DEKADAL TECHNICAL NOTE FOR SECOND DEKAD OF FEBRUARY, 2021
AND PRECIPITATION FORECAST FOR WEEK 1 AND 2

Drafted by: **Tarekegn Abera**

Edited by: **Hubert KABENGELA**

Presented by:

OUTLINE

- Dekadal average precipitation in percent of average
- Past four weeks SST anomalies
- Last month SST anomalies
- Past four weeks and month velocity potential, TPW anomalies with MJO, Kelvin and Rossby wave overlaid on global maps (850 et 200)
- Past 4 weeks precipitable water and outlooks
- Hovmoller diagram of velocity potential, anomalies for 5N-5S , 15N-15S with waves overlay including outlooks

- Ecmwf mjo forecast
- Hovmoller diagram for TPW and OLR with waves overlaid including outlook
- Past 3 weeks olr anomalies
- Past 4 weeks velocity potential and month stream function anomalies with MJO, kelvin and rossby wave overlaid on global maps 850 hpa Mean Sea Level Presssure (dekadal climatology, dekadal mean and anomaly overlayed)

OUTLINE

- Observed mlsp for the recent 10 day period with anomalies super imposed on the left and climatology of mslp for the past 10 day period
- Wind anomalies for the recent 10 day period 850 and 700 hpa
- Relative humidity recent 10 days anomalies, climatology 850 for dekad 1 of February 2021
- Relative humidity recent 10 days anomalies, climatology 700 for dekad 1 of February 2021
- Ir image and Velocity Potential anomaly
- Extremes events table recorded during the dekad in Africa and socio economic impacts
- Precipitation forecasts from ECMWF for week 1 & 2

OUTLINE

- MJO forecast
- Wind anomaly forecast from GFS
- Week 1 AT 700 hPa relative vorticity forecast from cfs ecmwf
- Week 1 AT 700 hPa divergence wind forecast ecmwf
- Monthly forecast from WMO lead centre single ensemble and multimodel
- Precipitation and anomaly forecast
- S2S products from the hazard center of university of california at SANTA BARBARA
- Precipitation probability forecast SUBX
- Climatology of precipitations for upcoming week 1 and 2

ESTIMATE CUMULATIVE PRECIPITATION IN PERCENT OF AVERAGE FOR DEKAD 2 FEBRUARY 2021

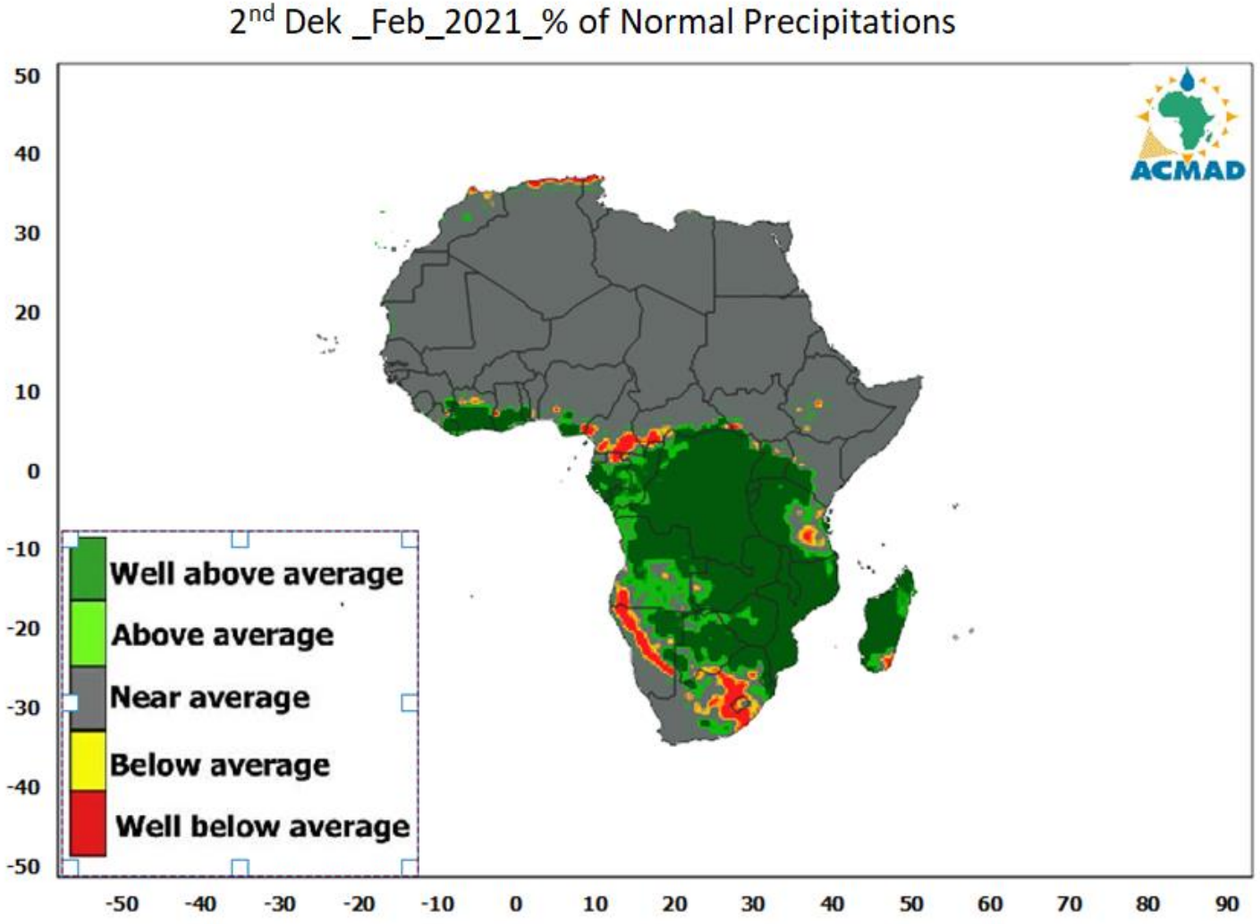


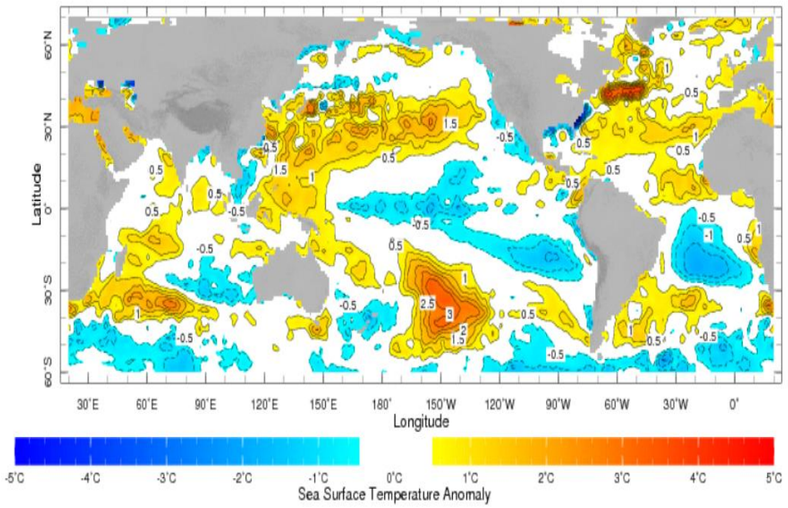
Figure 1: **This map displays decadal average precipitation in percent of average**

The figure show well above to above average précipitation prevailed over most of central, south-esatern, and some of the Guniea gulf countrious during the second dek of February 2021

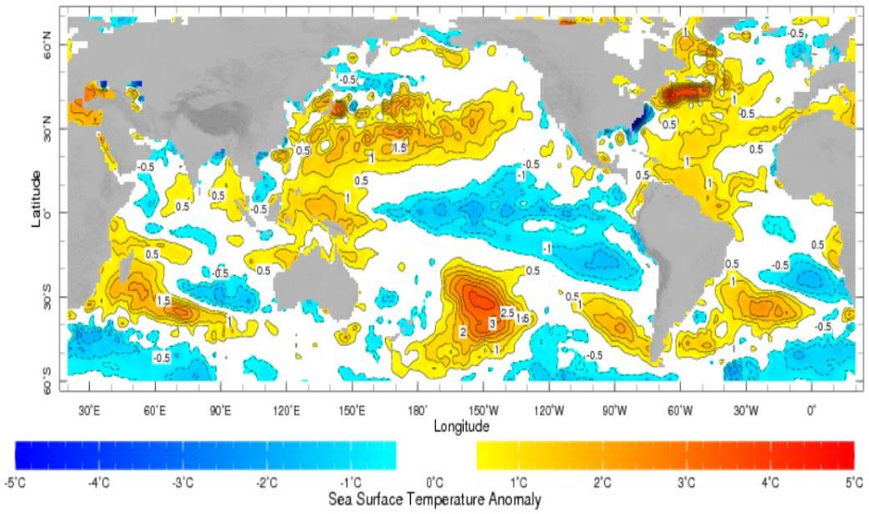
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Weekly Sea Surface Temperature Anomaly

14-20 Feb 2021

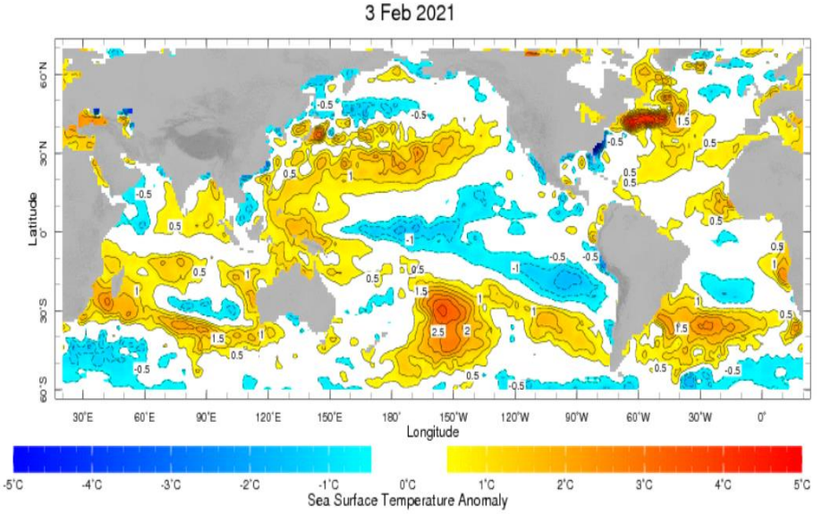


7-13 Feb 2021

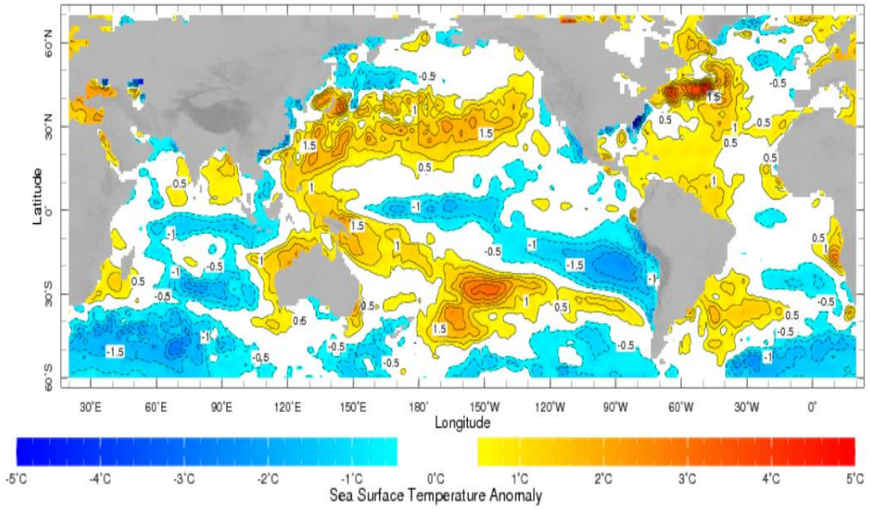


As it is depicted in the SST anomaly maps, the warming conditions dominate across the equatorial Pacific and warmer SST with time is observed from week-to-week over Atlantic, and the western Indian during the period between 24 of Jan to 20 of February 2021.

