DEKADAL TECHNICAL NOTE FOR THIRD DEKAD OF JANUARY, 2022
AND PRECIPITATION FORECAST FOR WEEK 1 AND 2

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Edited by: Pierre KAMSU

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   - Weekly NCEP/GFS bias corrected ensemble forecast
   - GEFS weekly precip exceedance forecast
   - Weekly Precip Forecast from ECMWF (Anom and Prob.)
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   - IRI SubX precip forecast
   - Two week climatology
   - Two weeks precip forecast

1. Monitoring Climate Element

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

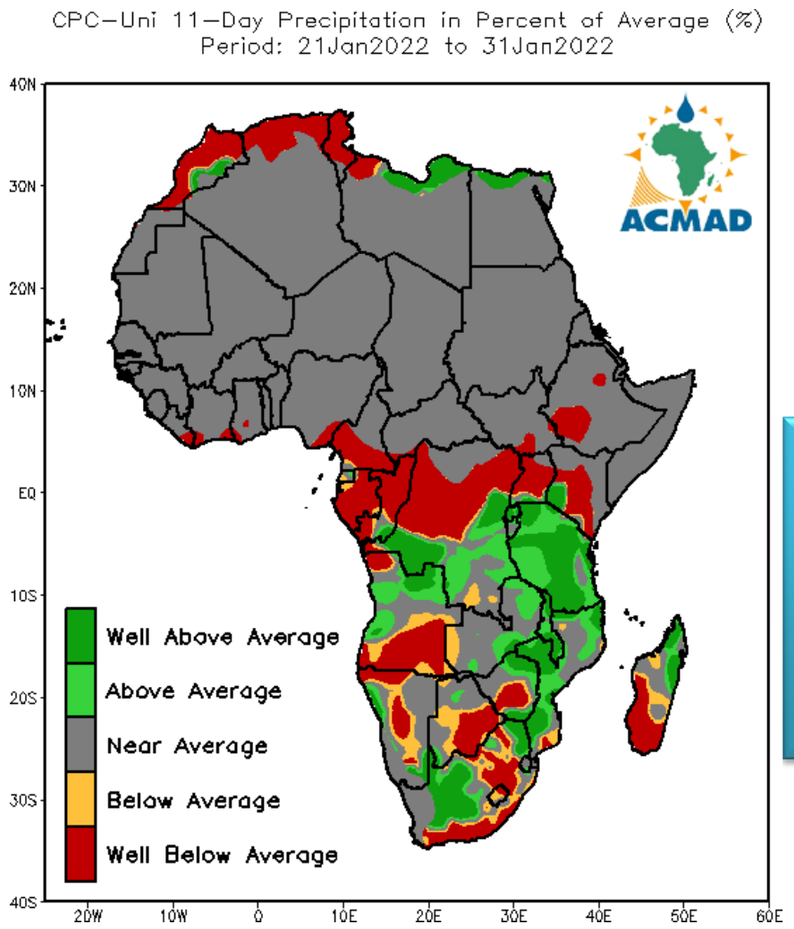


Figure 1: **This map displays decadal average precipitation in percent of average**

The figure shows a gradual extension of the rains to most of the southern hemisphere with above average to well above average precipitation observed over southern parts of Central Africa, eastern south-western of SADC region, northern Madagascar and north-west of Northern Africa. Below to well below average precipitation dominated over most of the east African countries from Morocco, Algeria, central of western parts of Central Africa region, Kenya, Uganda, Angola, Botswana, South Africa and north of Madagascar.

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

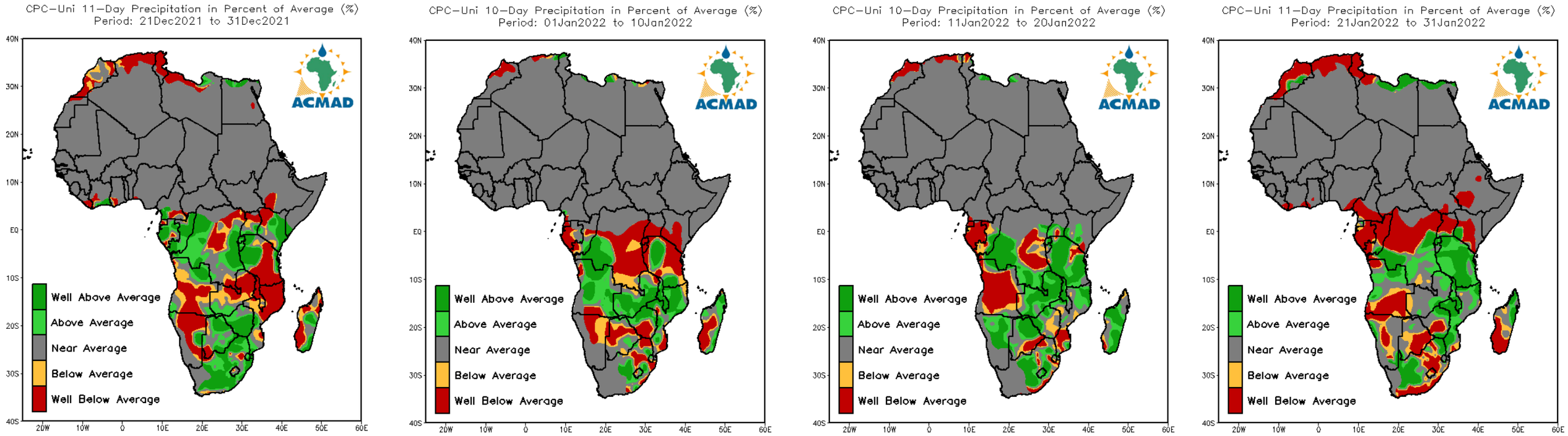
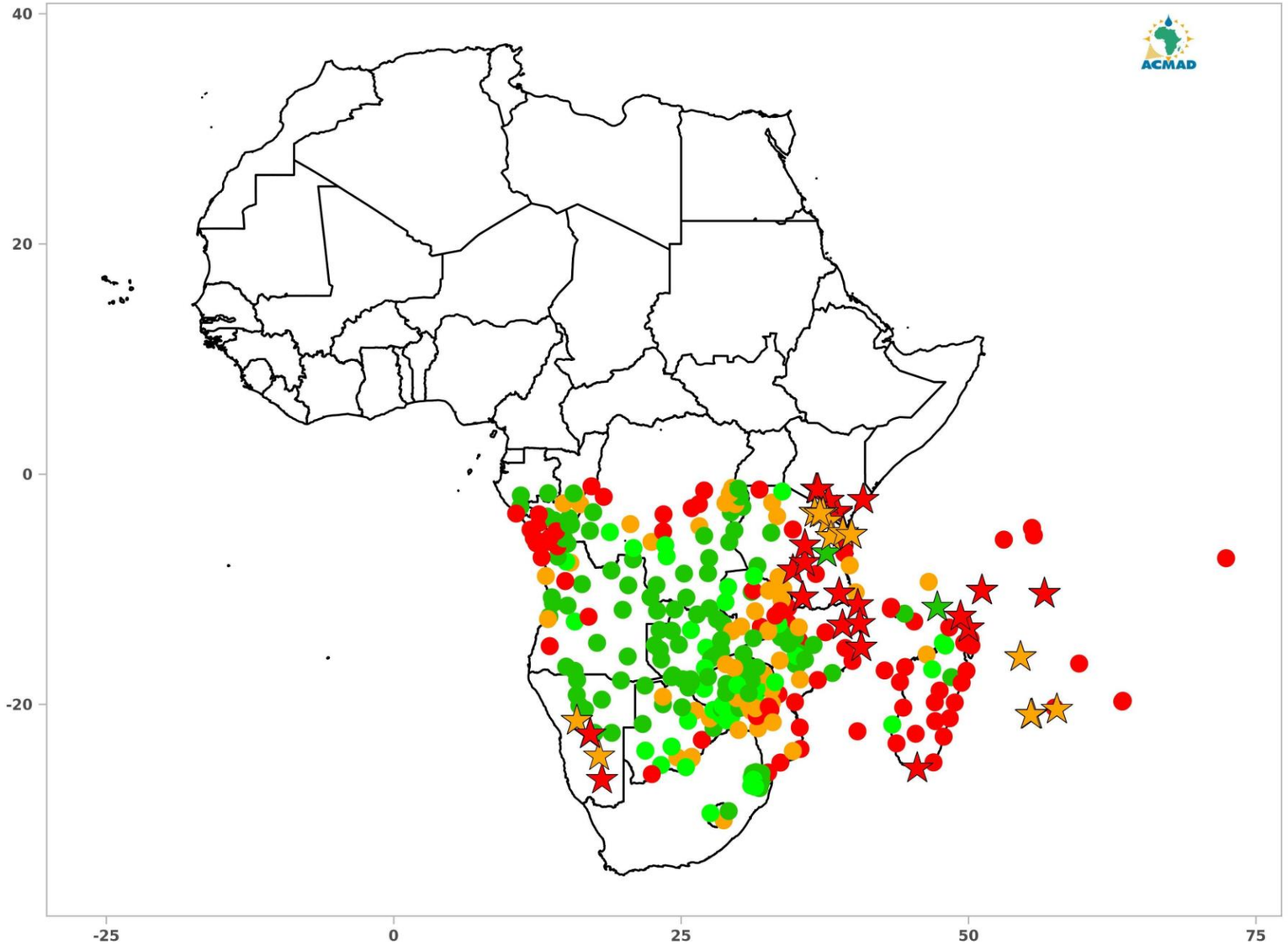


Figure 2: **This maps display decadal average precipitation in percent of average**

The below to well below average precipitation observed in the third dekad of December 2021 and the fist two dekads of January with rainfall activities centered around the Northern Africa, Central African and Southern Africa regions. The persisted deficit into the last dekad of January with more spatial coverage though dominated by below to well below average precipitation in the northern , central and western parts of the continent with countries like Morocco, Algeria, DRC, Angola Botswana affected. The above to well above average precipitation was observed in most of the Central Africa and SADC regions from DRC, Zambia, Tanzania, Mozambique South Africa and northern Madagascar.

MONITORING OF OBSERVED ANOMALIES ON THE START OF THE AGRICULTURE SEASON AND OUTLOOK.
MONITORING PERIOD: JULY 2021-JANUARY 2022.
CURRENT MONITORING WEEK: LAST WEEK OF DECEMBER.
OUTLOOK VALIDITY PERIOD: JANUARY 01 TO JANUARY 14 2022.
DATE OF ISSUE: DECEMBER 31-2021.



