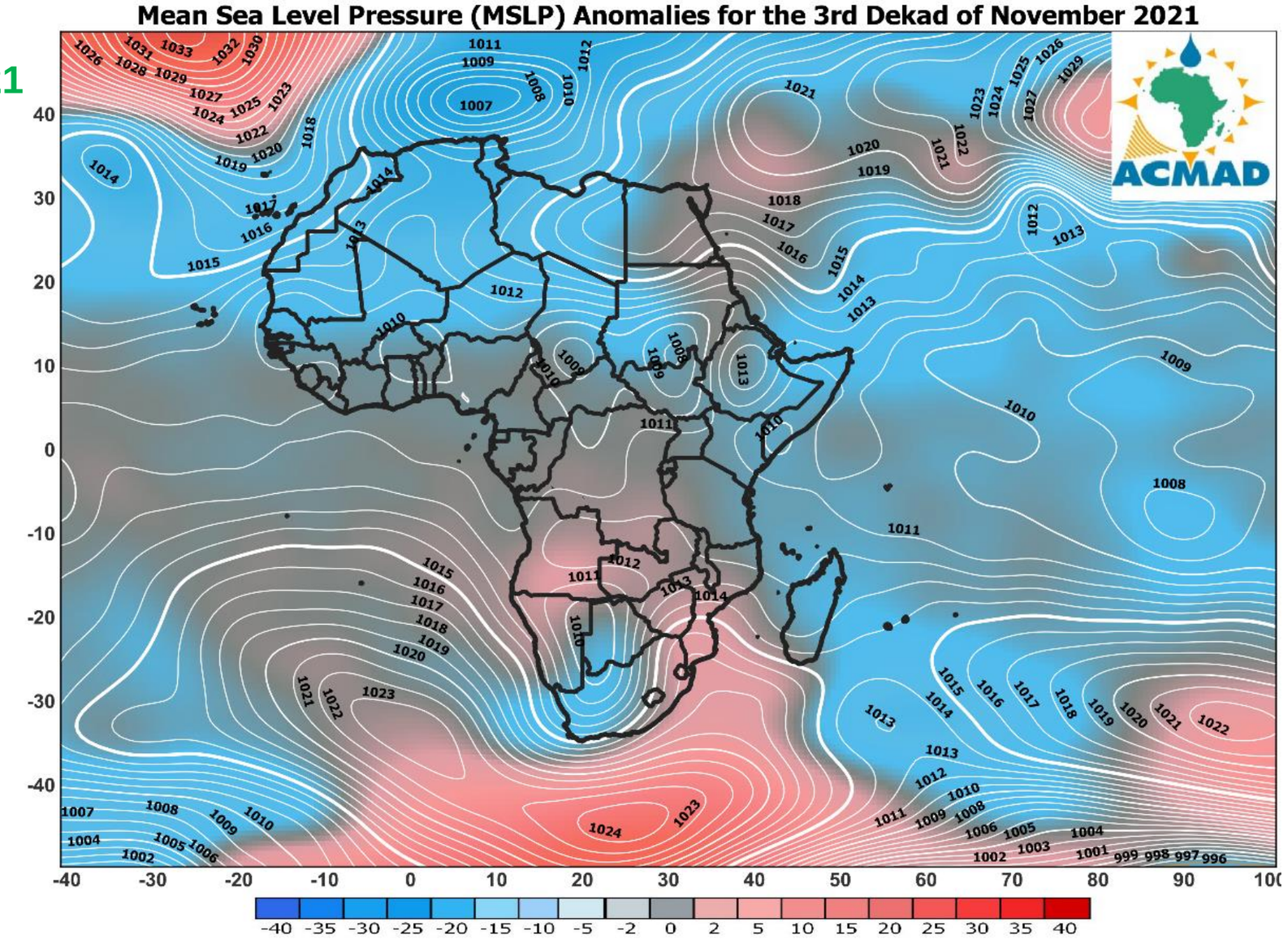


Figure 5: **MSLP observation versus anomaly**

Data source:
http://iridl.ldeo.columbia.edu/expert/SOURCES/.NOAA/.NCEP-NCAR/.CDAS-1/.DAILY/.Intrinsic/.MSL/.pressure

Wind Anomalies for the 3rd Dekad of Nov. 2021 @ 850hpa, 700hpa and 200hPa

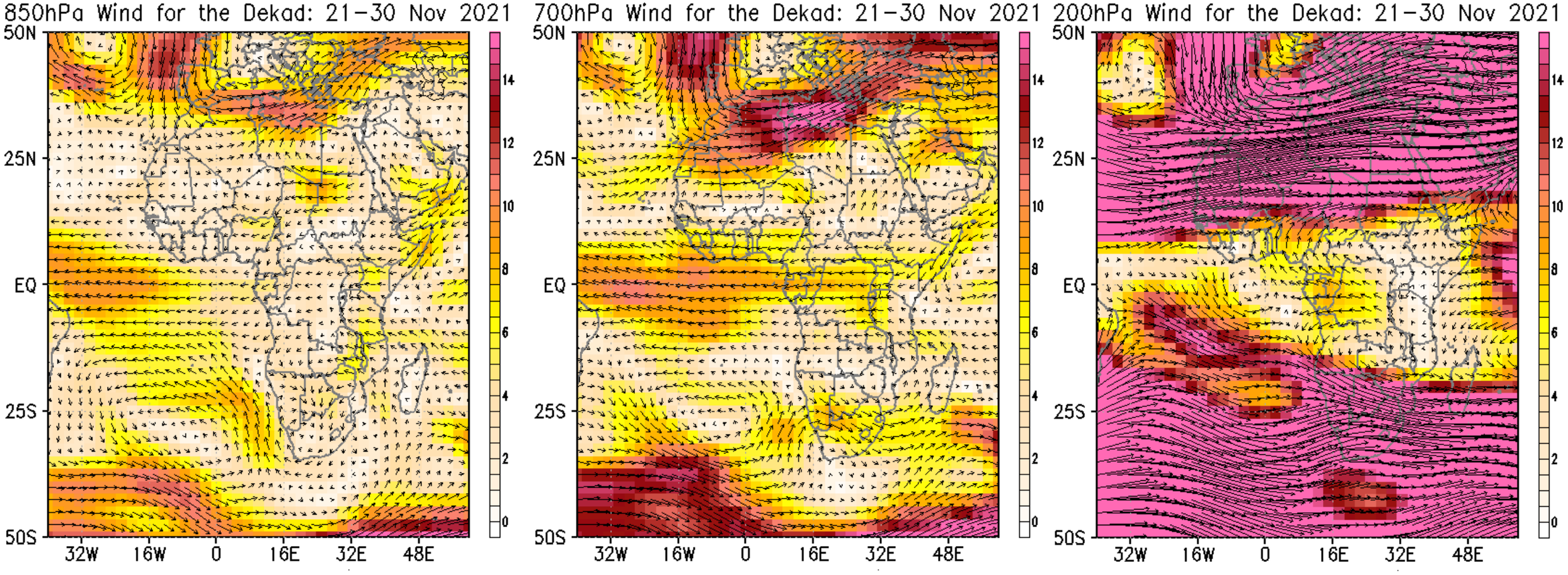


Figure 6: **Wind anomalies for 850hpa and 700hPa**

9def/long_name/%28Vitesse%29def/windspeed_colors/DATA/0/15/RANGE/u/v/X/Y/fig:/colors/vectors/grey/countries_gaz/:fig//plotaxislength/432/psdef//plotborder/72/psdef//XOVY/null/psdef/

Wind Anomalies for the last 7 day period 850hpa, 700hpa and 200hpa

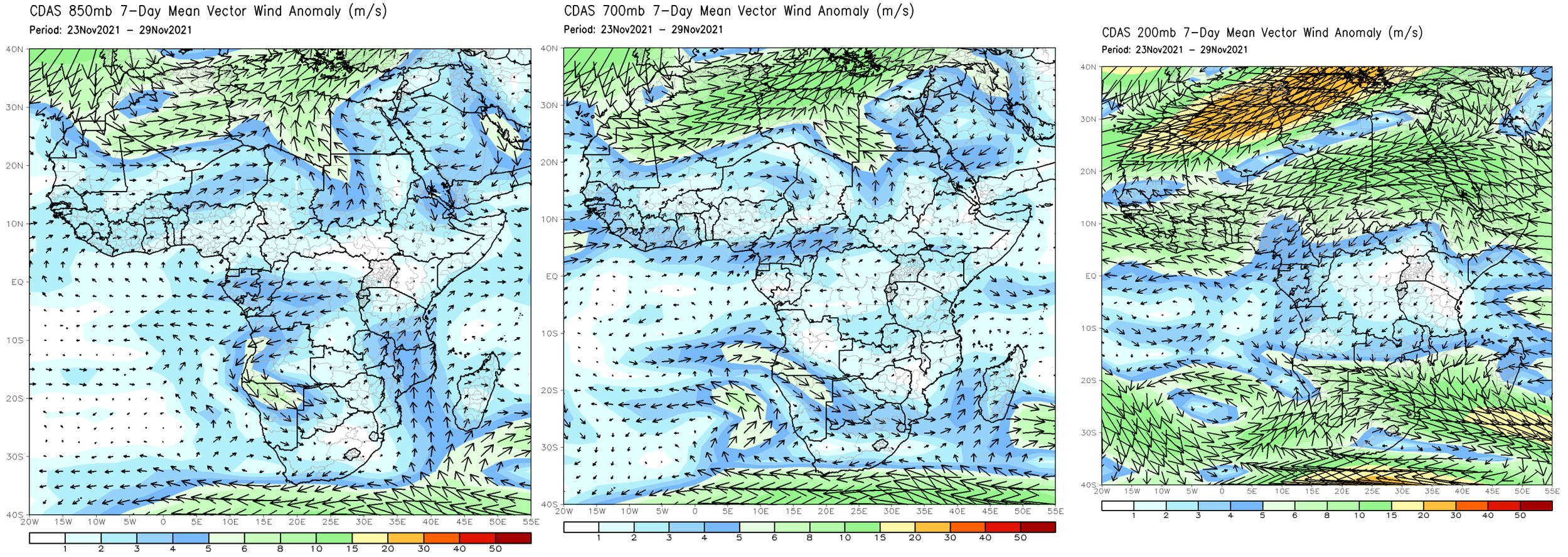
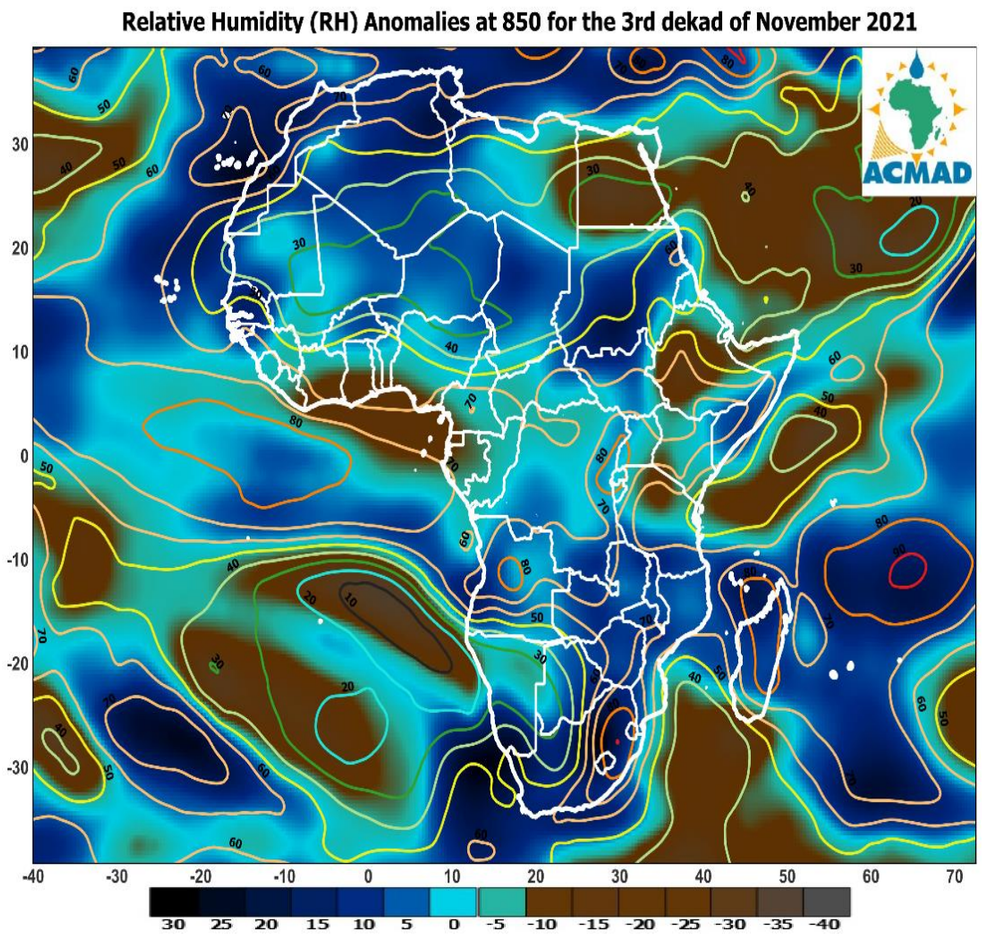


Figure 7: **Wind anomalies for 850hpa, 700hPa and 200hpa**

https://www.cpc.ncep.noaa.gov/products/international/africa/africa.shtml

[Climate Prediction Center - African Desk: SWFDP GFS FORECASTS (noaa.gov)]

Relative Humidity (RH) Anomalies at 850hpa and 700hpa for the 3rd Dekad of Nov 2021



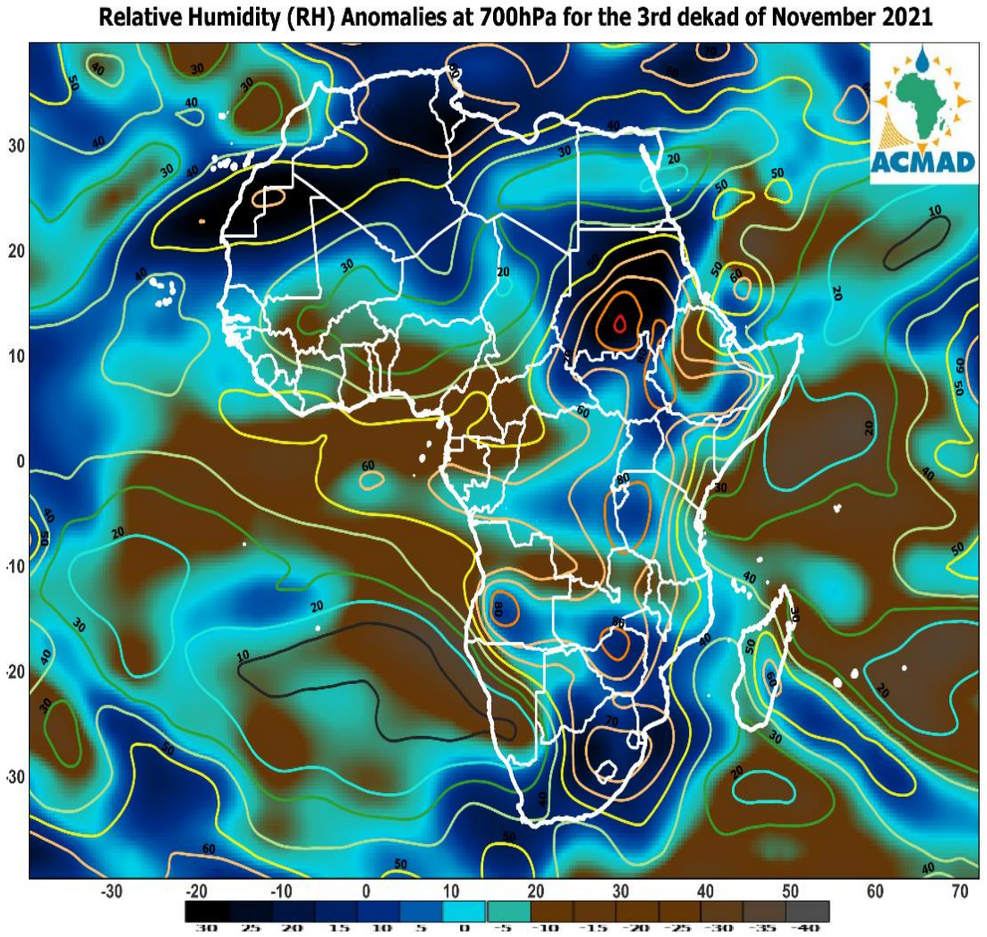
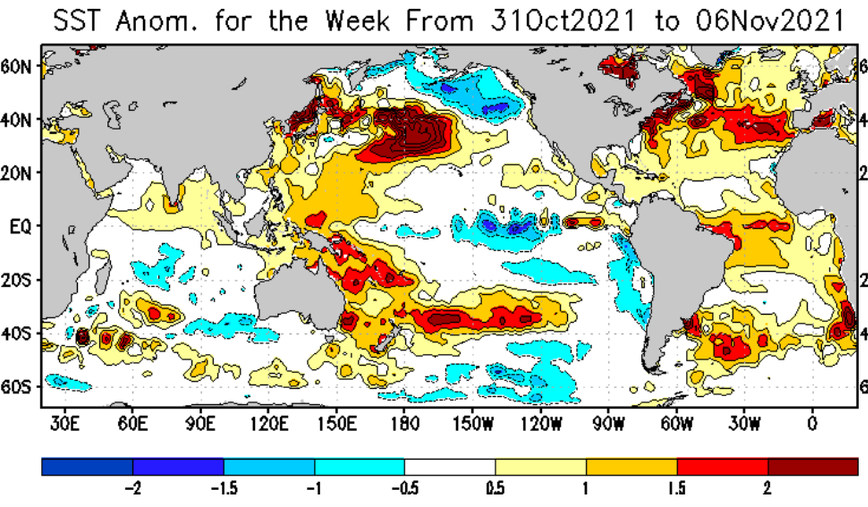


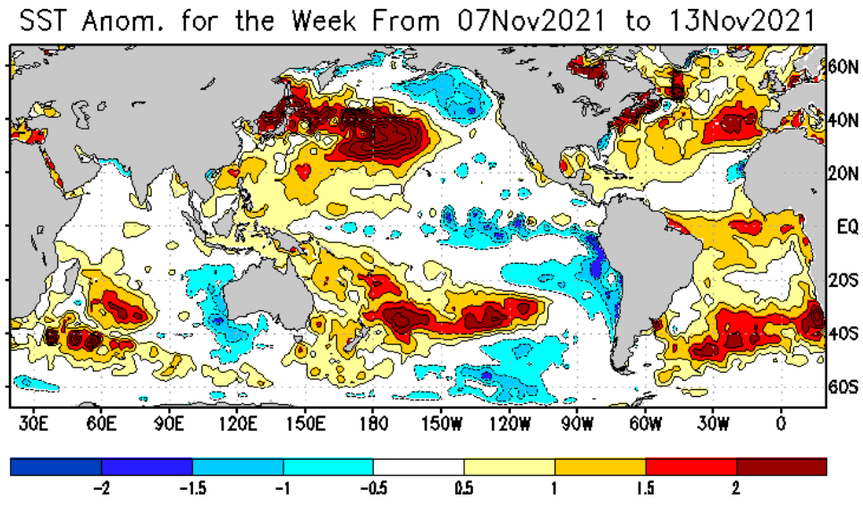
Figure 8: **Relative Humidity Anomaly at 850hPa (left) and 700hPa (right)**

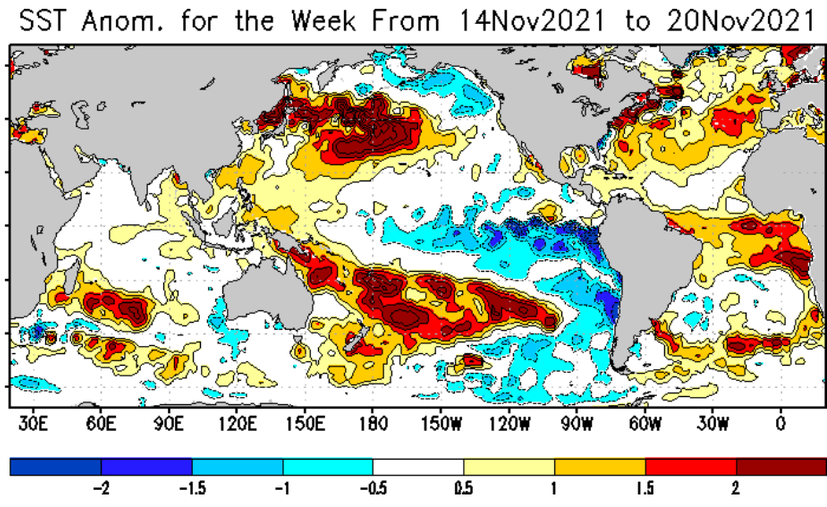
http://iridl.ldeo.columbia.edu/expert/SOURCES/.NOAA/.NCEP-NCAR/.CDAS-1/.DAILY/.Intrinsic/.PressureLevel/.rhum

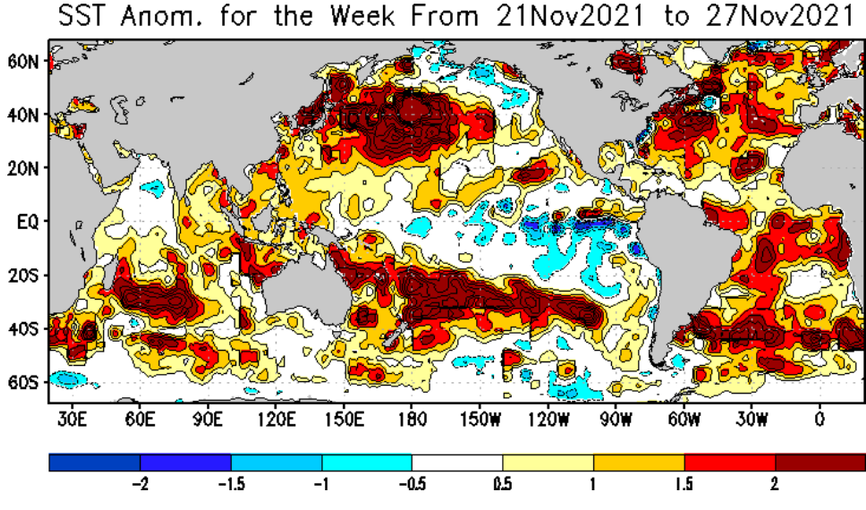
1. Monitoring Climate Element
2. Global Driver Review and Assessment
    a. SST
    b. MJO and other Equatorial Waves

Weekly Sea Surface Temperature Anomaly









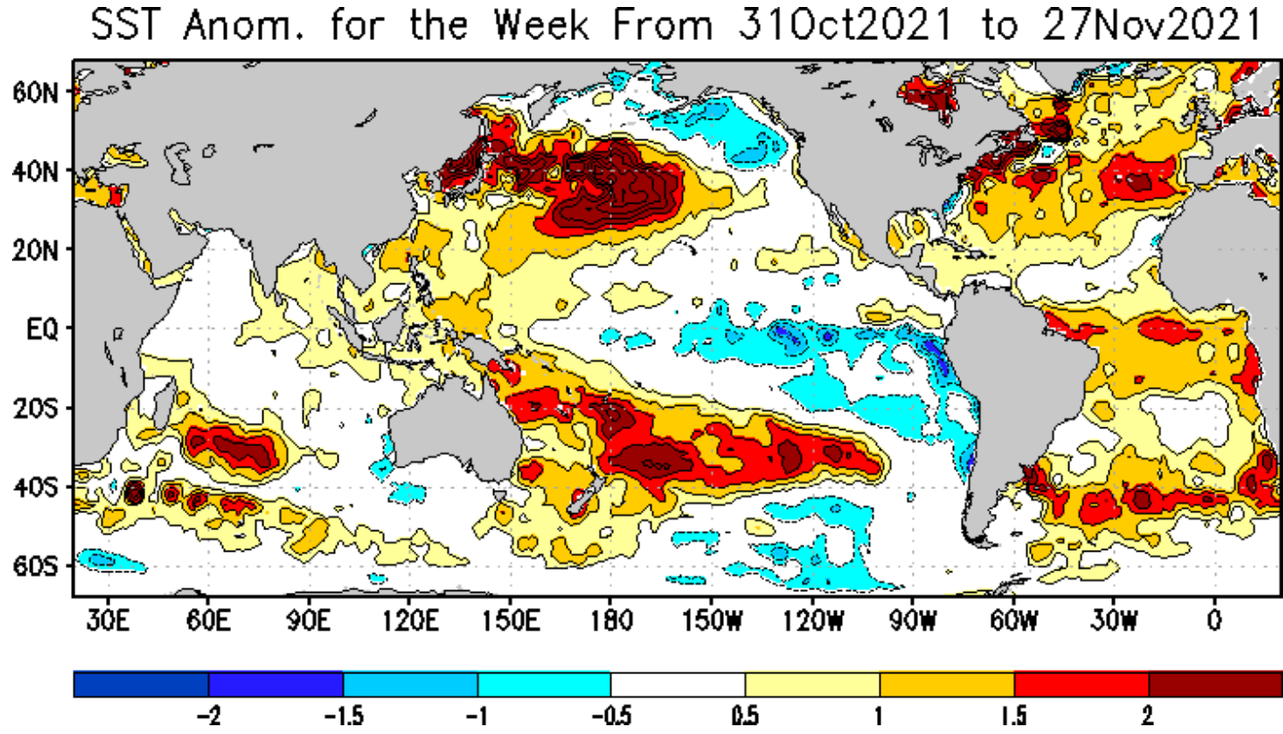
These maps display weekly sea surface temperature anomalies over the globe, and they depict mostly normal to cooling conditions over the equatorial Pacific with warming observed over northern Atlantic, Gulf of Guinea while neutral to cooling ssts are observed over the south-western Indian ocean.