31 Jan – 6 Feb 2021



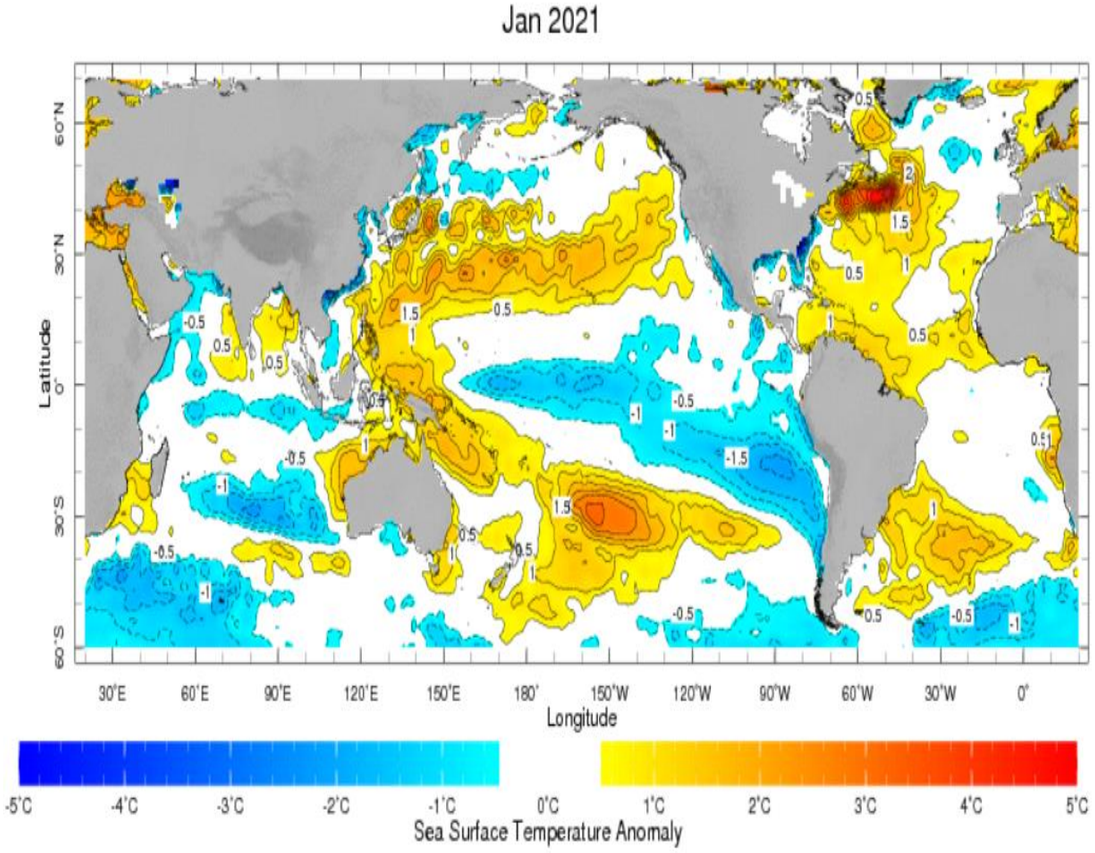
24-30 Jan 2021



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

Figure3, weekly sea surface temperature anomalies

LAST MONTH SST OBSERVED



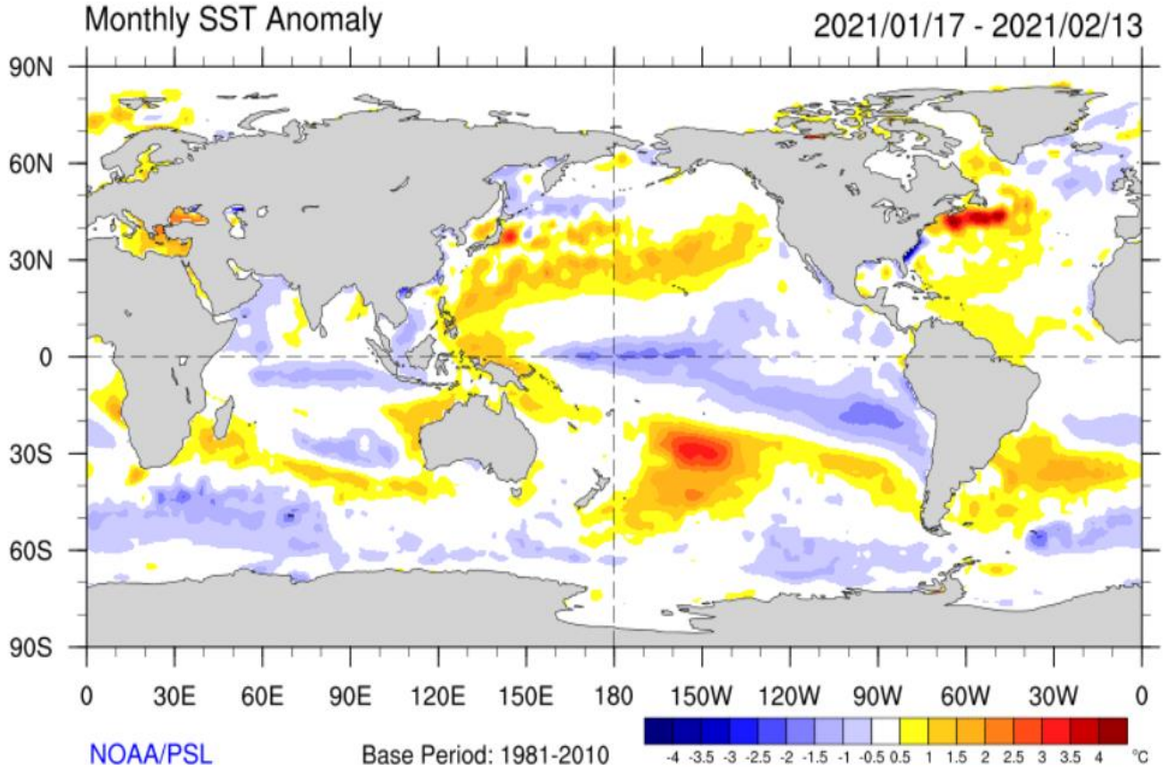


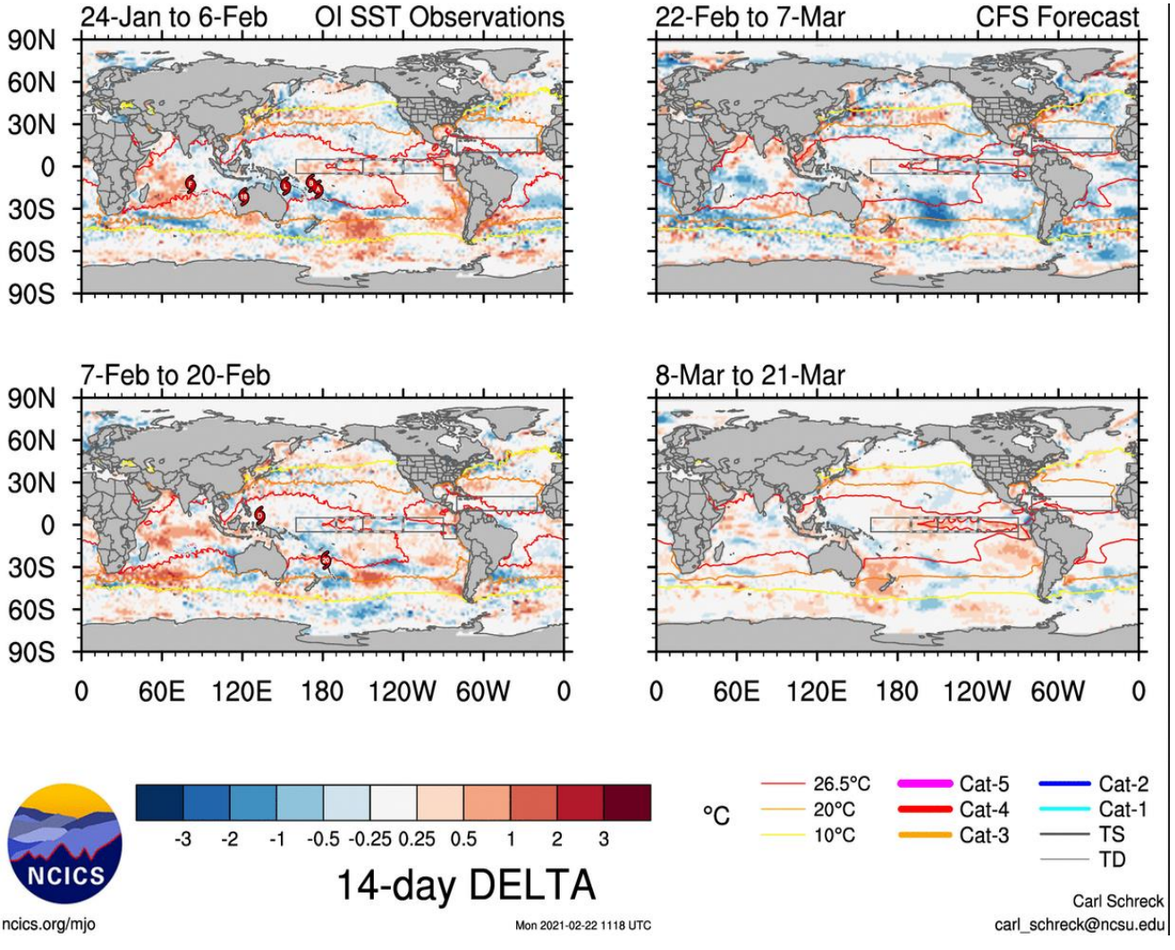
Figure 4 : This map displays monthly sea surface temperature anomalies for the globe.

During January 2021 and last 30 days, the cooling persisted over western Equatorial Pacific, Tropical South Atlantic, and South-Western Indian Ocean,. Source:

https://www.esrl.noaa.gov/psd/map/clim/sst.shtml

http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html. Accessed 15/02/2021.

SST OBS AND FCST FOR TWO WEEK



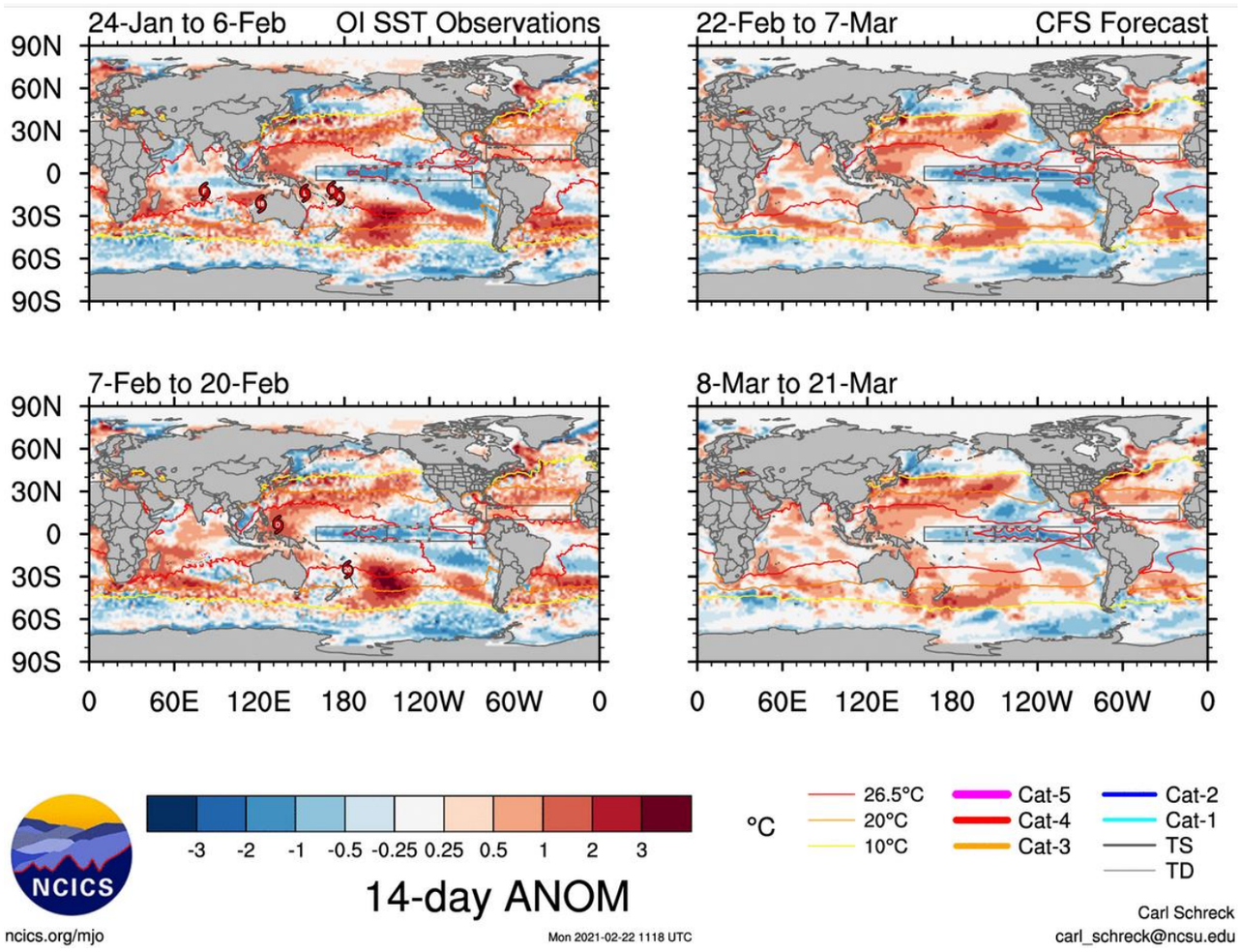
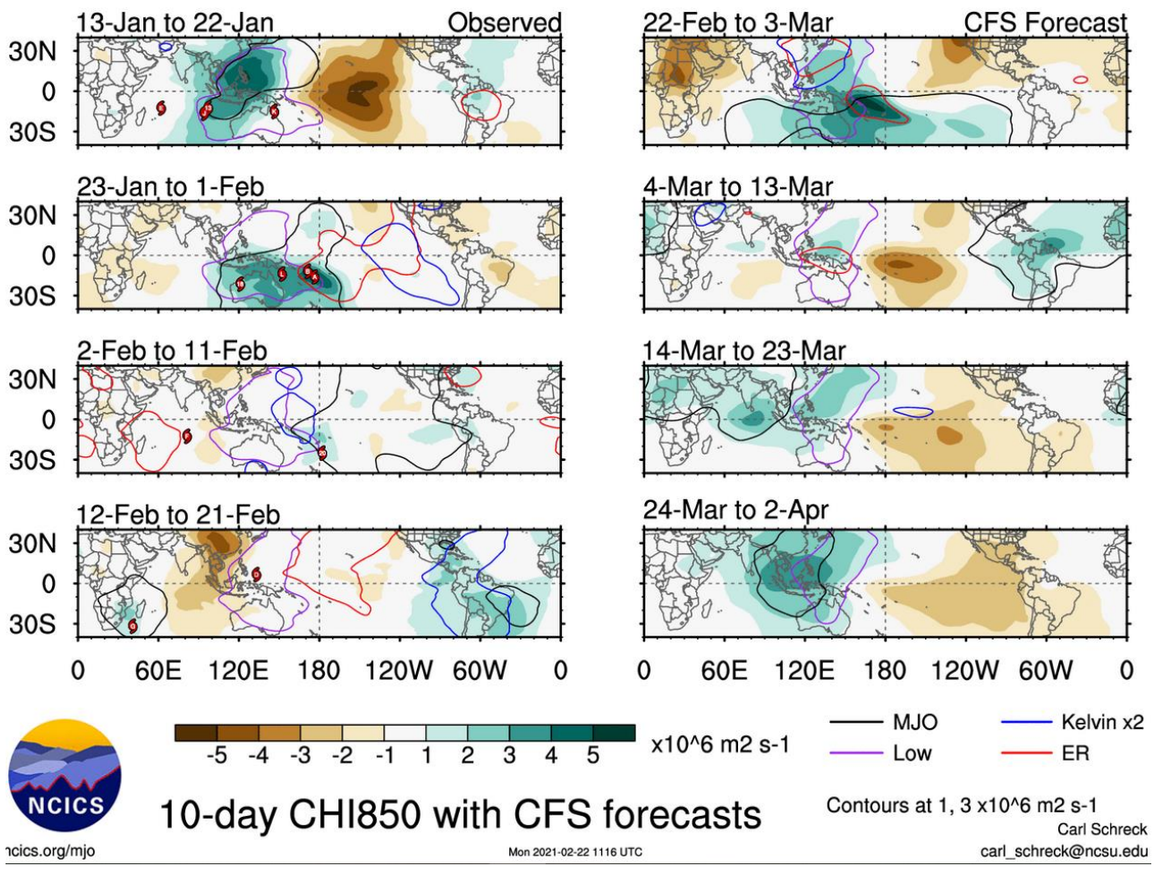