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

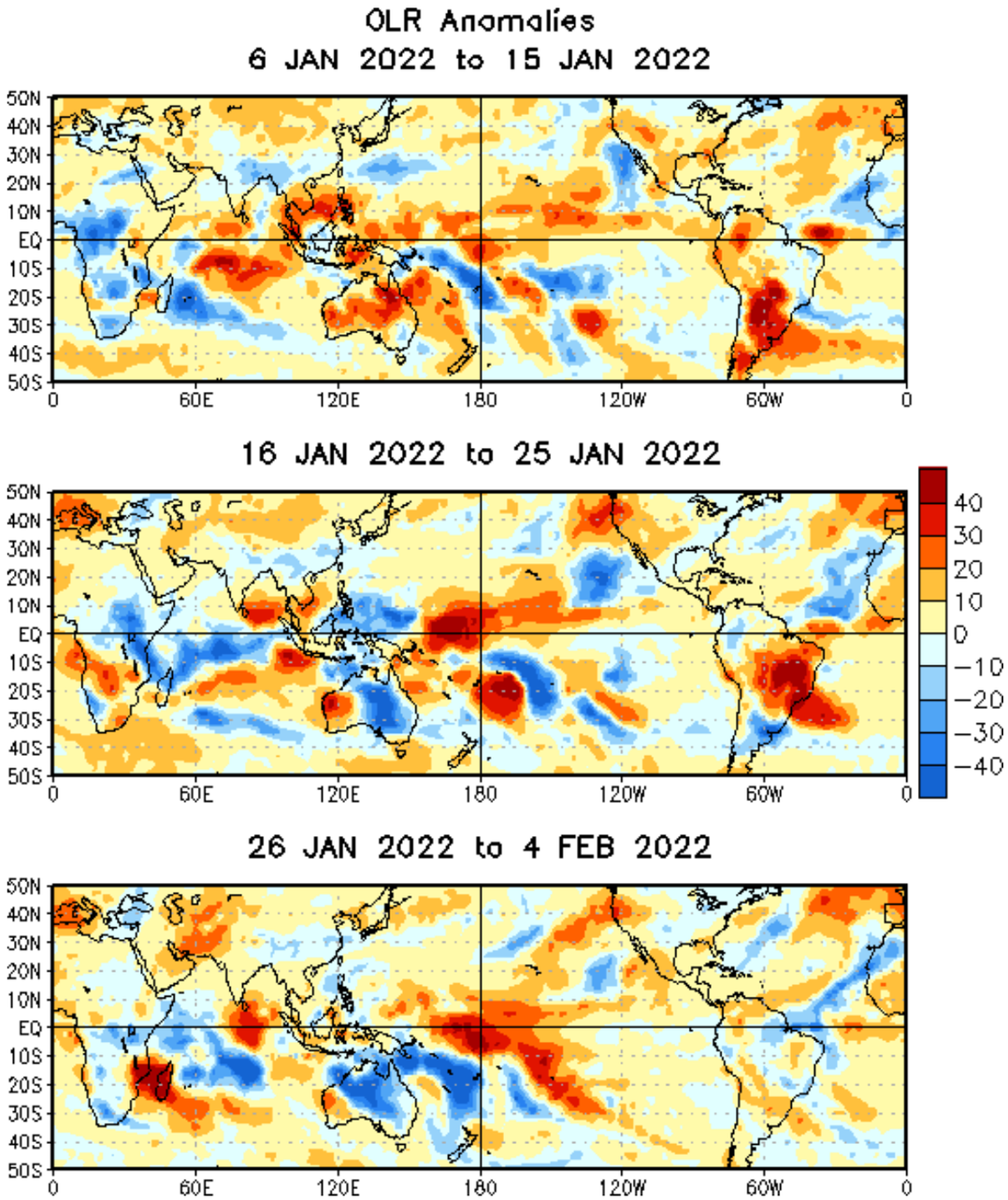


Figure 4: **Past 3 weeks OLR anomalies**

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 Jan. 2022

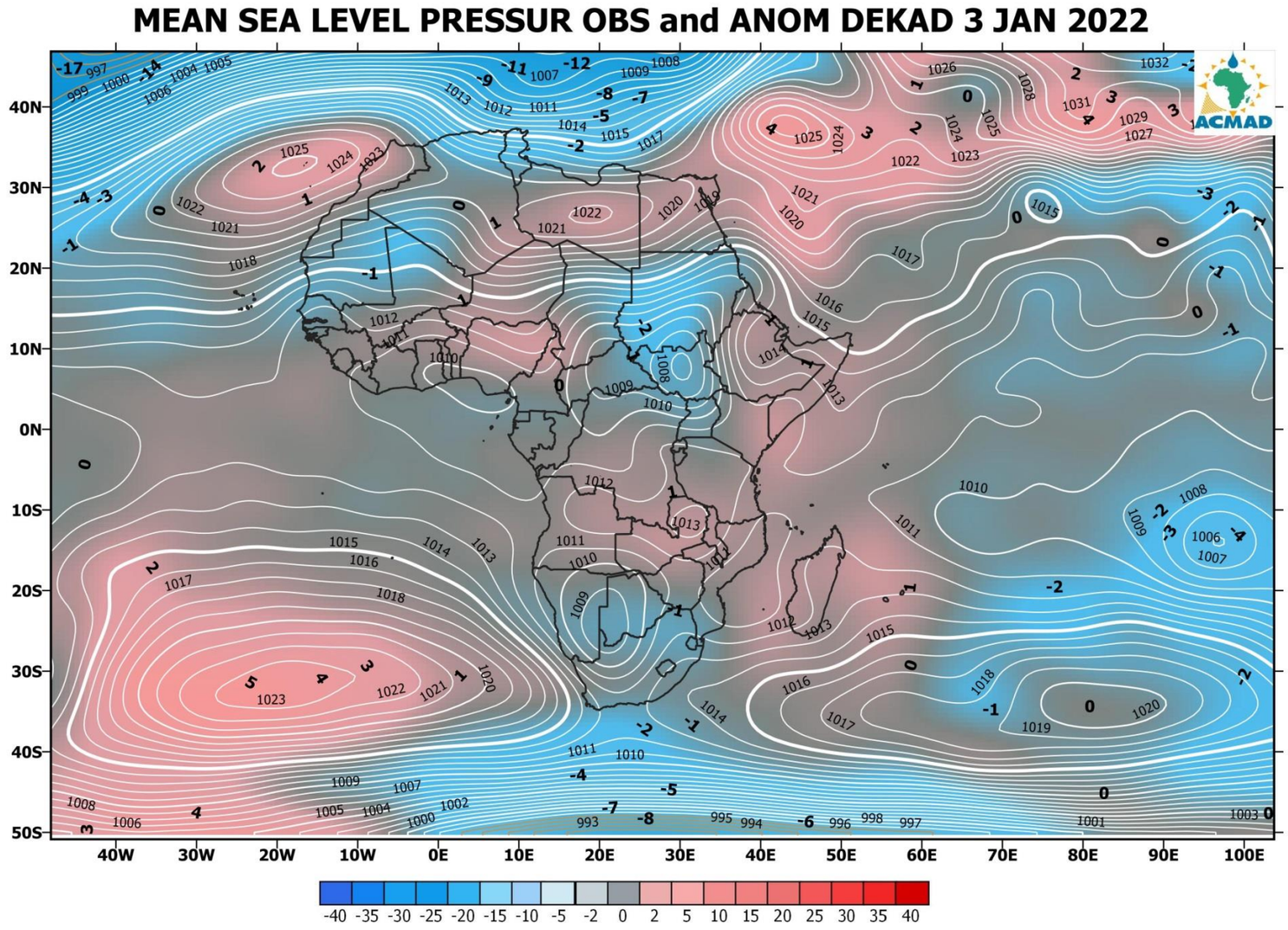


Figure 5: **MSLP observation versus anomaly**

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

Wind Anomalies for the 1st Dekad of Nov. 2021 @ 850hpa, 700hpa and 200hPa

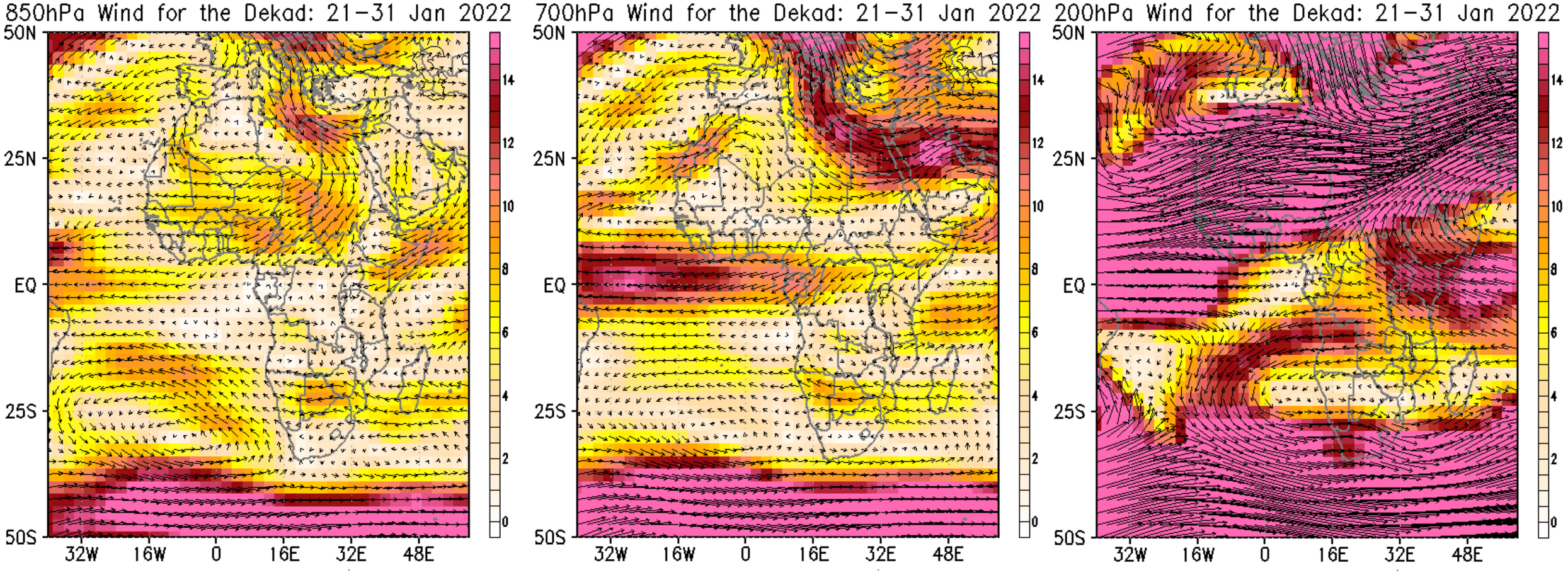


Figure 6: **Wind anomalies for 850hpa and 700hPa**

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

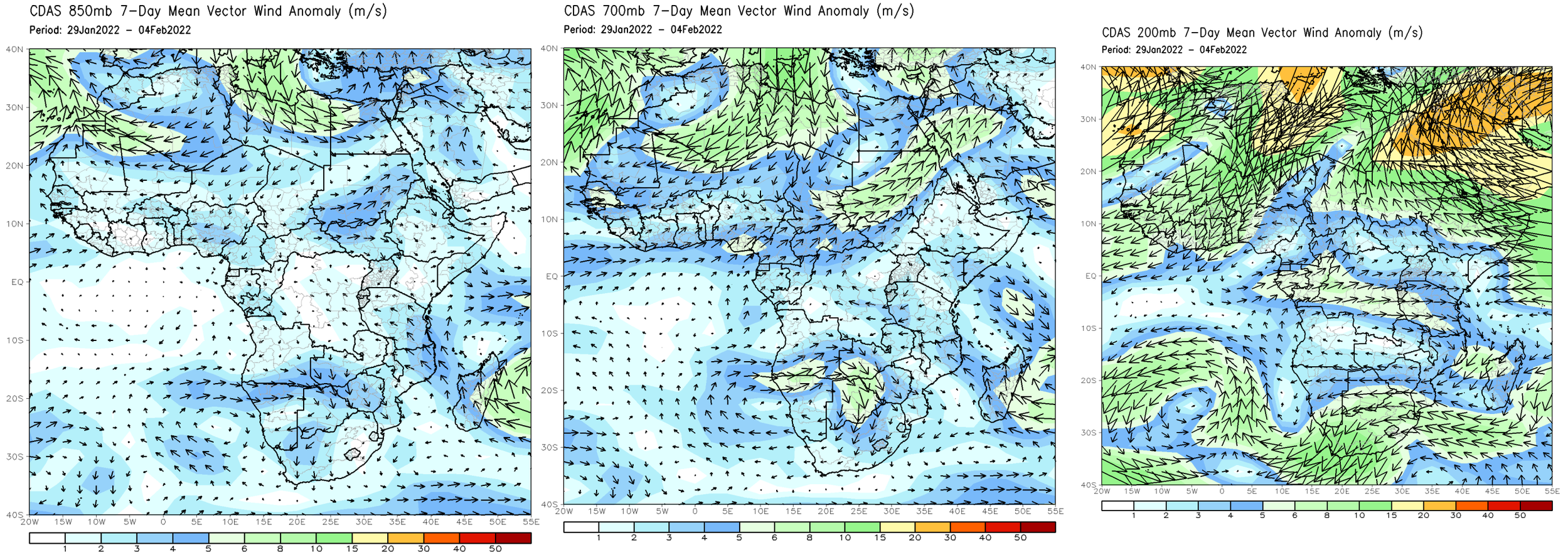


Figure 7: **Wind anomalies for 850hpa, 700hPa and 200hpa**

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 1st Dekad of Nov 2021

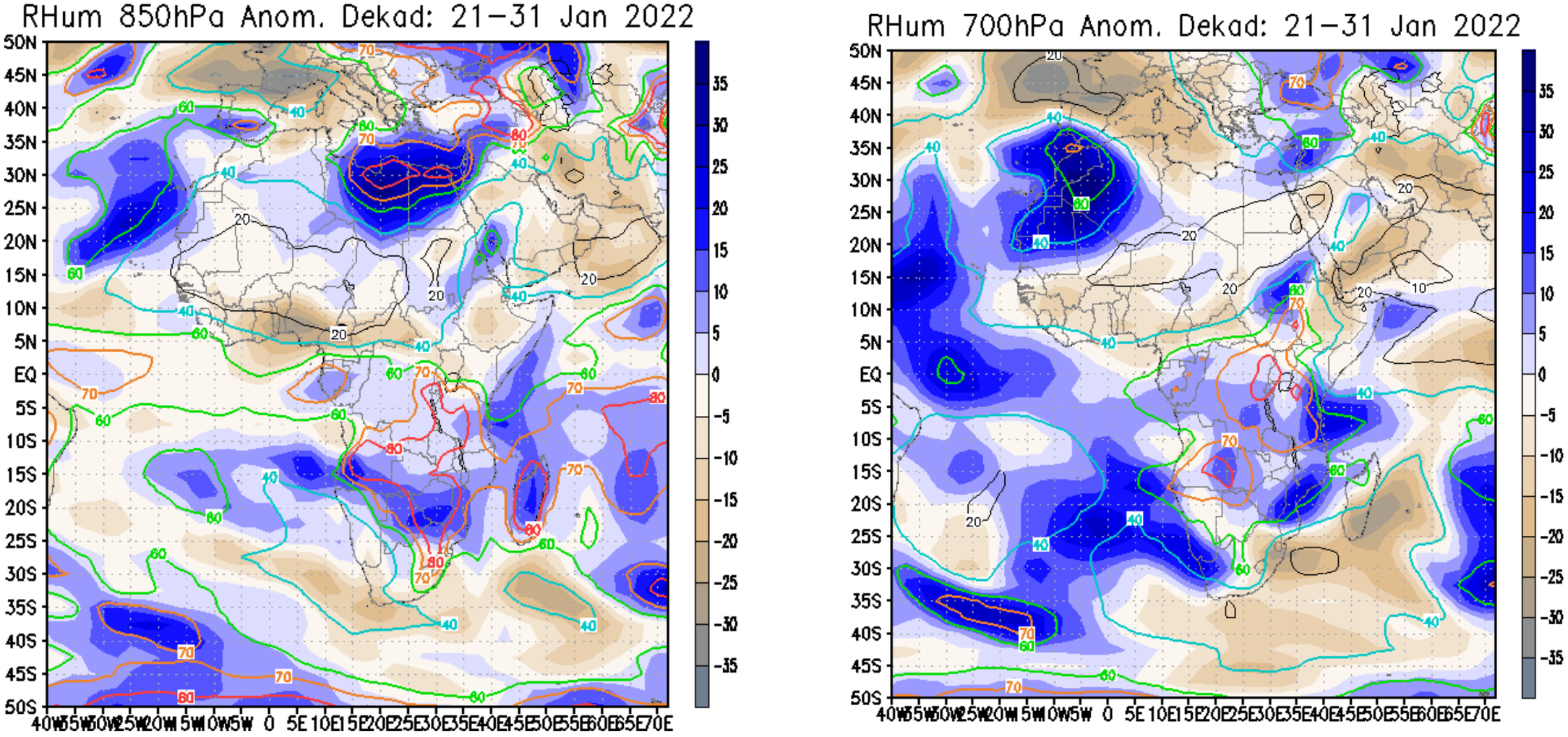
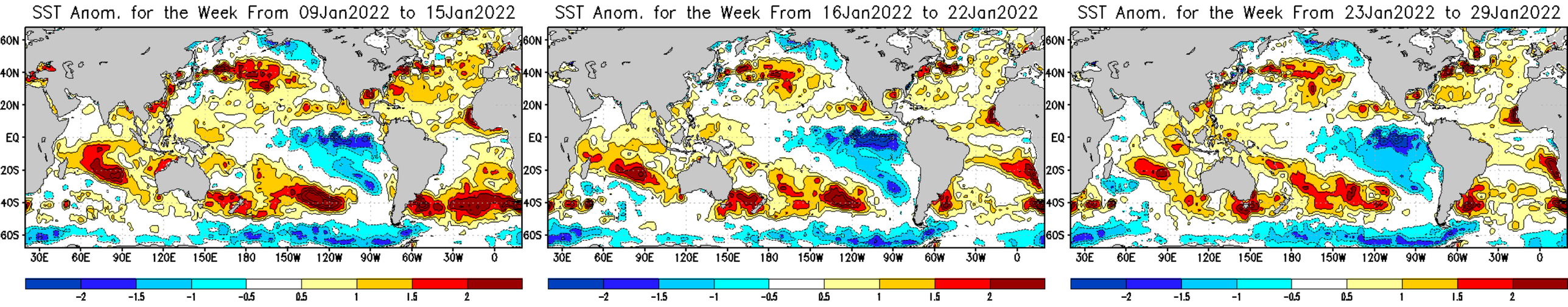


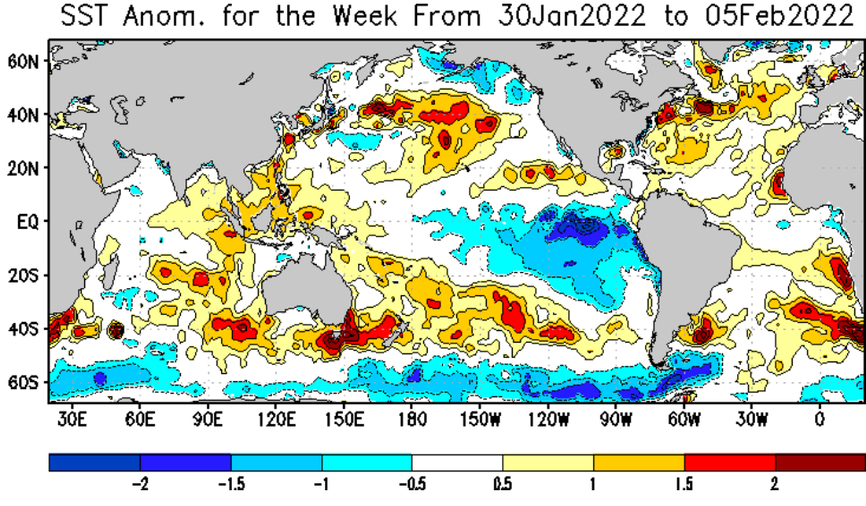
Figure 8: **Relative Humidity Anomaly at 850hPa (left) and 700hPa (right)**

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





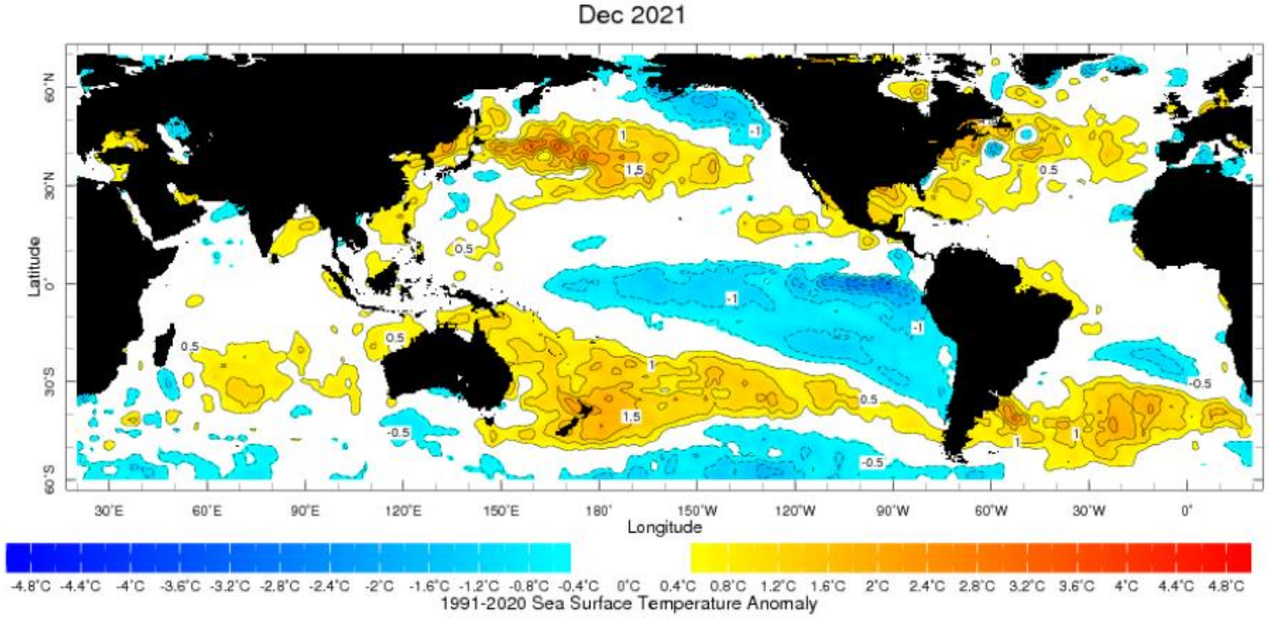
These maps display weekly sea surface temperature anomalies over the globe, and they depict mostly normal to cooling conditions over the equatorial Pacific with warming observed over northern Atlantic, Gulf of Guinea while neutral to cooling ssts are observed over the south-western Indian ocean.

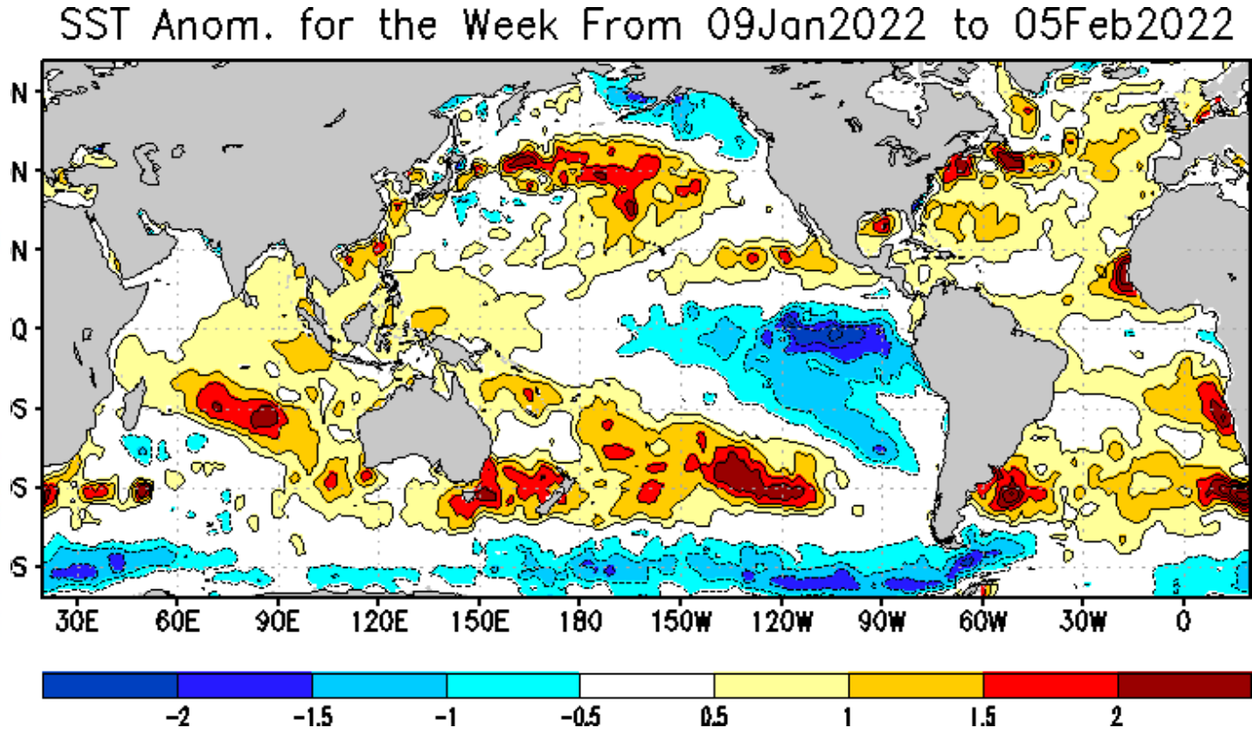
Figure 9: Maps display weekly sea surface temperature anomalies over the globe for last four weeks

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

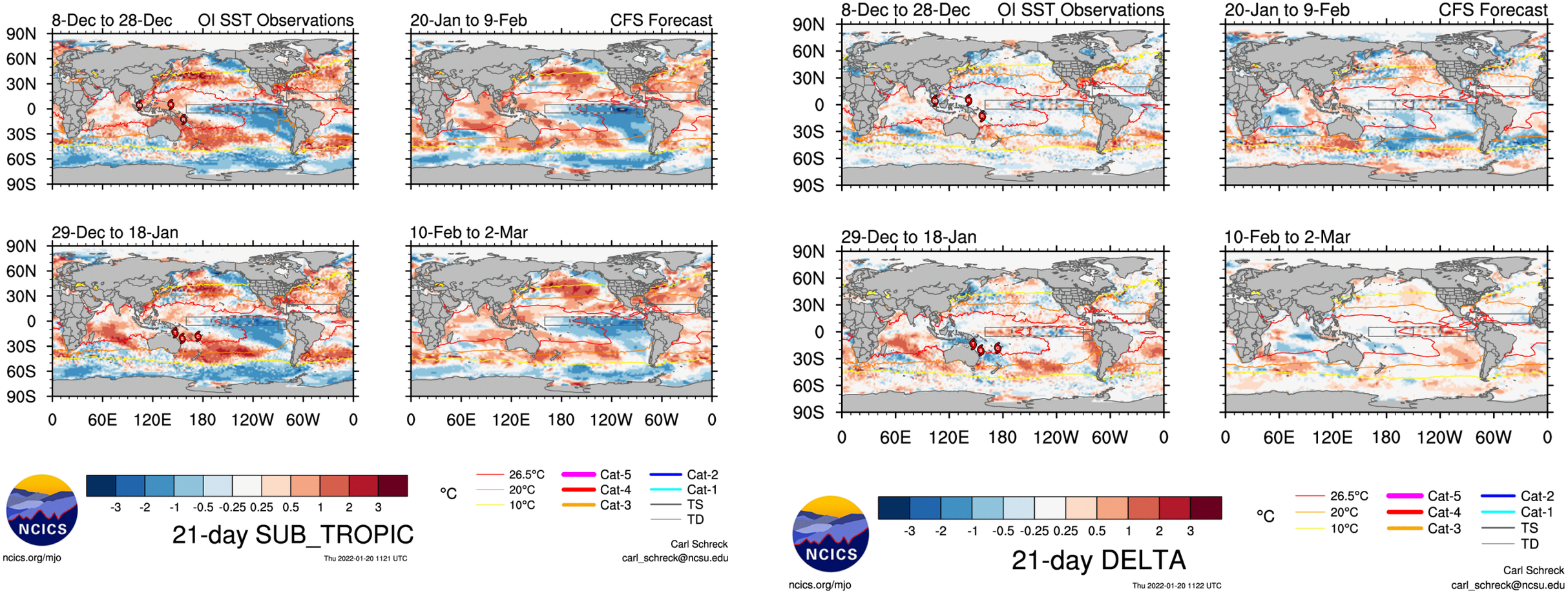
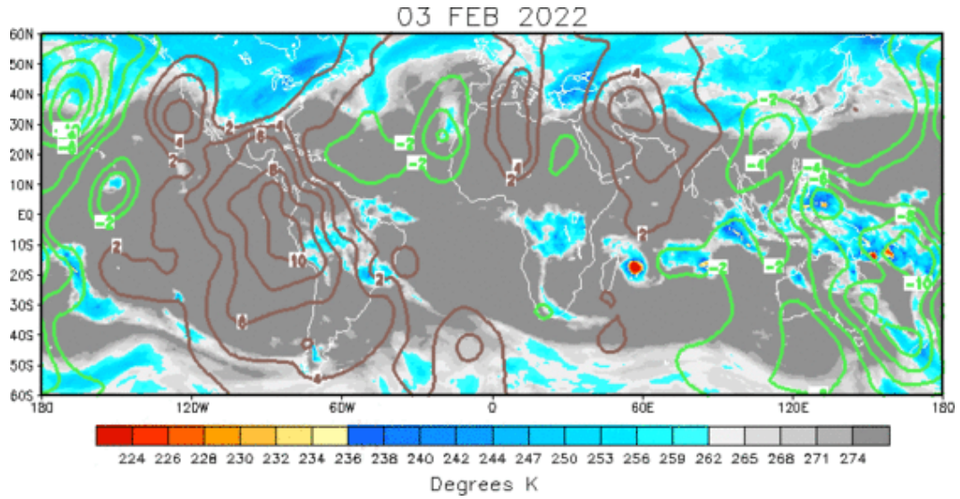
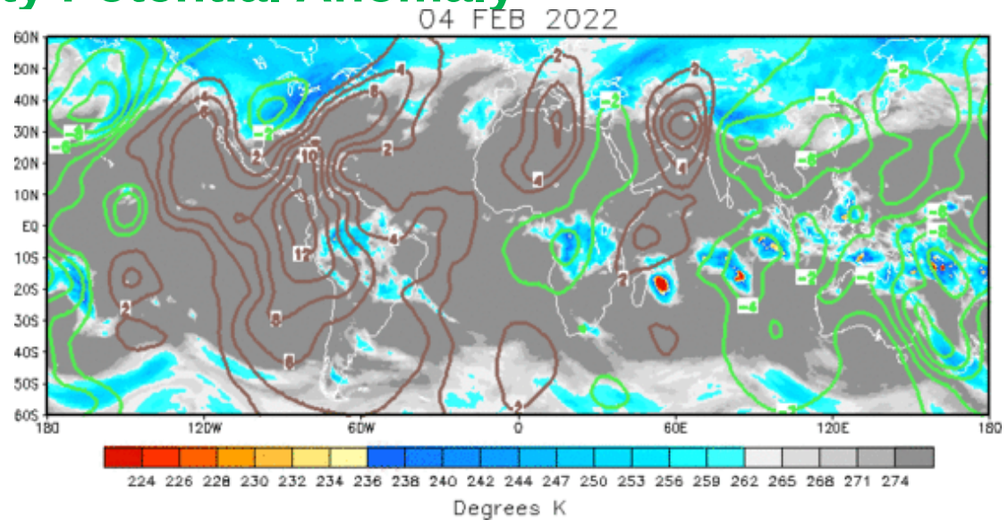