Figure 9: Maps display weekly sea surface temperature anomalies over the globe for last four weeks

https://psl.noaa.gov/map/clim/sst.shtml

http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Weekly_Anomaly.html?

Last Month's Sea SurfaceTemperatures (SST) Observed



During20th of Sep to 23rd Oct 2021, the cooling persisted over eastern Equatorial Pacific, and the Western Indian Ocean, whereas the Gulf of Guinea in the South Atlantic, and western pacific continue in warming siyuation.

Figure 10 : Maps display monthly sea surface temperature anomalies over the globe.

https://psl.noaa.gov/map/clim/sst.shtml
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

SST OBS AND FCST FOR TWO WEEKS

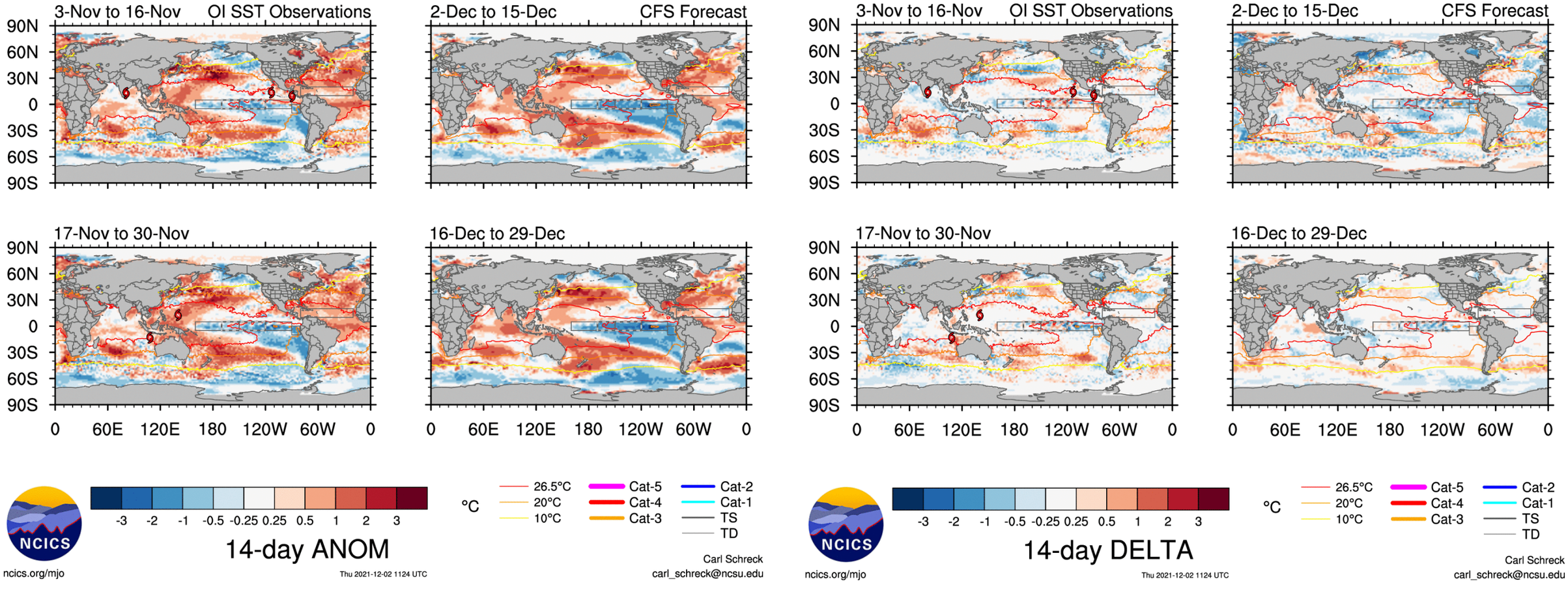


Figure 11: Sea Surface Temperature and FCST for two week

https://ncics.org/pub/mjo/v2/sst/global.anom.14.png
https://ncics.org/pub/mjo/v2/sst/global.delta.14.png;

3-Days Infra-Red (IR) 200hpa and Velocity Potential Anomaly

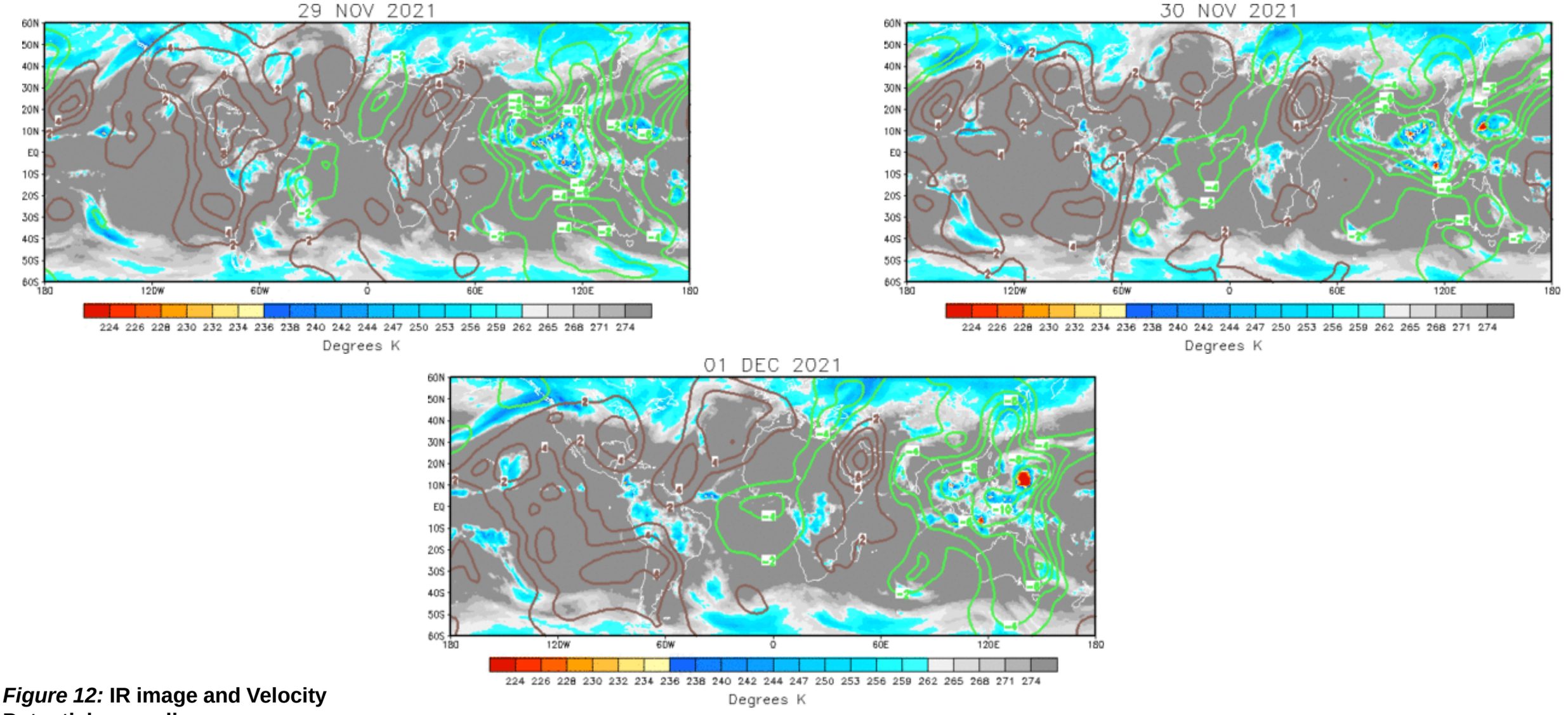
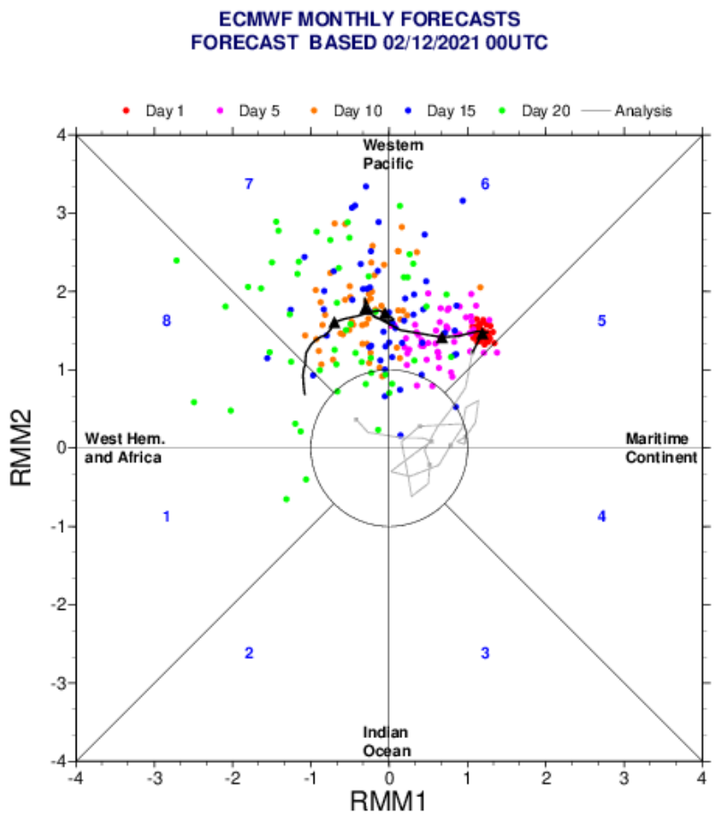
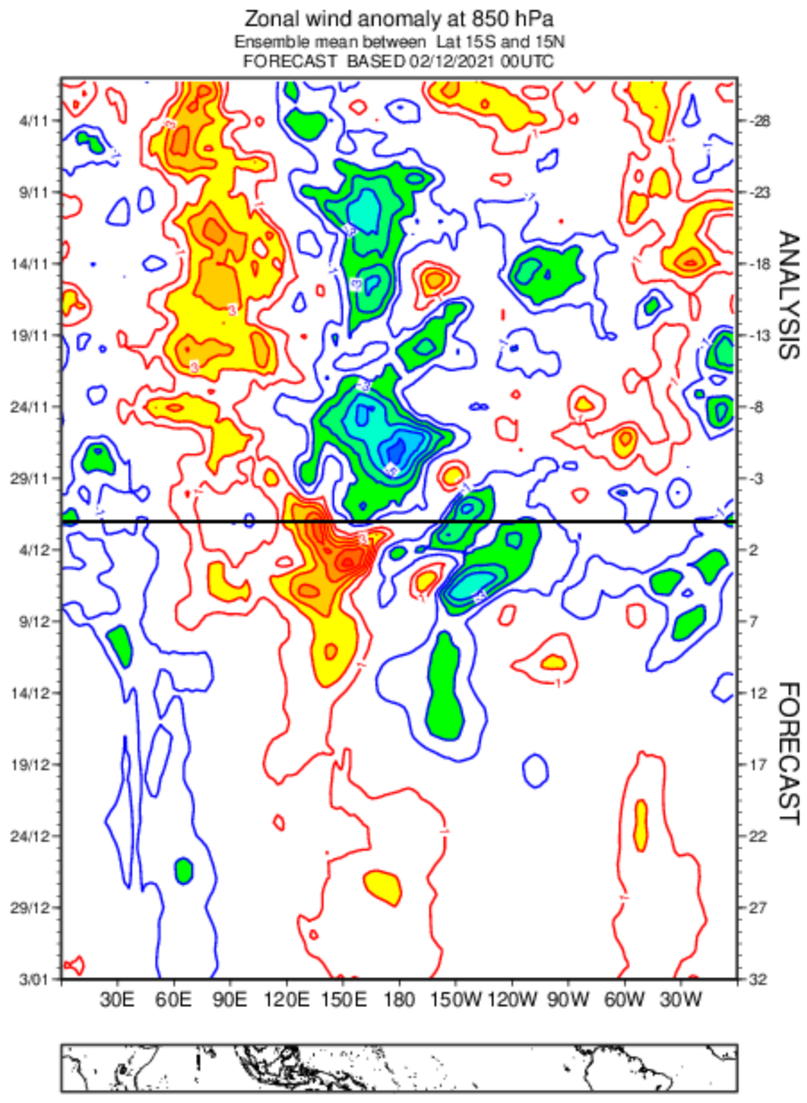


Figure 12: **IR image and Velocity Potential anomalies**

https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/mjo.shtml

ECMWF Madden-Julian-Oscillation (MJO) Forecast





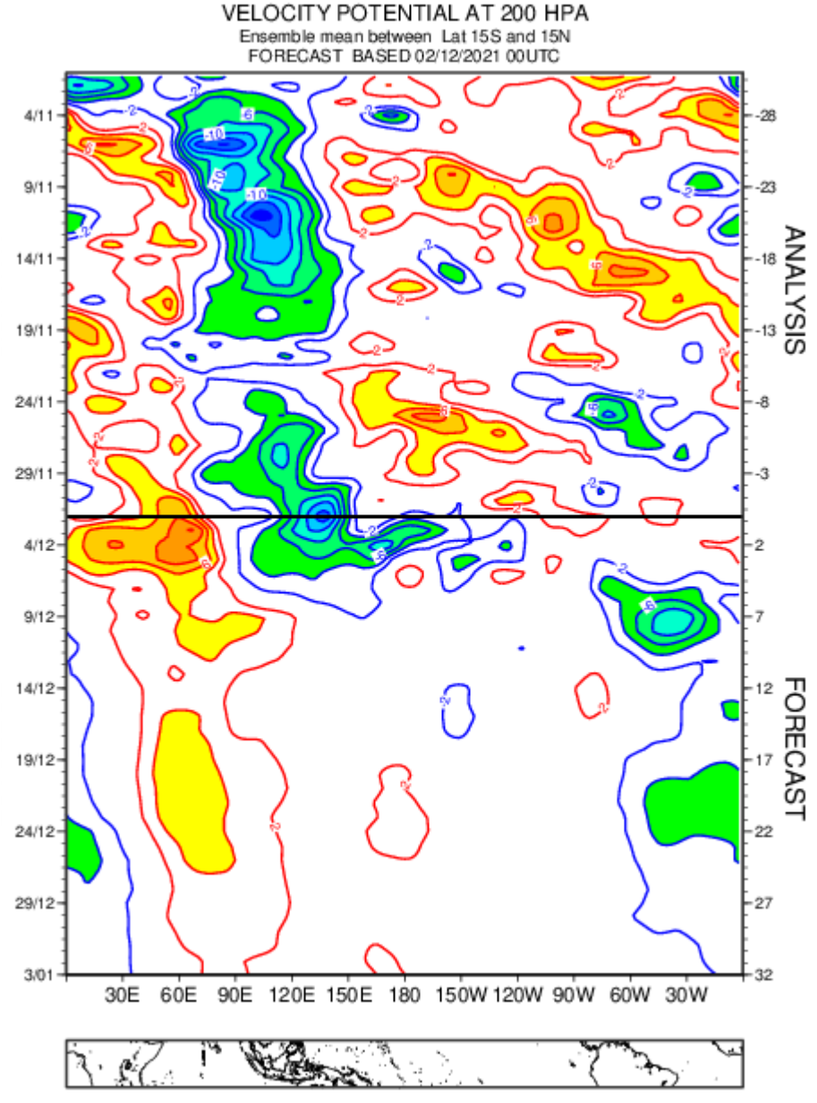
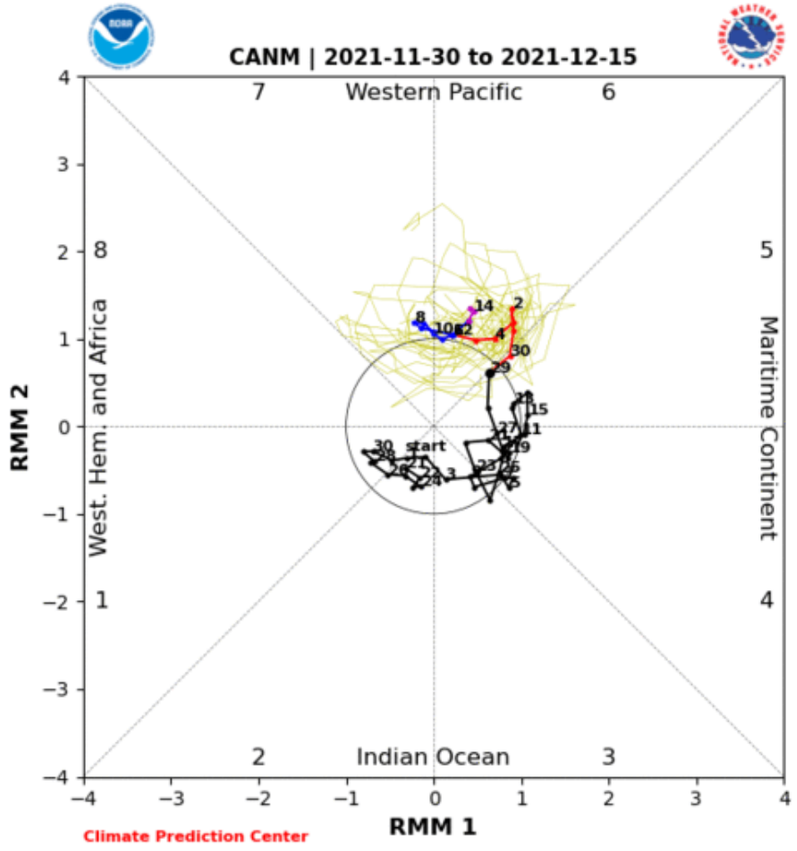
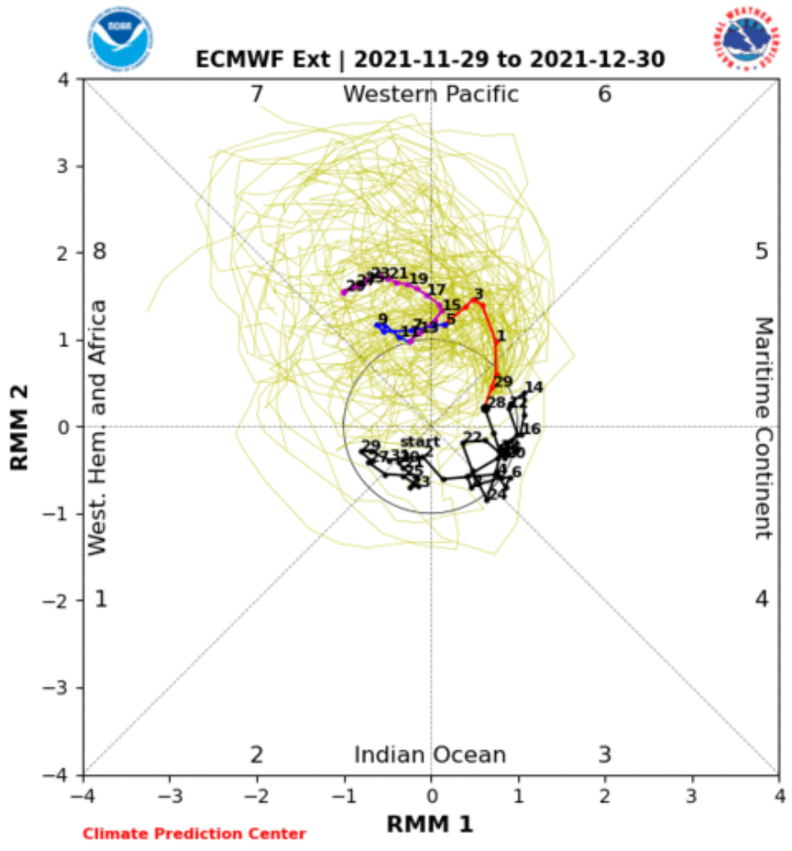