Figure 5: Sea Surface Temperature and FCST for two week

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

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

PAST FOUR WEEK AND MONTH VELOCITY POTENTIAL WITH MJO, KELVIN AND ROSSBY WAVE OVERLAID ON GLOBAL MAPS 850 ET 200



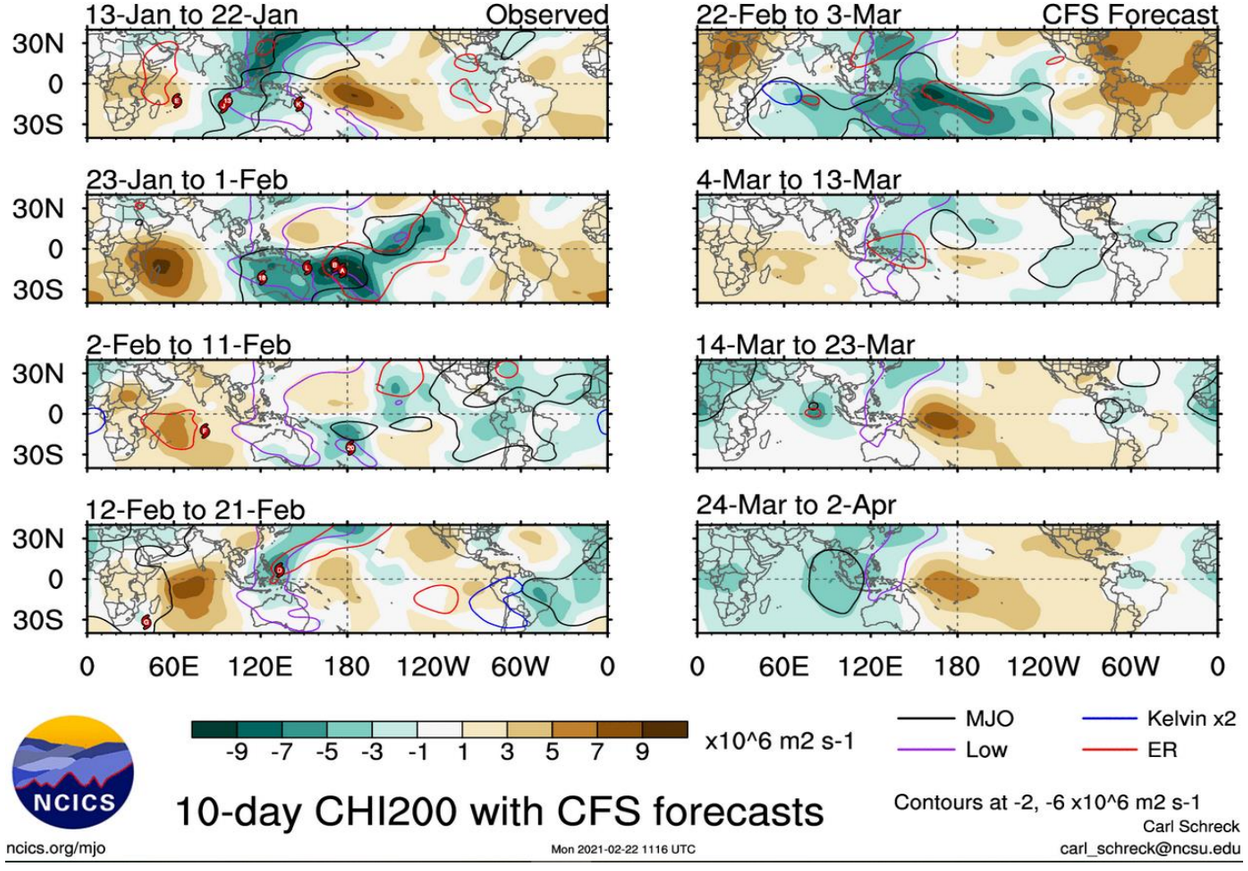


Figure 6a and b: past four week and month velocity potential

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

PAST 4 WEEKS PRECIPITABLE WATER AND OUTLOOKS

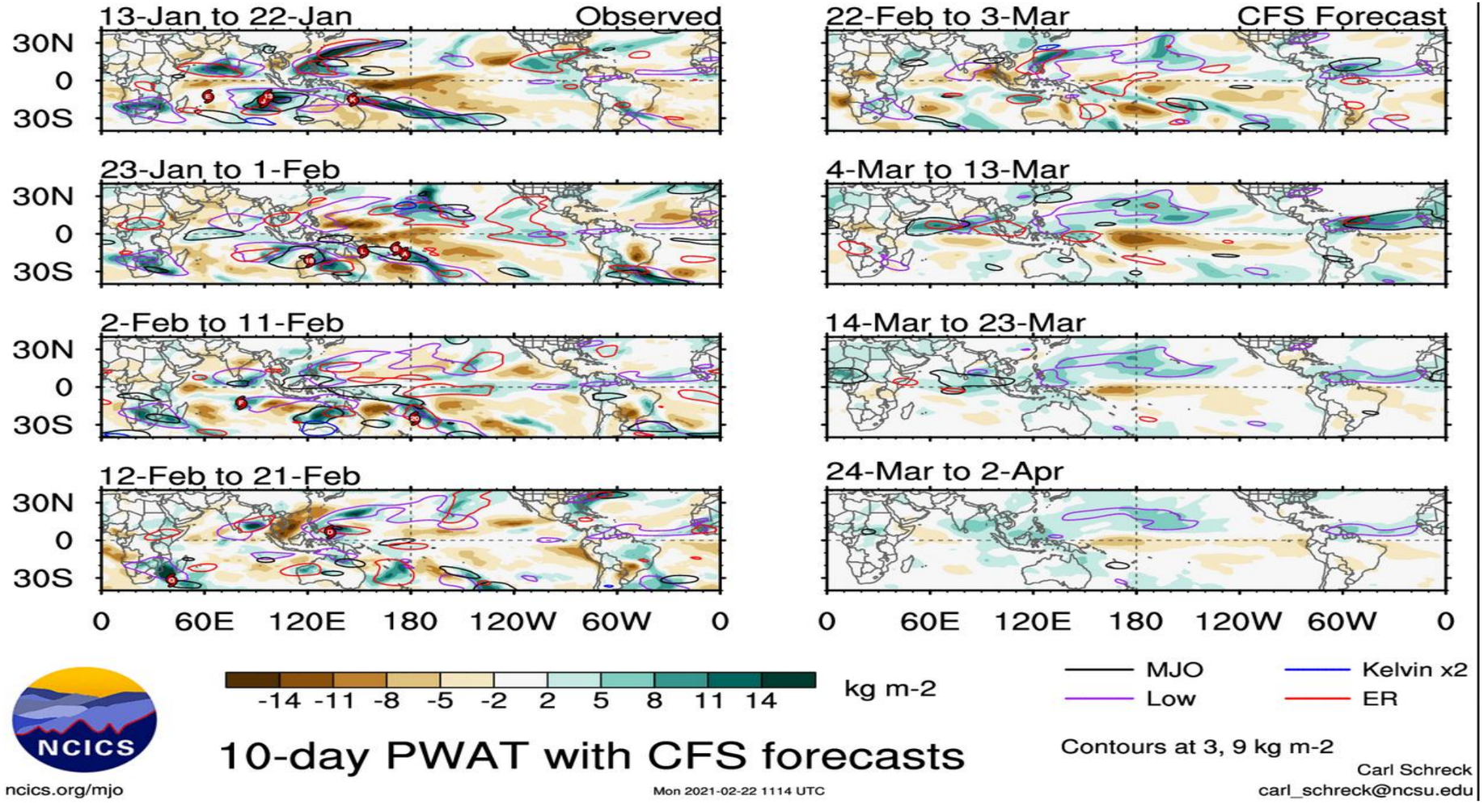
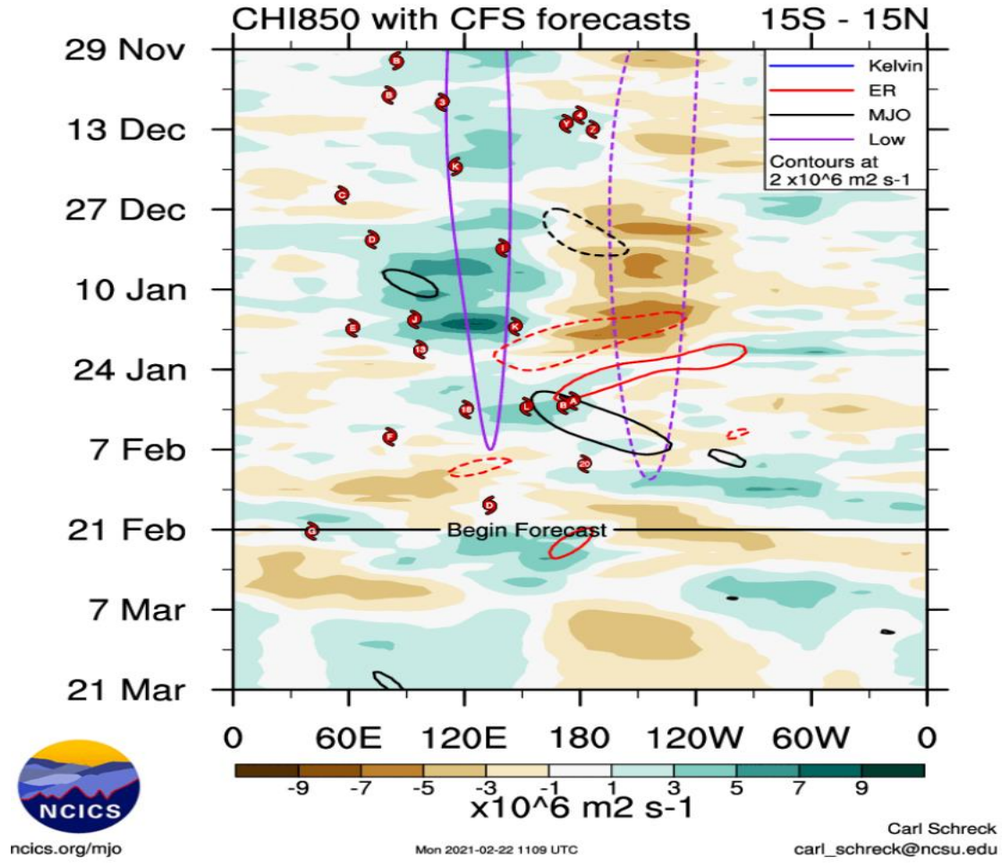