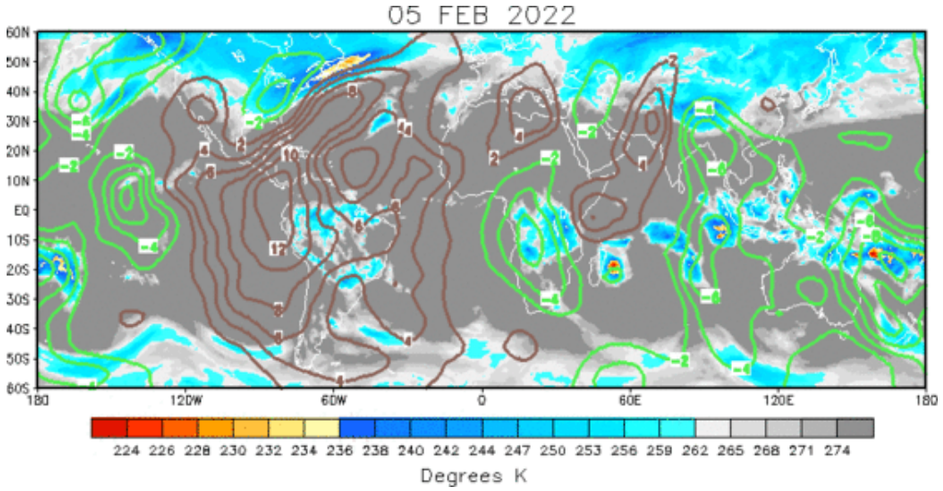
Figure 11: Sea Surface Temperature and FCST for two week

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







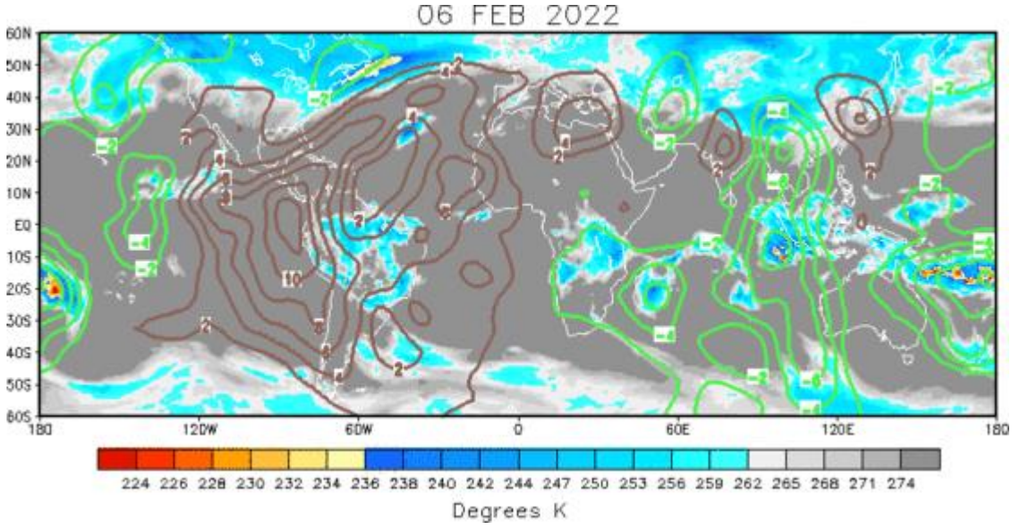
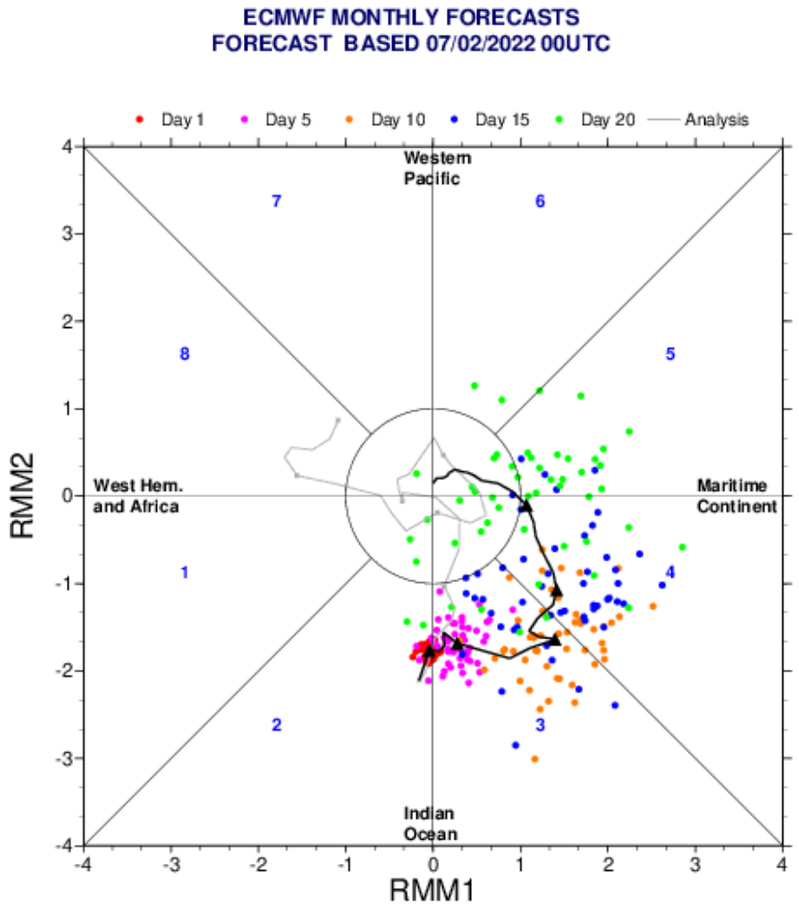
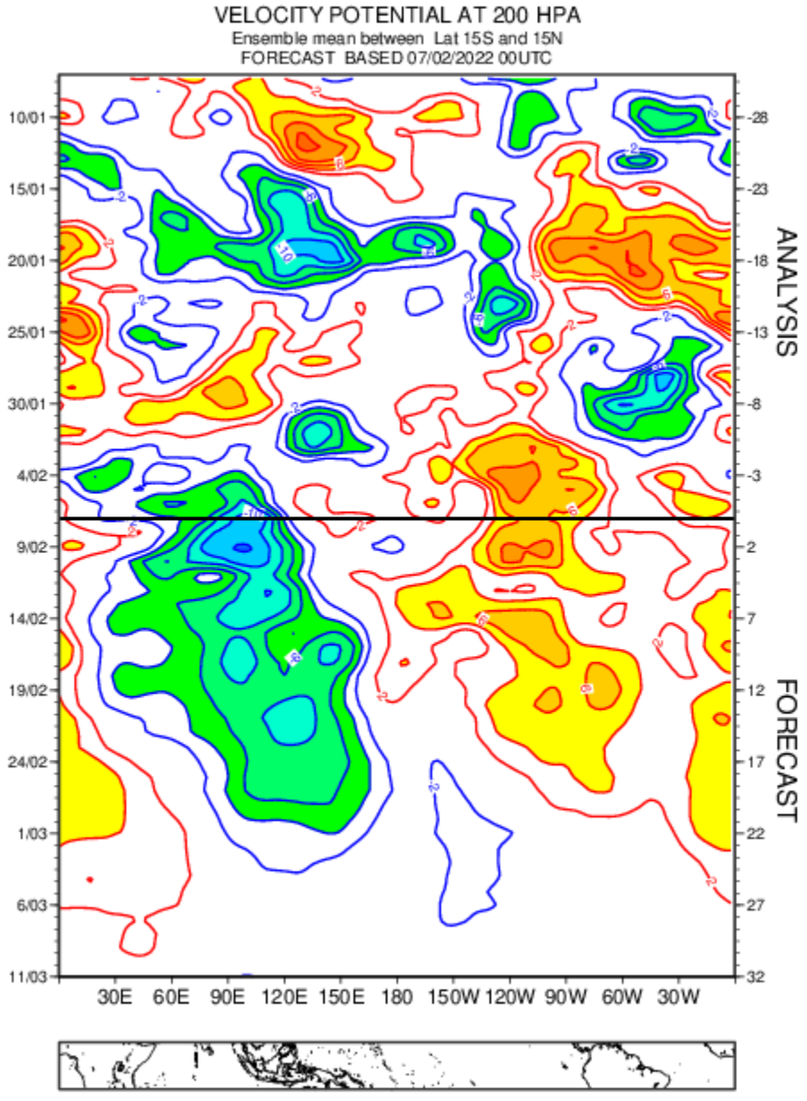


Figure 12: **IR image and Velocity Potential anomalies**

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

ECMWF Madden-Julian-Oscillation (MJO) Forecast





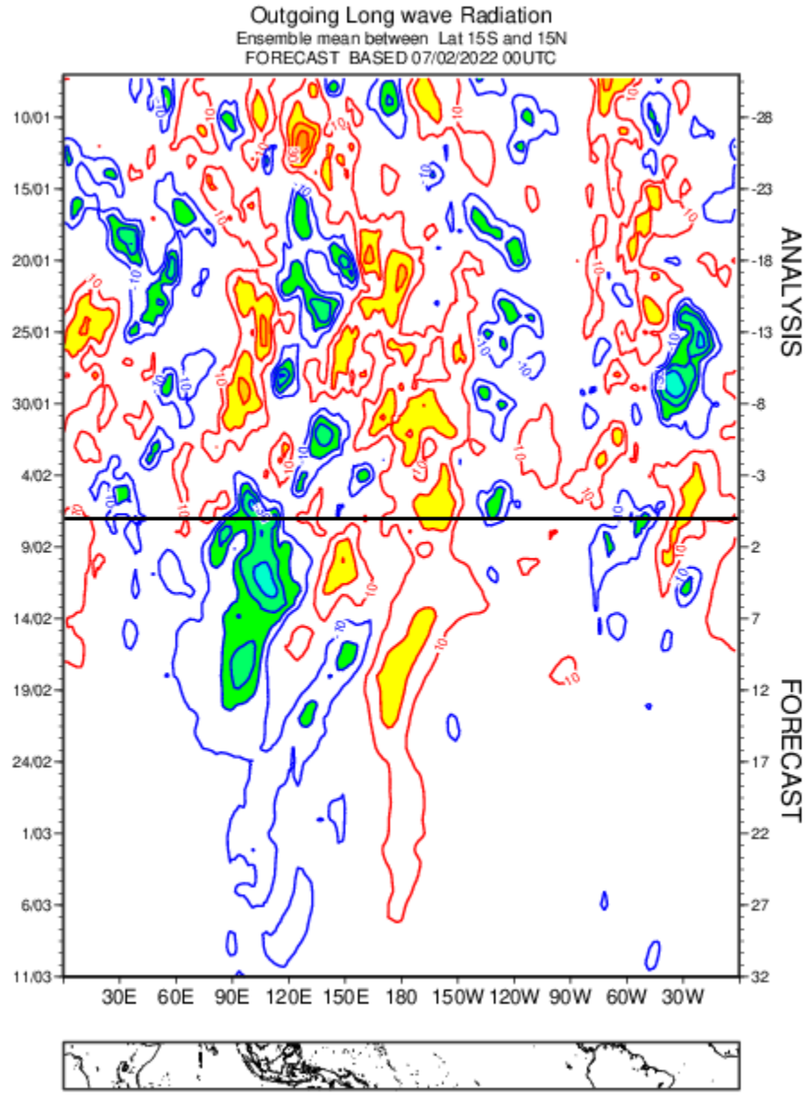
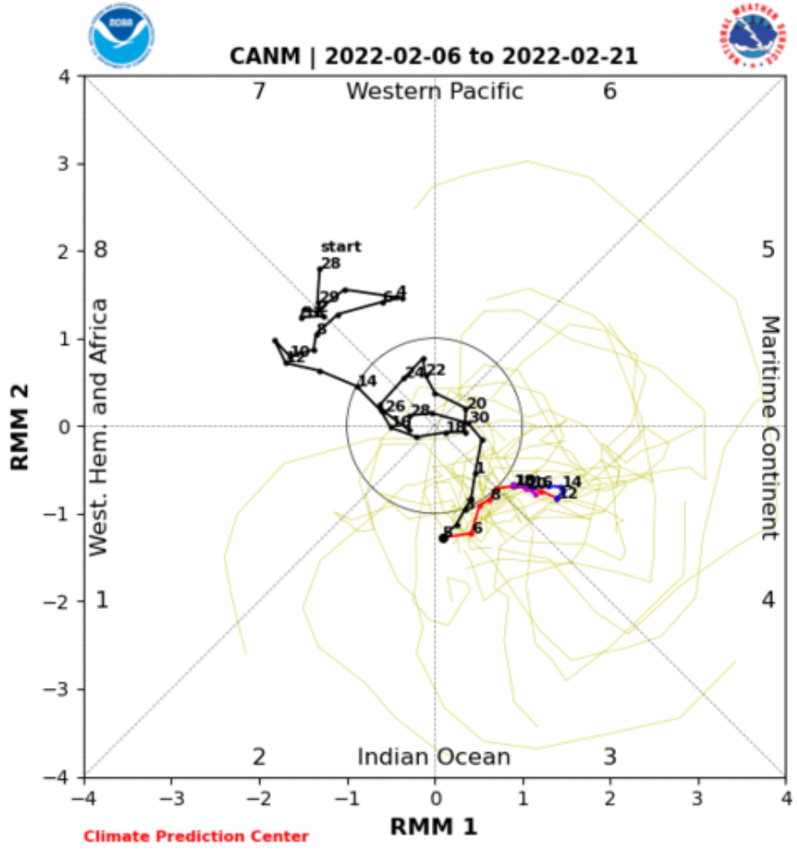
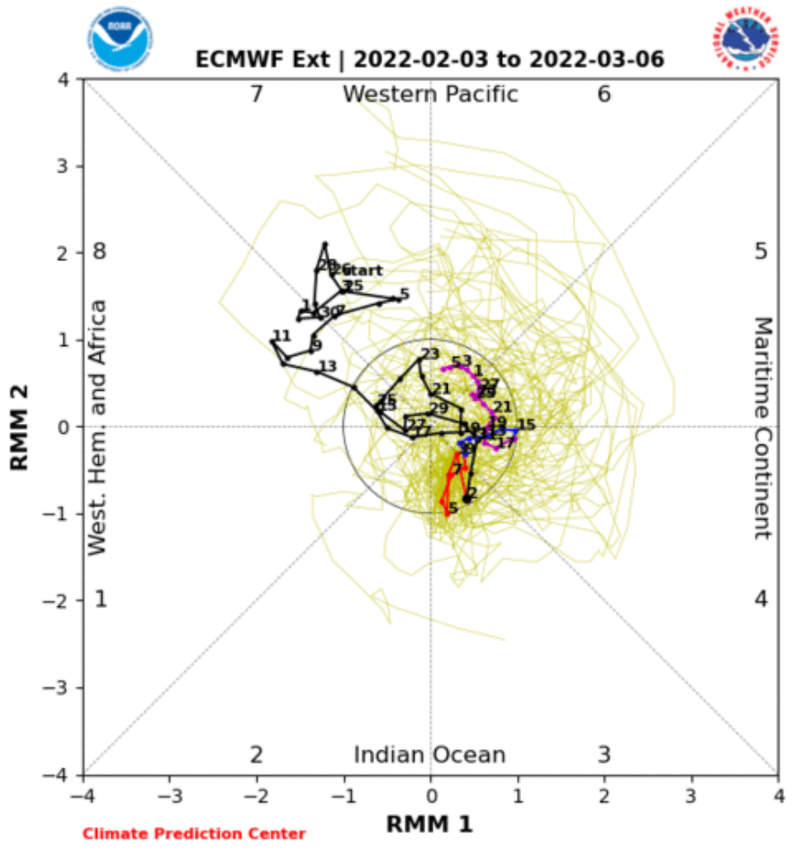


Figure 13: **ECMWF MJO Forecast**

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





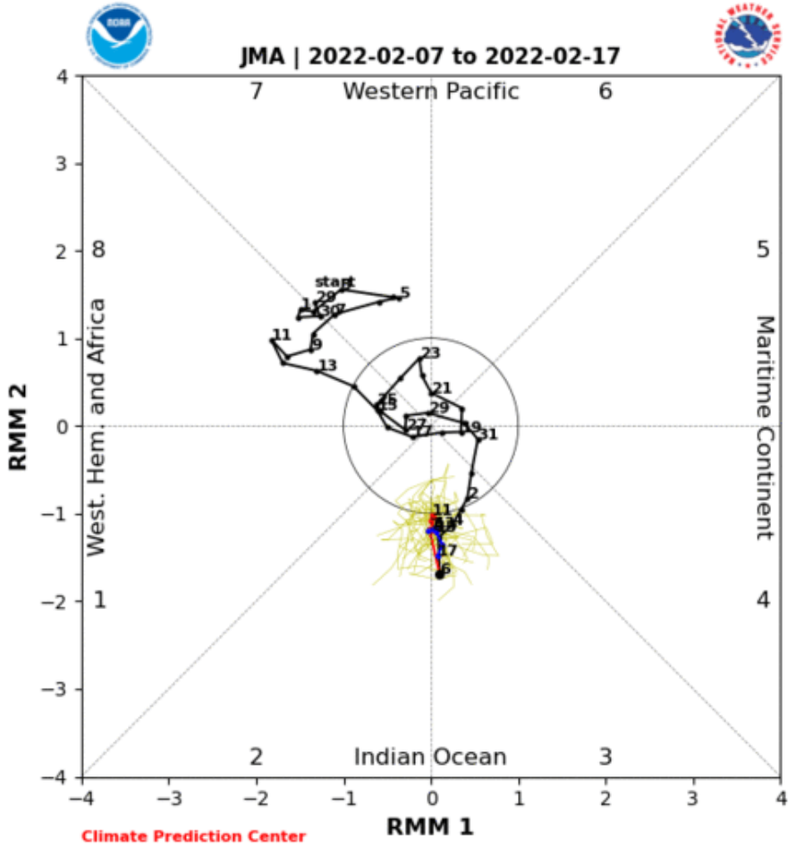


Figure 14: Forecasts for ECMWF, NCEP and UK Met Office

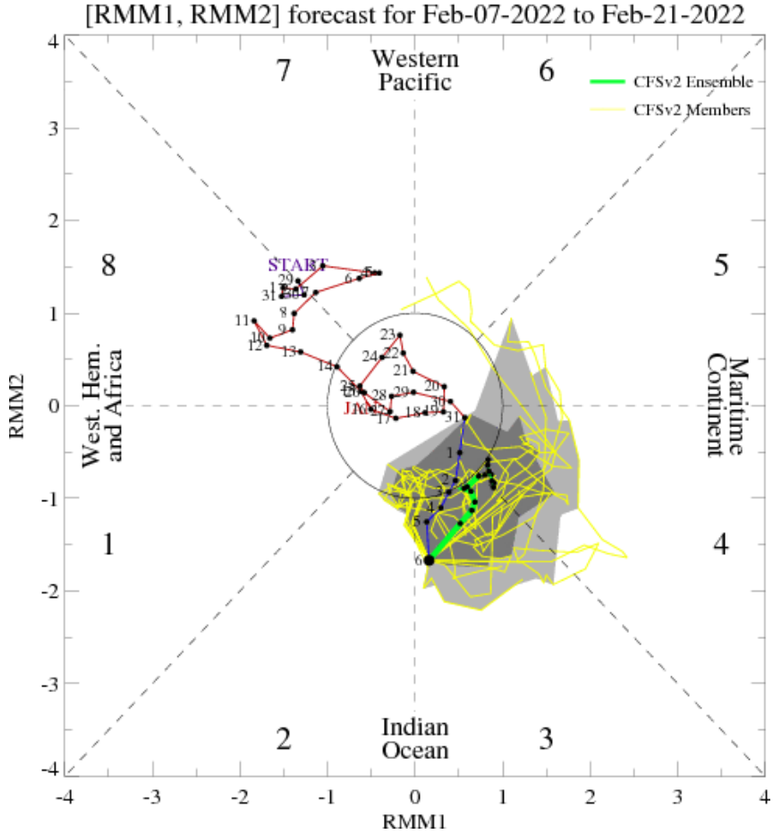
https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/emon.shtml

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

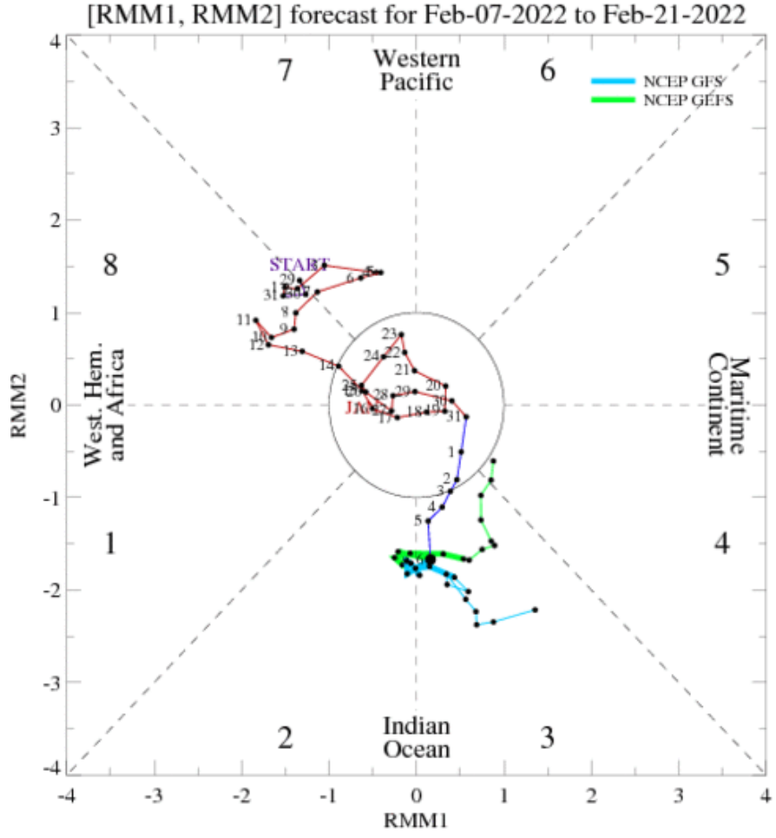
https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_mjo_family_index?facets=undefined&time=2019081500,0,2019081500