Figure 13: **ECMWF MJO Forecast**

https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_mjo_family_index?facets=undefined&time=2019080500,0,2019080500
https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_mjo_family_time_longitudes?facets=undefined&time=2019112500,0,2019112500

MJO monitoring and forecasts for ECMWF, NCEP and UK Met Office from MJO working group website





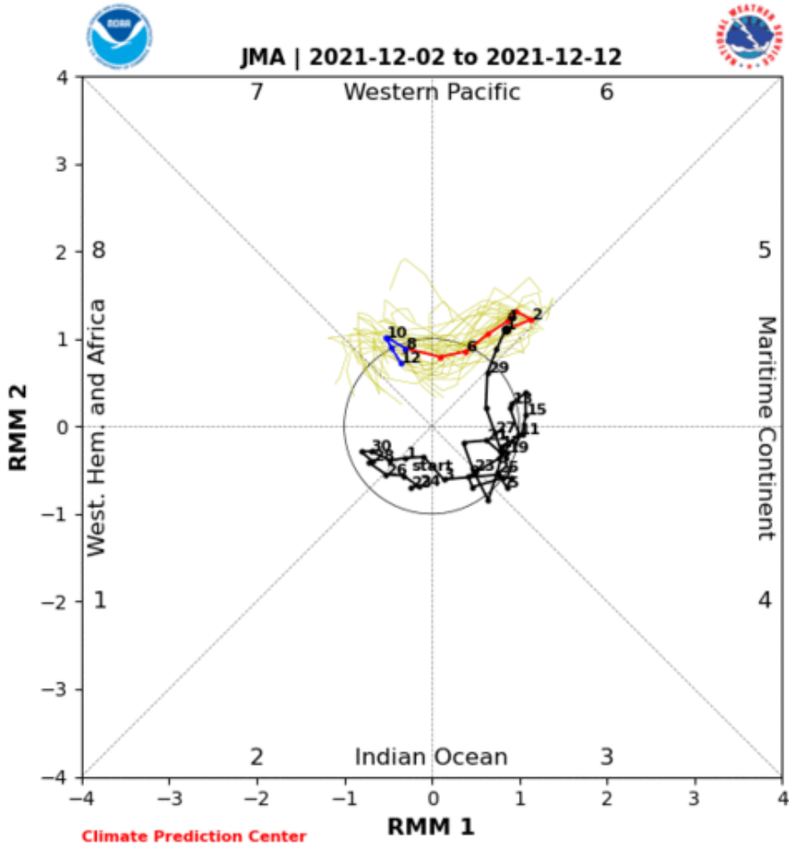


Figure 14: Forecasts for ECMWF, NCEP and UK Met Office

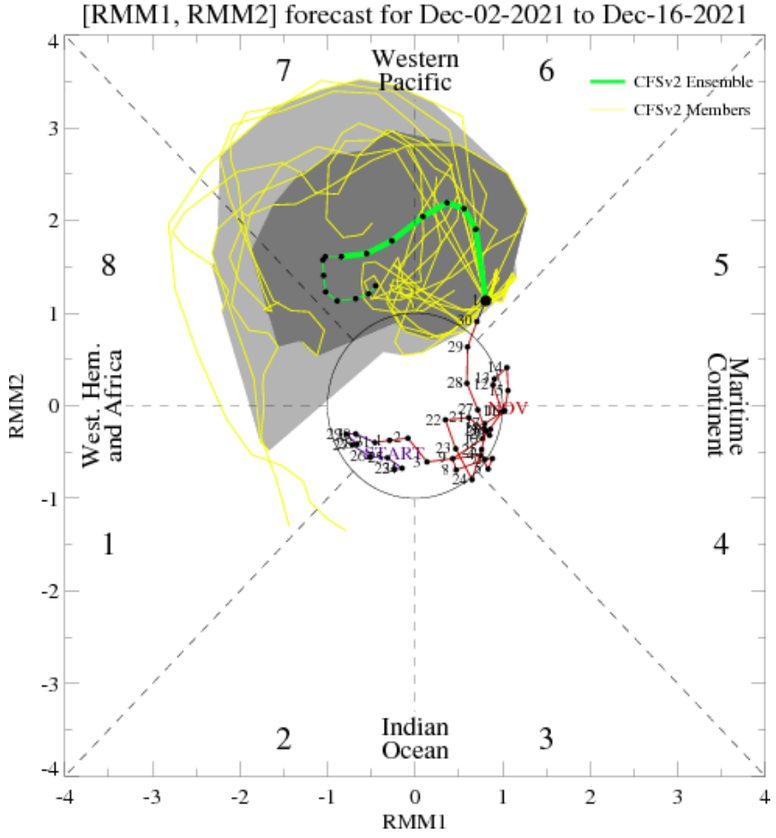
https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/emon.shtml

https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/jman.shtml

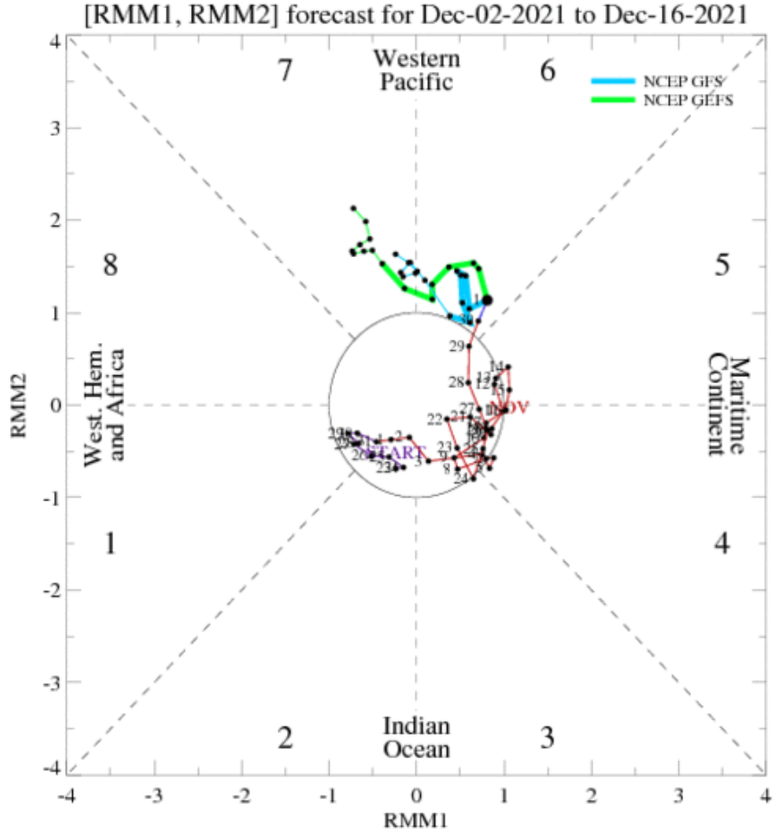
https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_mjo_family_index?facets=undefined&time=2019081500,0,2019081500

MJO FORECAST

Ensemble GFS Phase Diagram



Operational GFS Phase Diagram



Statistical GFS Phase Diagram

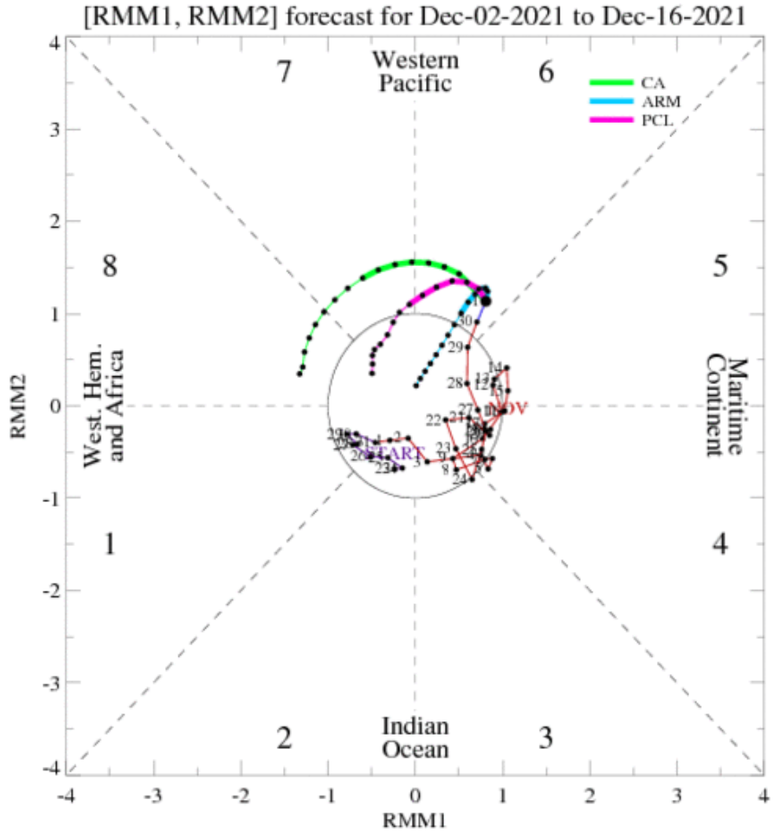


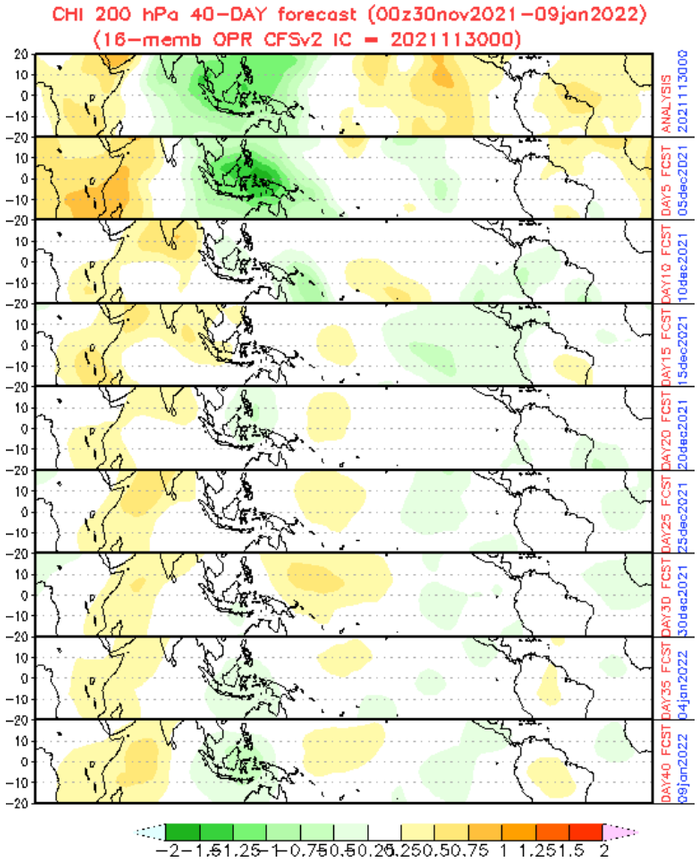
Figure 15: MJO forecast

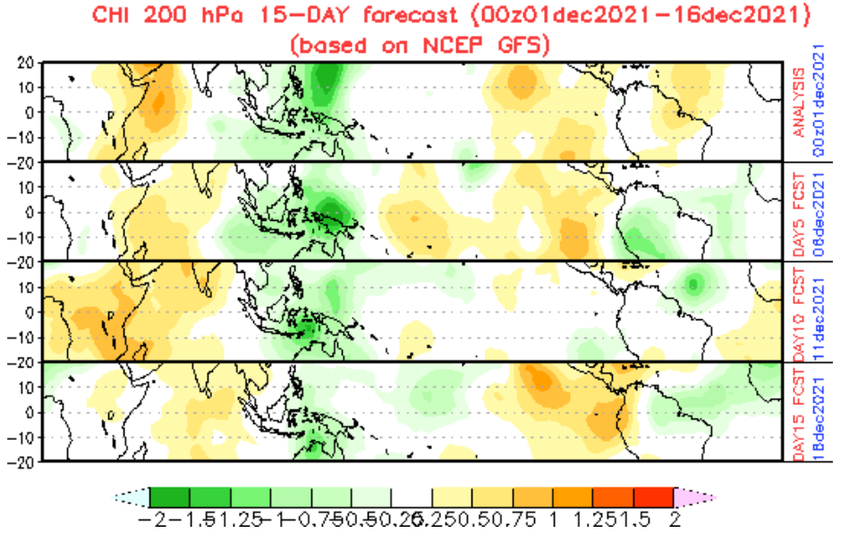
https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/foregfs.shtml