Figure 7: **past 4 weeks precipitable water and outlooks**

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

HOVMOLLER DIAGRAM OF VELOCITY POTENTIAL, ANOMALIES FOR 15N-15S WITH WAVES OVERLAY INCLUDING OUTLOOKS



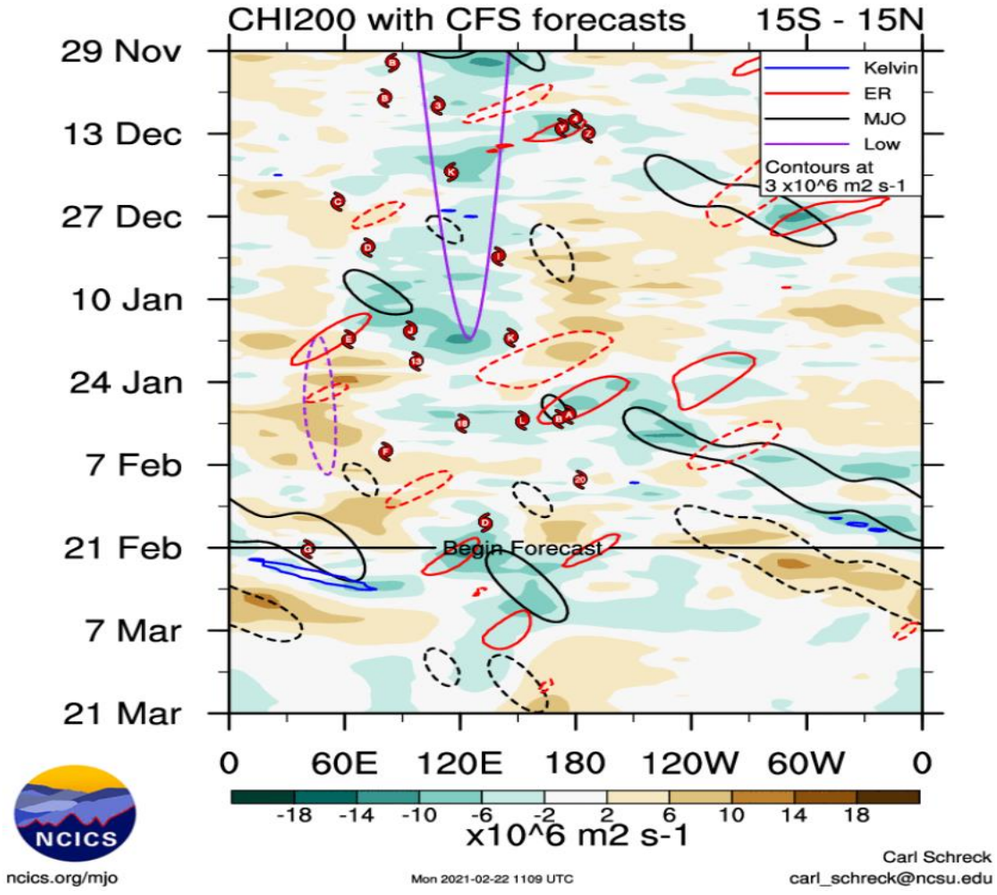
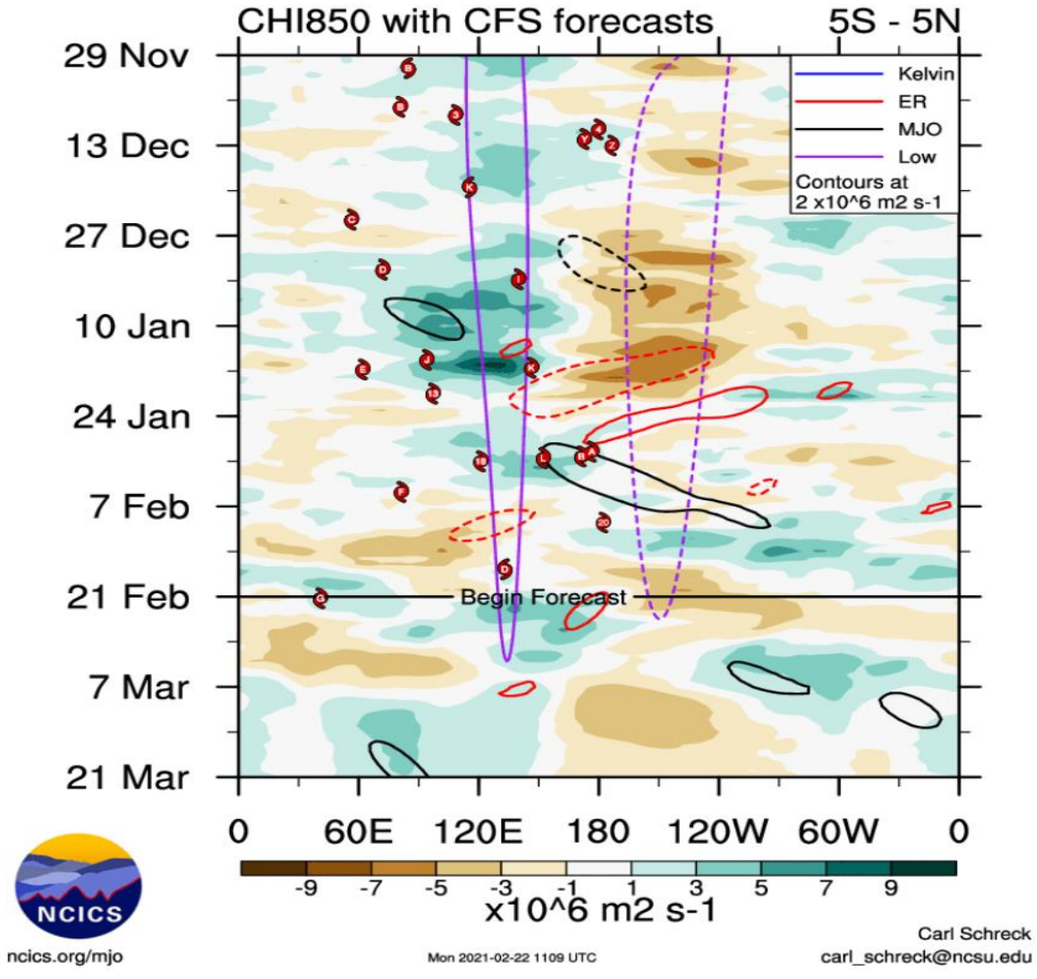


Figure 8: anomalies for 15n-15s with waves overlay including outlooks

https://ncics.org/pub/mjo/v2/hov/chi200.cfs.eqtr.png
https://ncics.org/pub/mjo/v2/hov/chi850.cfs.wide.png

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

HOVMOLLER DIAGRAM OF VELOCITY POTENTIAL, ANOMALIES FOR 5N-5S WITH WAVES OVERLAY INCLUDING OUTLOOKS



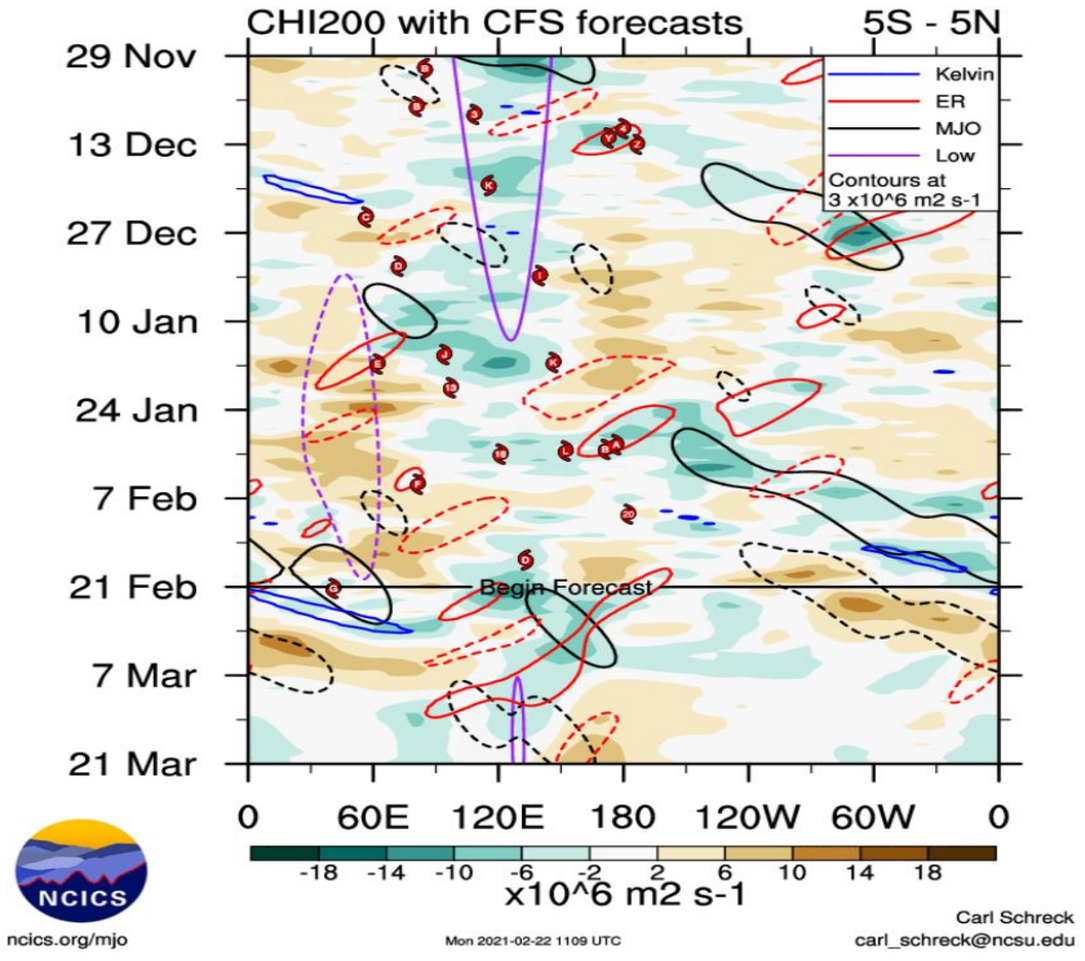
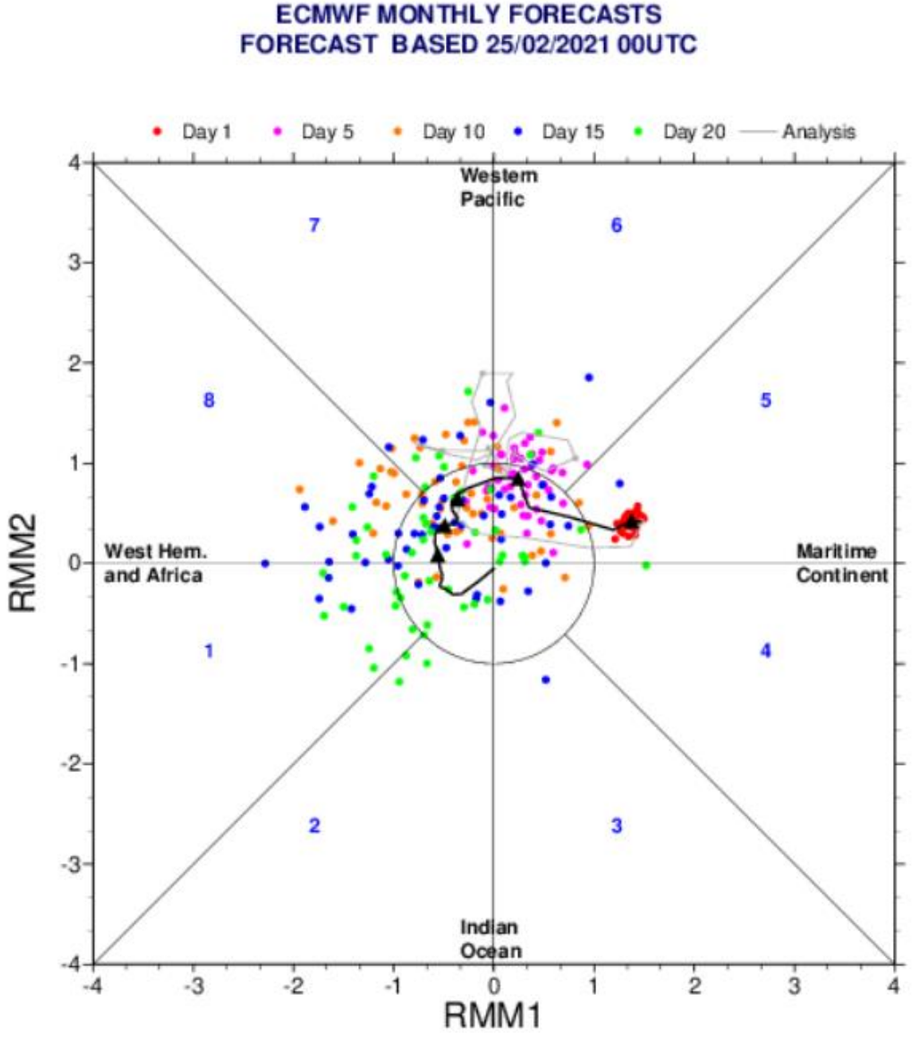