MJO FORECAST

Ensemble GFS Phase Diagram



Operational GFS Phase Diagram



Statistical GFS Phase Diagram

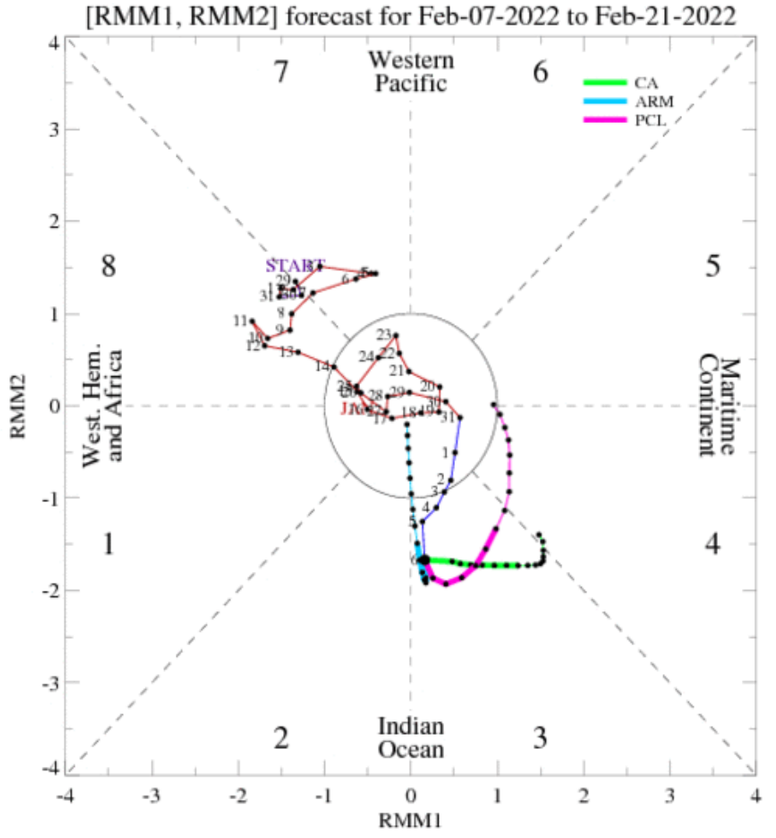


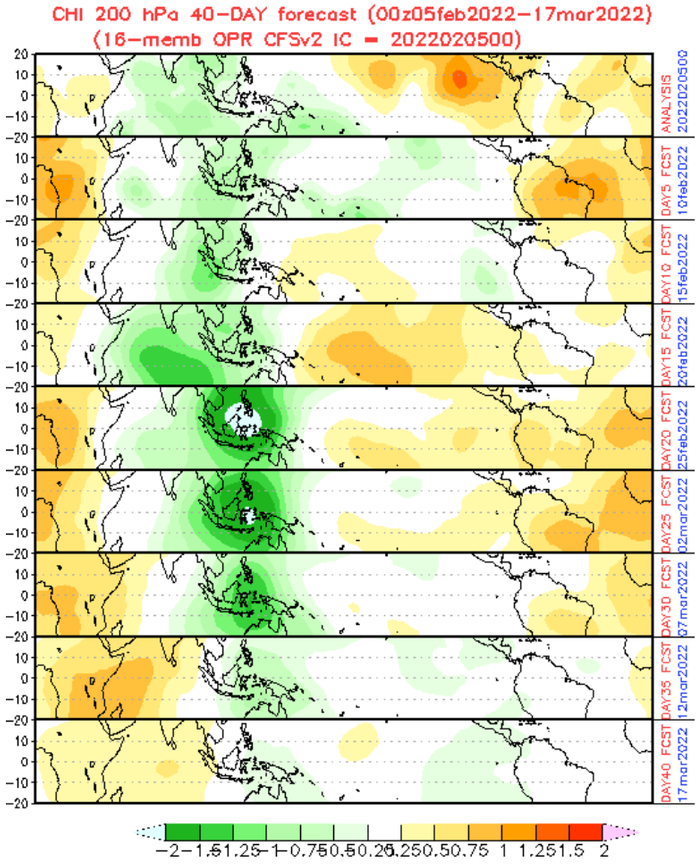
Figure 15: MJO forecast

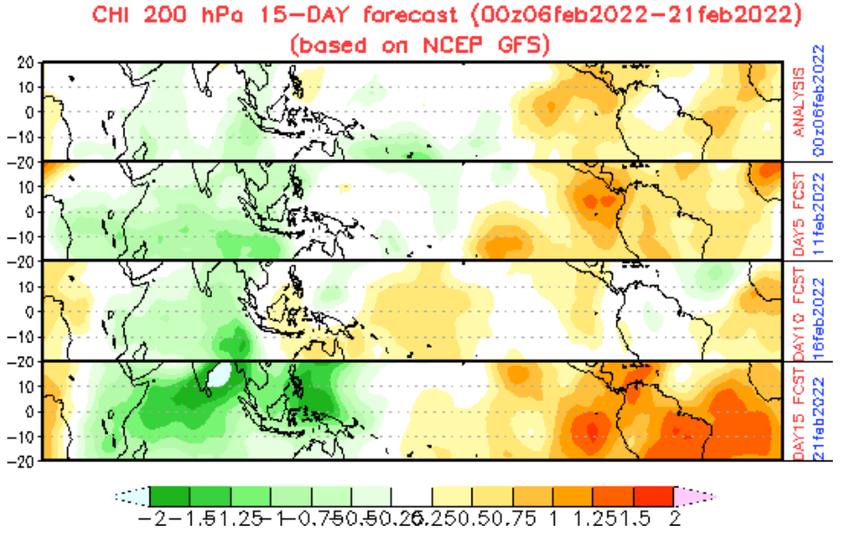
https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/foregfs.shtml

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





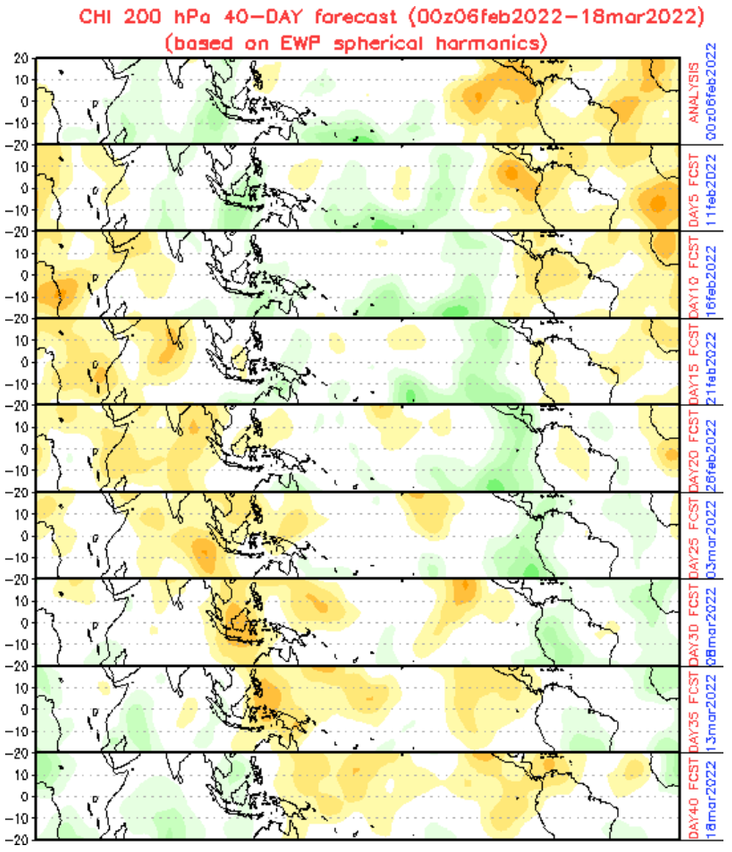


Figure 16: MJO forecast

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

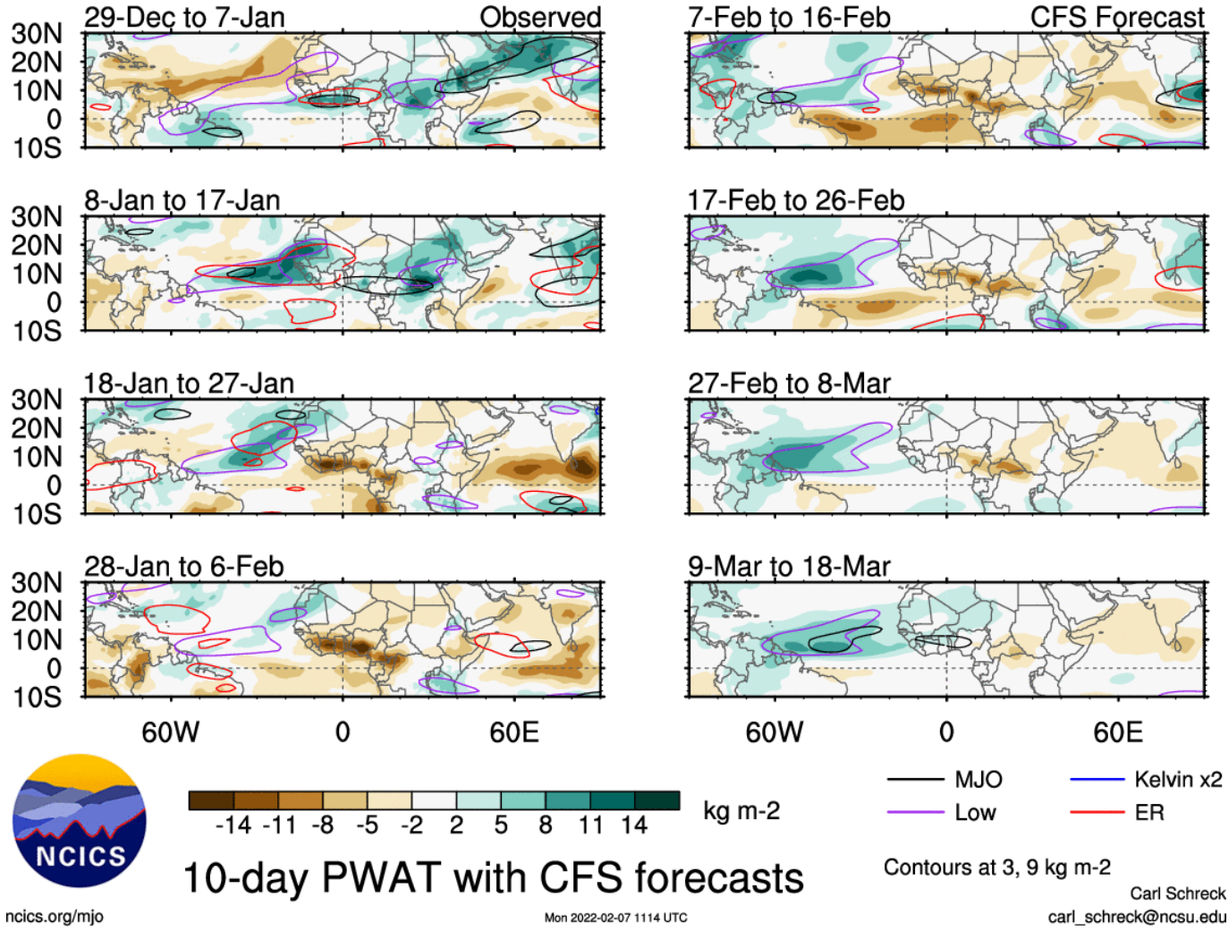


Figure 7a: Africa

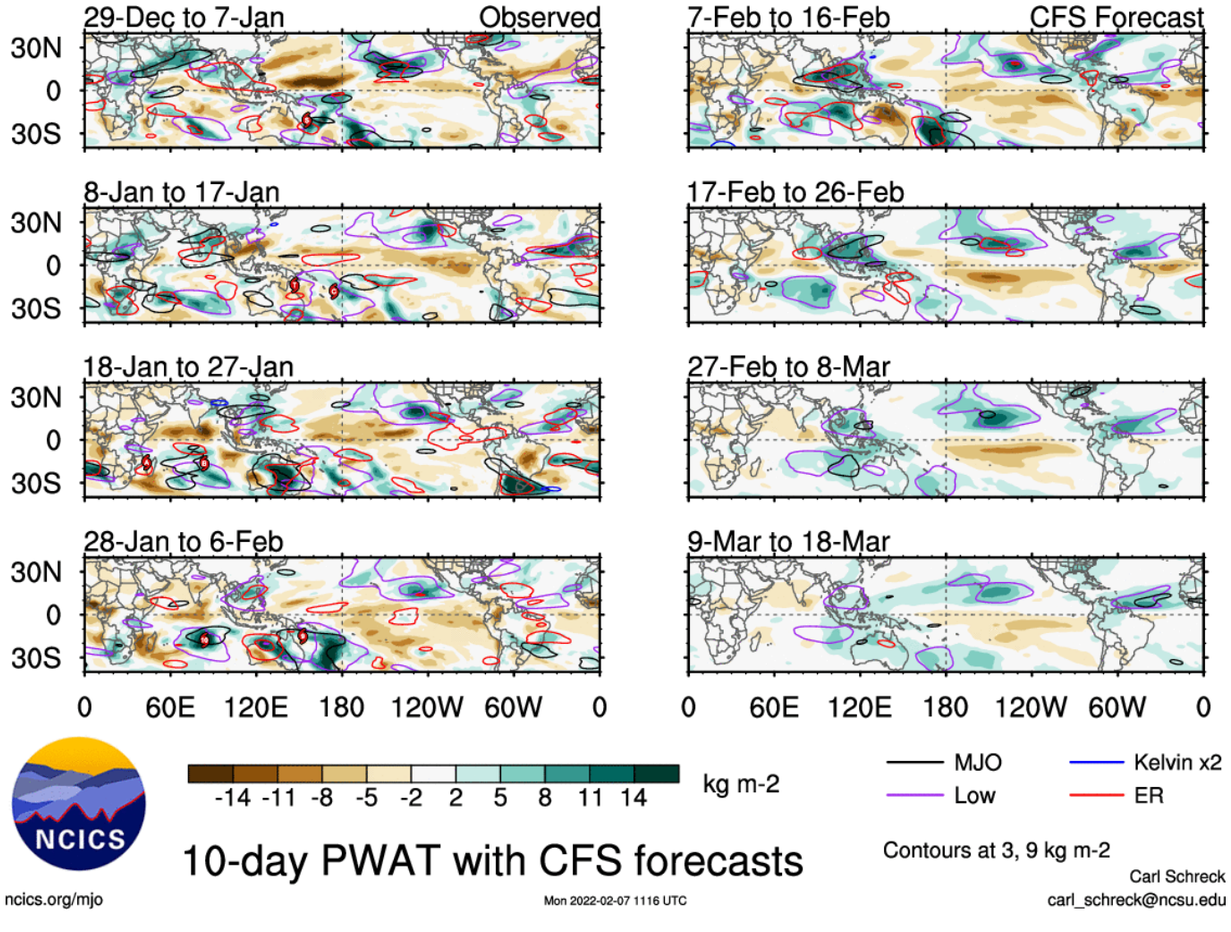


Figure 7b: Global

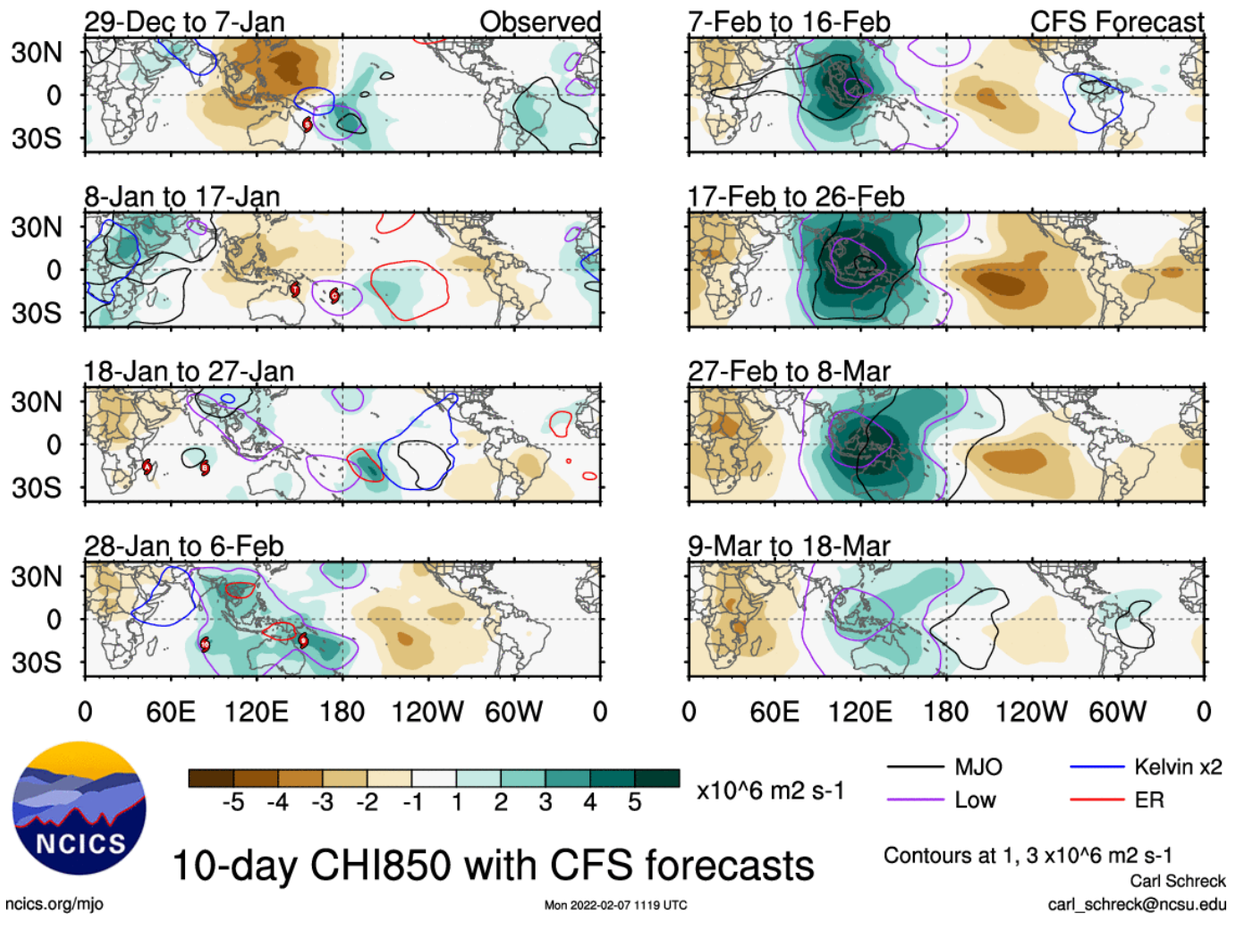
https://ncics.org/portfolio/monitor/mjo/