https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/foroper.shtml

https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/forca.shtml

The EWP, NCEP/GFS and CFSv2 models Predicting the MJO 40 day Forecast





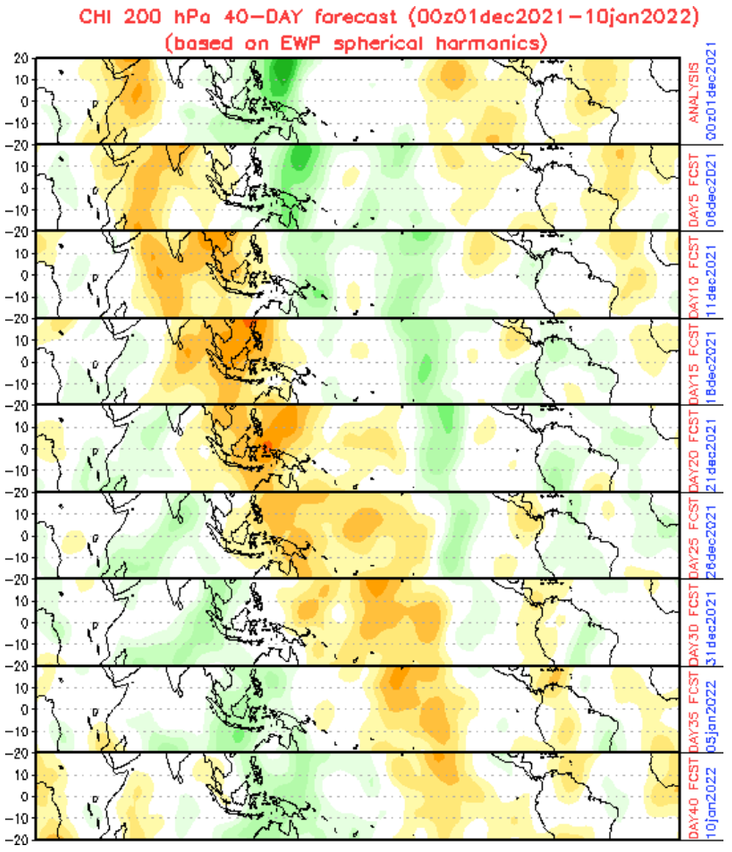


Figure 16: MJO forecast

https://www.cpc.ncep.noaa.gov/products/people/wd52qz/mjo/chi/ewp.gif

https://www.cpc.ncep.noaa.gov/products/people/wd52qz/mjo/chi/gfs.gif

https://www.cpc.ncep.noaa.gov/products/people/wd52qz/mjo/chi/cfs.gif

Past 4 Weeks Precipitable Water and Outlooks for Africa and Globally

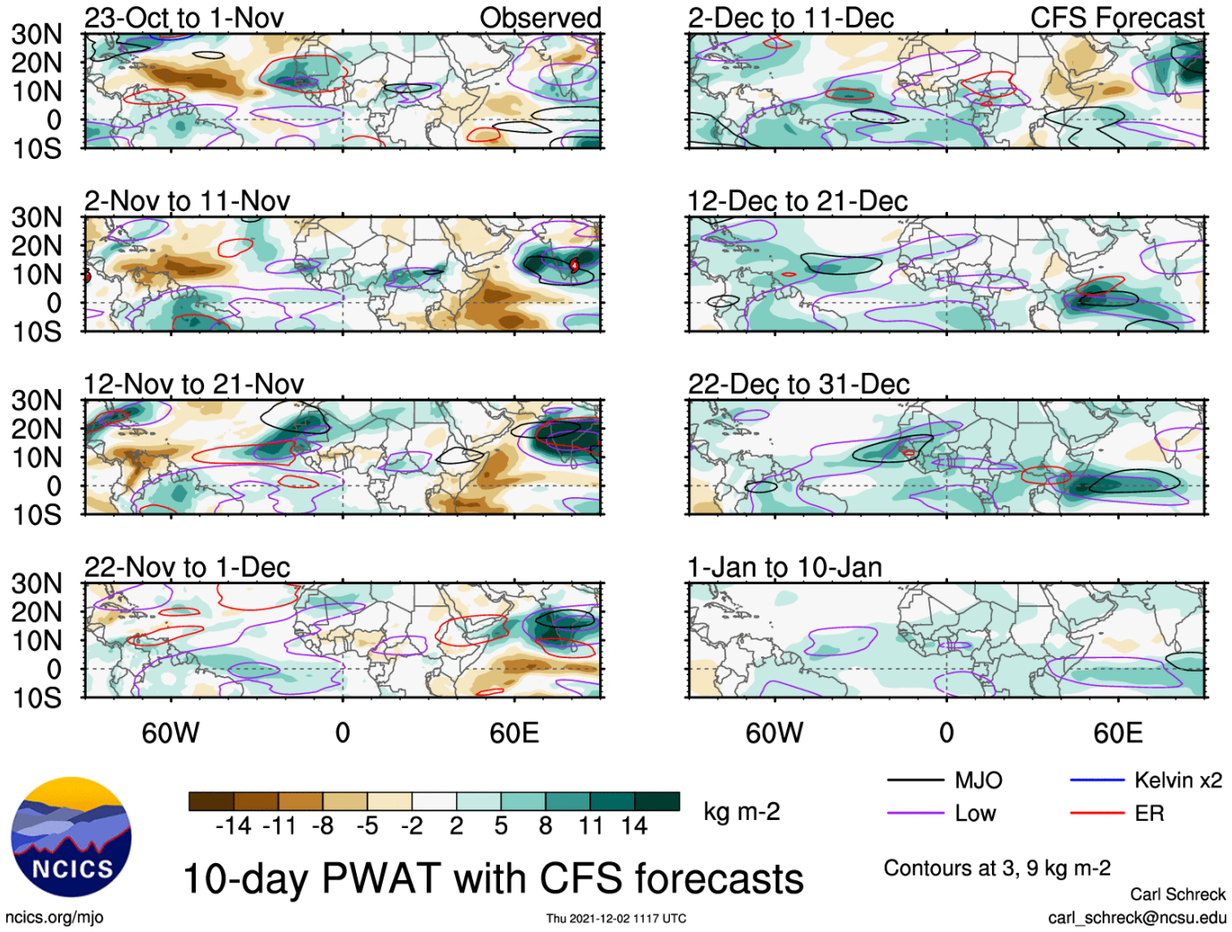


Figure 7a: Africa

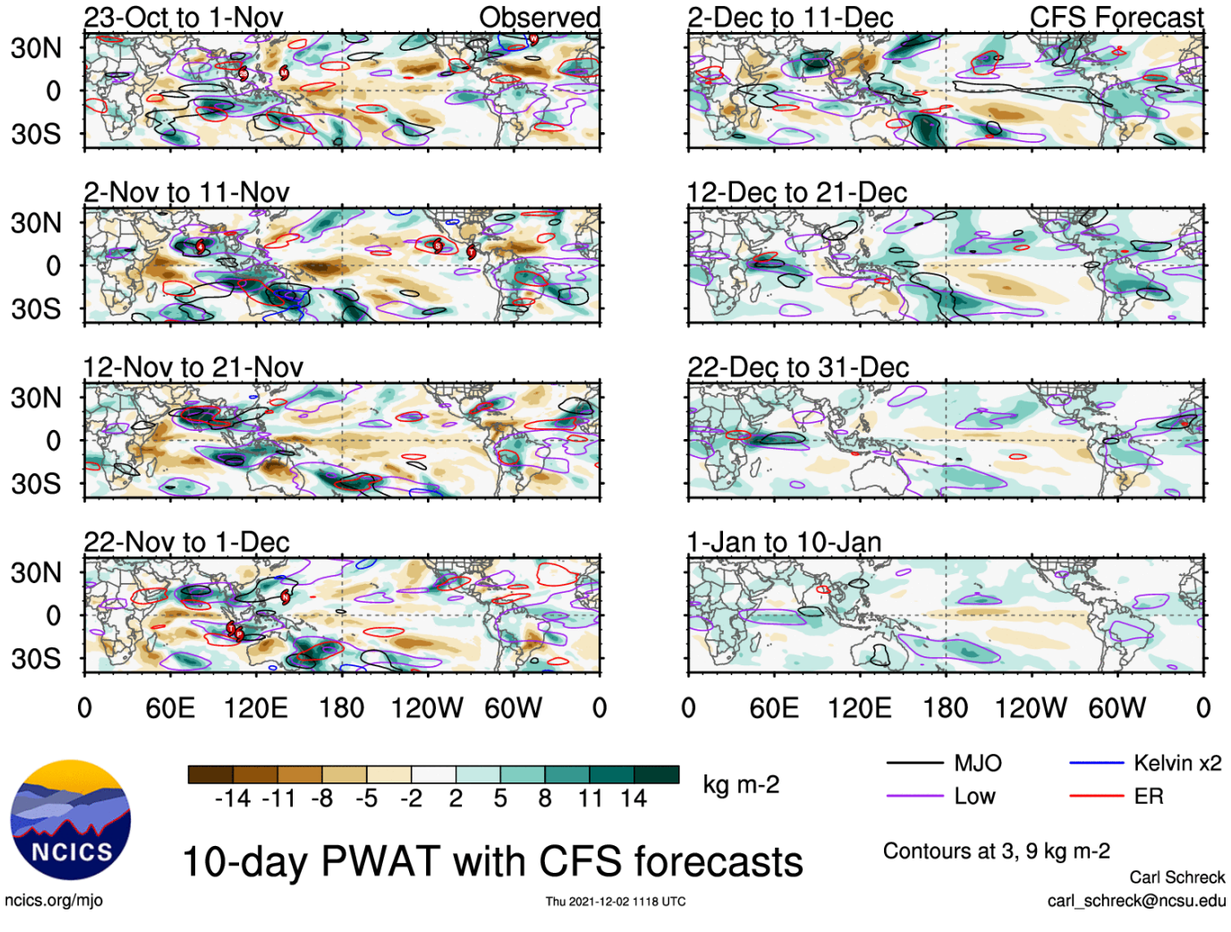


Figure 7b: Global

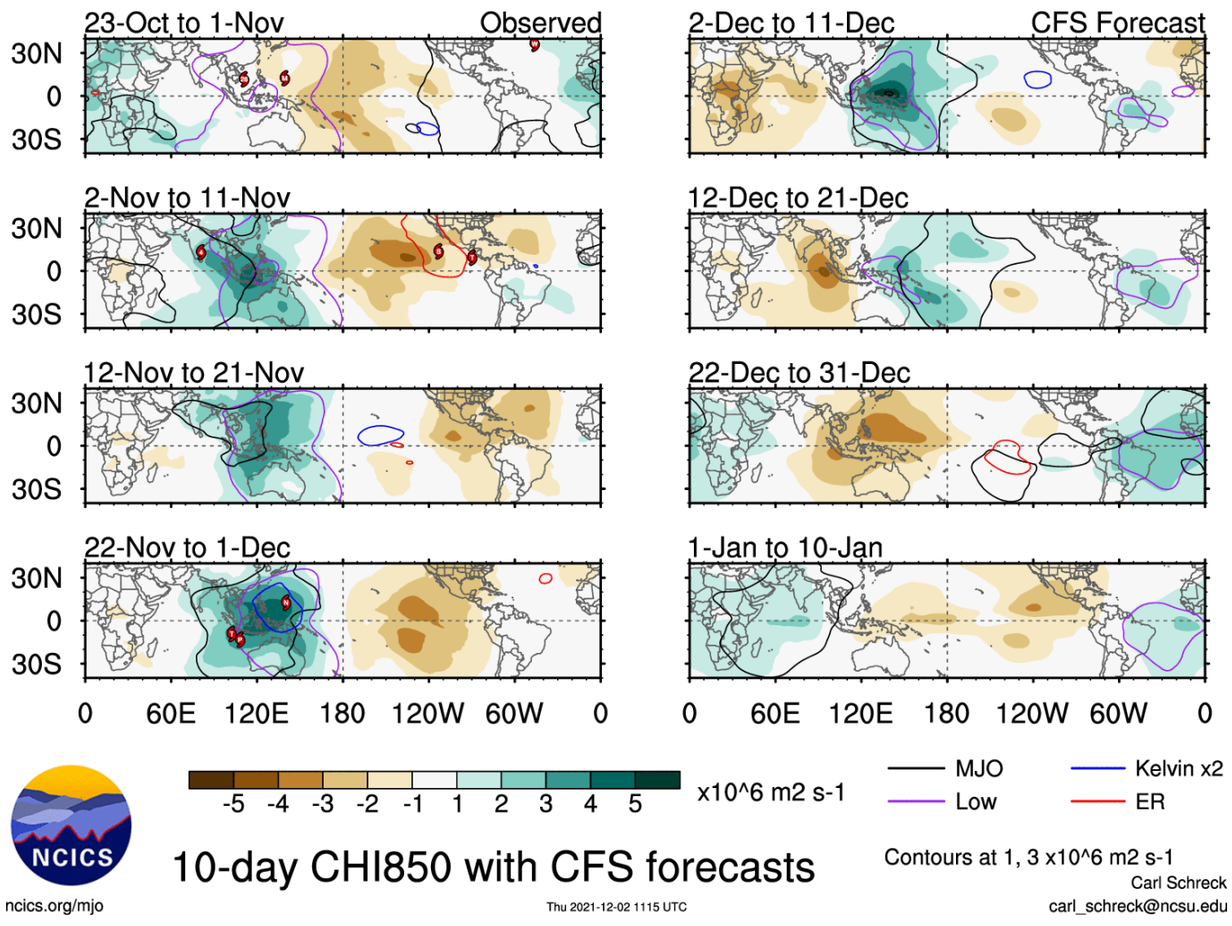
https://ncics.org/portfolio/monitor/mjo/

Figure 17: Past four week Precipitable Water and Outlooks

https://ncics.org/pub/mjo/v2/map/pwat.cfs.all.Africa.10.png

https://ncics.org/pub/mjo/v2/map/pwat.cfs.all.global.10.png

Past Four Weeks Velocity Potential with MJO, Kelvin and Rossby Wave overlaid on Global Maps at 850mb and 200mb



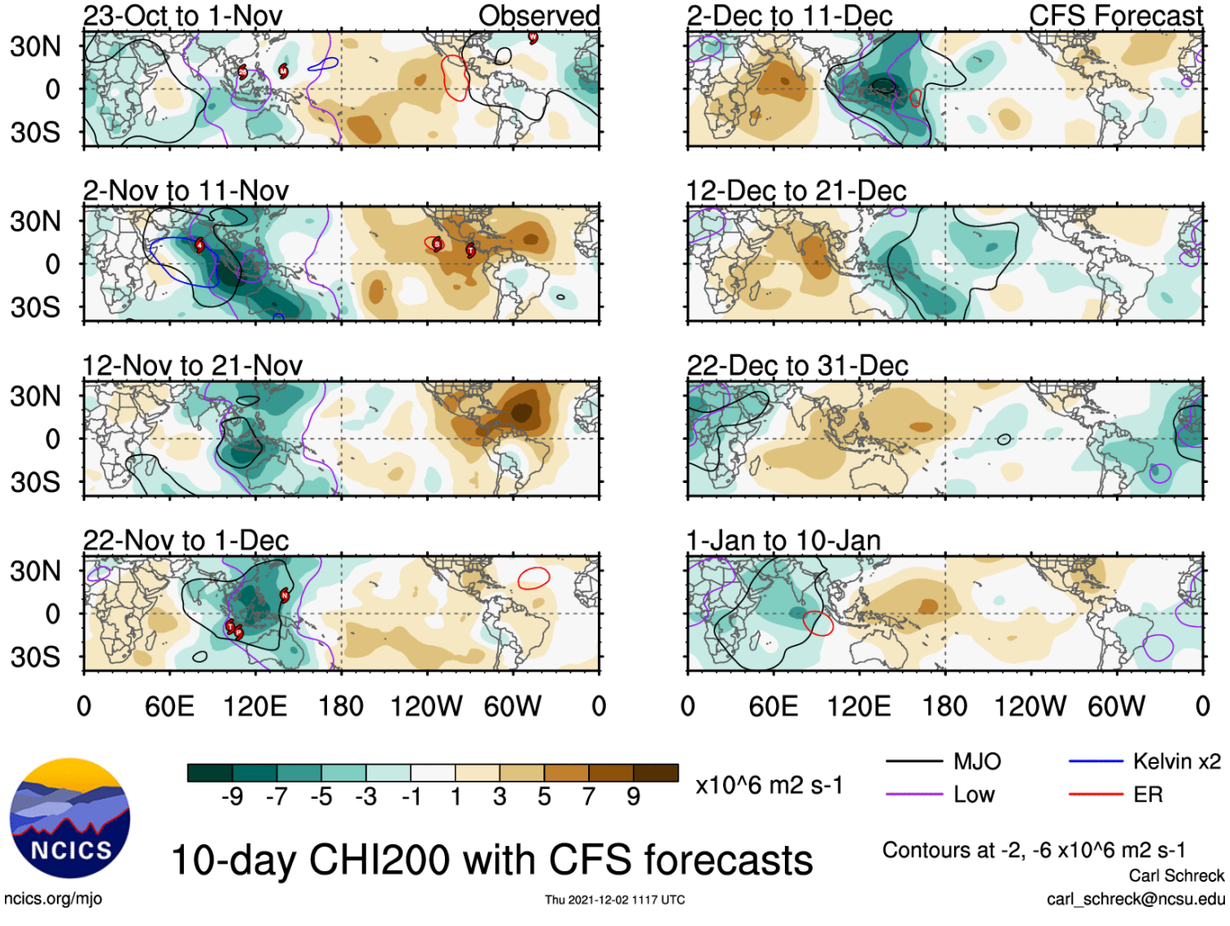
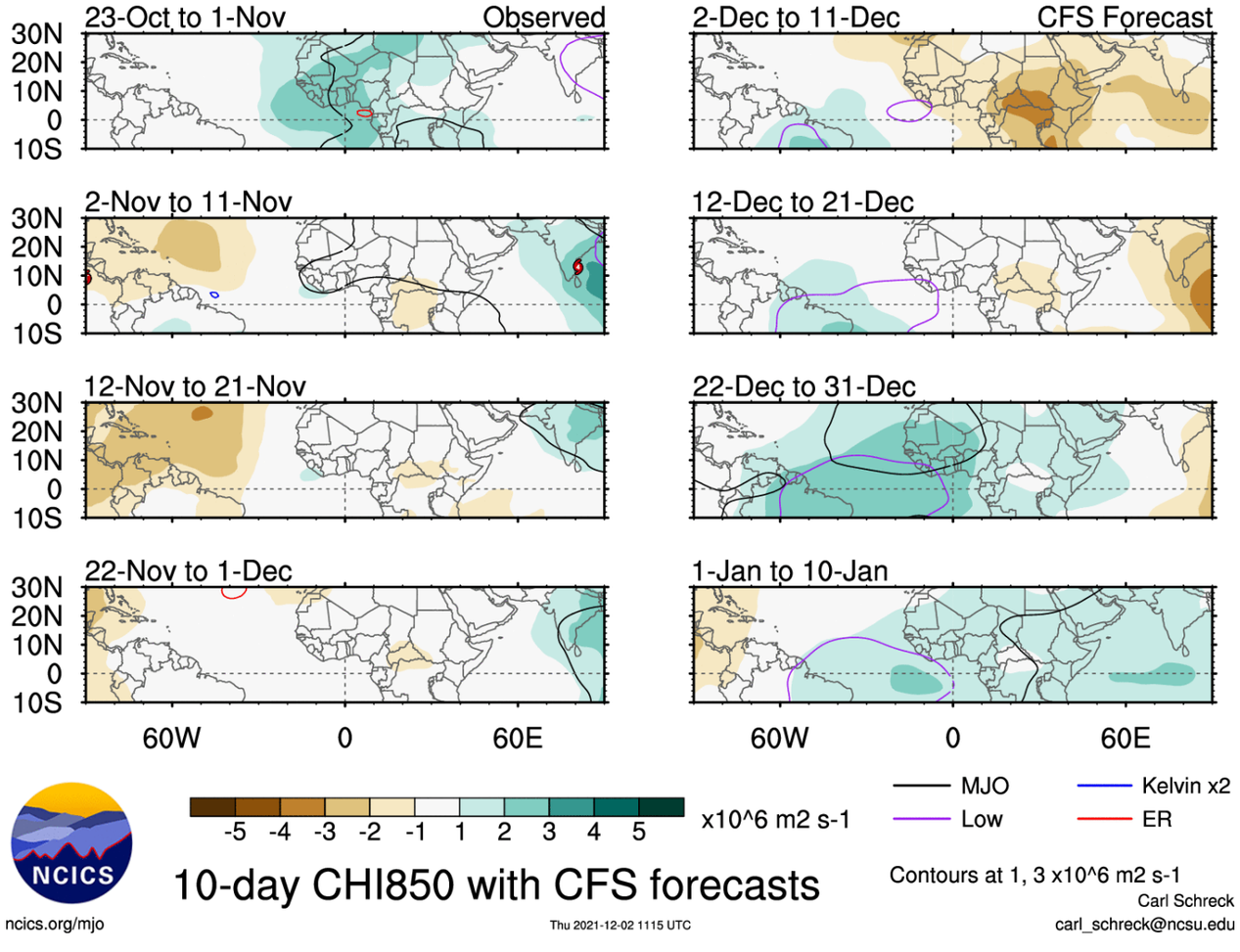


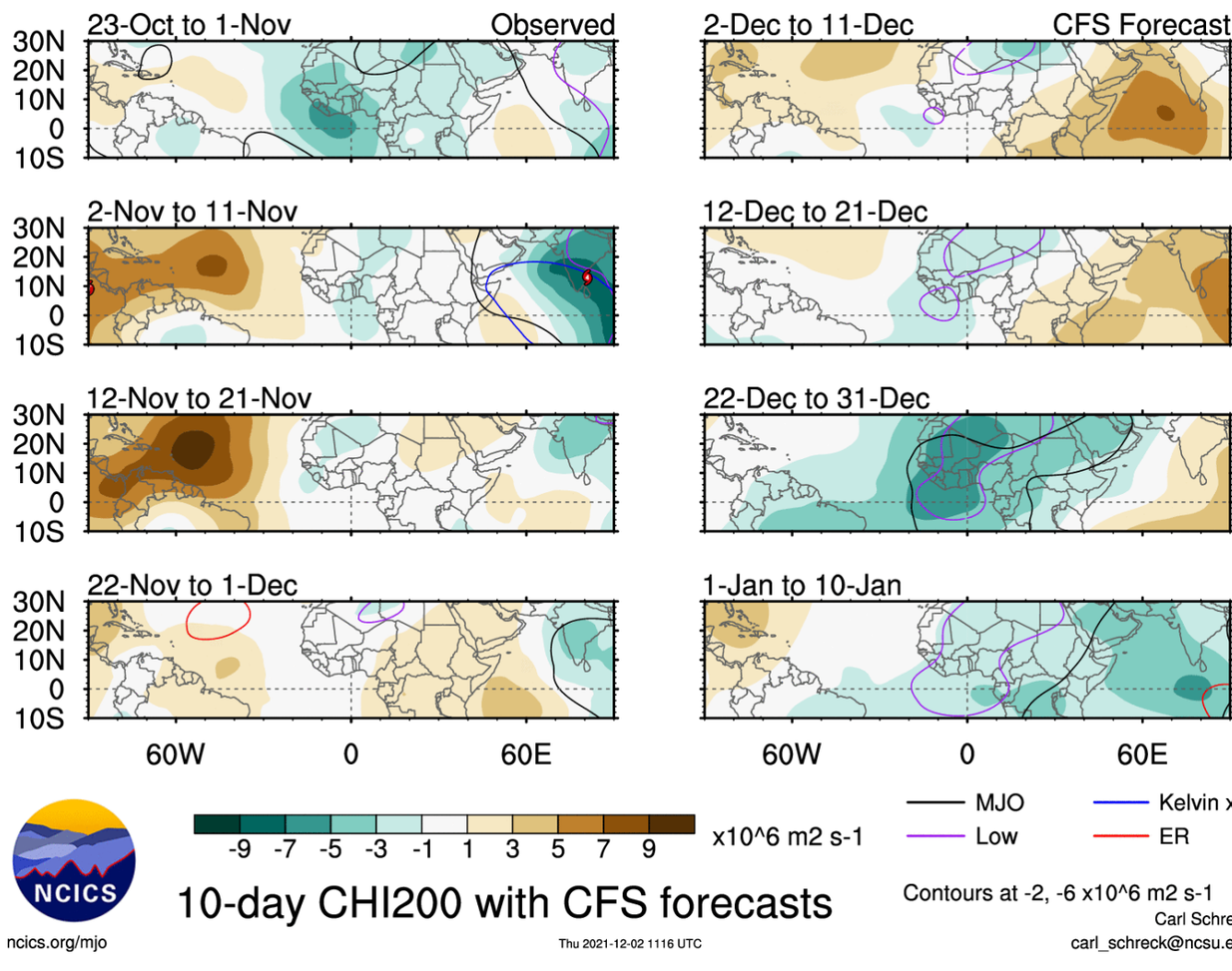
Figure 18a and b: Past four week and month velocity potential

https://ncics.org/pub/mjo/v2/map/chi850.cfs.all.global.10.png

https://ncics.org/pub/mjo/v2/map/chi200.cfs.all.global.10.png

Past Four Weeks Velocity Potential with MJO, Kelvin and Rossby Wave overlaid on Africa Maps at 850mb and 200mb



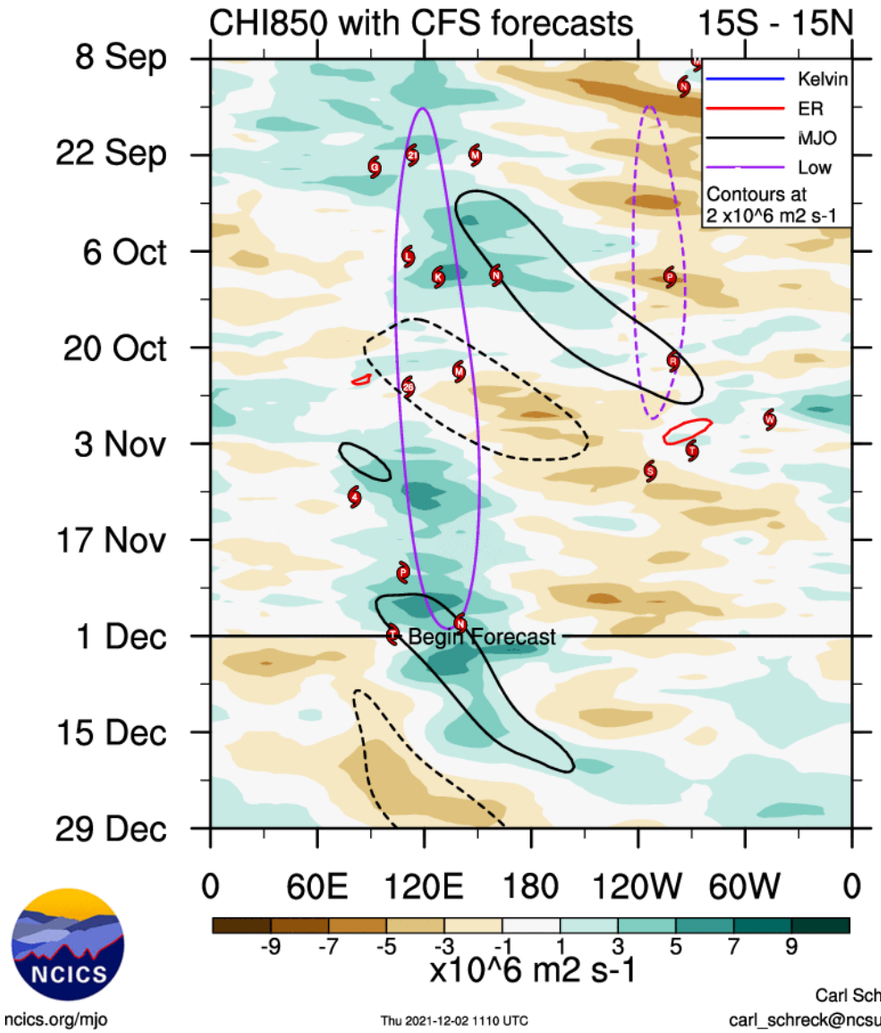


https://ncics.org/pub/mjo/v2/map/chi850.cfs.all.africa.10.png

https://ncics.org/pub/mjo/v2/map/chi200.cfs.all.africa.10.png

Figure 19a and b: Past four week and month velocity potential

Hovmoller diagram of Velocity Potential, Anomalies for 15N-15S with Waves overlay including Outlook



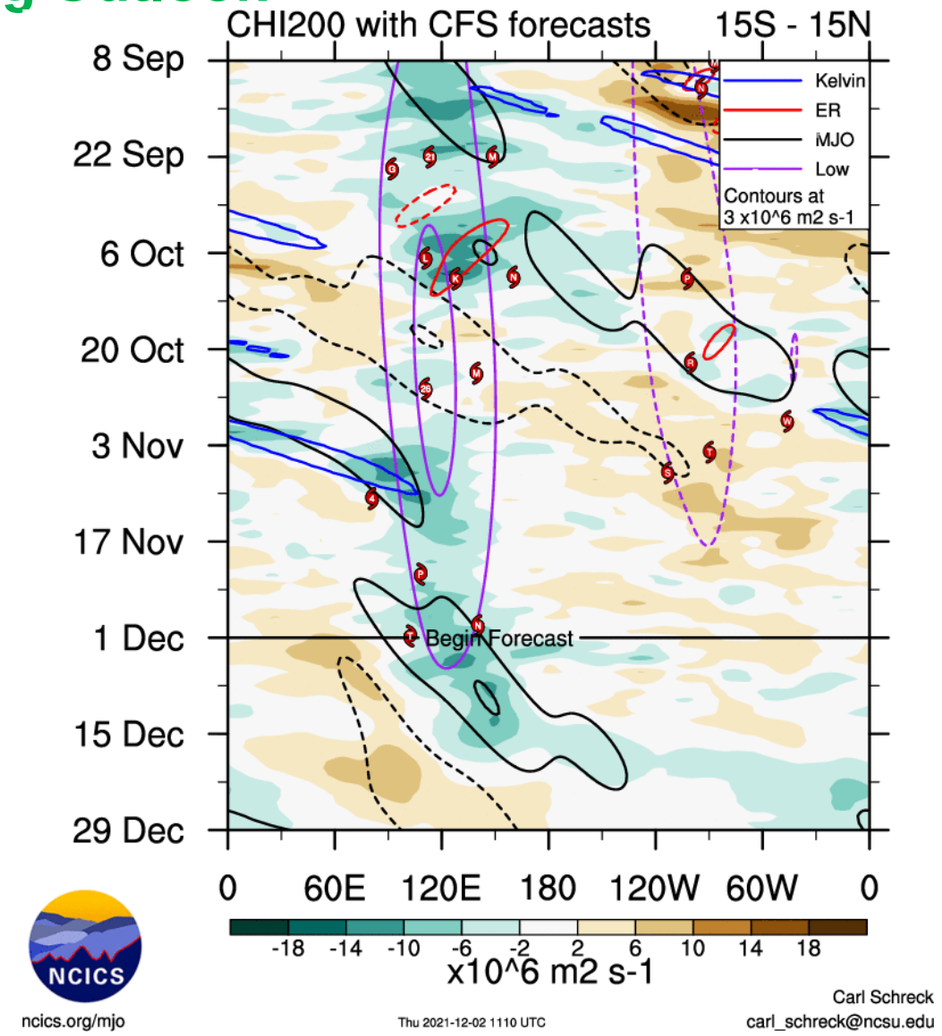
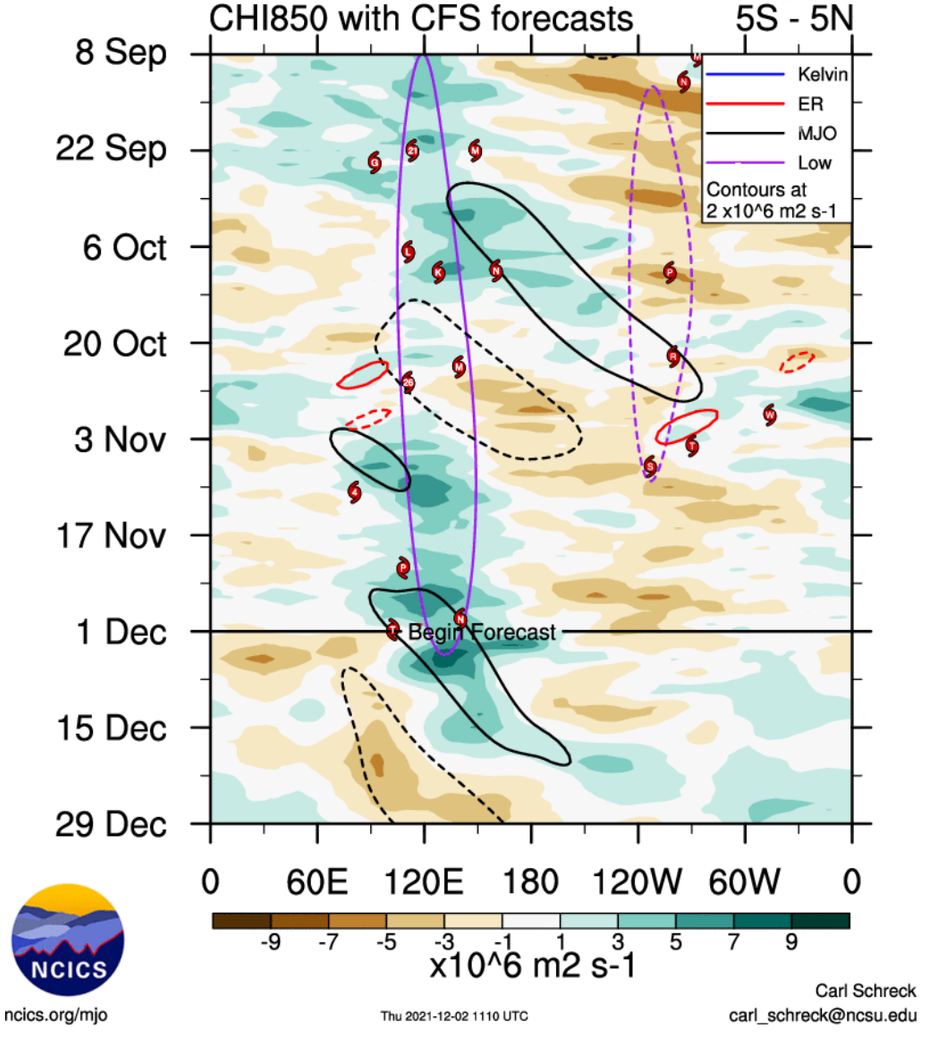