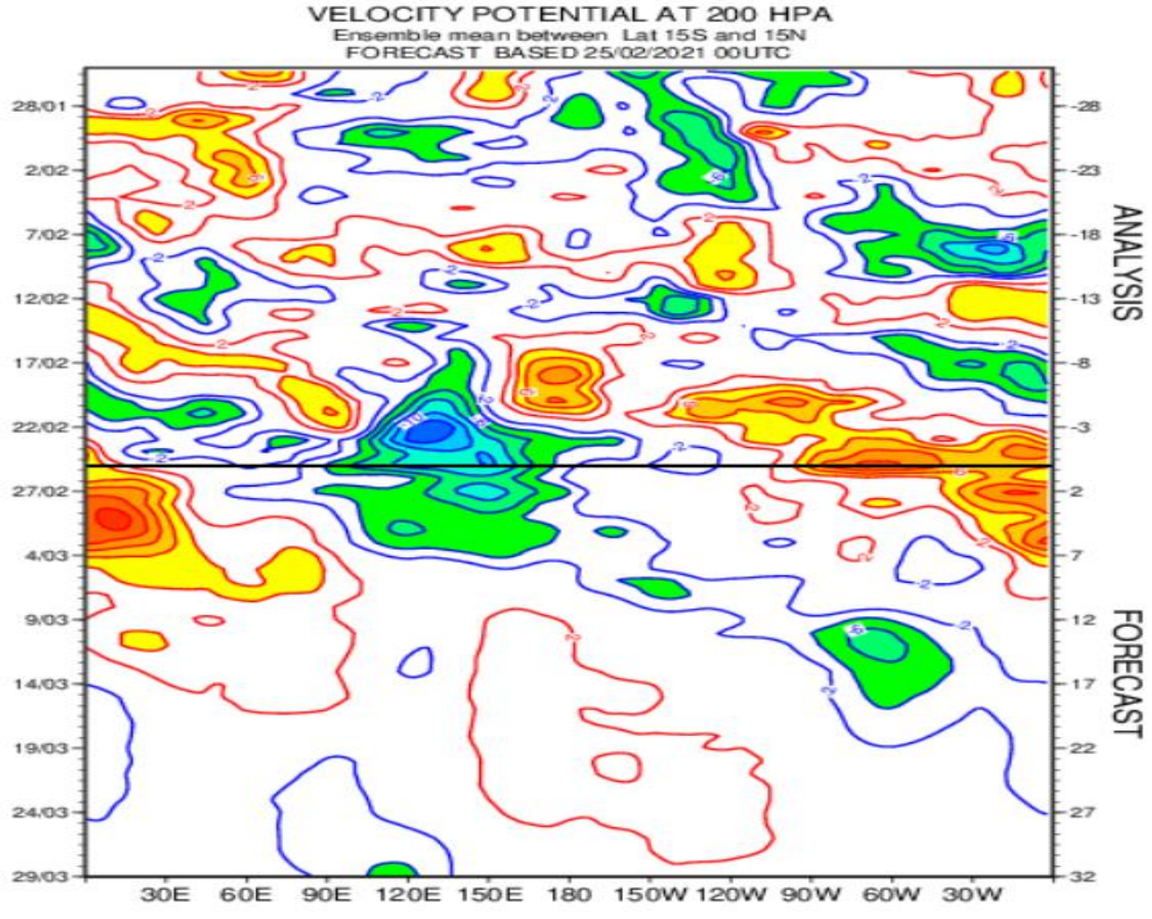
Figure 9: anomalies for 15n-5s with waves overlay including outlooks

https://ncics.org/pub/mjo/v2/hov/chi200.cfs.south.png
https://ncics.org/pub/mjo/v2/hov/chi850.cfs.south.png

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

PAST 3 WEEKS OLR ANOMALIES

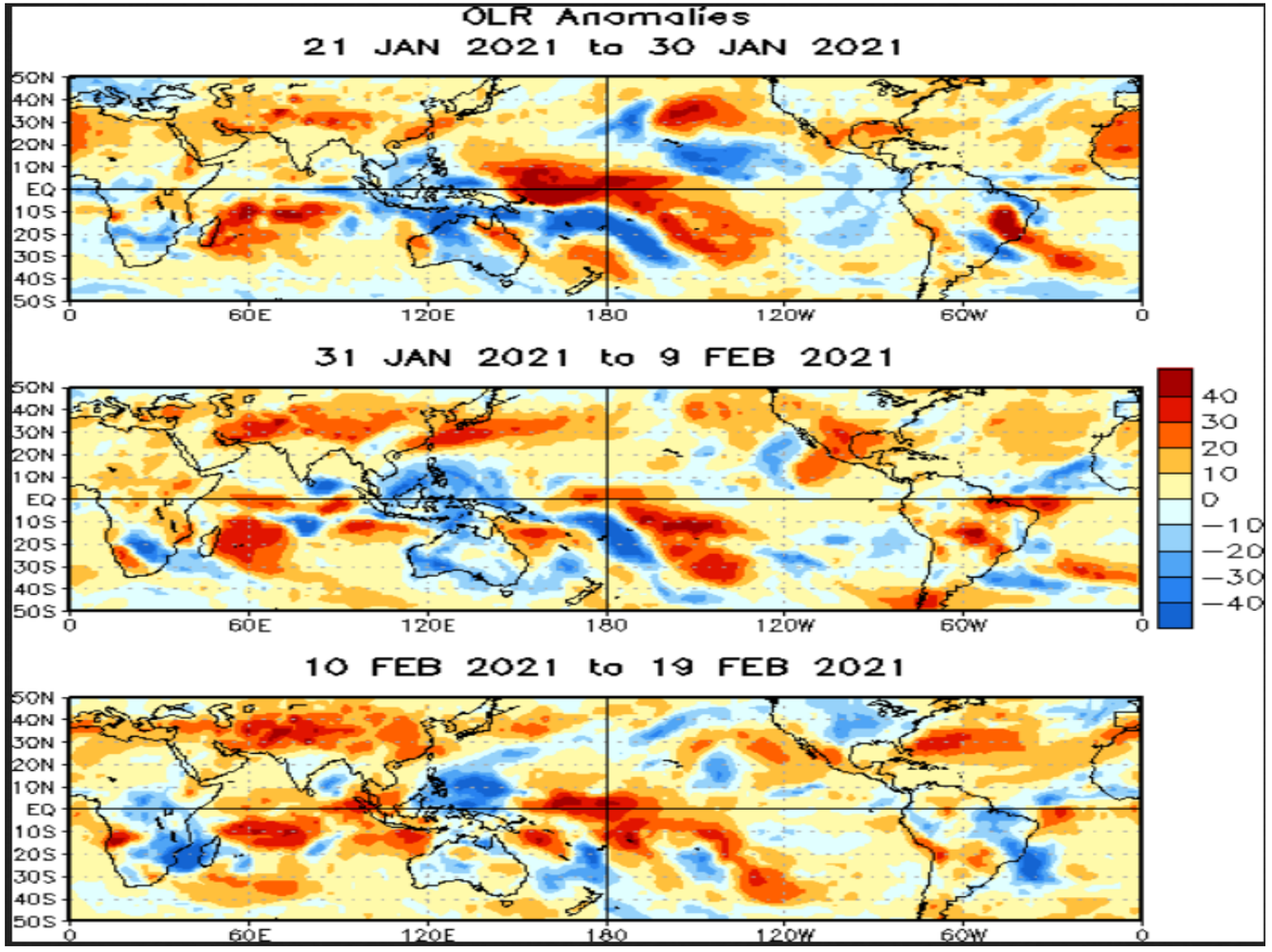


Figure 11: PAST 3 WEEKS OLR ANOMALIES

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

PAST 4 WEEKS VELOCITY POTENTIAL AND MONTH STREAM FUNCTION ANOMALIES WITH MJO, KELVIN AND ROSSBY WAVE OVERLAID ON GLOBAL MAPS 850 hPa