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



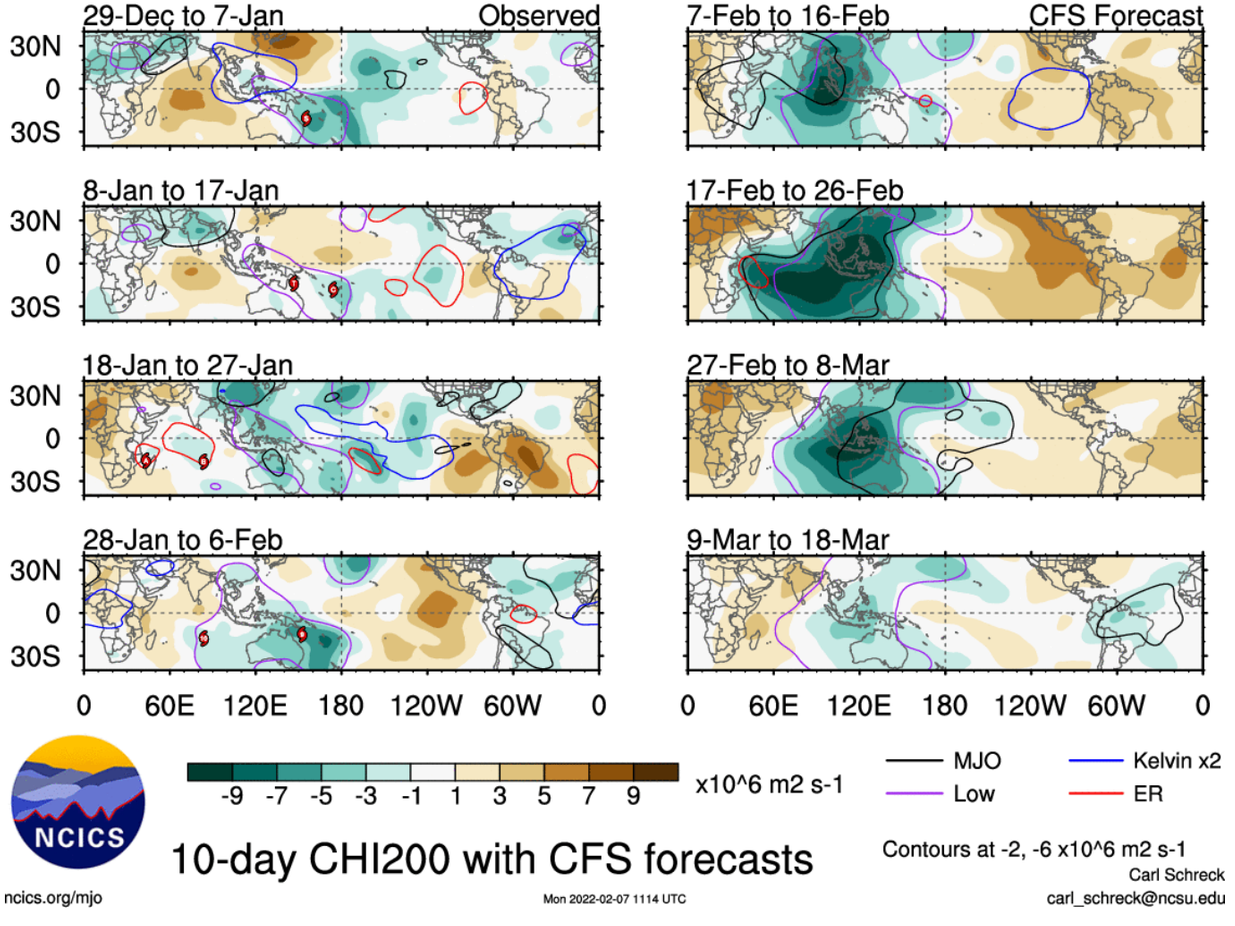
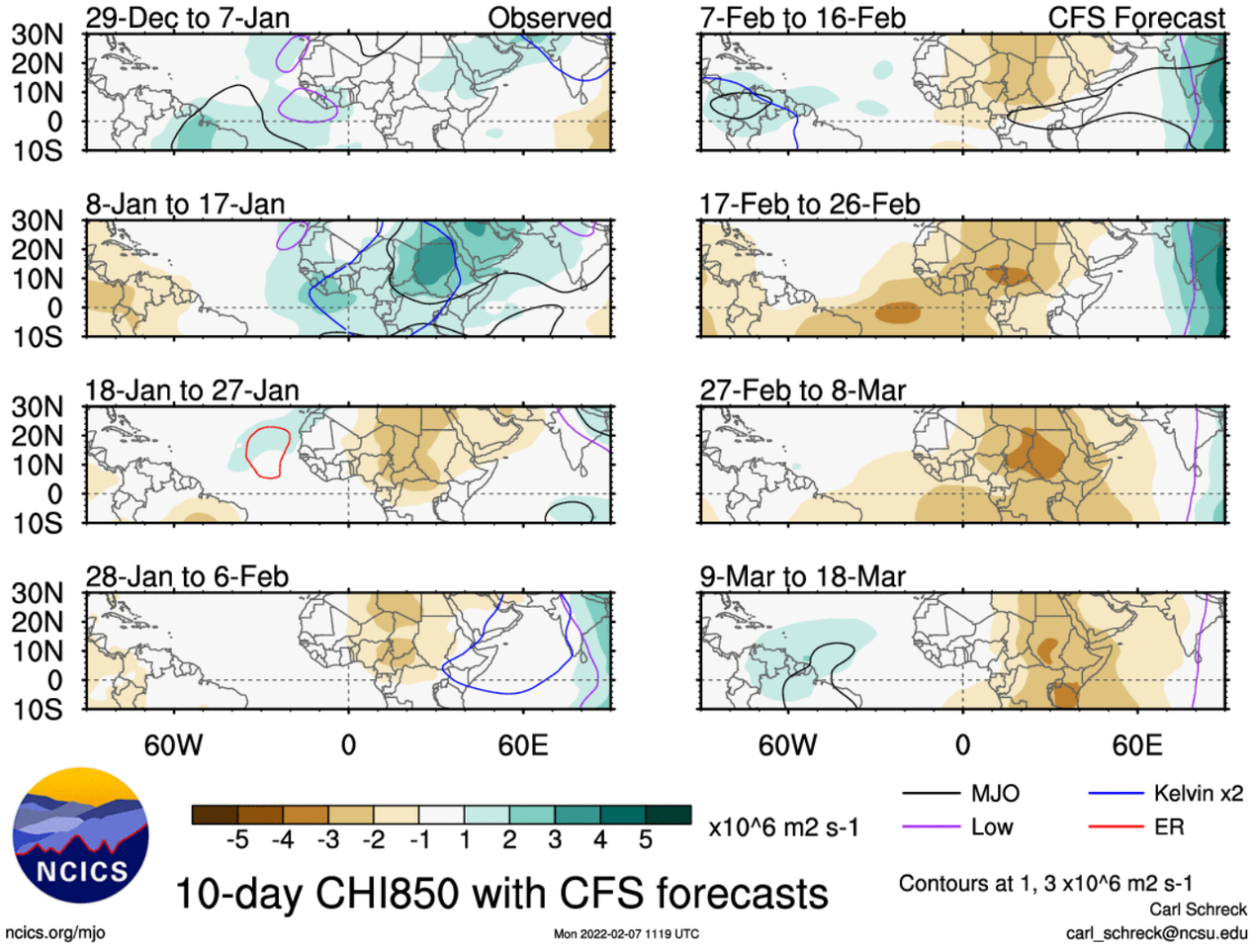


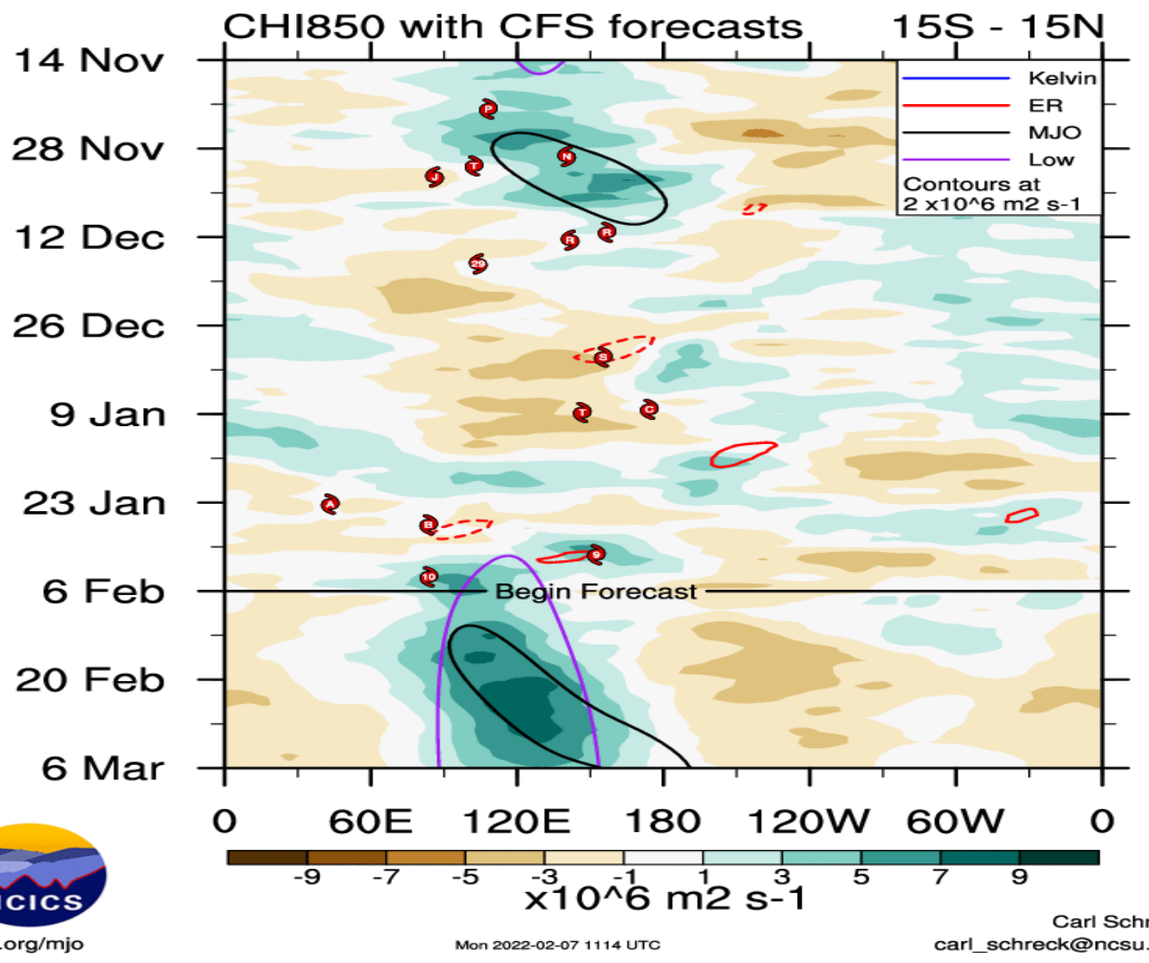
Figure 18a and b: Past four week and month velocity potential

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



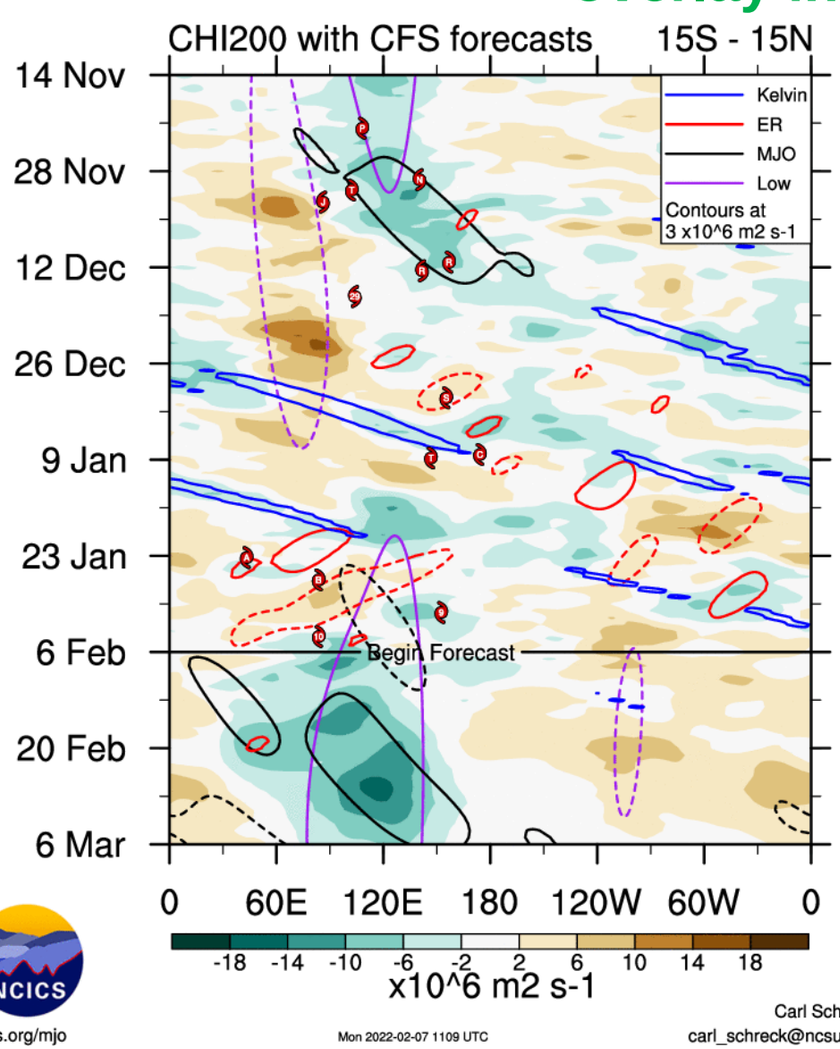


https://ncics.org/pub/mjo/v2/map/chi850.cfs.all.africa.10.png

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



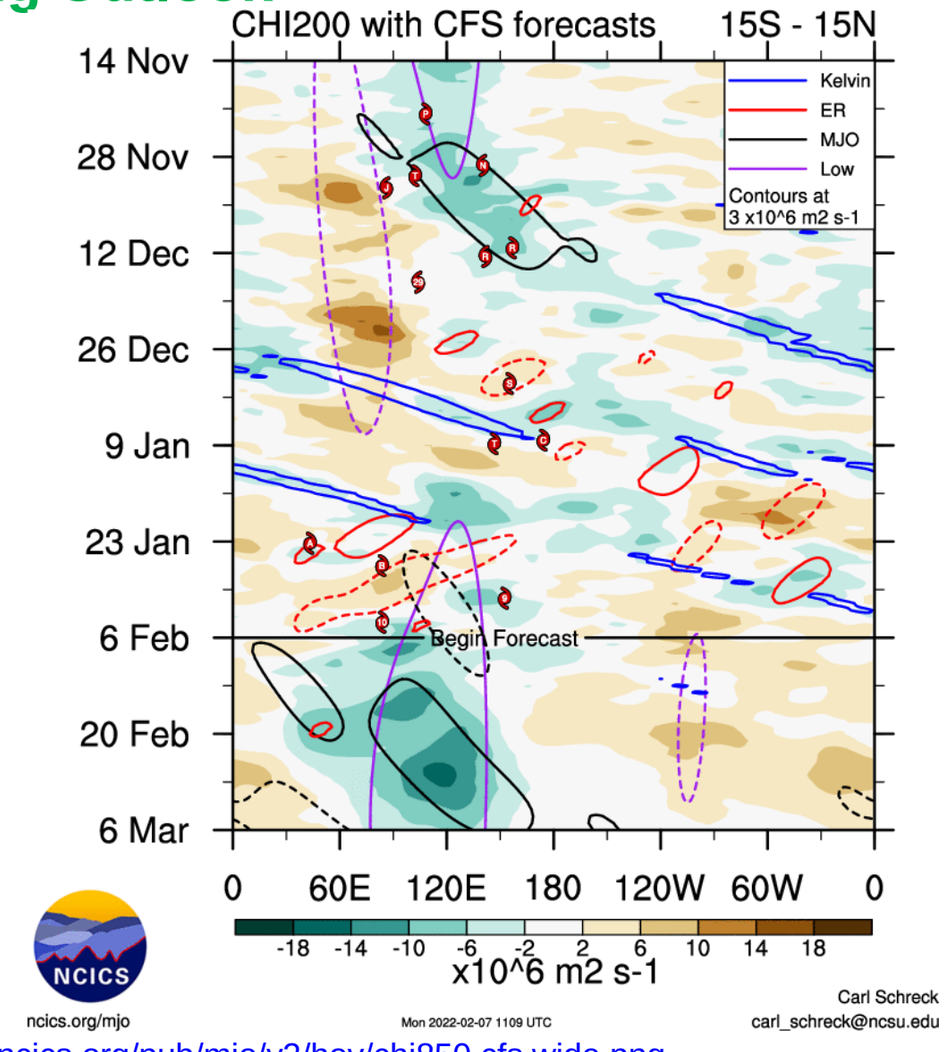
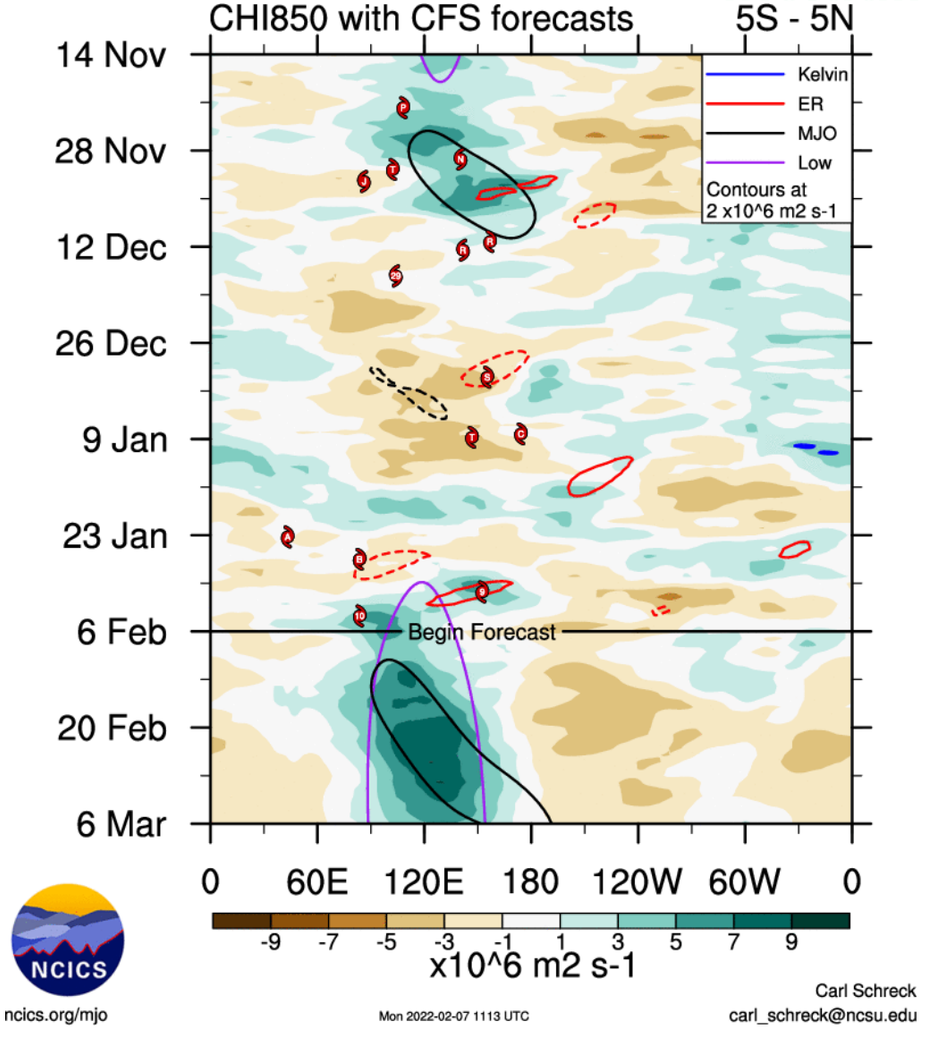


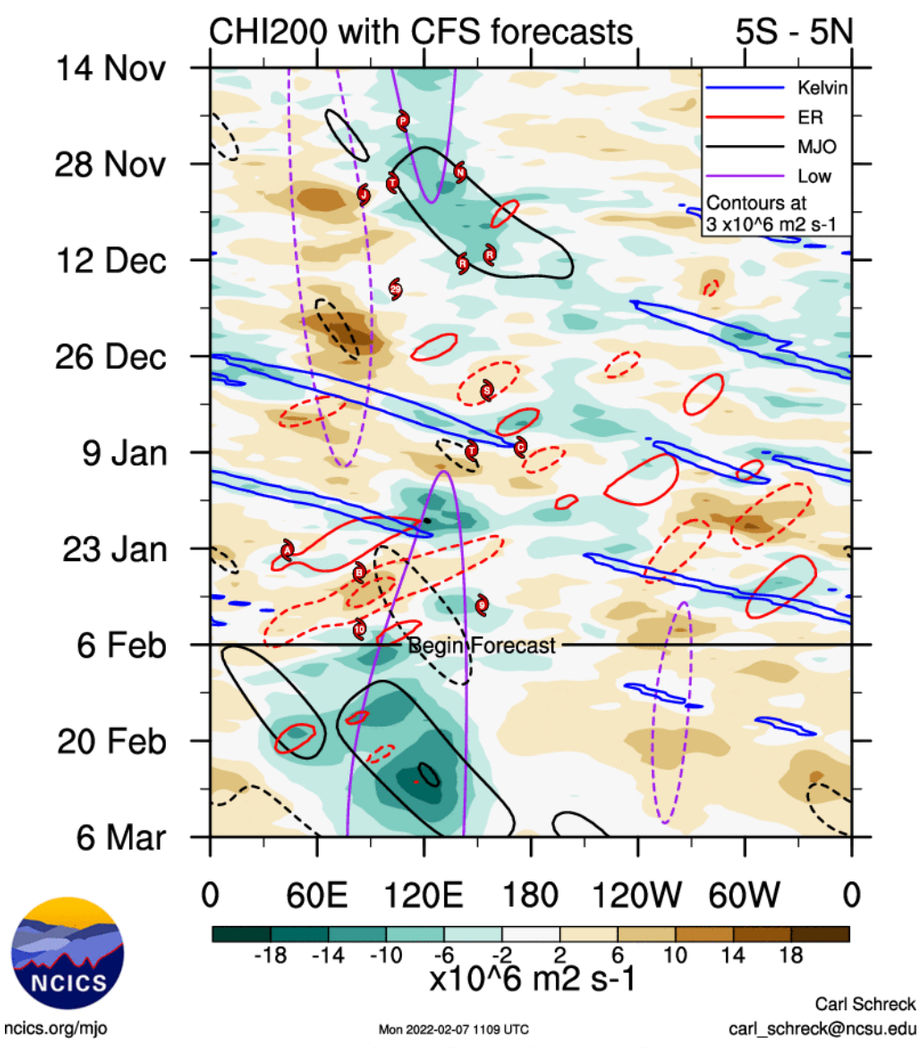
Figure 20: **Anomalies for 15n-15s with waves overlay including outlooks**