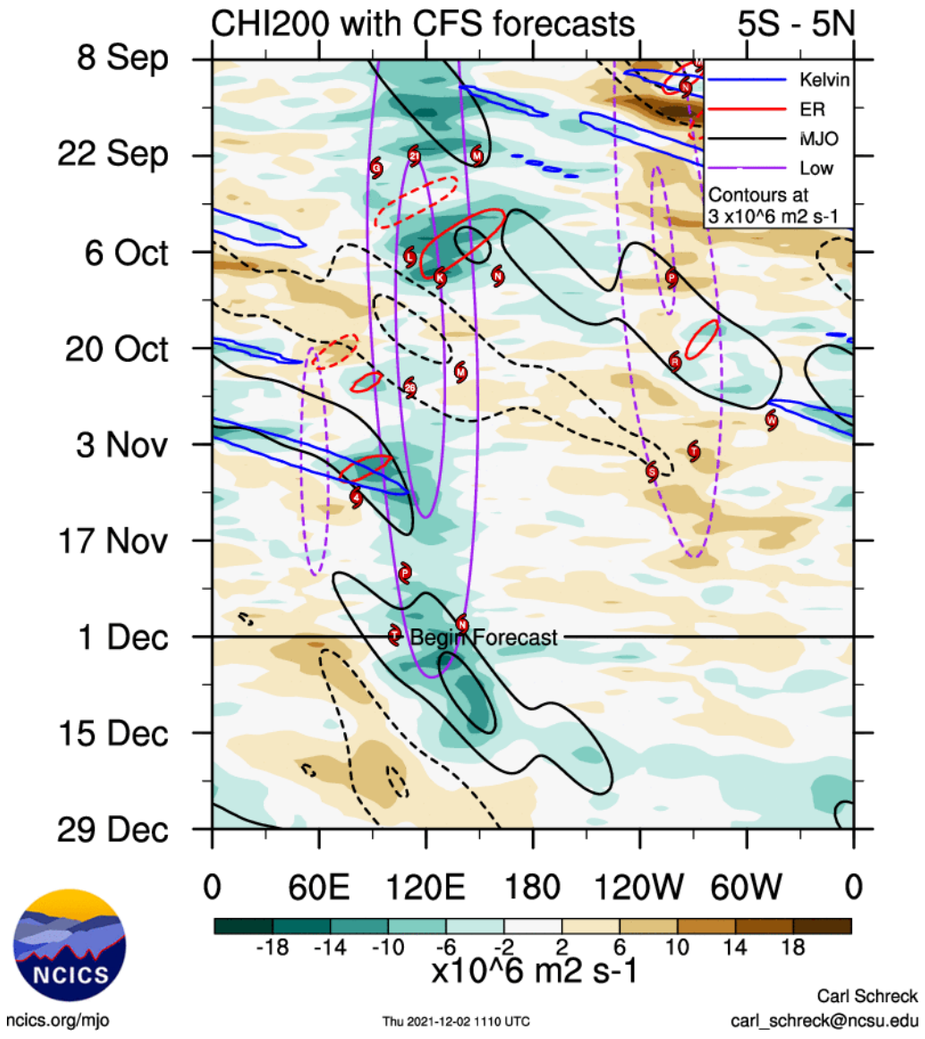
Figure 20: **Anomalies for 15n-15s with waves overlay including outlooks**

https://ncics.org/pub/mjo/v2/hov/chi850.cfs.wide.png

https://ncics.org/pub/mjo/v2/hov/chi200.cfs.wide.png

Hovmoller diagram of Velocity Potential, anomalies for 5n-5s with waves overlay including outlooks



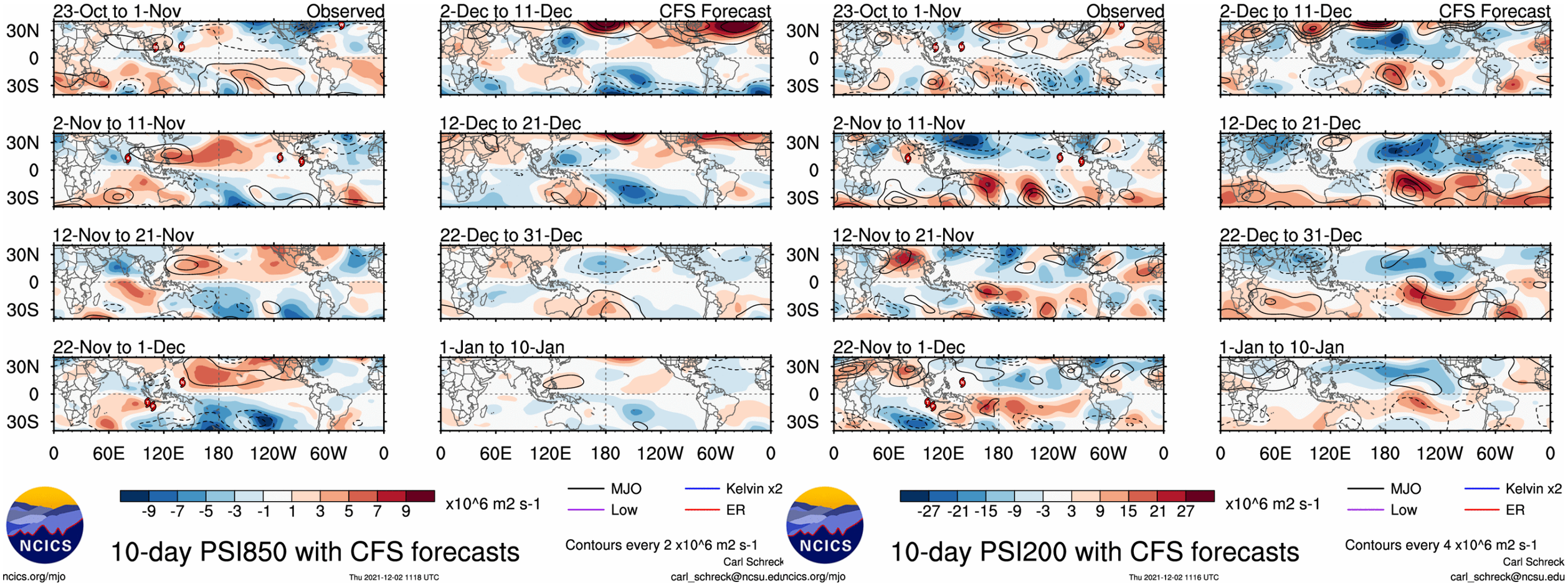


https://ncics.org/pub/mjo/v2/hov/chi850.cfs.eqtr.png

https://ncics.org/pub/mjo/v2/hov/chi200.cfs.eqtr.png

Figure 21: **Anomalies for 5N-5S with waves overlay including outlooks**

Past 4 Weeks Stream Function Anomalies with MJO, Kelvin and Rossby wave overlaid on Global Maps 850hpa and 200hpa

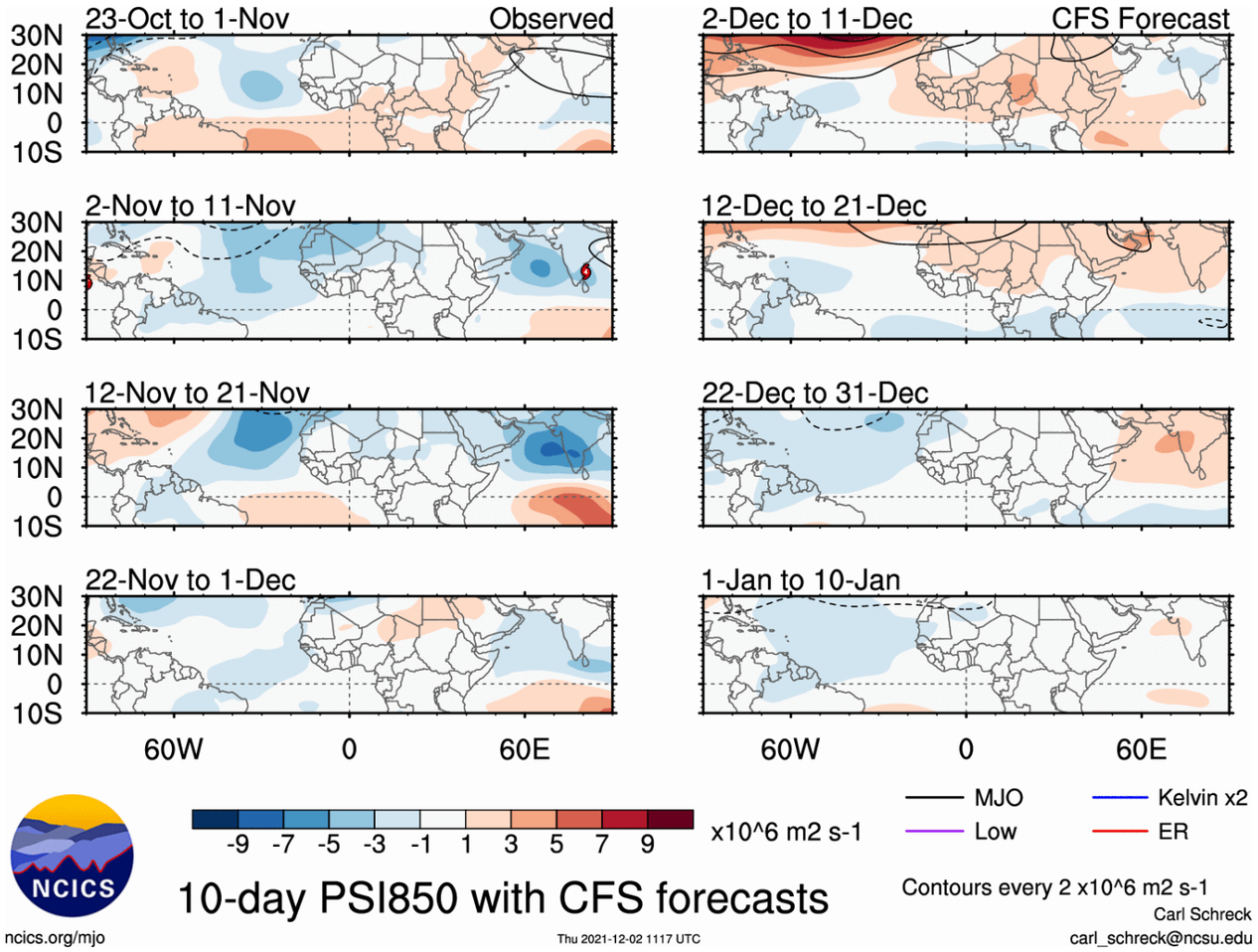


https://ncics.org/pub/mjo/v2/map/psi850.cfs.mjo.global.10.png

https://ncics.org/pub/mjo/v2/map/psi200.cfs.mjo.global.10.png

Figure 22: **Past 4 weeks stream function anomalies with MJO, Kelvin & Rossby wave on Global Maps**

Past 4 weeks Stream Function Anomalies with MJO, Kelvin and Rossby wave overlaid on Africa Maps 850hpa and 200hpa



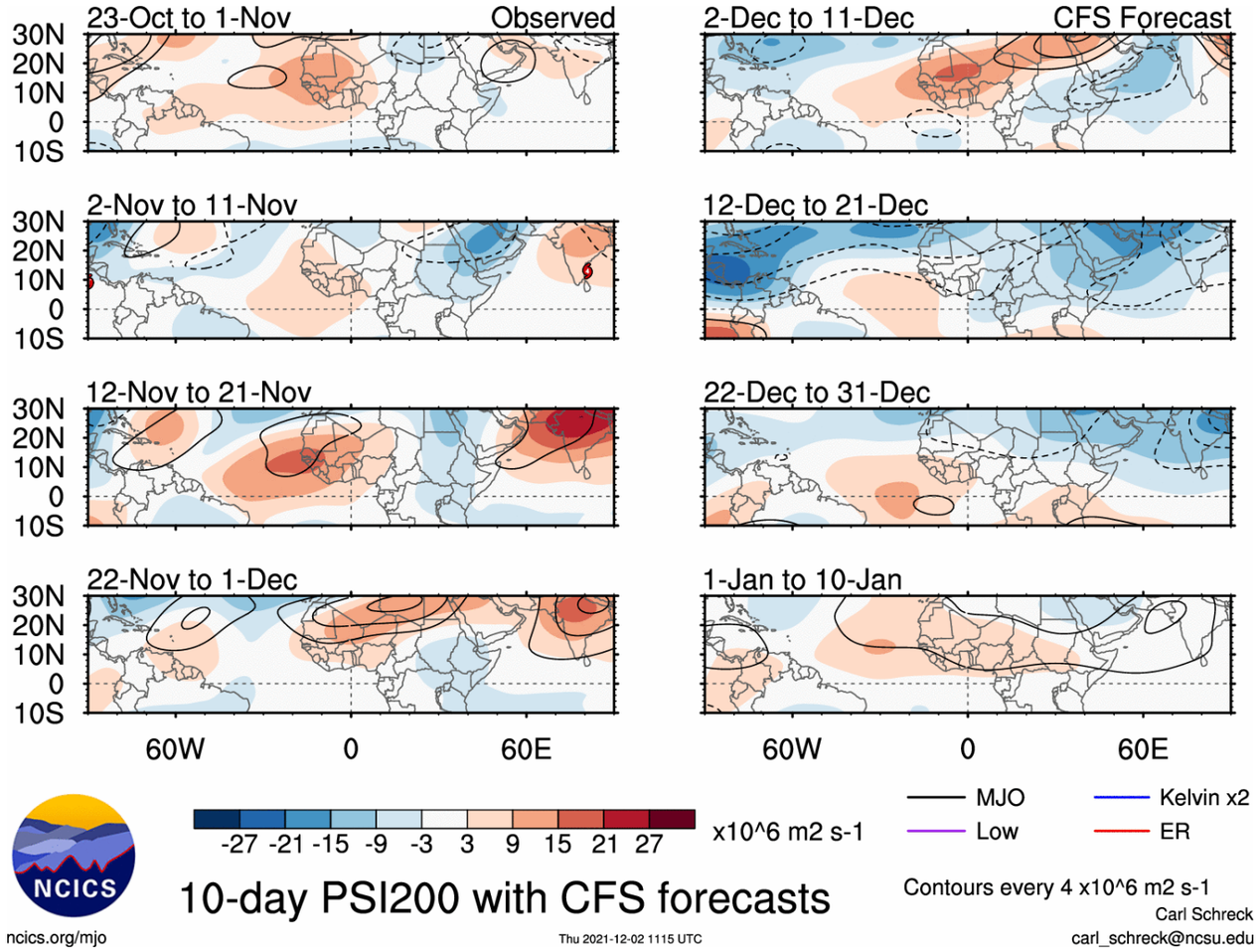


Figure 23: **Past 4 weeks stream function anomalies with MJO, Kelvin & Rossby wave on Africa maps**

https://ncics.org/pub/mjo/v2/map/psi850.cfs.mjo.africa.10.png

https://ncics.org/pub/mjo/v2/map/psi200.cfs.mjo.africa.10.png

1. Monitoring Climate Element
2. Global Driver Review and Assessment
3. Model Guidance for Weekly Climate outlook

Wind Anomaly and Divergence Forecast from GFS week1

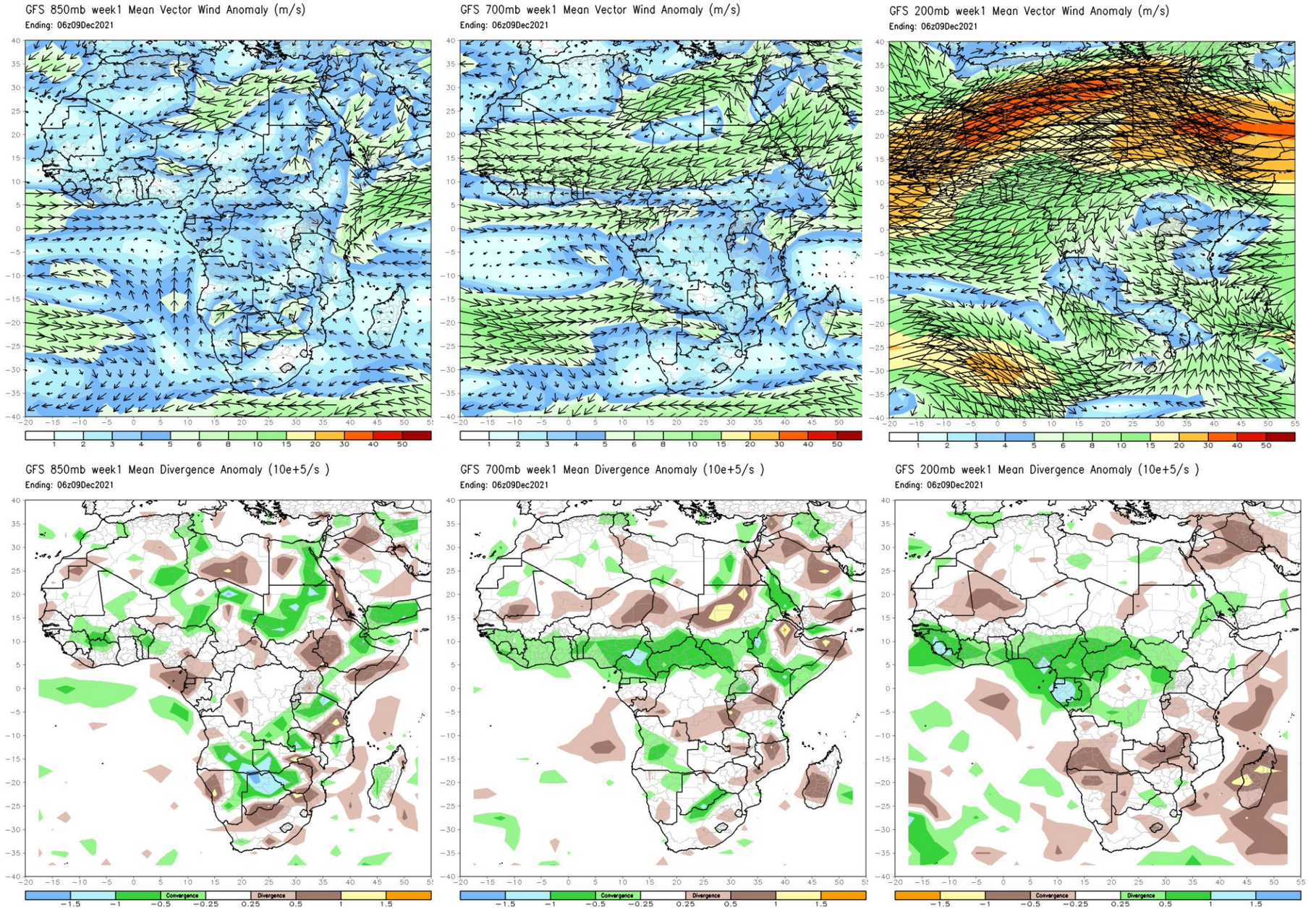
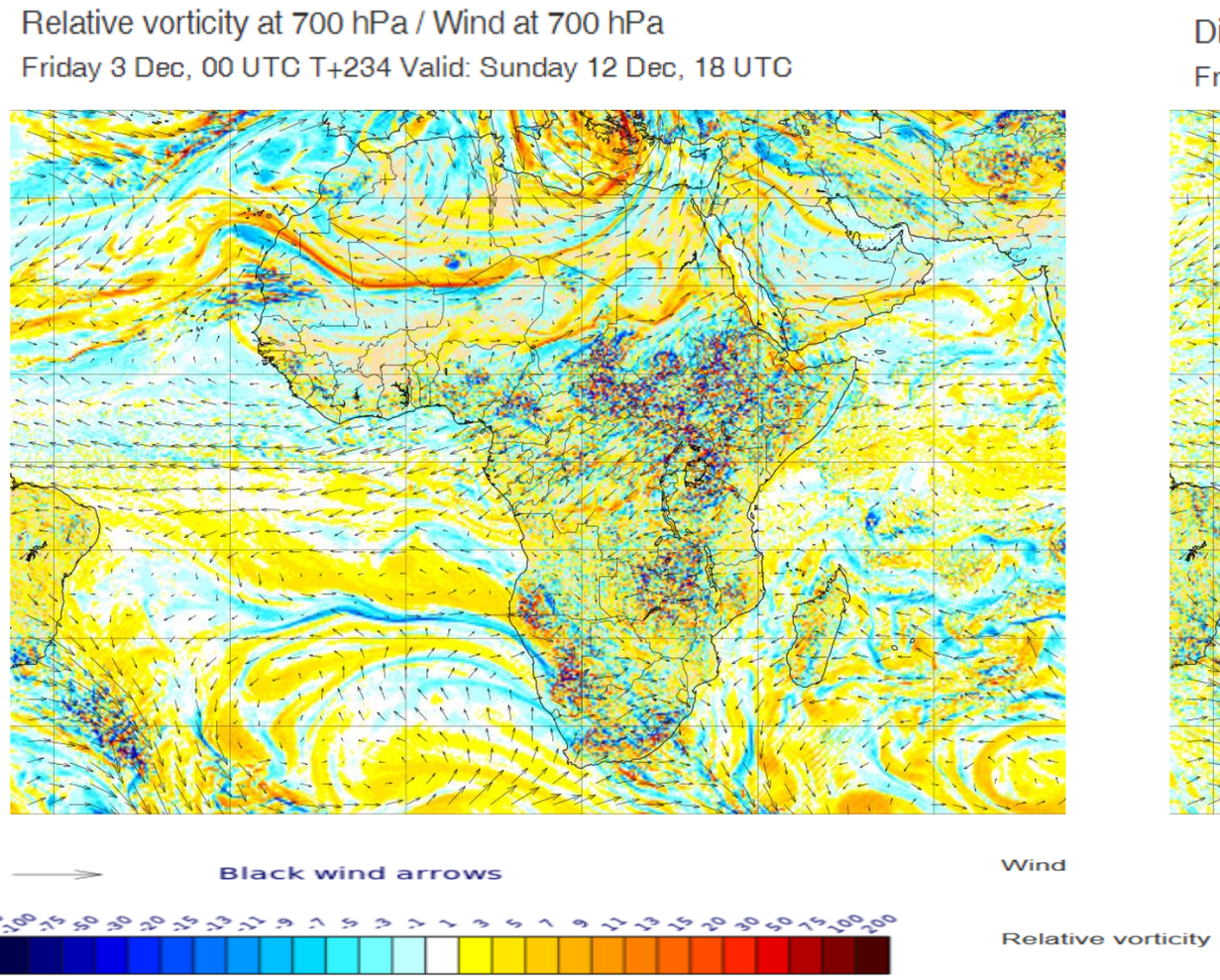