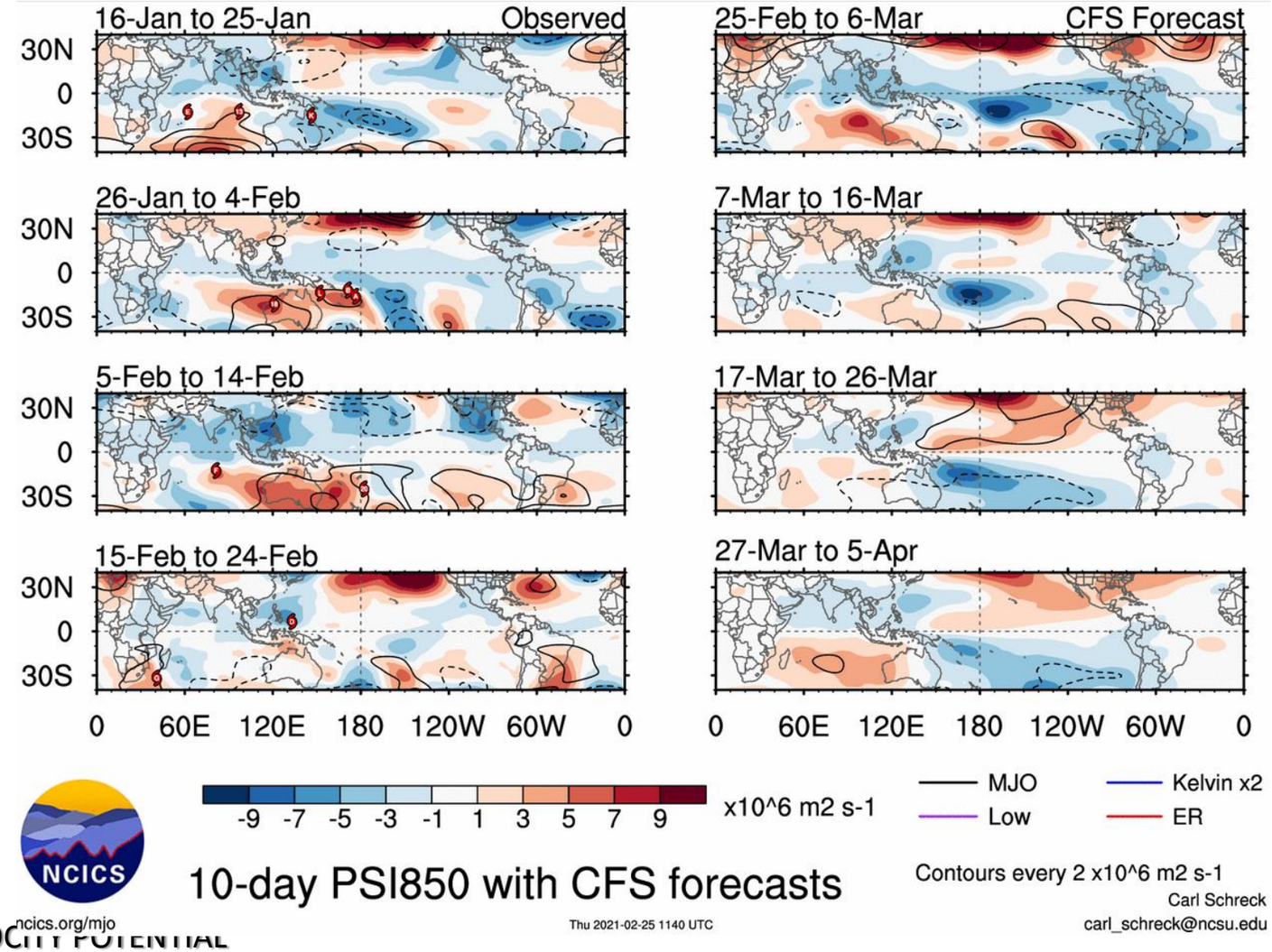


Figure 12: PAST 4 WEEKS VELOCITY POTENTIAL

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

MEAN SEA LEVEL PRESSURE OF THE DEKAD 2 FEBRUARY 2021 WITH THE ANOMALIES COMPARED THE AVERAGE 1971-2000

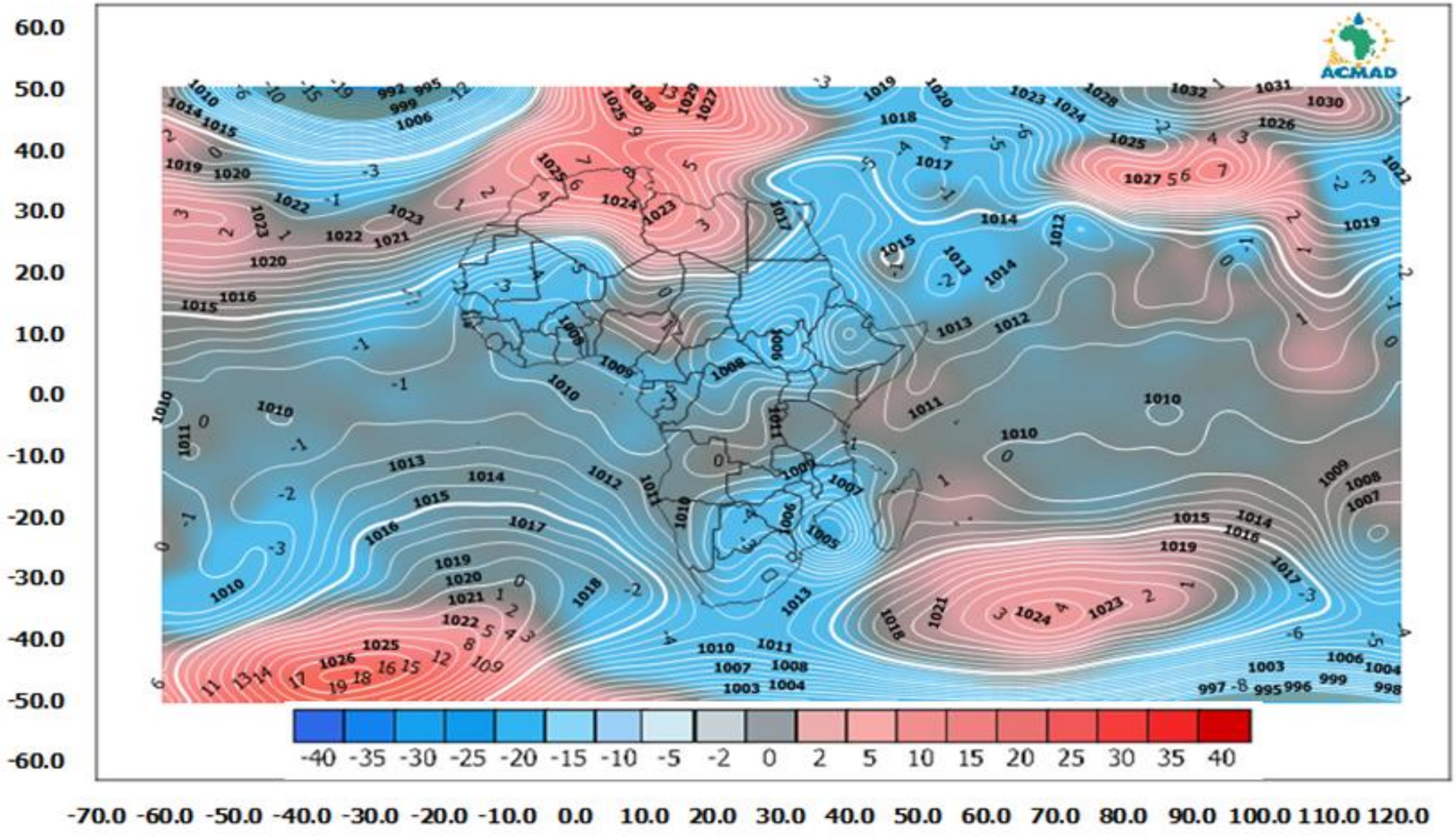


Figure 13: MSLP obs-anom and MSLP-climatology

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

WIND ANOMALIES FOR THE RECENT 10 DAY PERIOD 850 AND 700 hPa

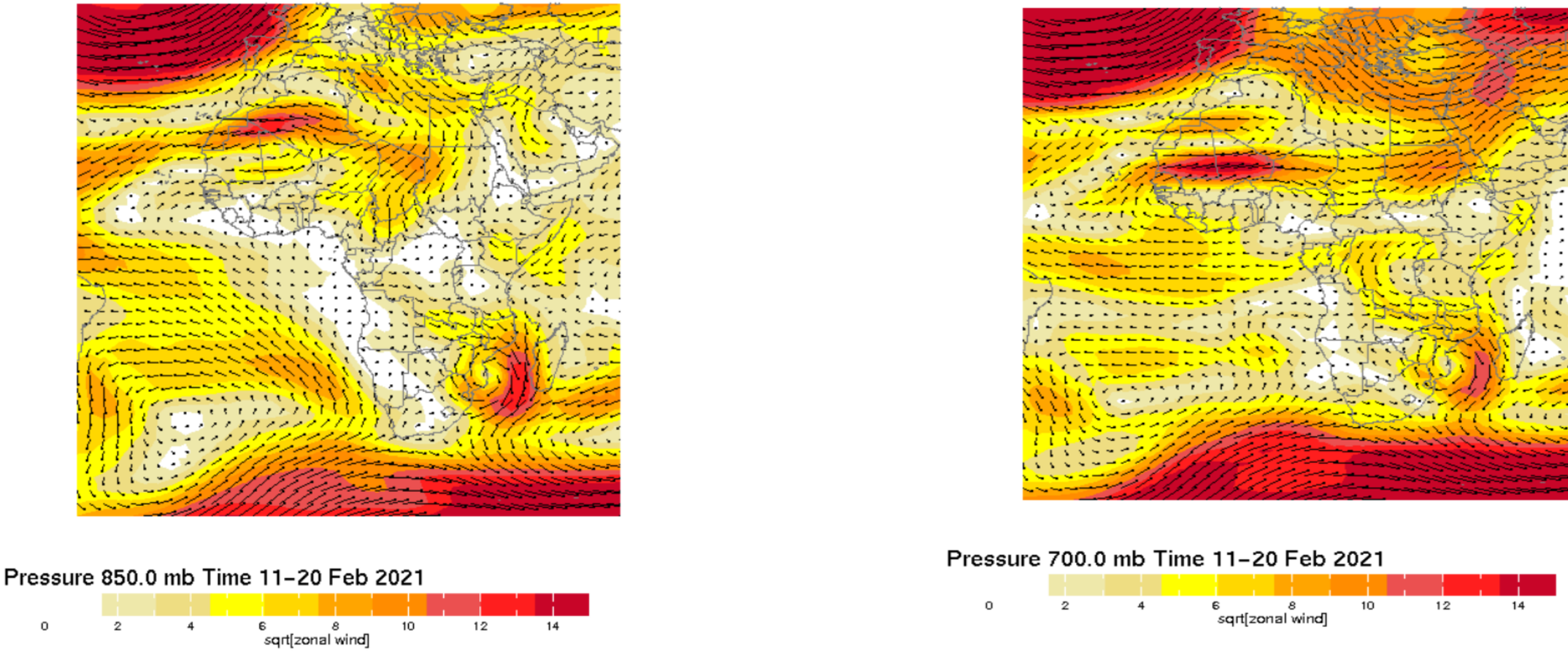


Figure 15: Wind anomalies for 850 (Left Pannel) and 700hPa (Right Pannel)

RELATIVE HUMIDITY 850 hPa DEKAD 1 FEBRUARY 2021 and ANOMALIES COMPARED OF AVERAGE 2002-2011

RH Anomaly at 850 hPa during 2nd dek of February 2021

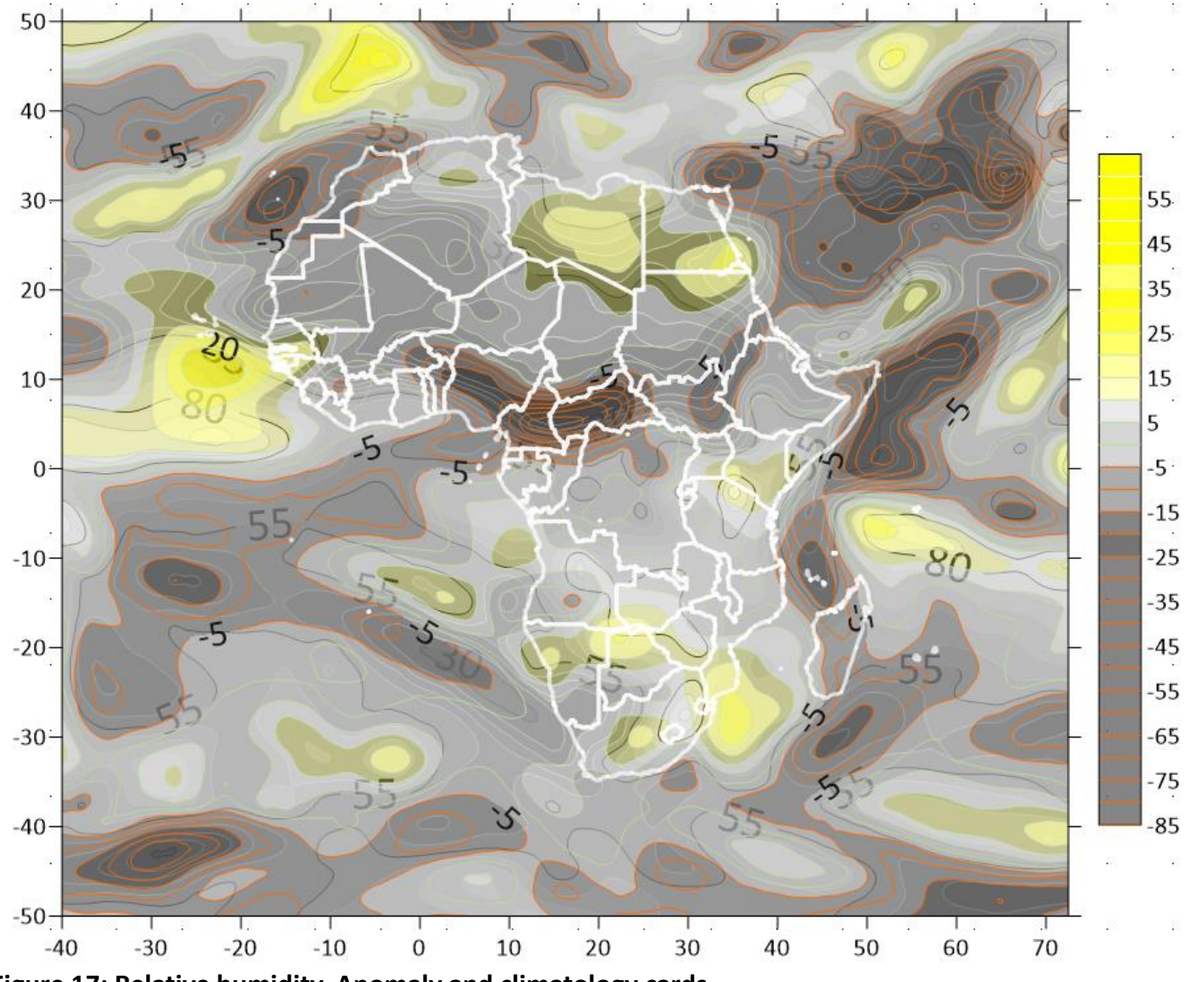


Figure 17: Relative humidity, Anomaly and climatology cards

The relative humidity anomalies for the second dekad of February 2021 were negative over Nigeria, Cameroun, Eritrea, south Sudan, CAC, Madagascar and Morocco.

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

RELATIVE HUMIDITY 700 hpa DEKAD 3 JANUARY 2021 and ANOMALIES COMPARED OF AVERAGE 2002-2011

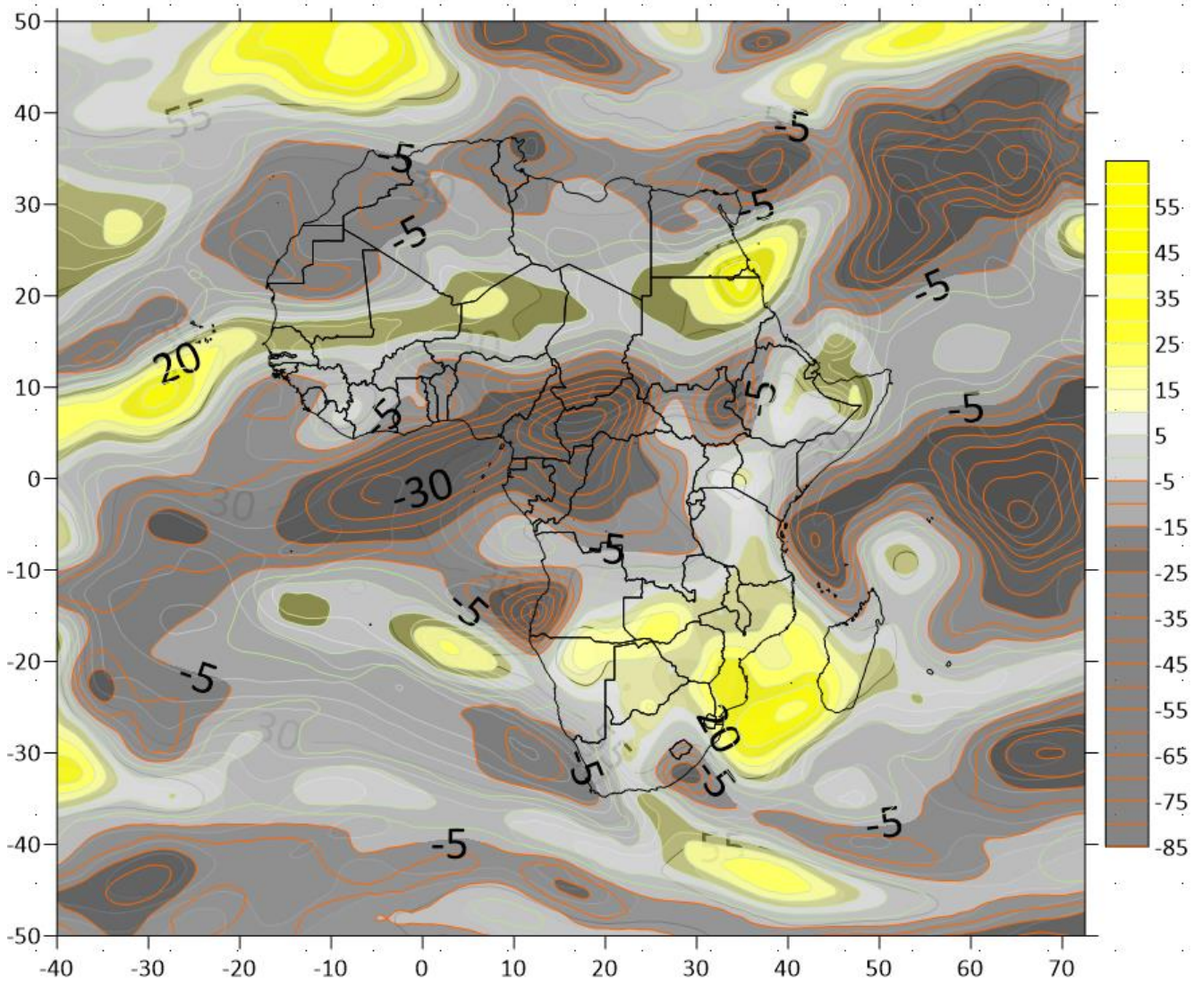
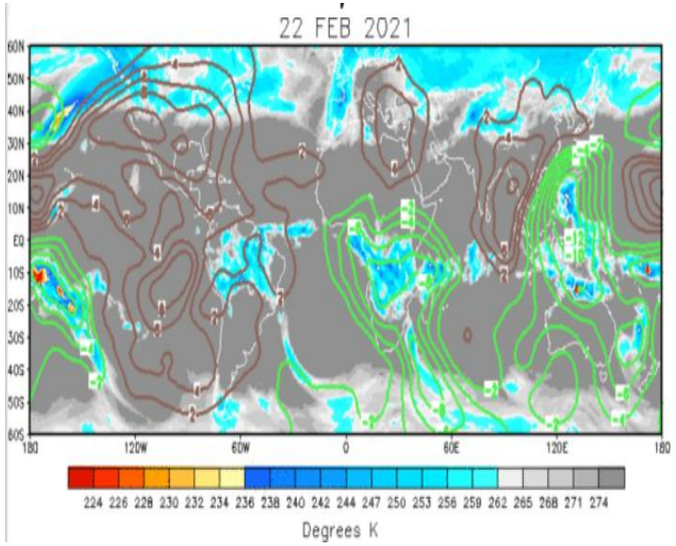


Figure 16: Relative humidity, Anomaly and climatology cards

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

The relative humidity anomalies for the second dekad of February 2021 were negative over most of Central and West Africa region, south Sudan, western Ethiopia, Northern Egypt, Algeria, Libya, Tunisia and Morocco.