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



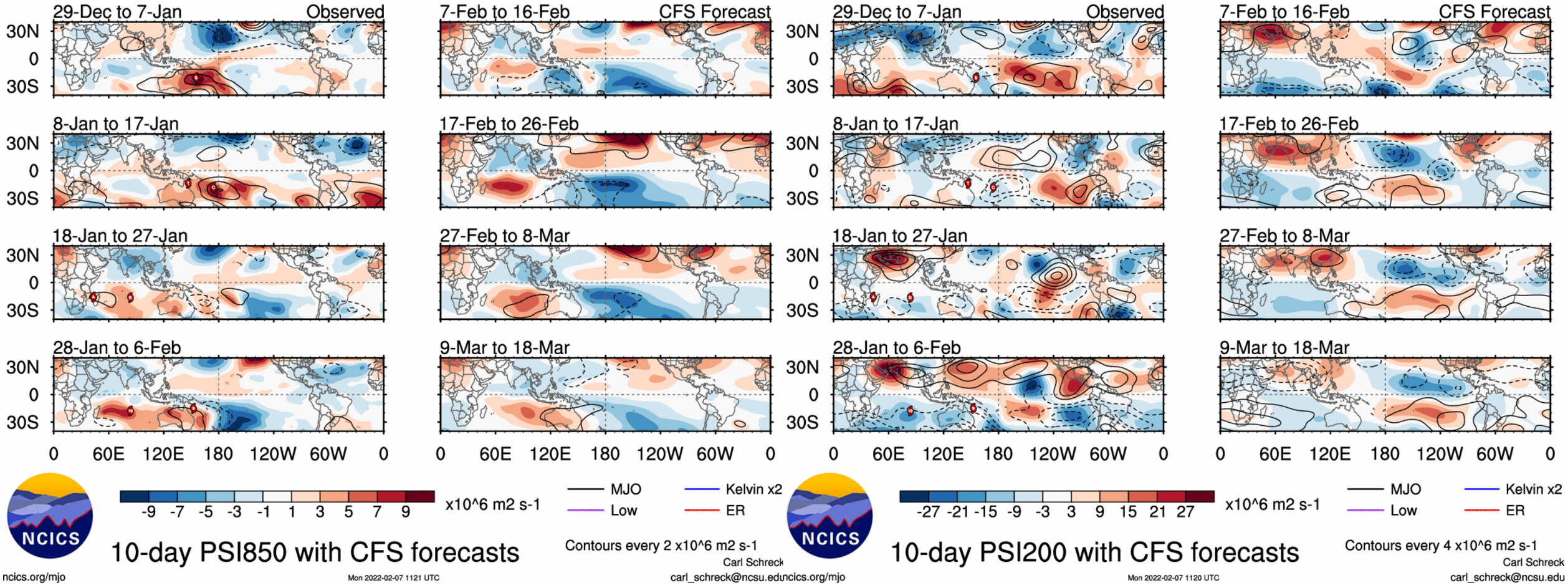


https://ncics.org/pub/mjo/v2/hov/chi850.cfs.eqtr.png

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

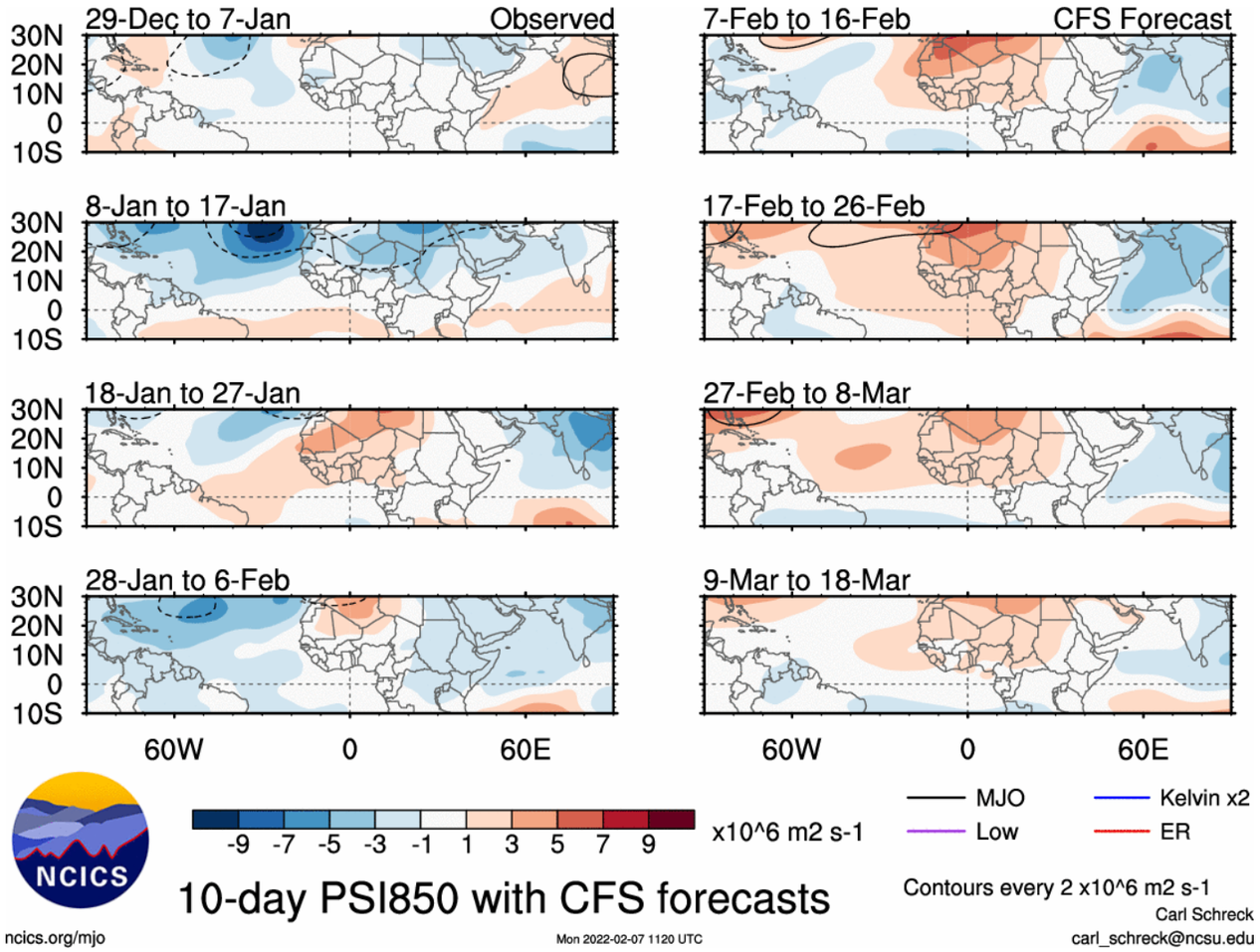


https://ncics.org/pub/mjo/v2/map/psi850.cfs.mjo.global.10.png

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



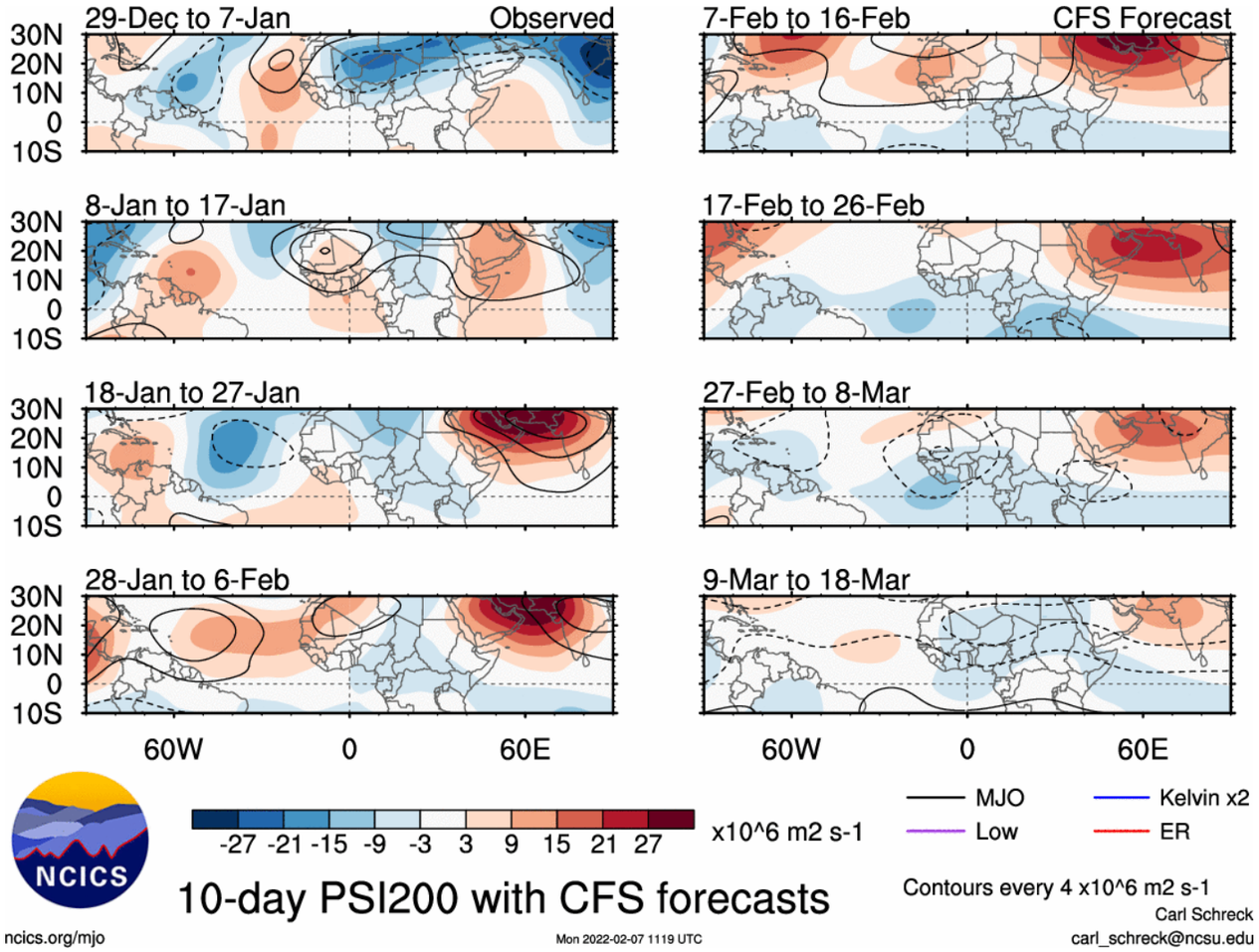


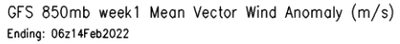
Figure 23: **Past 4 weeks stream function anomalies with MJO, Kelvin & Rossby wave on Africa maps**

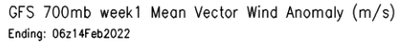
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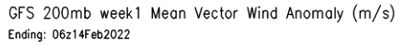
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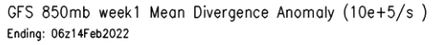
1. Monitoring Climate Element
2. Global Driver Review and Assessment
3. Model Guidance for Weekly Climate outlook

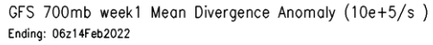
Wind Anomaly and Divergence Forecast from GFS week1











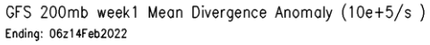


Figure 24 : Forecast from GFS

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

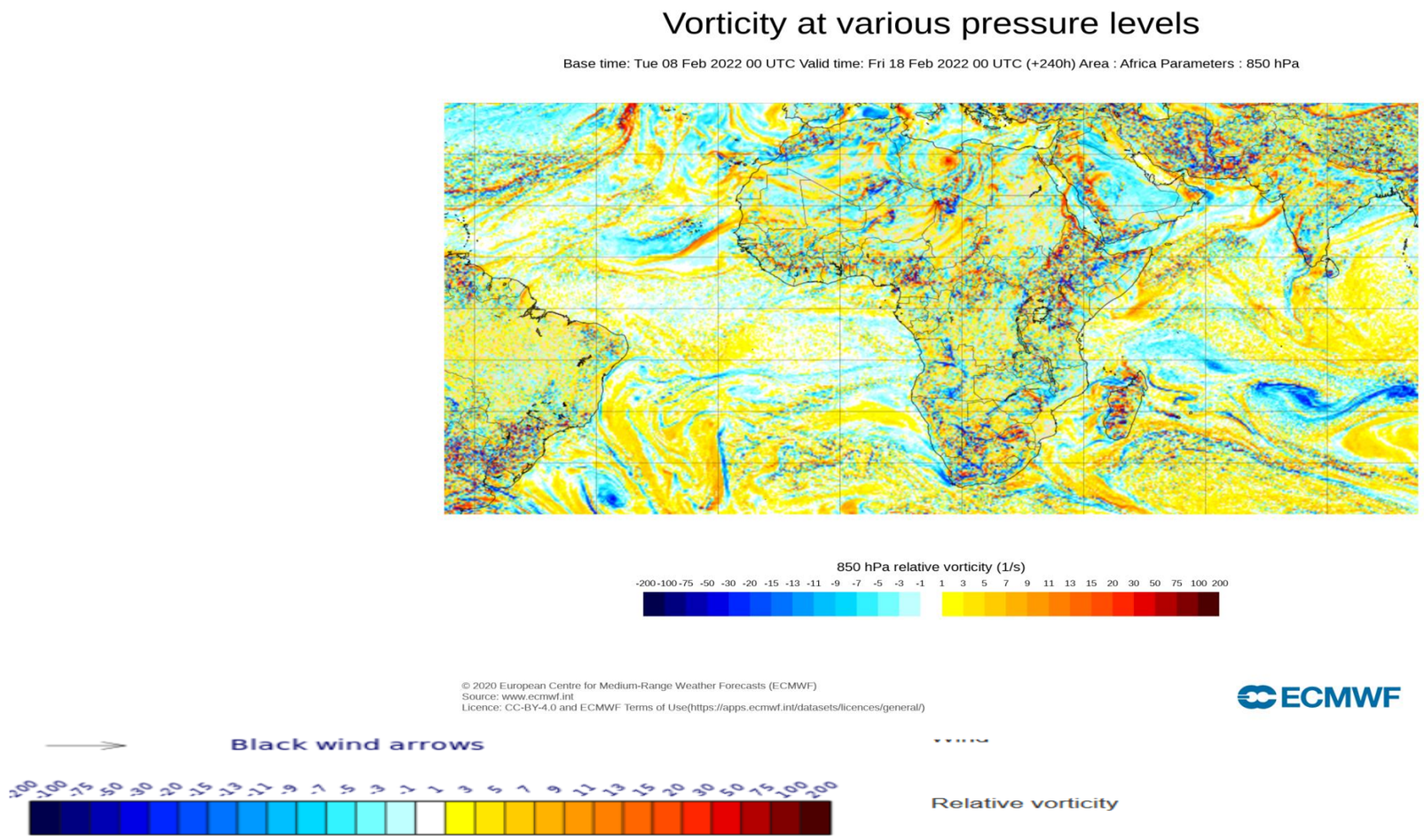
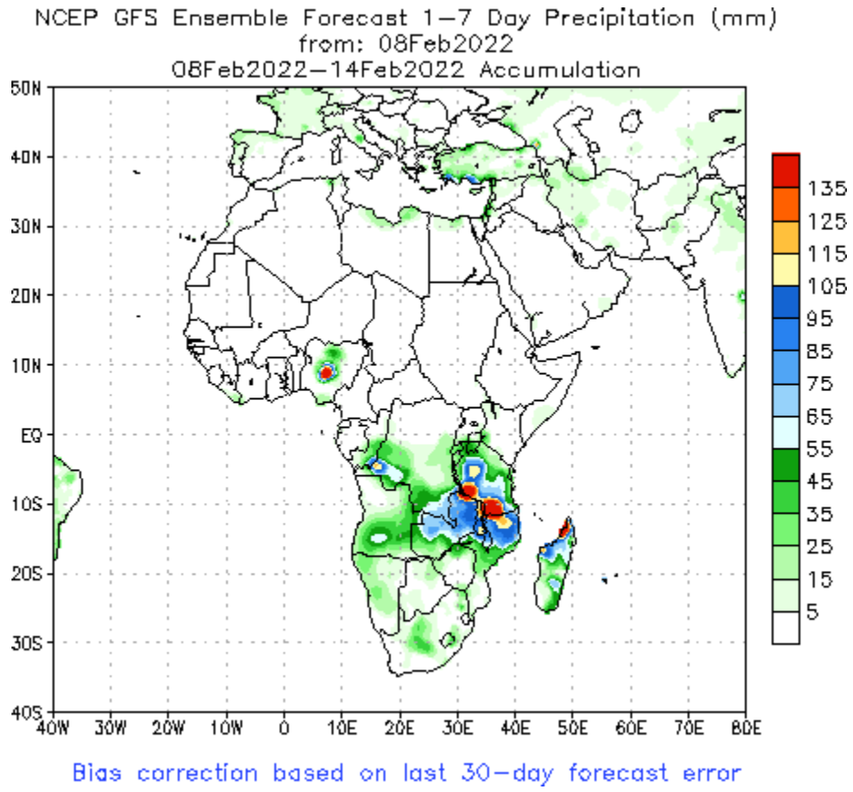


Figure 25: Relative Vorticity and Divergence forecast from CFS and ECMWF

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



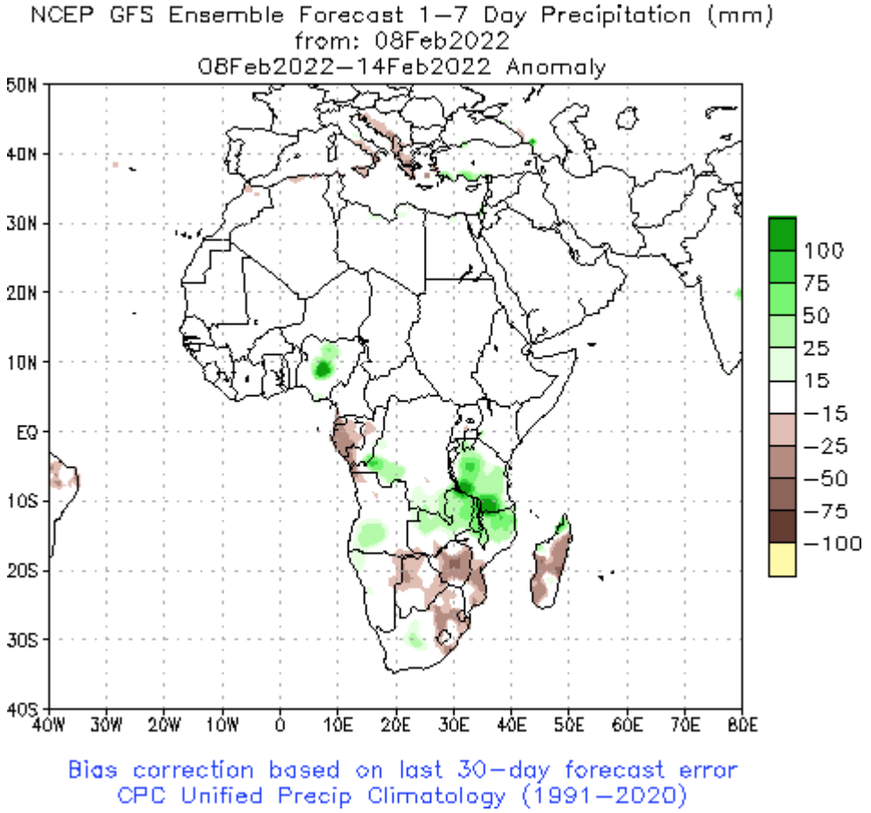


Figure 26: NCEP/GFS Précipitation and Anomaly forecast.