Figure 24 : Forecast from GFS

https://www.cpc.ncep.noaa.gov/products/international/africa/africa.shtml

Week 1 at 700hpa Relative Vorticity and Divergence Wind Forecast from CFS and ECMWF



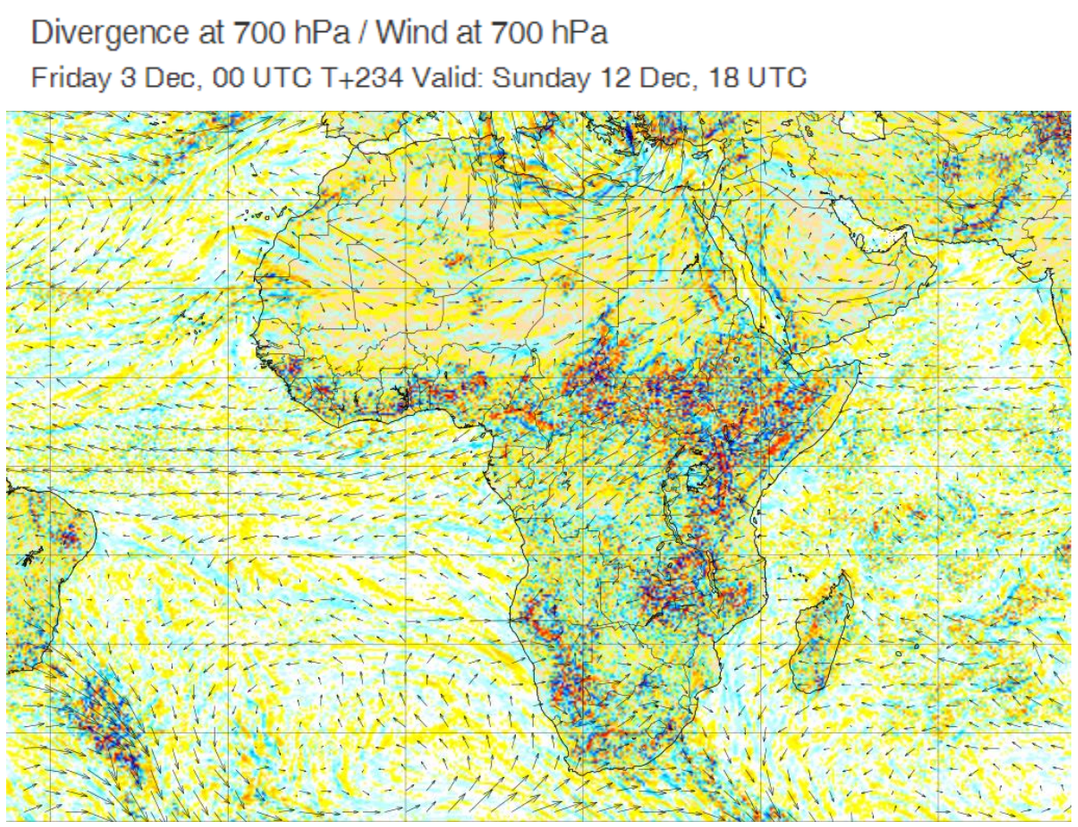
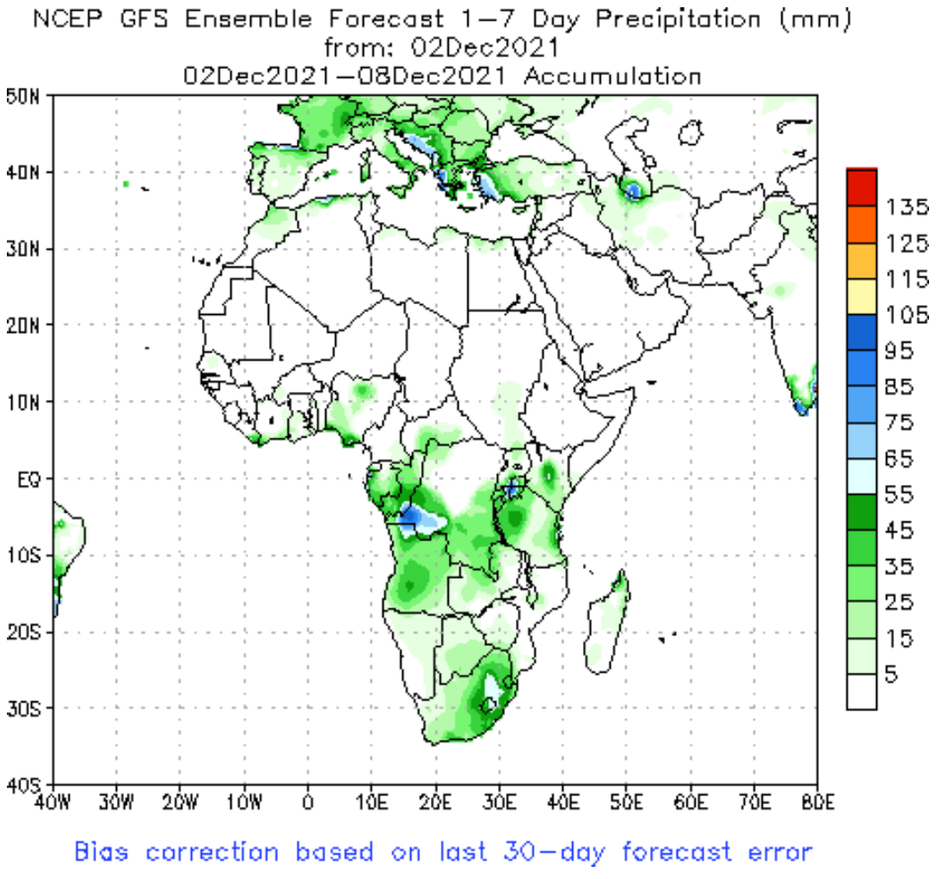


Figure 25: Relative Vorticity and Divergence forecast from CFS and ECMWF

https://www.ecmwf.int/en/forecasts/charts/catalogue/medium-rv-div-uv?facets=undefined&time=2019102300,144,2019102900&projection=africa&layer_name=rv_custom

African Precipitation NCEP/GFS Bias-Corrected Precipitation and Anomaly Forecasts for week 1



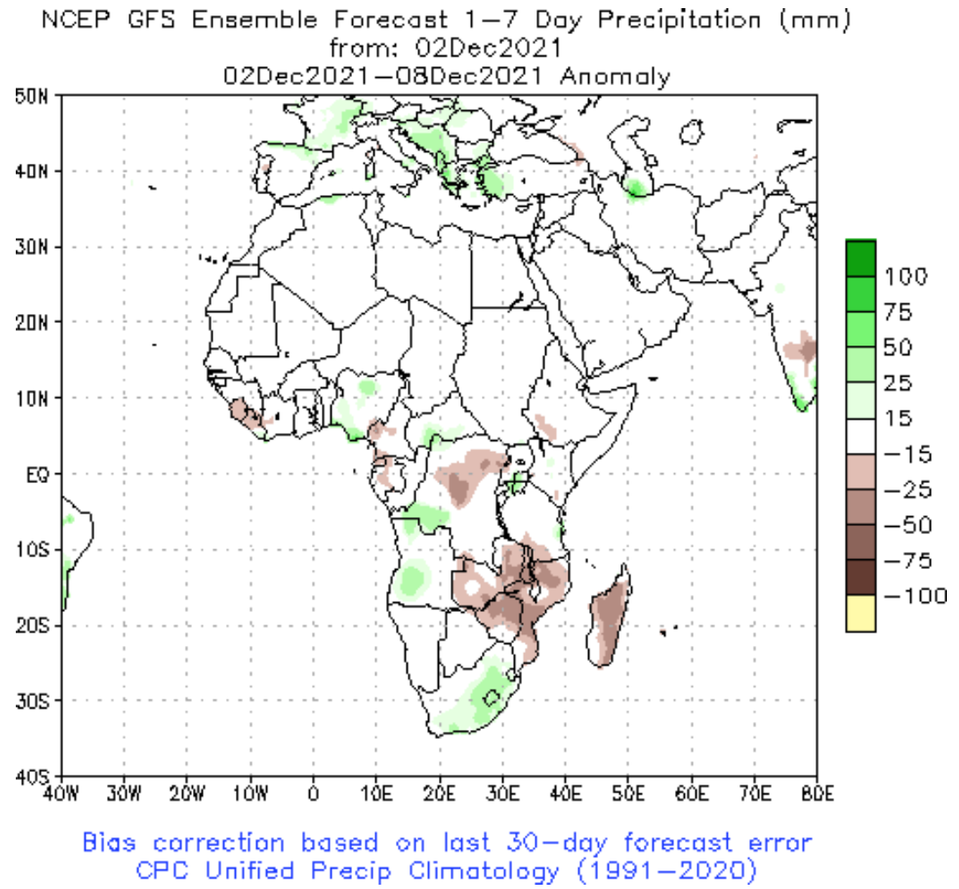


Figure 26: NCEP/GFS Précipitation and Anomaly forecast.

https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/African_Monsoons/gfs_model.shtml

http://www.cpc.ncep.noaa.gov/products/people/wwang/gfs_precip/gfs_wk1.gif

Probability of week-1 precip > 25 (left), 50mm (middle) and, 100mm (right)
3rd – 9th Dec 2021

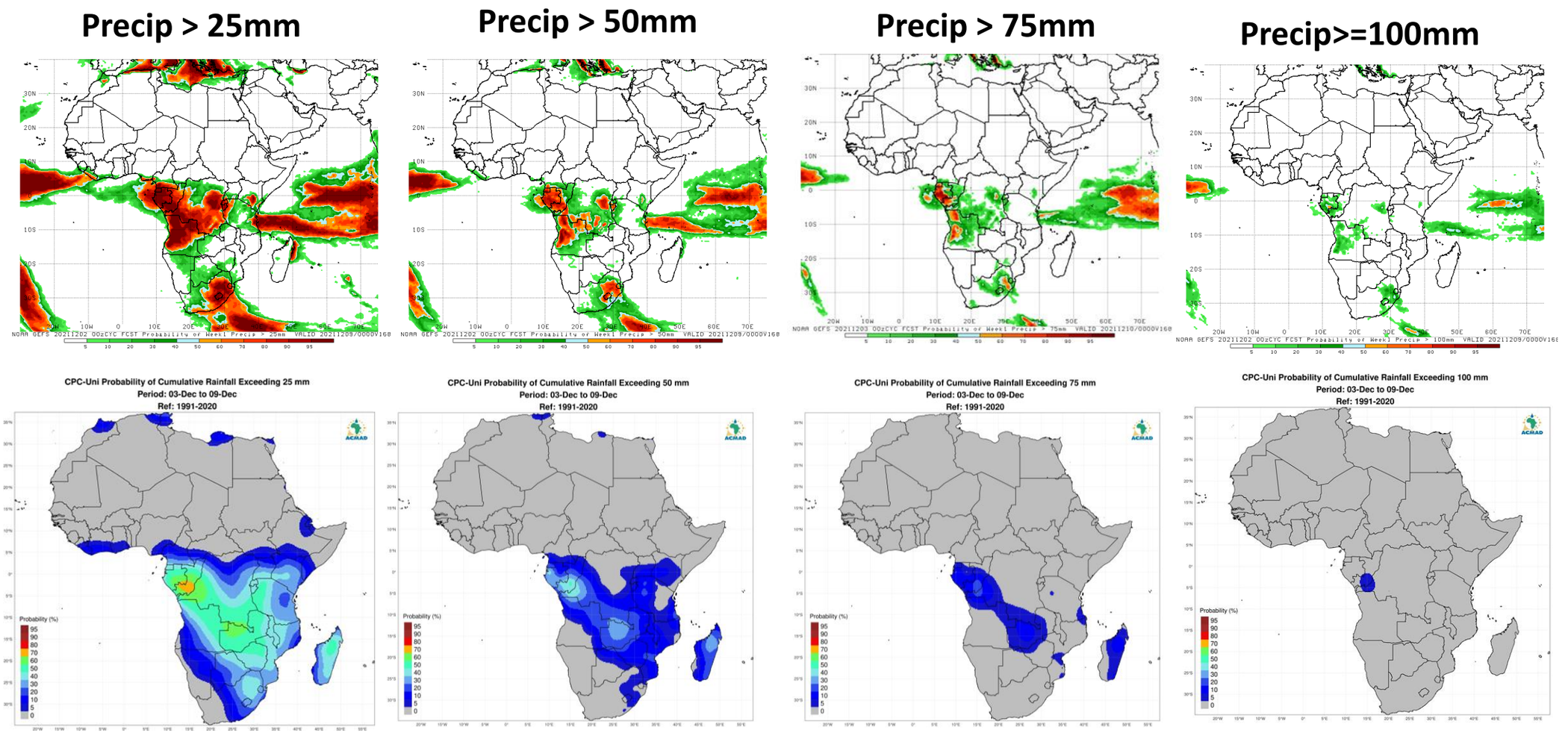


Figure 27: Week1 Precipitation Total Exceedance Probabilities

https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk1_precip25mm_prob_africa.html
https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk1_precip50mm_prob_africa.html
https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk1_precip75mm_prob_africa.html
https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk1_precip100mm_prob_africa.html

http://154.66.220.45:8080/thredds/catalog/ACMAD/CDD/climatemonitoringservice/Probability_of_Exceedance/Weekly/Current/catalog.html

Precipitation Anomaly Forecasts from ECMWF for week 1

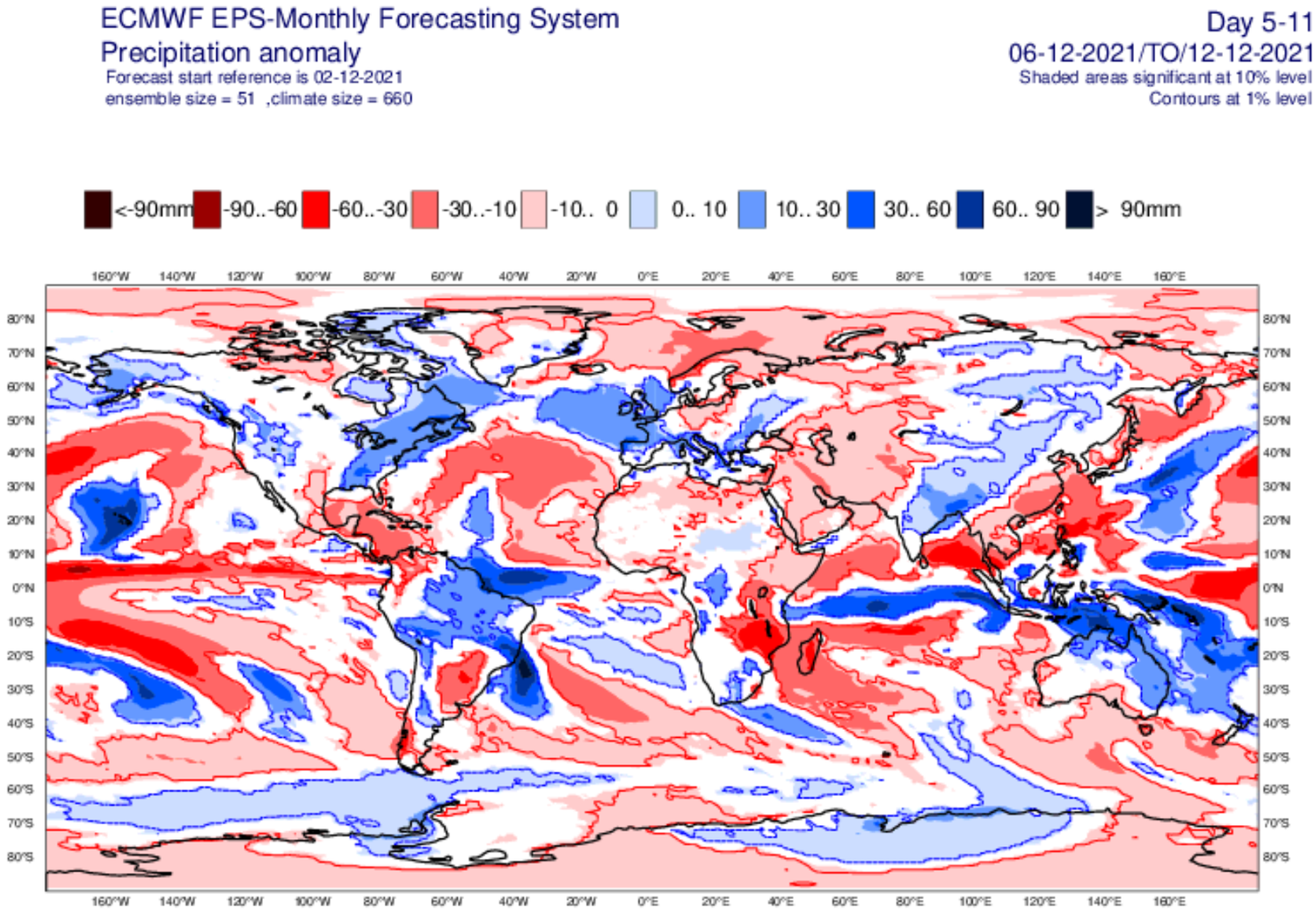
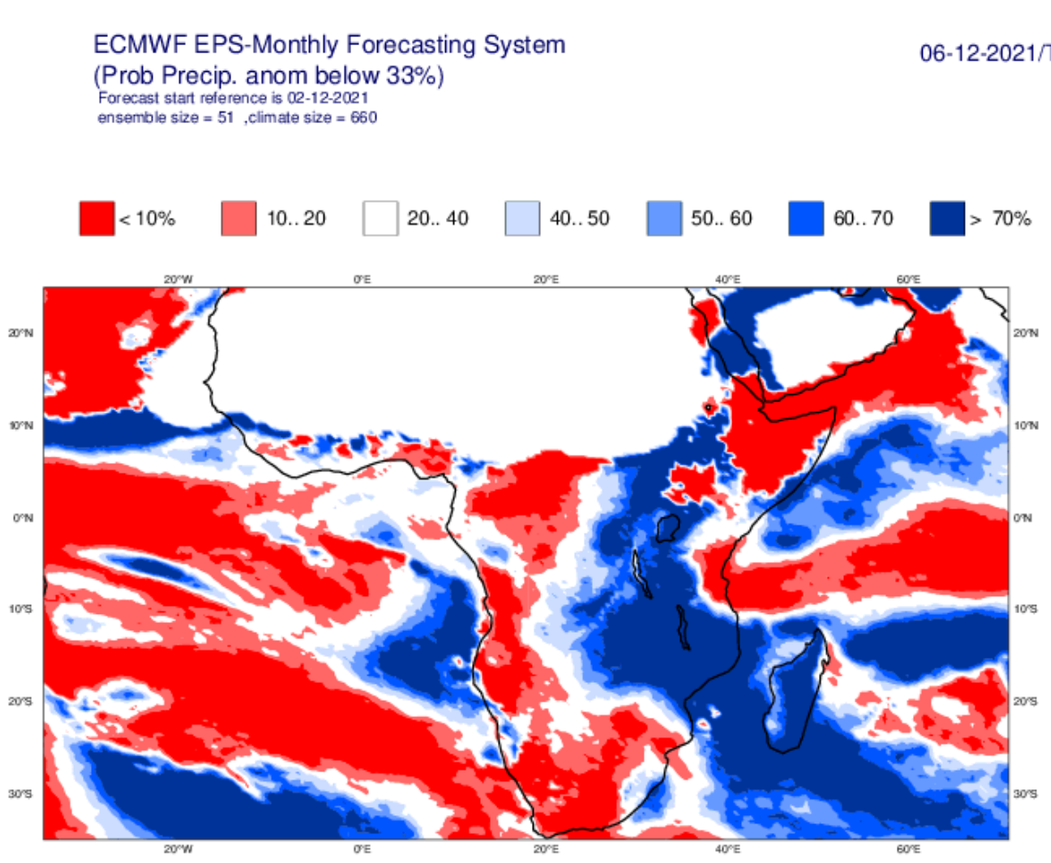