IR IMAGE AND VELOCITY POTENTIAL ANOMALY



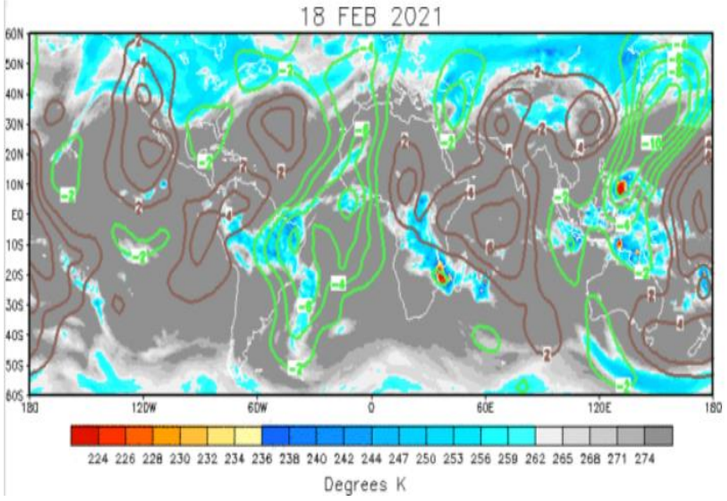
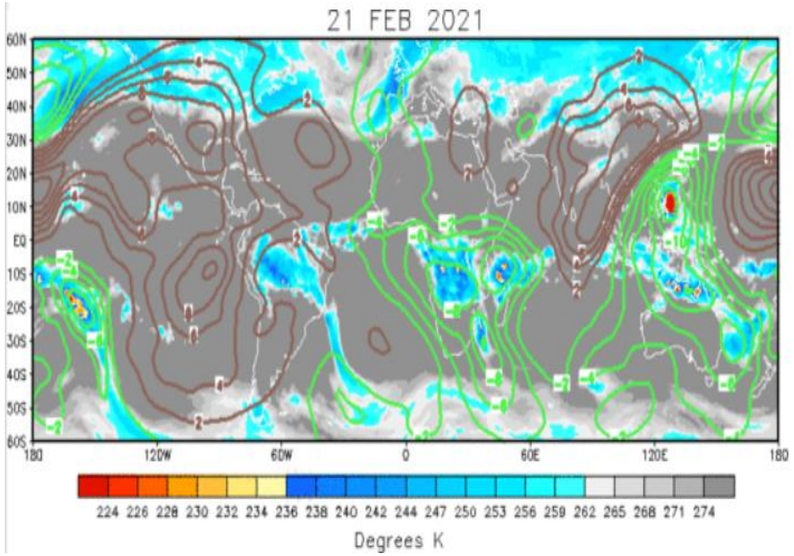
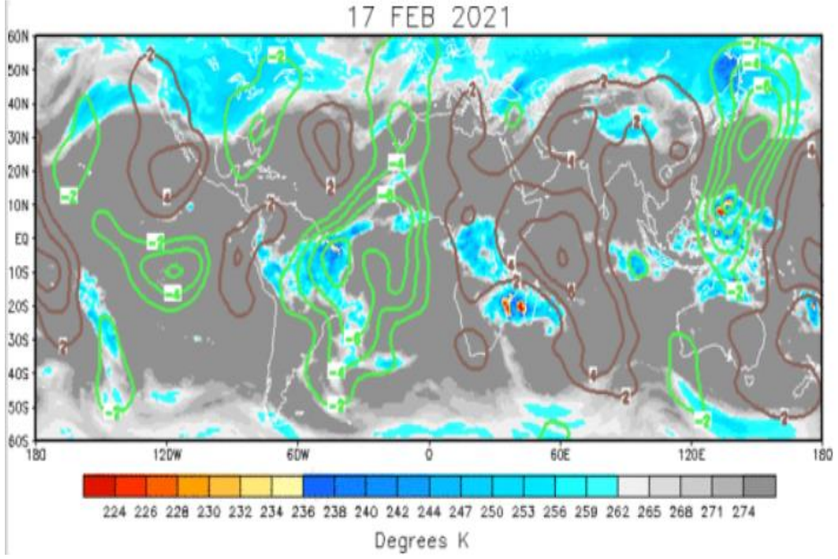


Figure 18: IR image and velocity potential anomaly

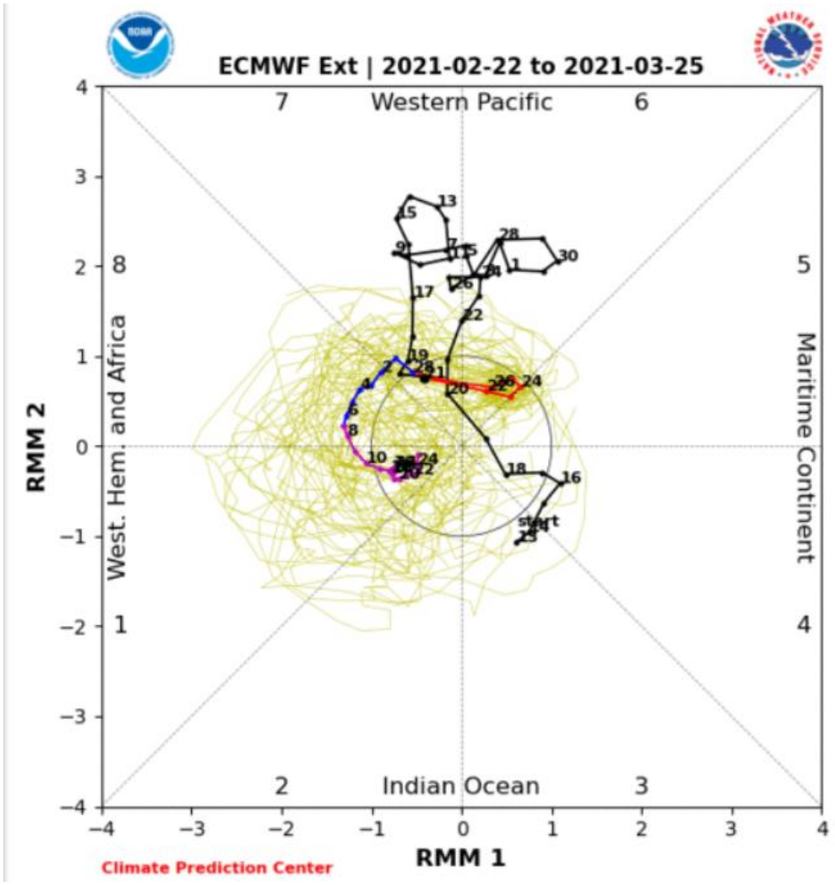
Three-day centered average animation of daily IR and 200-hPa velocity potential anomalies (base period 1981-2010) at 200-hPa are proportional to divergence with green contours corresponding to regions in which convection tends to be enhanced whereas brown contours associated with regions in which convection tends to be suppressed.