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

Week-1 Precipitation Probability of Exceedance: Forecast and Climo

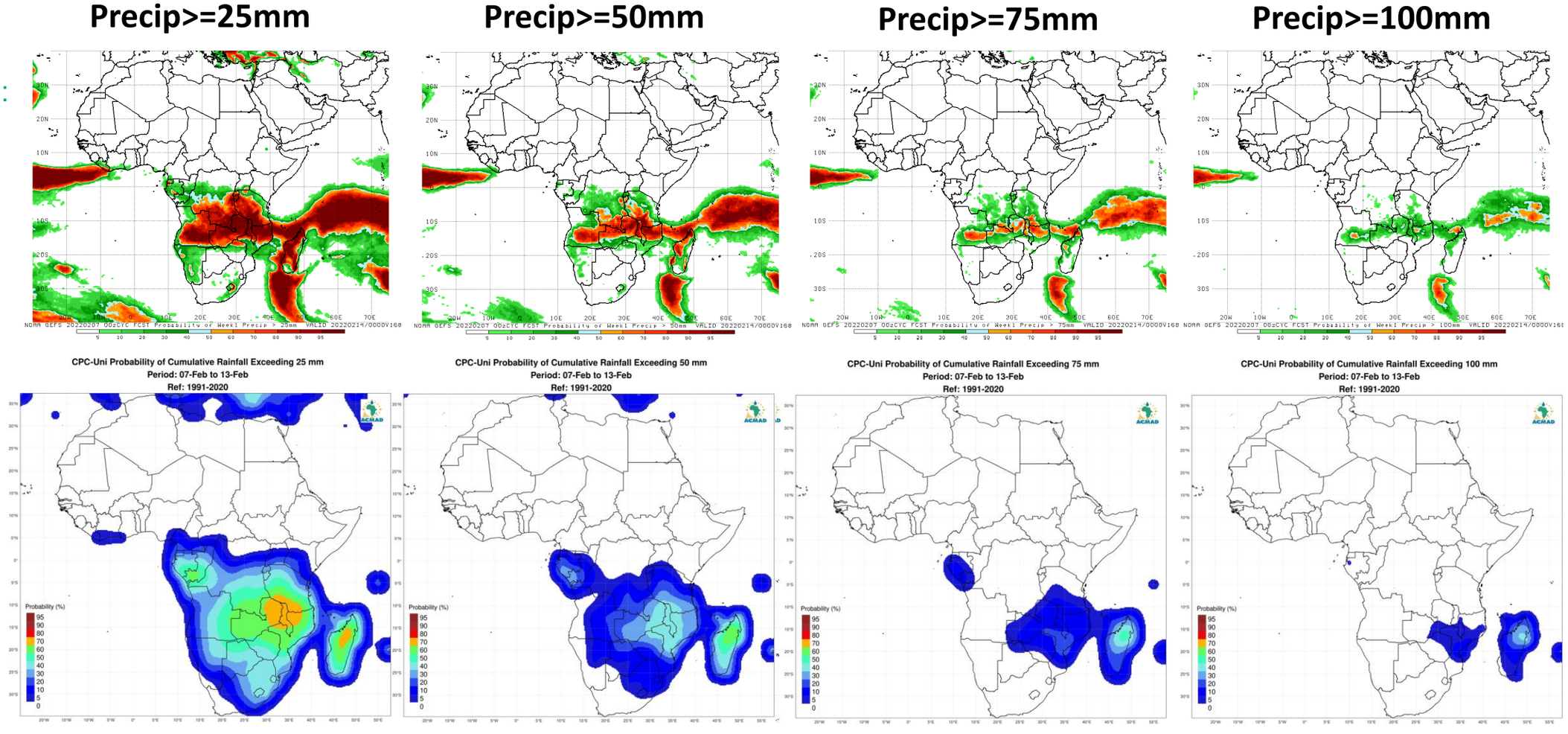


Figure 27: Week1 Precipitation Total Exceedance Probabilities

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
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Precipitation Anomaly Forecasts from ECMWF for week 1

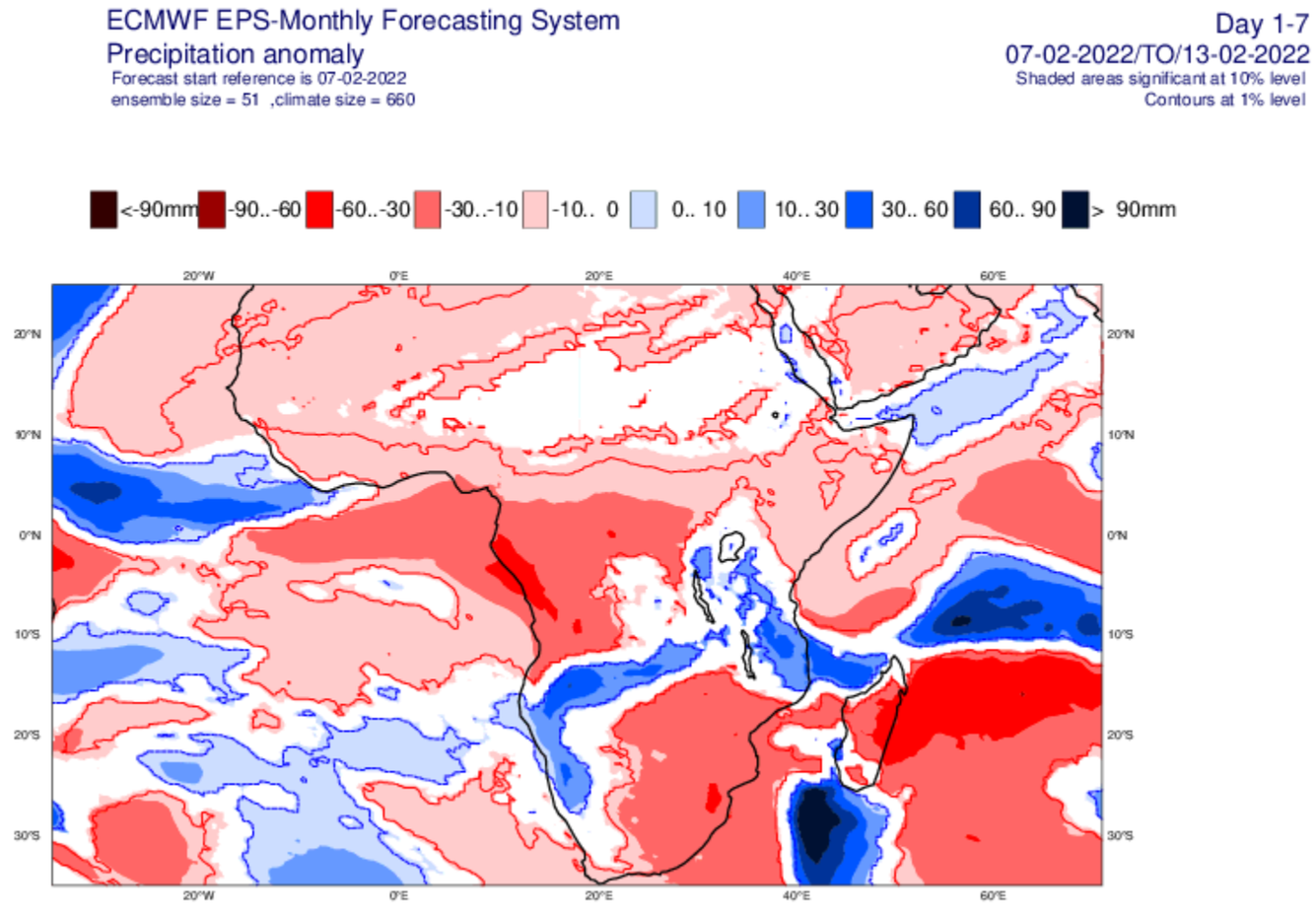
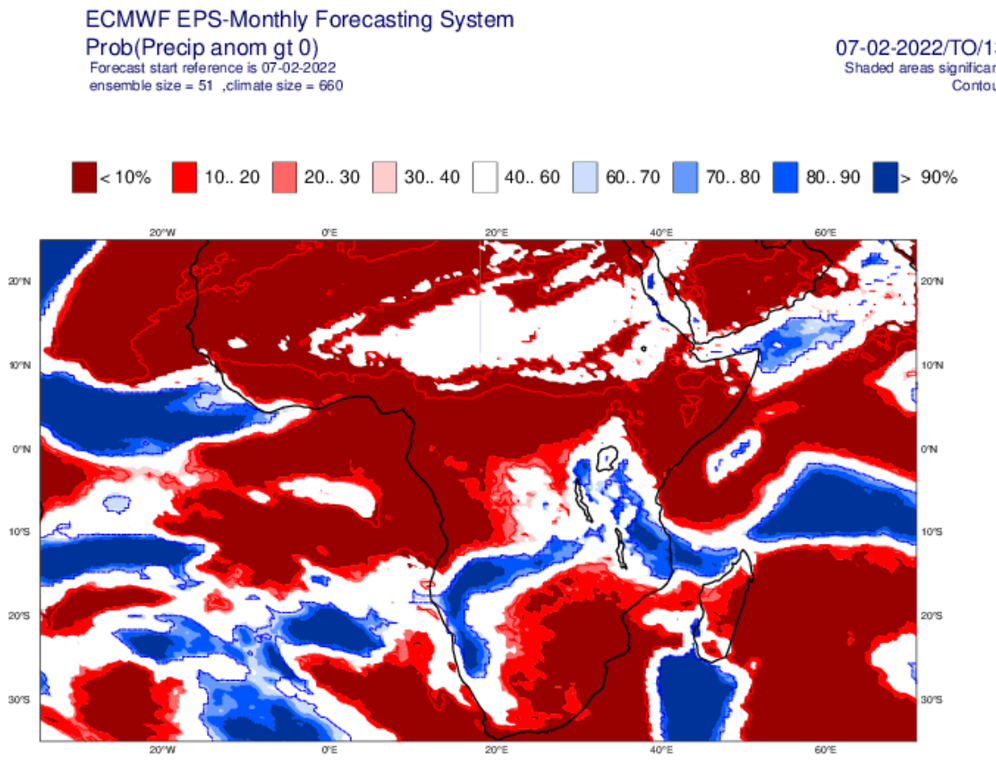


Figure 28: Monthly Precipitation Anomaly forecast from ECMWF

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%



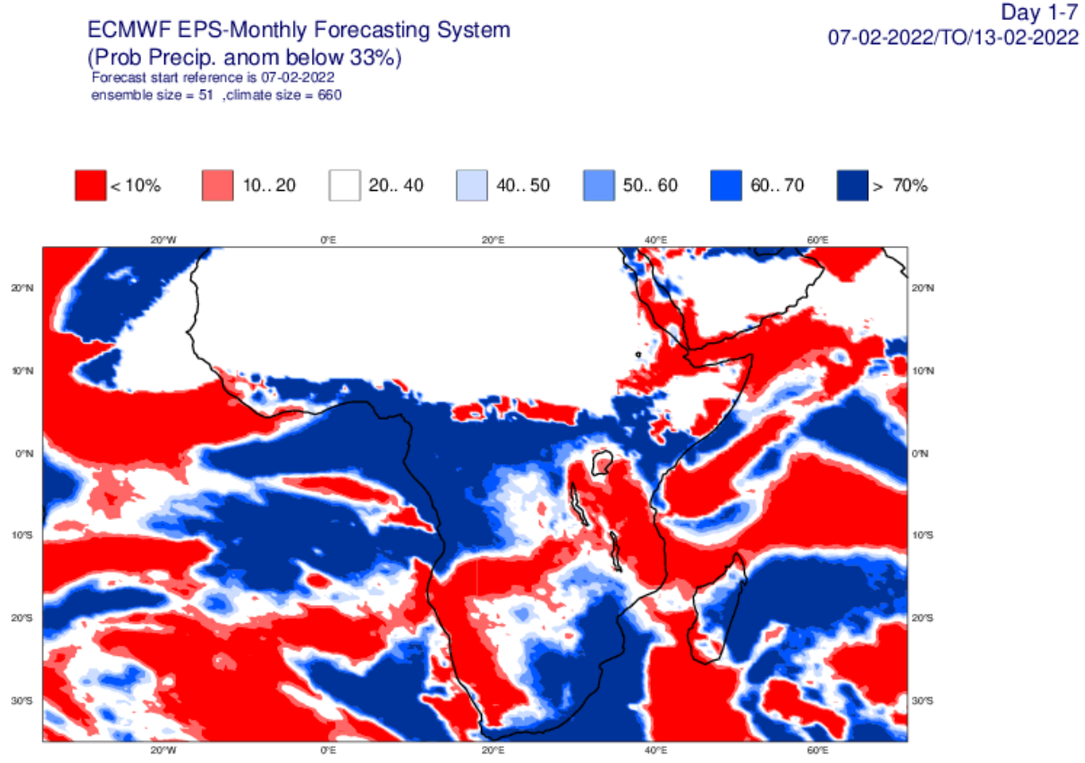
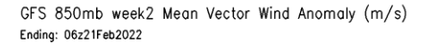
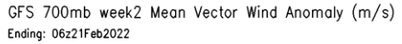


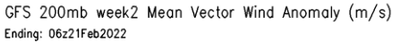
Figure 29: Weekly tercile probability forecast below 33%

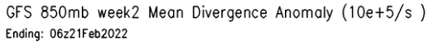
https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_tercile?facets=undefined&time=2021110100,312,2021111400&parameter=precipitation&tercile=1&area=Africa

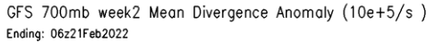
Wind Anomaly and Divergence Forecast from GFS week2











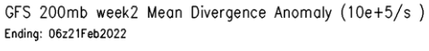


Figure 30: GFS divergence forecast

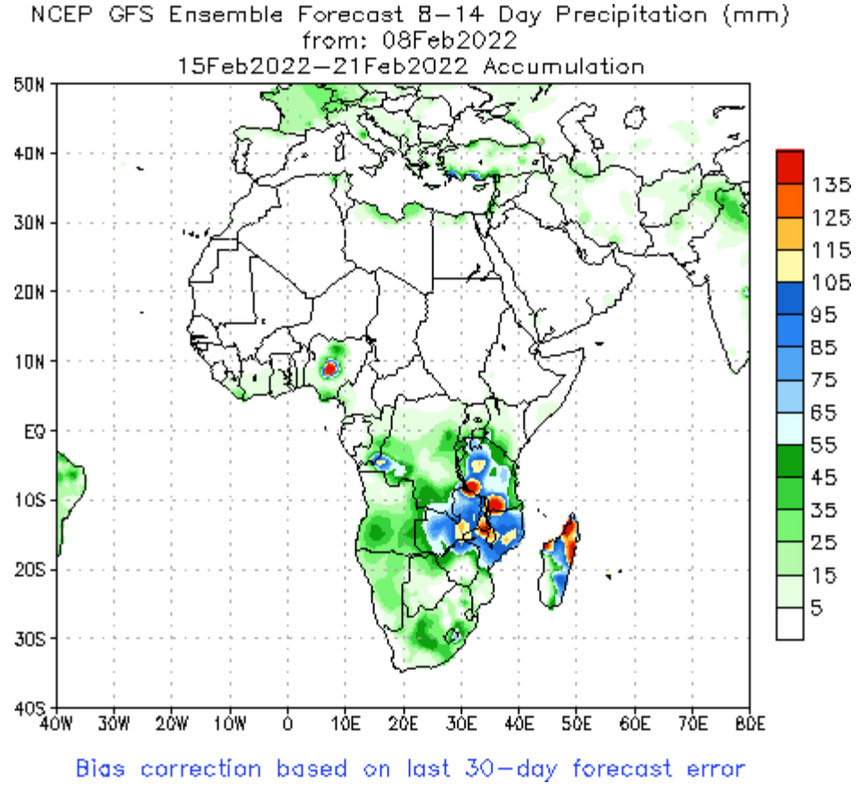
https://www.cpc.ncep.noaa.gov/products/international/africa/africa.shtml







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



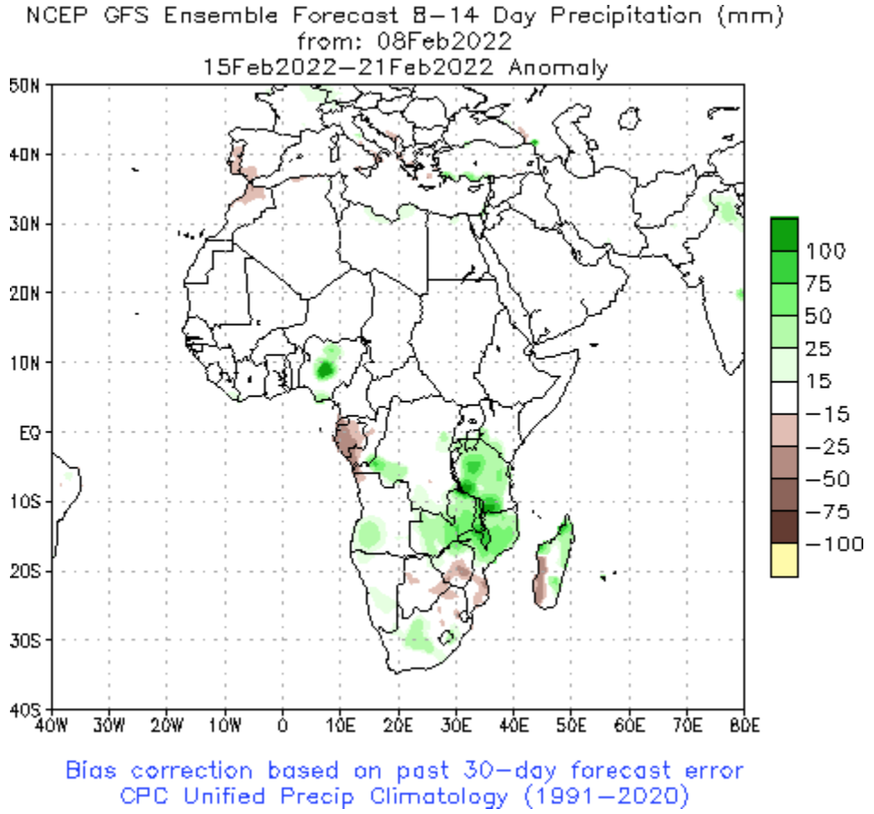


Figure 31: Précipitation and Anomaly forecast

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

Week-2 Precipitation Probability of Exceedance: Forecast and Climo

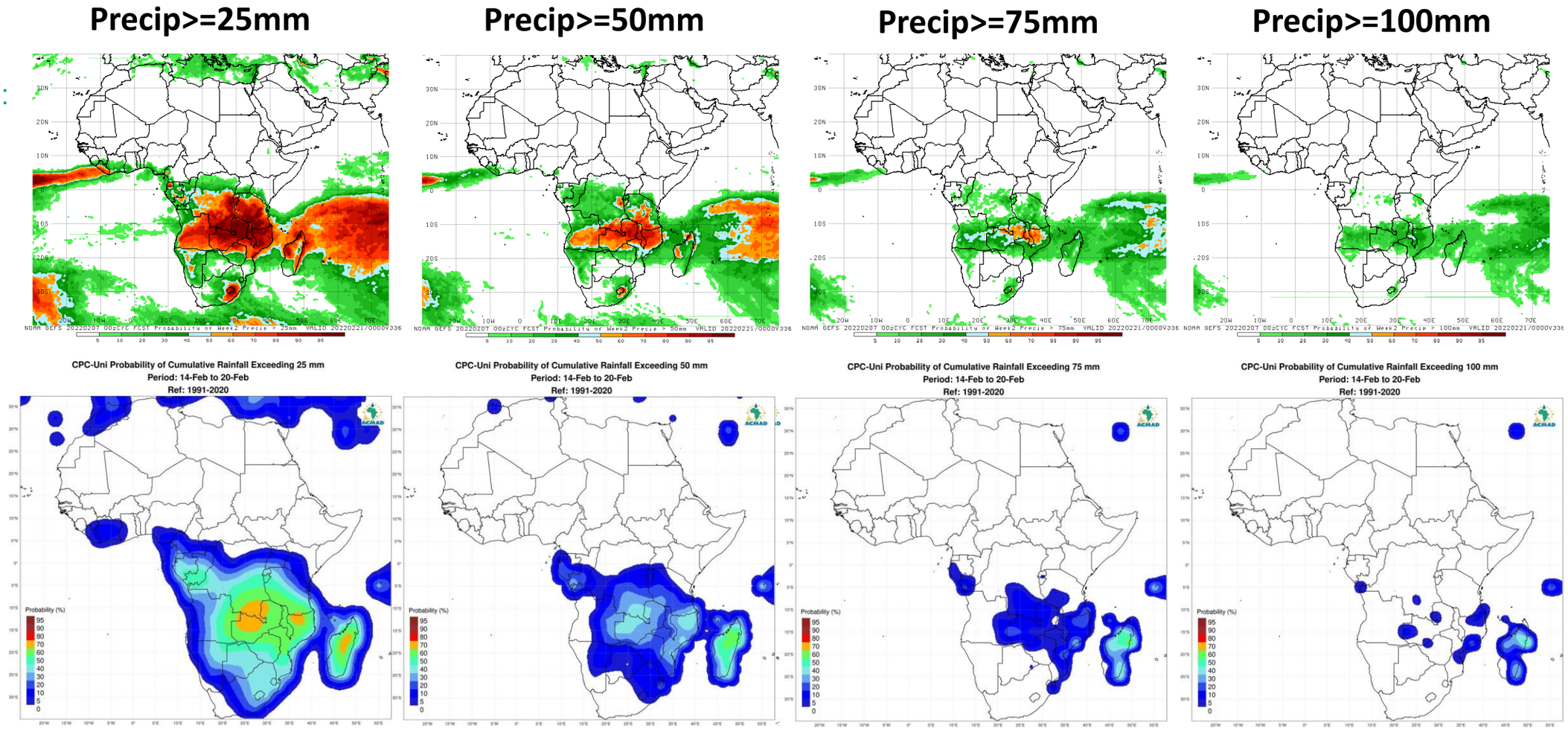


Figure 32: Week2 Precipitation Total Exceedance Probabilities

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
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Precipitation Anomaly Forecasts from ECMWF for week 2