Figure 28: Monthly Precipitation Anomaly forecast from ECMWF

https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_anomaly?facets=undefined&time=2019081500,408,2019090100&parameter=precipitation&area=Global

Probability Precipitation Forecasts from ECMWF for week 1 : weekly tercile at below 33% and above 66%



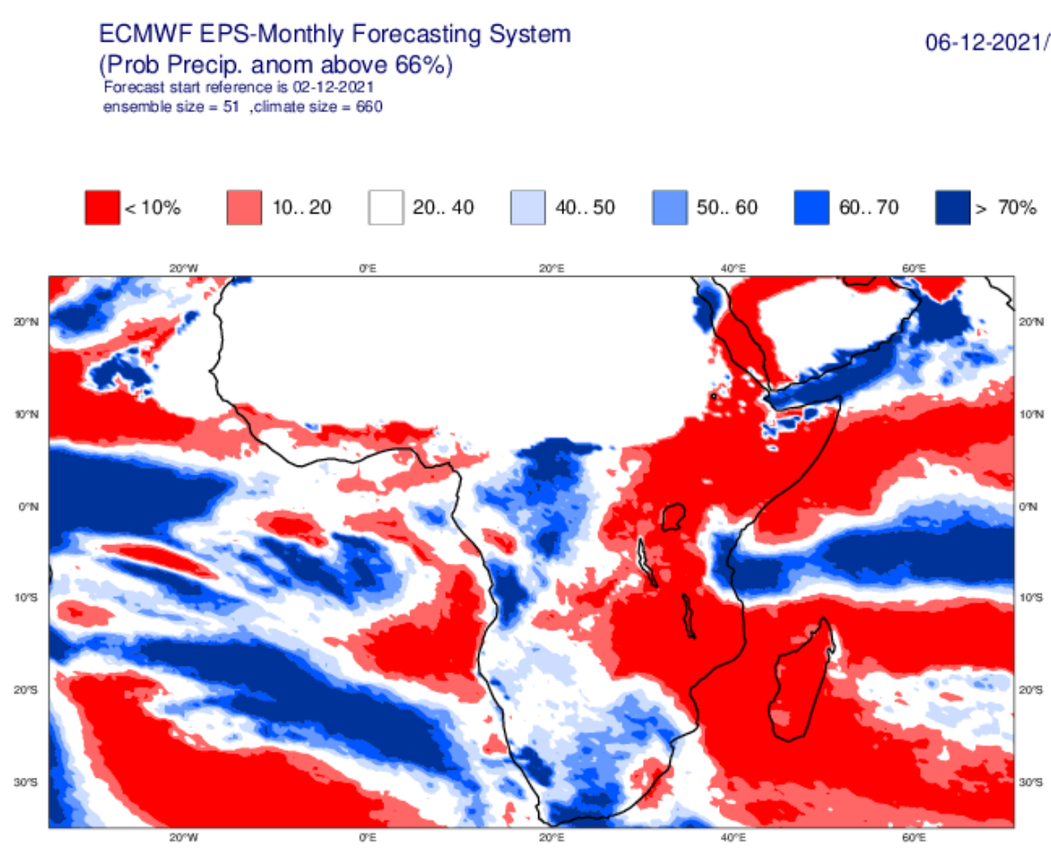


Figure 29: Weekly tercile probability forecast below 33%

https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_tercile?facets=undefined&time=2021110100,312,2021111400&parameter=precipitation&tercile=1&area=Africa

Wind Anomaly and Divergence Forecast from GFS week2

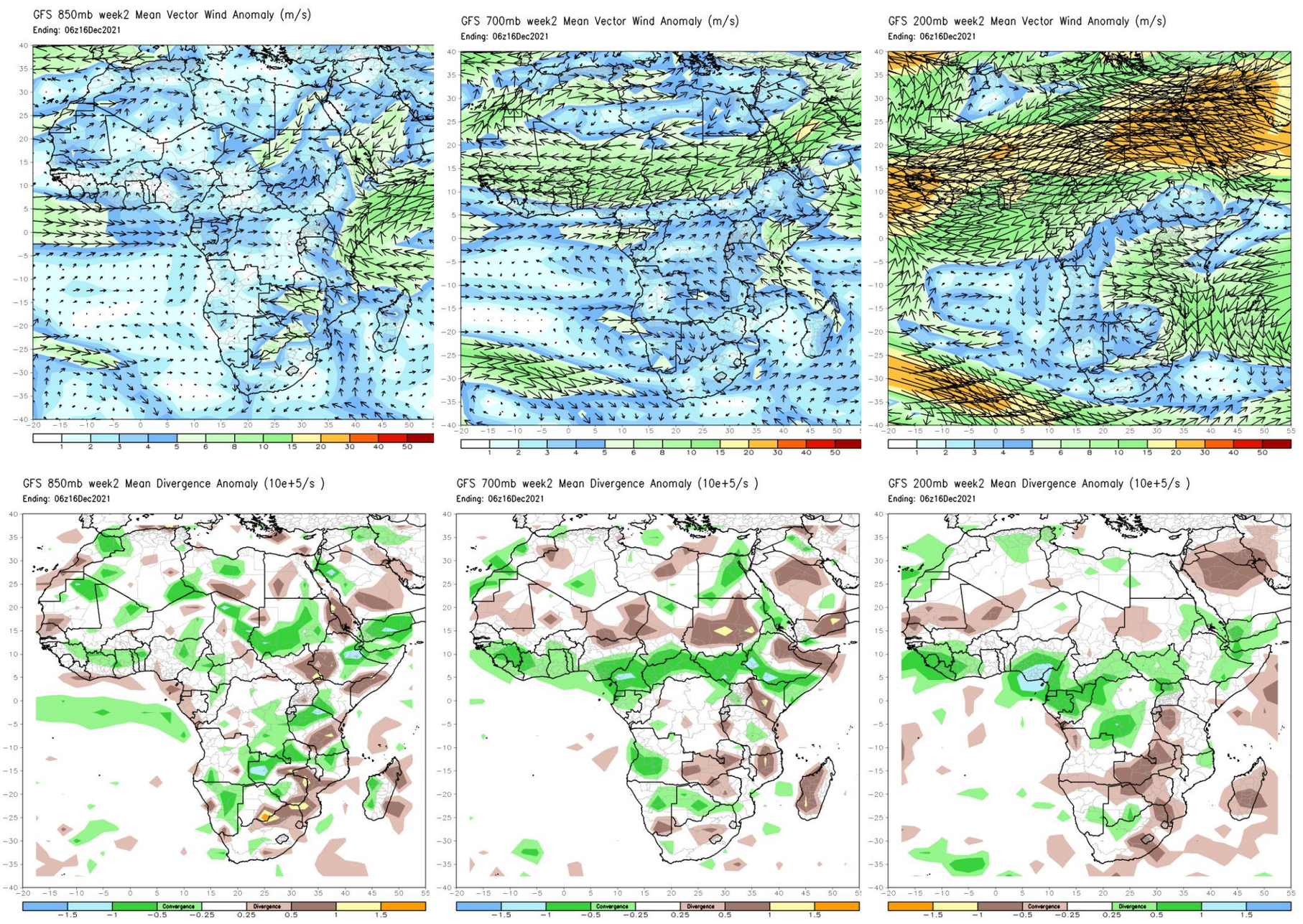
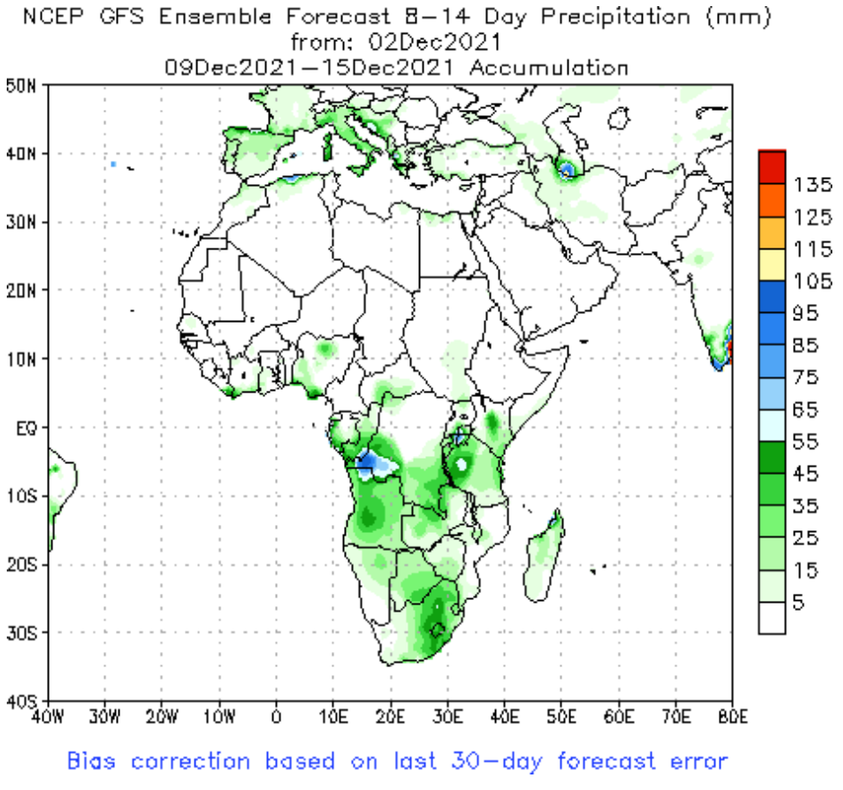


Figure 30: GFS divergence forecast

https://www.cpc.ncep.noaa.gov/products/international/africa/africa.shtml

African Precipitation NCEP/GFS Bias-Corrected precipitation and anomaly forecasts for week 2



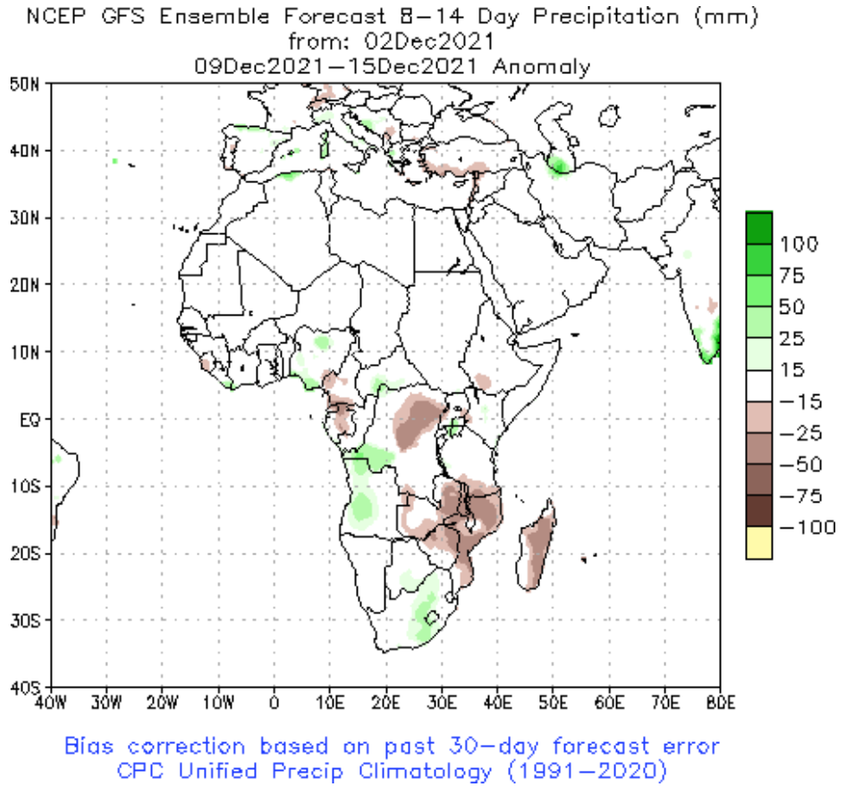
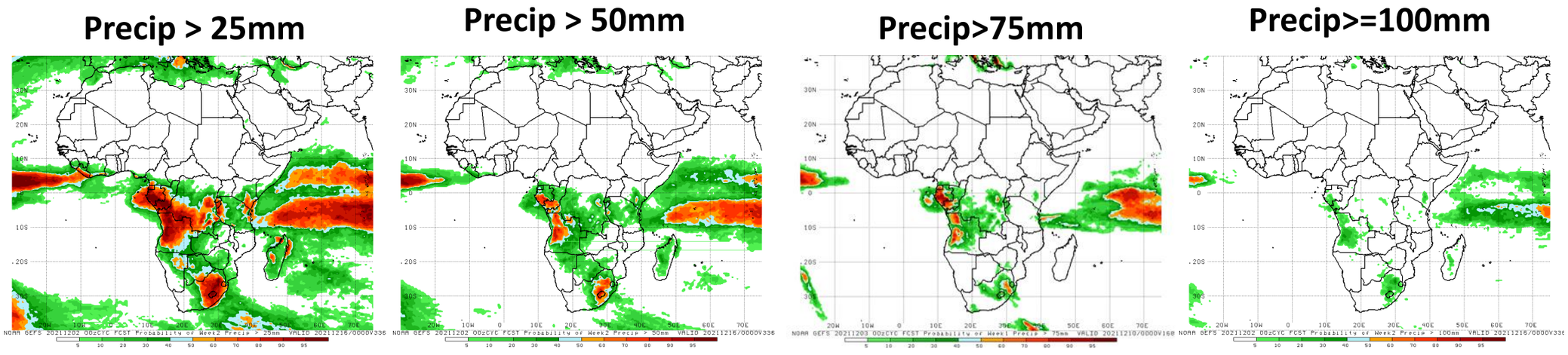
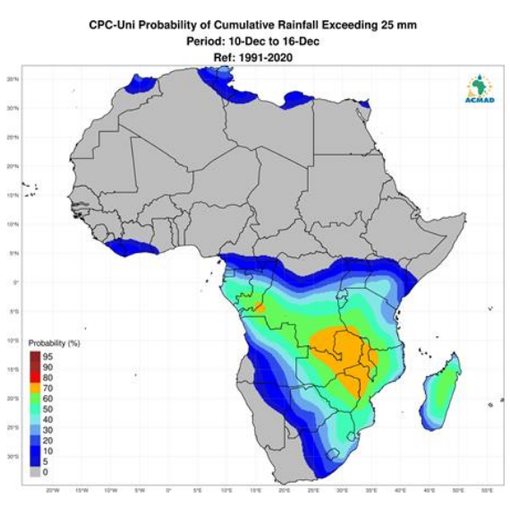


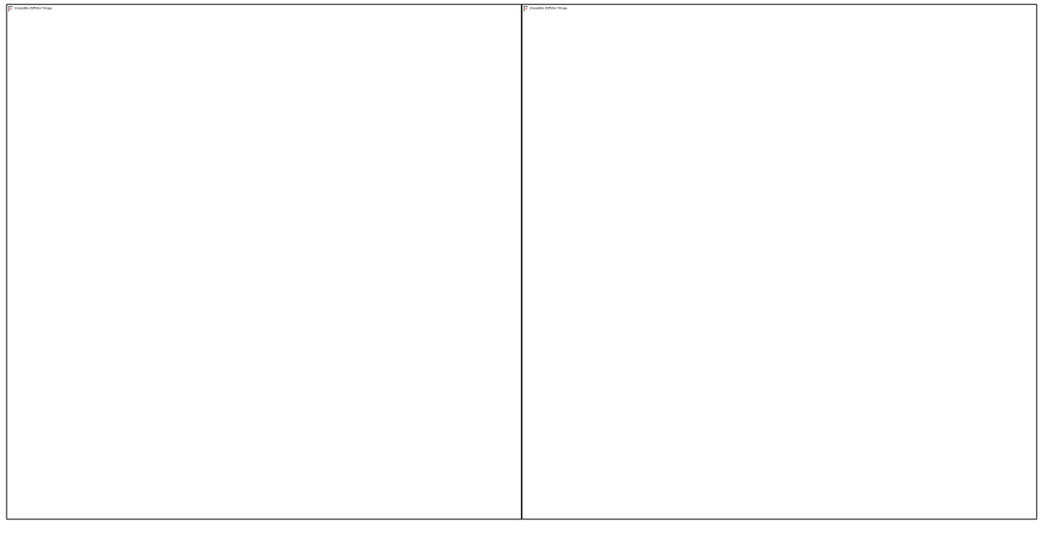
Figure 31: Précipitation and Anomaly forecast

https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/African_Monsoons/gfs_model.shtml

Probability of week-2 precip > 25 (left), 50mm (middle) and, 100mm (right)
10th – 16th Dec 2021







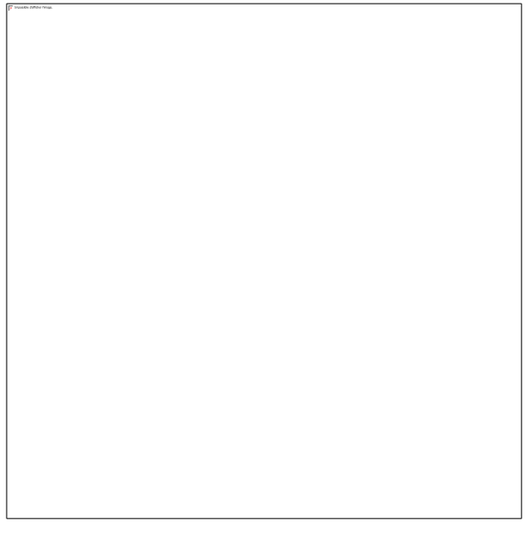


Figure 32: Week2 Precipitation Total Exceedance Probabilities

https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk2_precip25mm_prob_africa.html
https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk2_precip50mm_prob_africa.html
https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk2_precip75mm_prob_africa.html
https://www.cpc.ncep.noaa.gov/products/international/cpci/data/00/gefs_wk2_precip100mm_prob_africa.html

http://154.66.220.45:8080/thredds/catalog/ACMAD/CDD/climatemonitoringservice/Probability_of_Exceedance/Weekly/Current/catalog.html

Precipitation Anomaly Forecasts from ECMWF for week 2

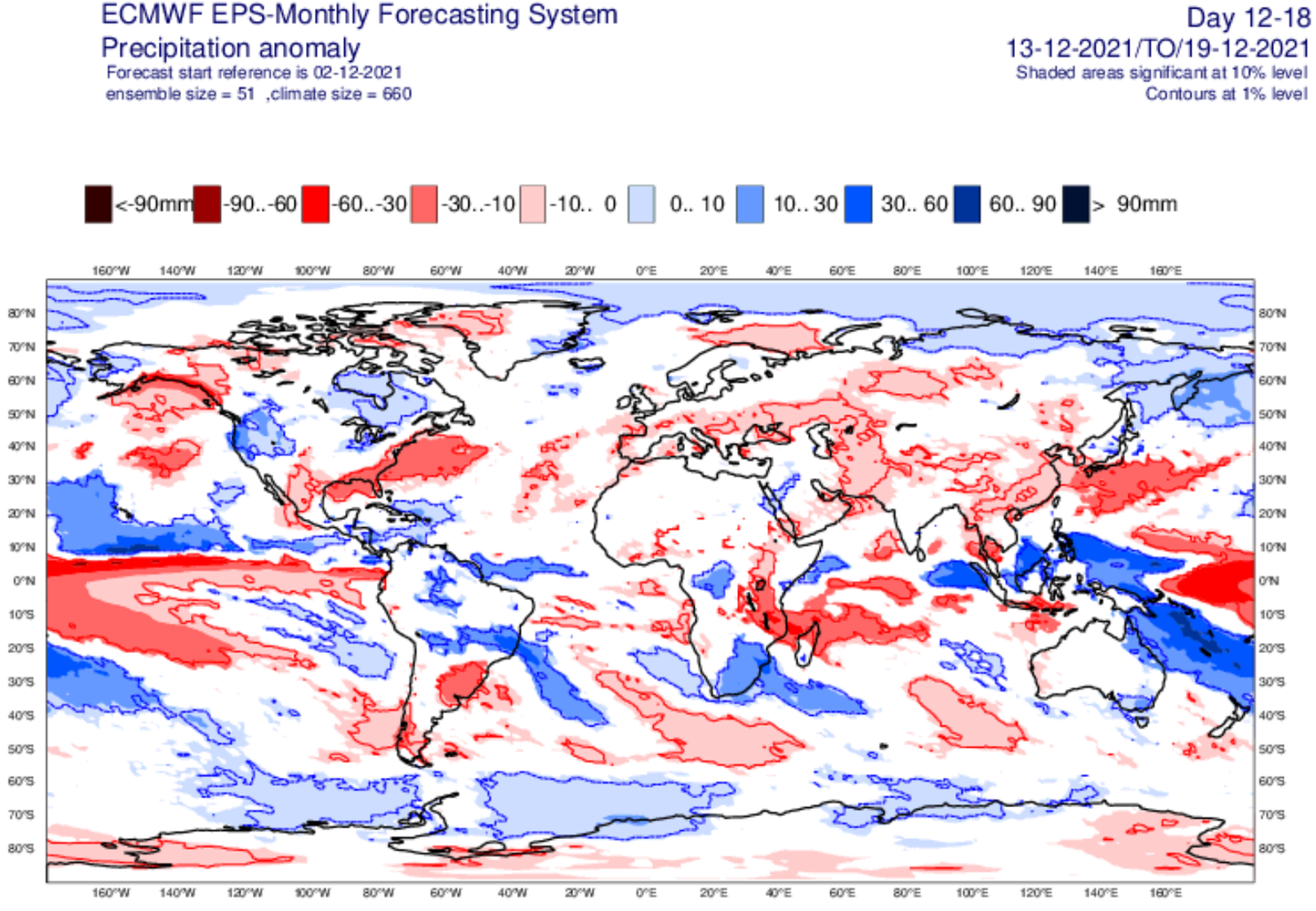
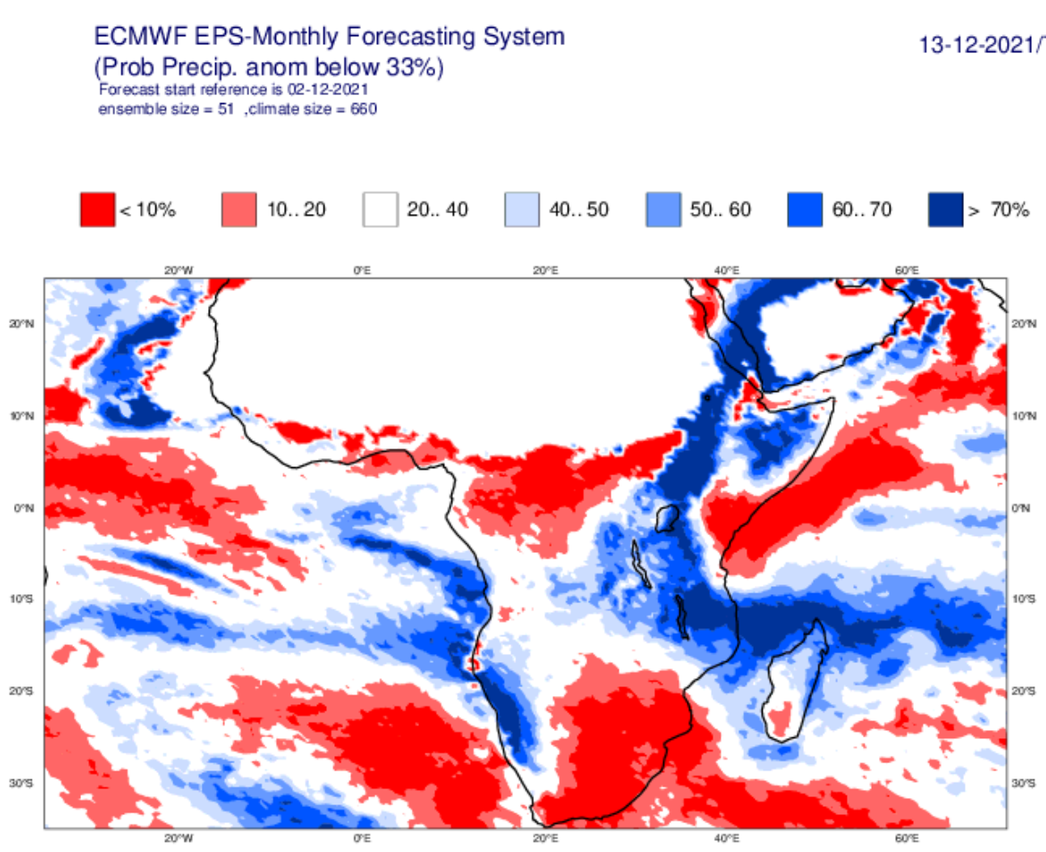