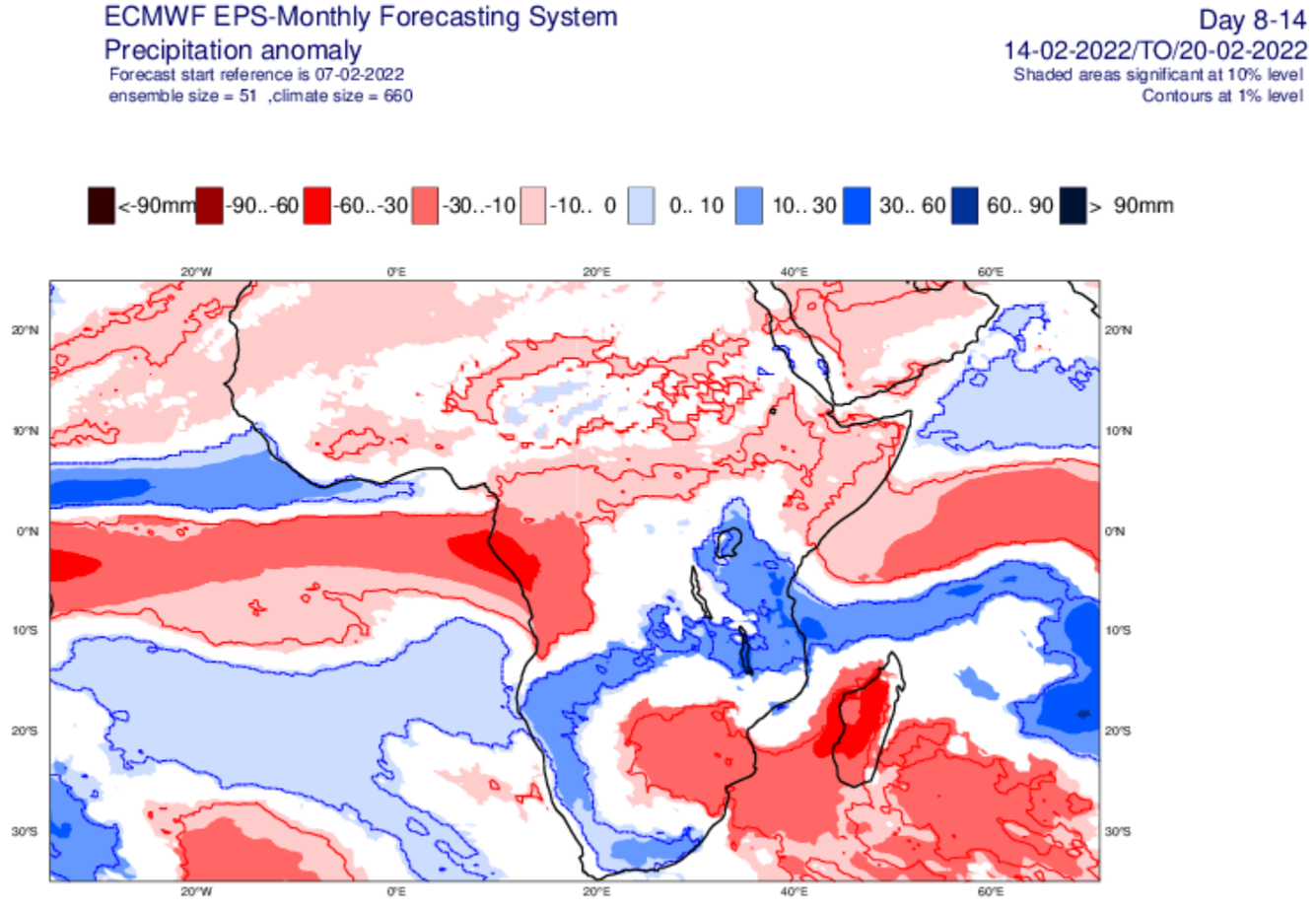
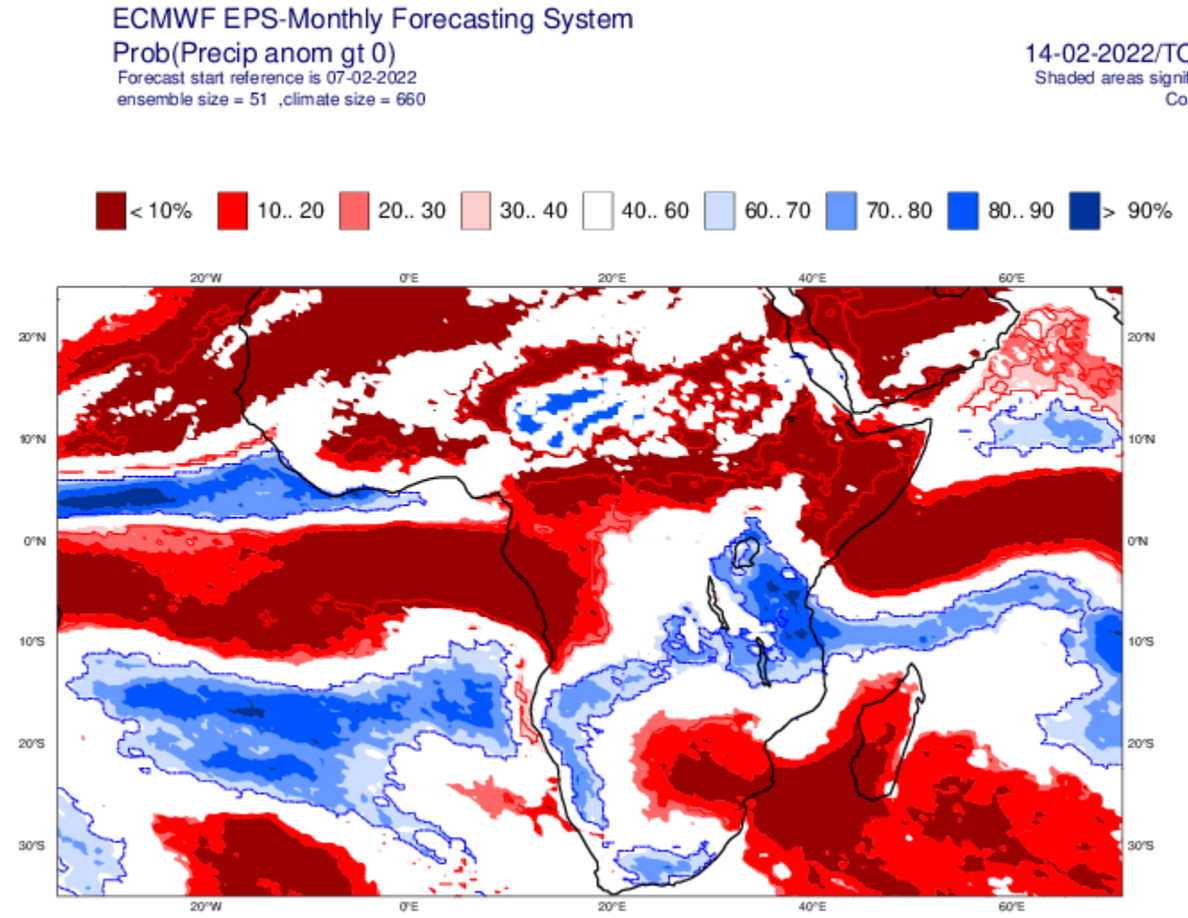


Figure 33: Monthly Precipitation Anomaly forecast from ECMWF

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%



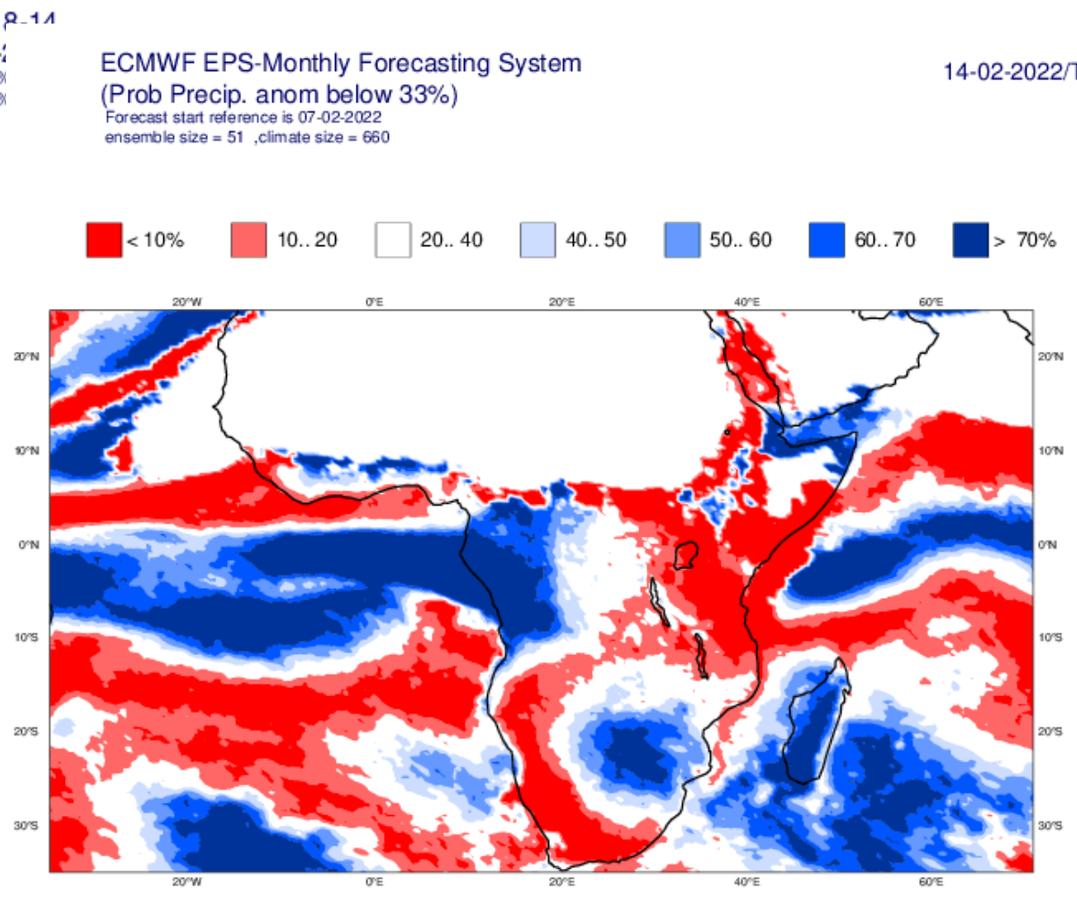
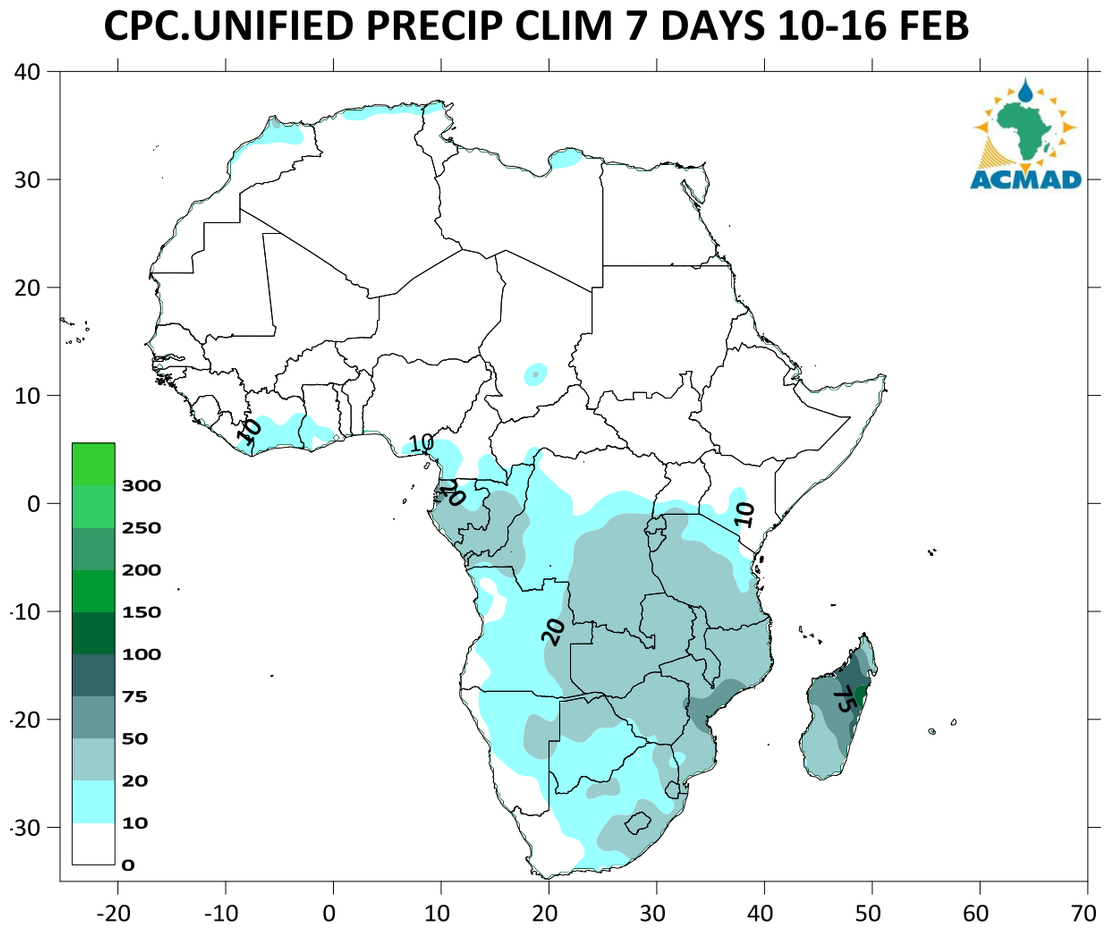


Figure 34: Weekly tercile probability forecast below 33%

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

CLIMATOLOGY OF PRECIPITATIONS FOR UPCOMING 2 WEEKS



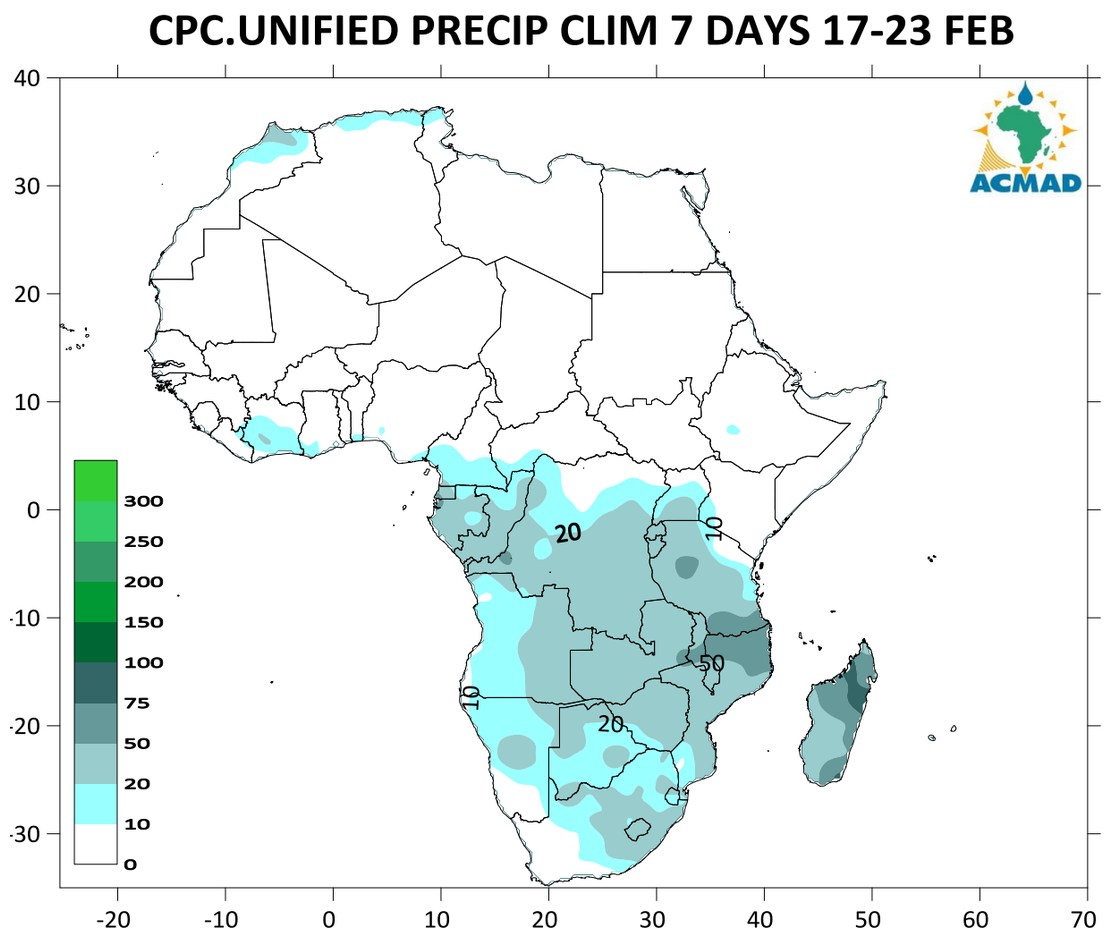
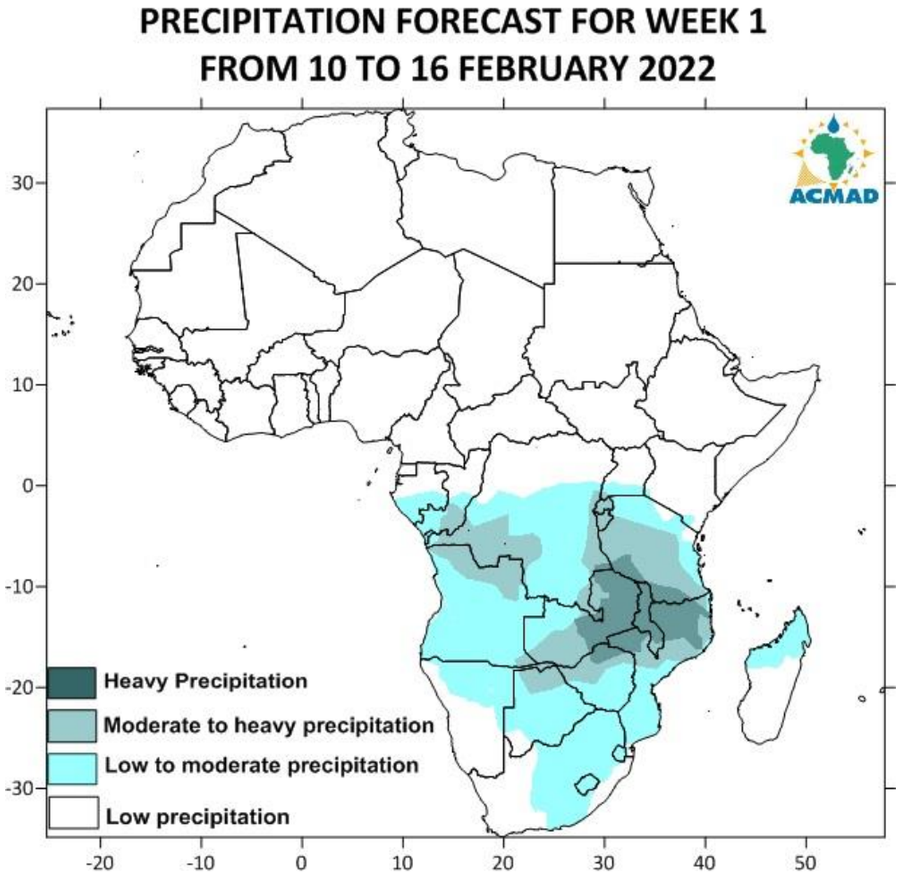


Figure 38: Climatology of Precipation for week-1(left panel) and week-2 (right panel)

PRECIPITATIONS FORECAST FOR THE UPCOMING TWO WEEKS



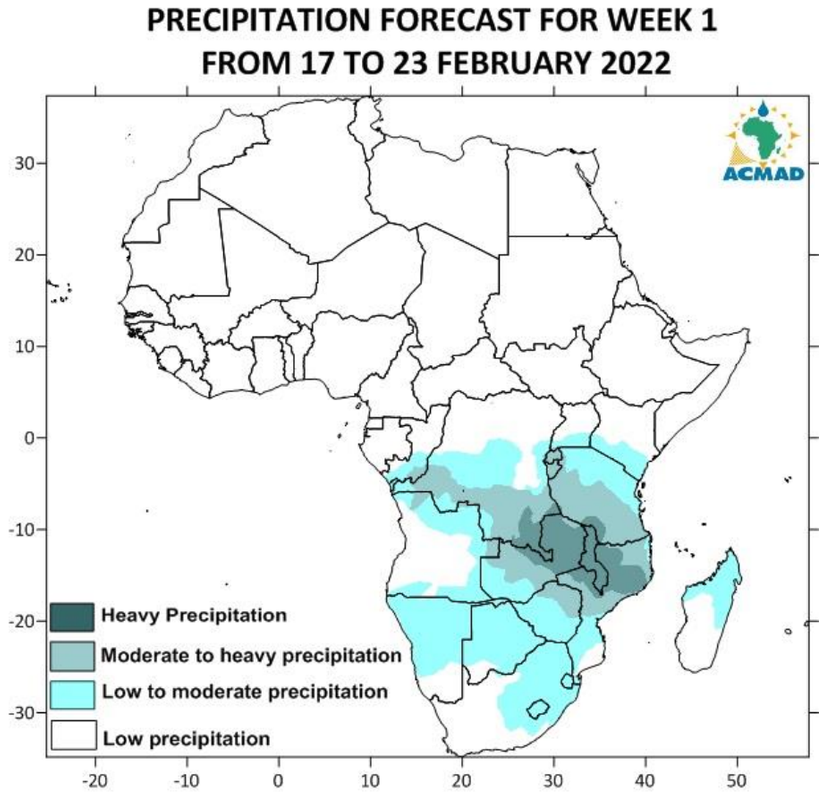


Figure 39: Precipitation Outlook for week-1(left panel) and week-2 (right panel)