Figure 33: Monthly Precipitation Anomaly forecast from ECMWF

https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_anomaly?facets=undefined&time=2019081500,408,2019090100&parameter=precipitation&area=Global

Probability Precipitation Forecasts from ECMWF for week 2 : weekly tercile at below 33% and above 66%



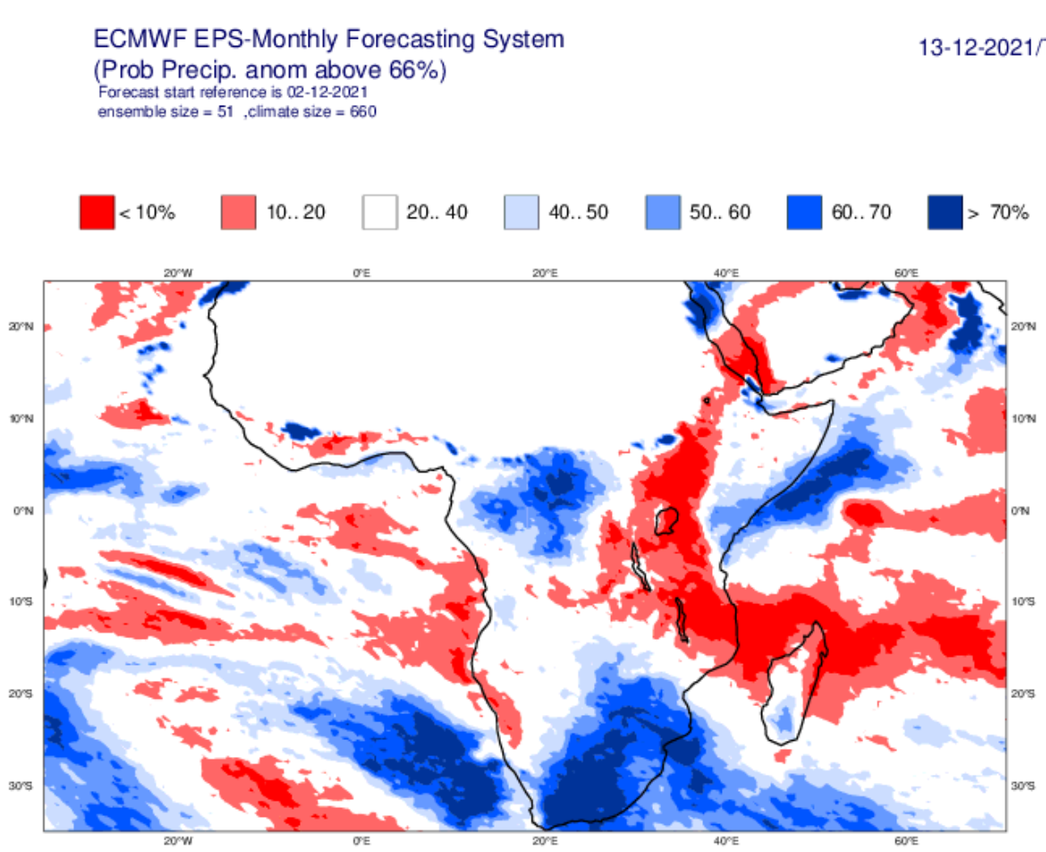


Figure 34: Weekly tercile probability forecast below 33%

https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_tercile?facets=undefined&time=2021110100,312,2021111400&parameter=precipitation&tercile=1&area=Africa

Monthly Forecast from WMO Lead Centre Multi-Model Ensemble

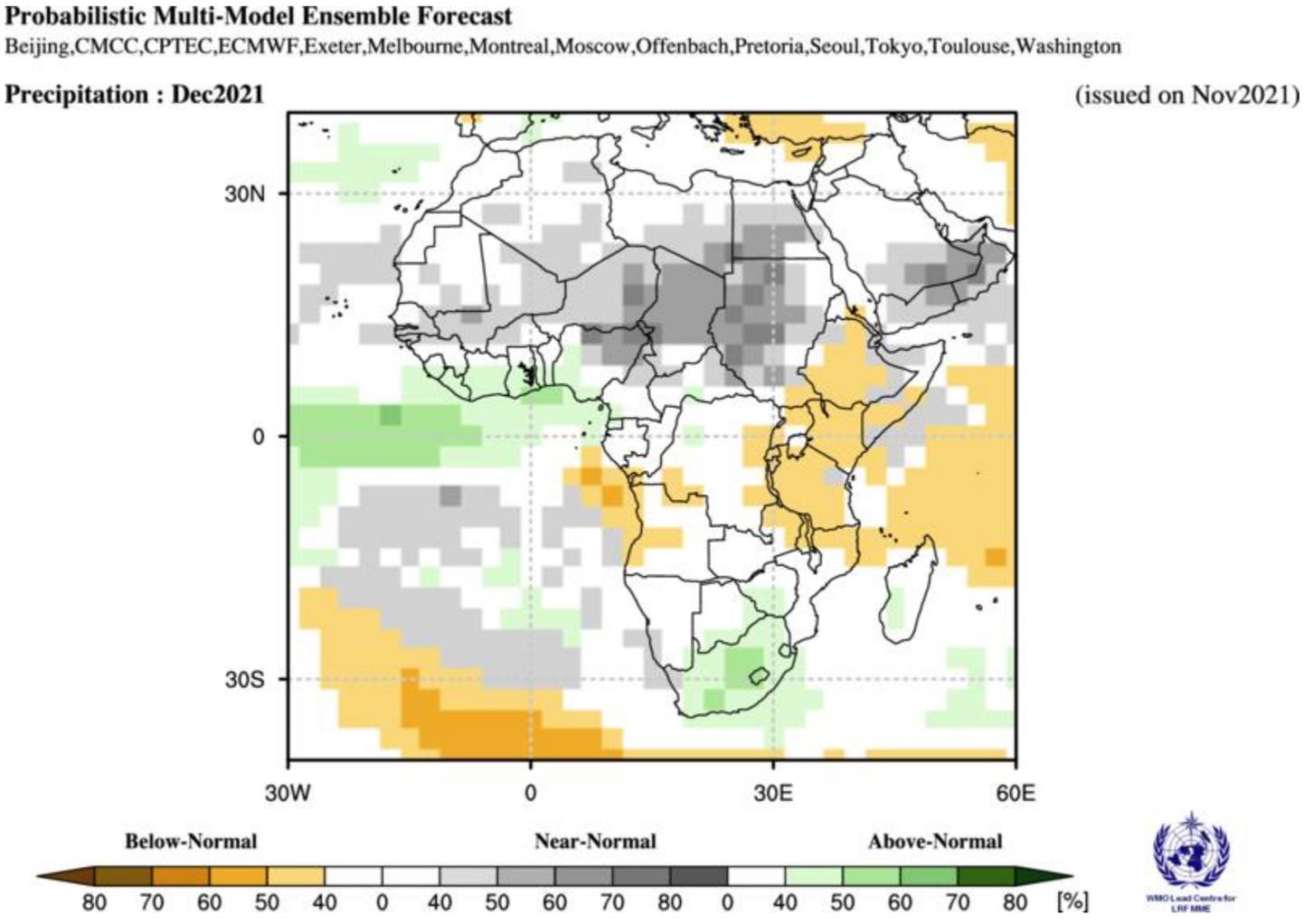
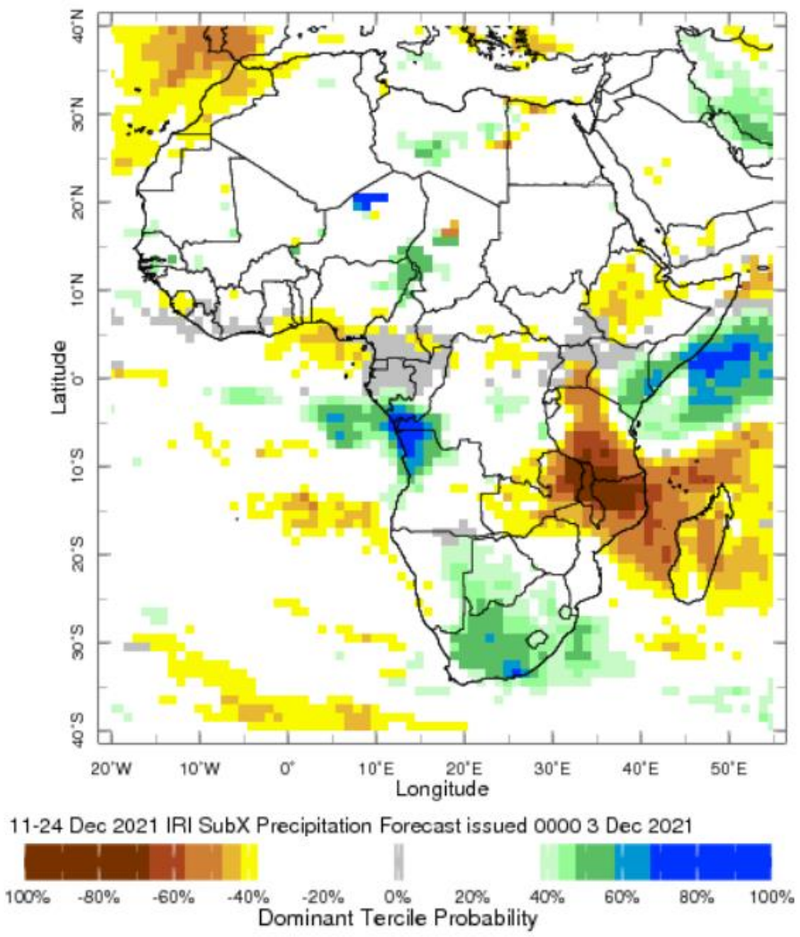


Figure 35: Monthly Precipitation forecast

The LCMM-level model set tells us that part of the Africa region will have average to higher than average rainfall.

https://www.wmolc.org/seasonPmmeUI/view?winName=PlotView1566209968309

PRECIPITATION PROBABILITY FORECAST 11 to 30 Dec 2021



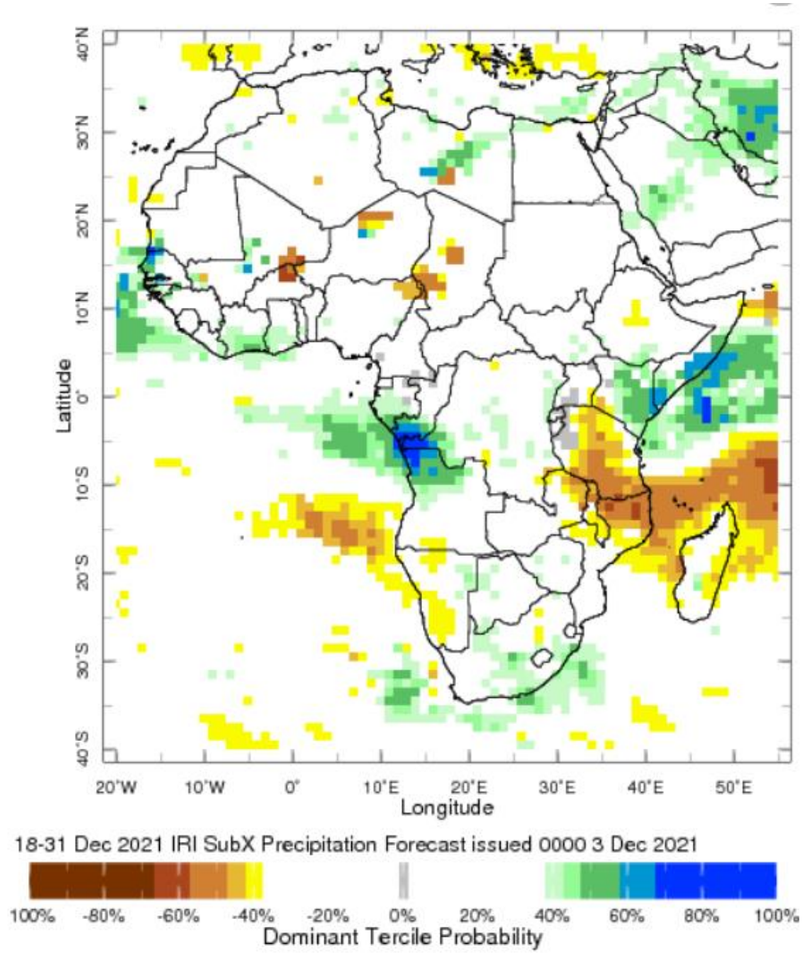


Figure 37: Précipitation and Anomaly forecast

https://iridl.ldeo.columbia.edu/maproom/Global/ForecastsS2S/precip_subx.html?Set-Language=en&bbox=bb%3A-20%3A-40%3A55%3A40%3Abb&S=0000%205%20Feb%202021&region=bb%3A-2%3A30%3A-1%3A31%3Abb

CLIMATOLOGY OF PRECIPITATIONS FOR UPCOMING 2 WEEKS

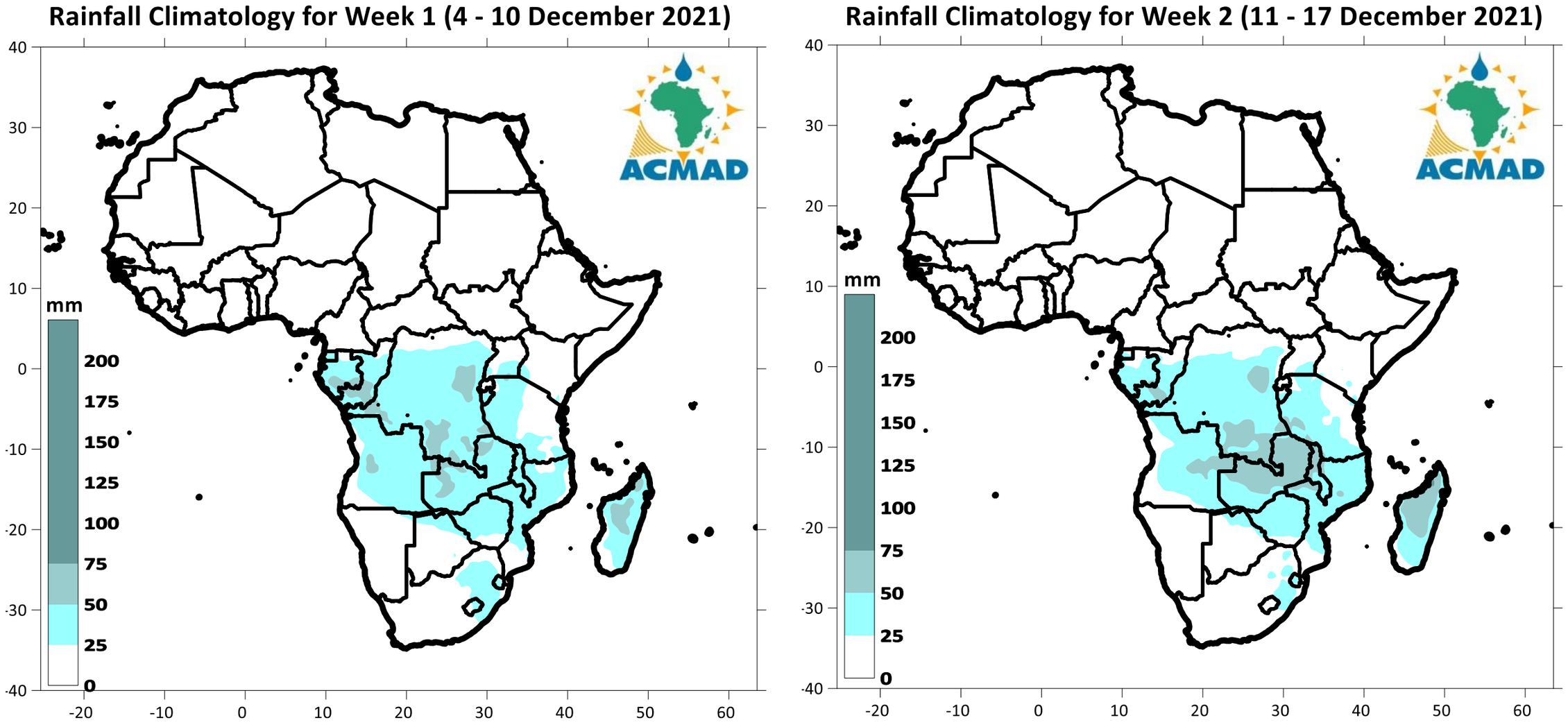


Figure 38: Climatology of Precipation for week-1(left panel) and week-2 (right panel)

PRECIPITATIONS FORECAST FOR THE UPCOMING TWO WEEKS

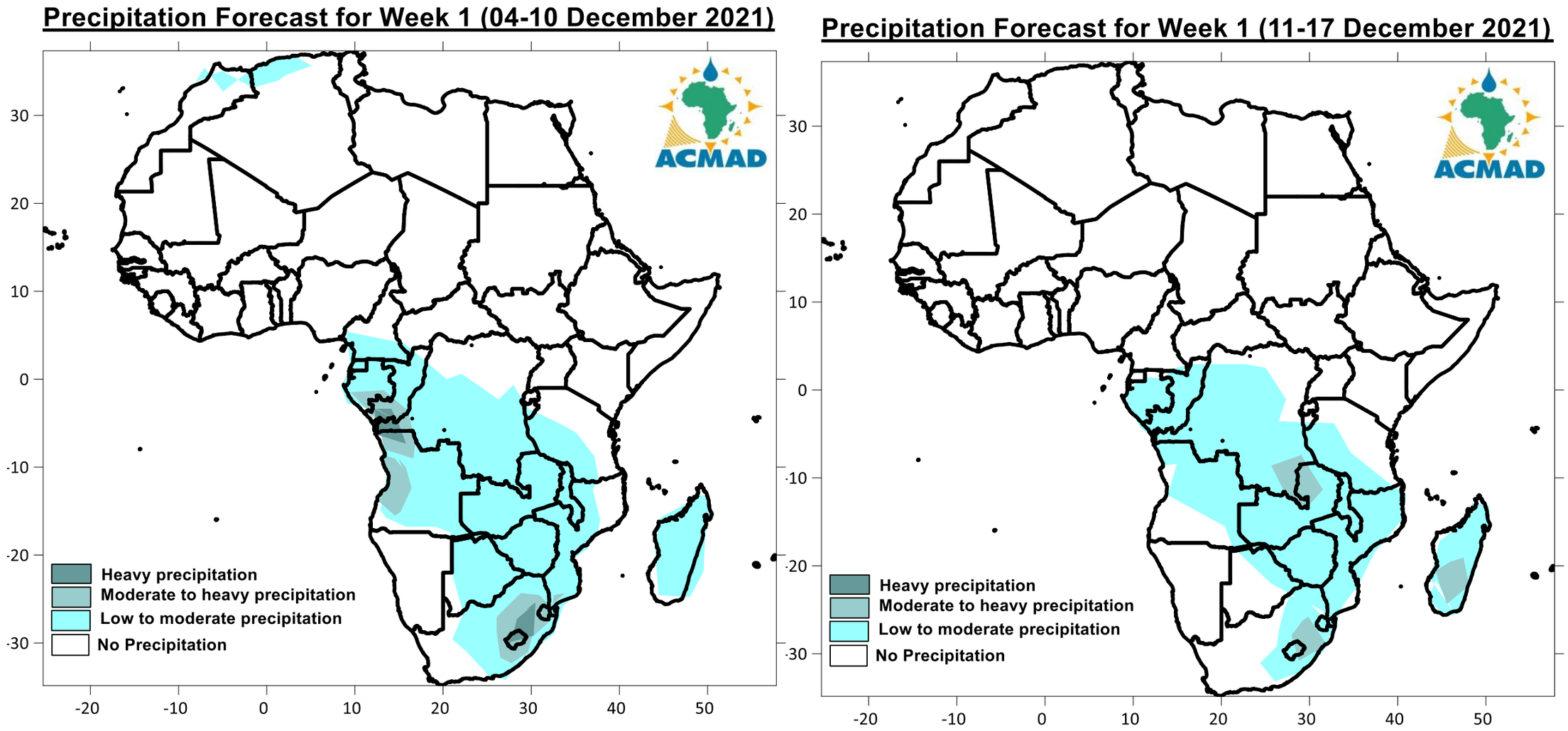


Figure 39: Precipitation Outlook for week-1(left panel) and week-2 (right panel)