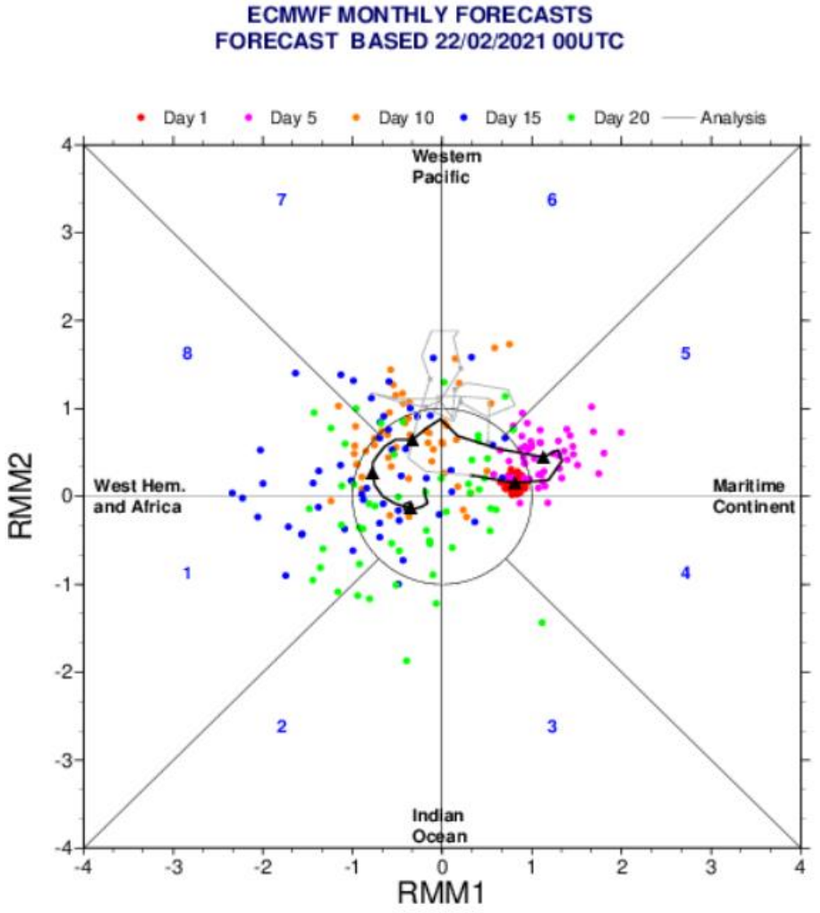




https://www.cpc.ncep.noaa.gov/products/precip/CWlink/ir_anim_monthly.shtml

MJO MONITORING AND FORECASTS FRO ECWF, NCEP, UK MET OFFICE … FROM MJO WORKING GROUP WEBSITE





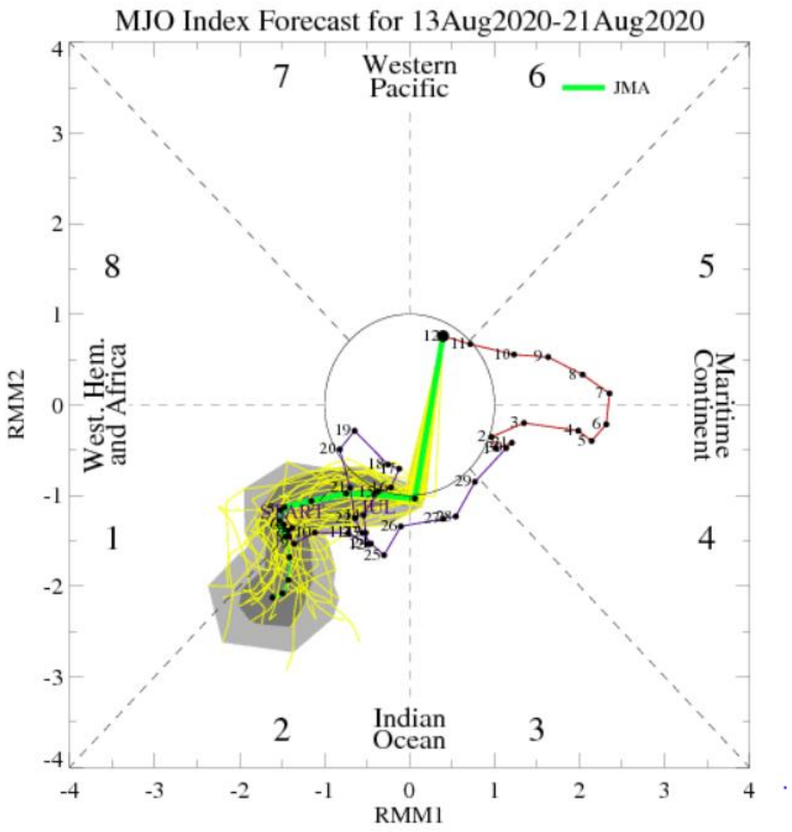


Figure 19:FORECASTS FRO ECWF, NCEP, UK MET OFFICE

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

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

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

WEEKLY FORECAST

MJO FORECAST

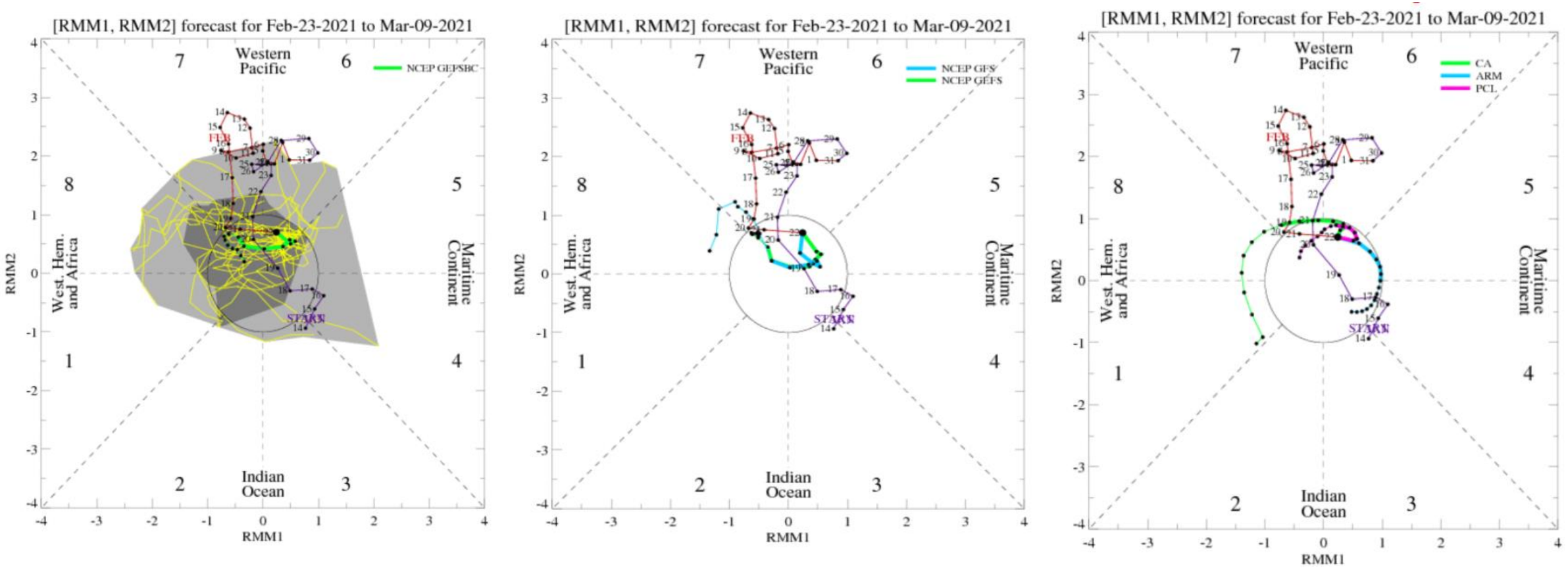


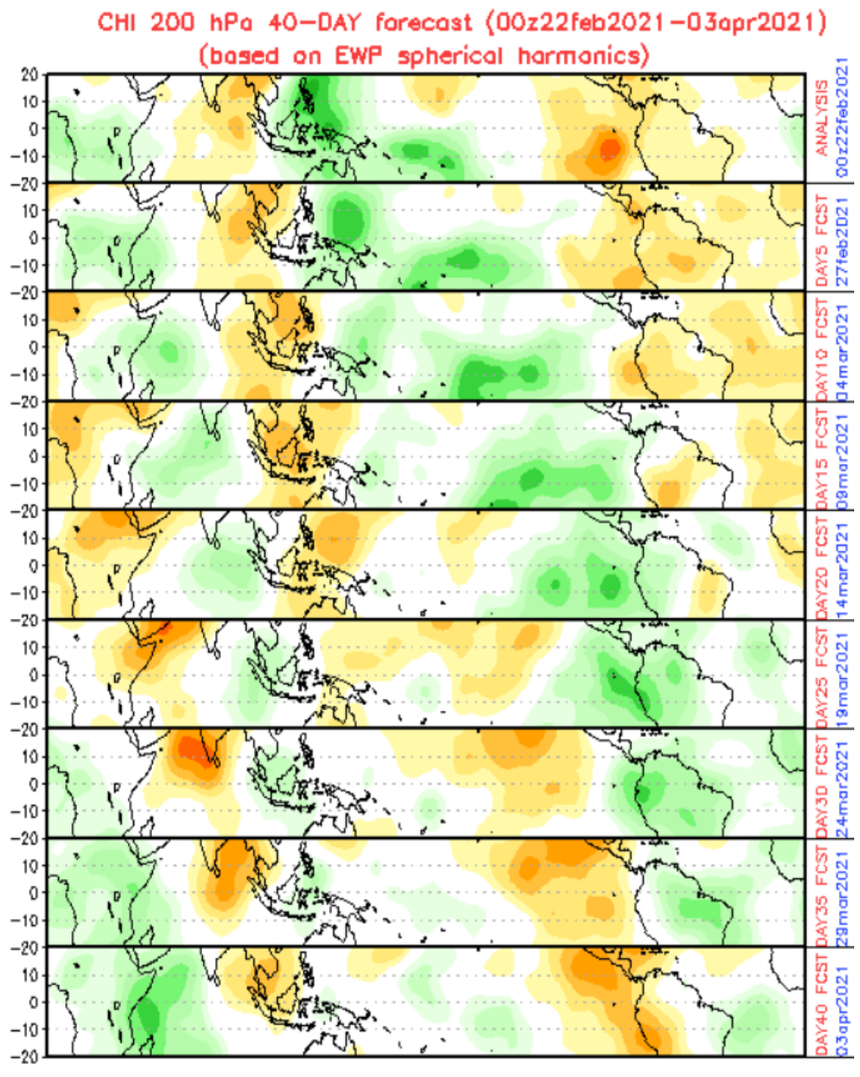
Figure 20: Mjo forecast

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

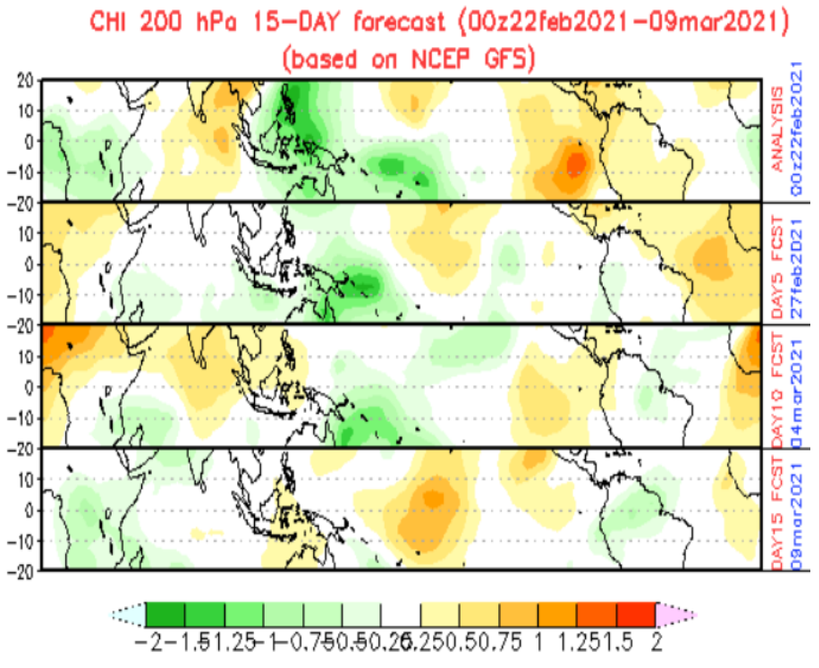
https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/foroper.shtml

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

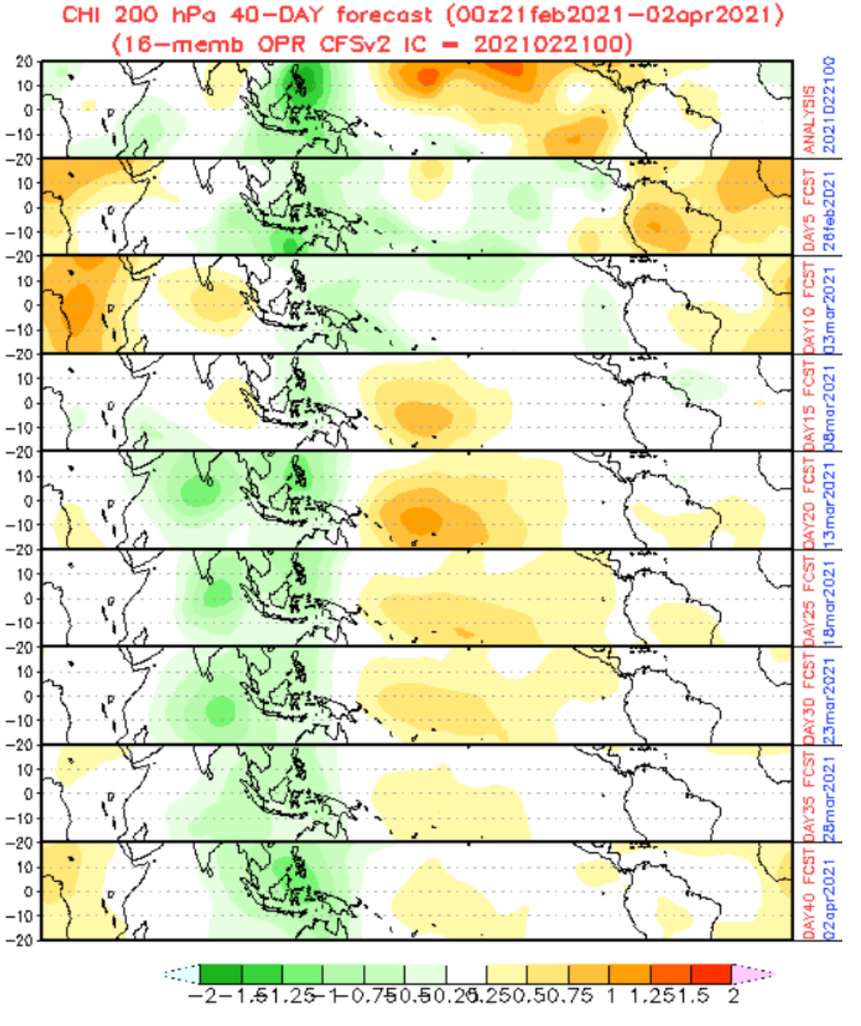
MJO FORECAST



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



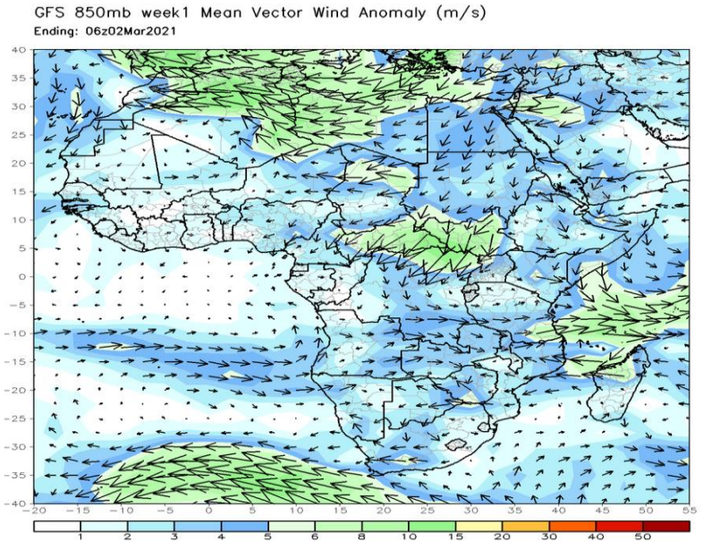
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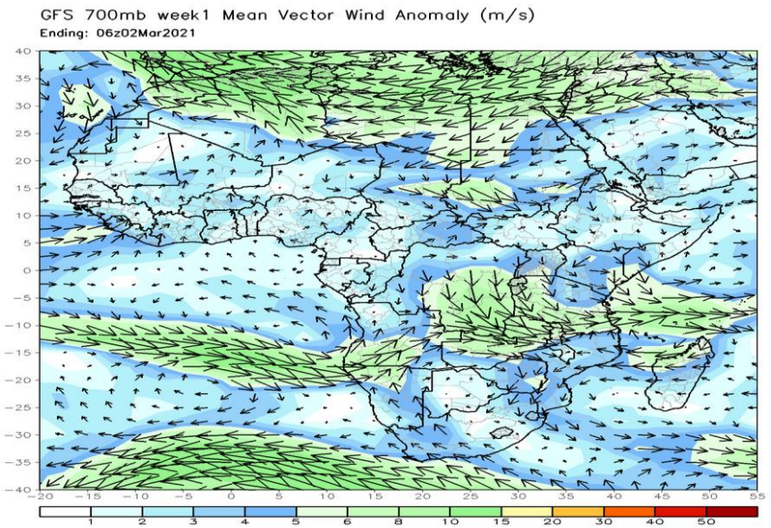


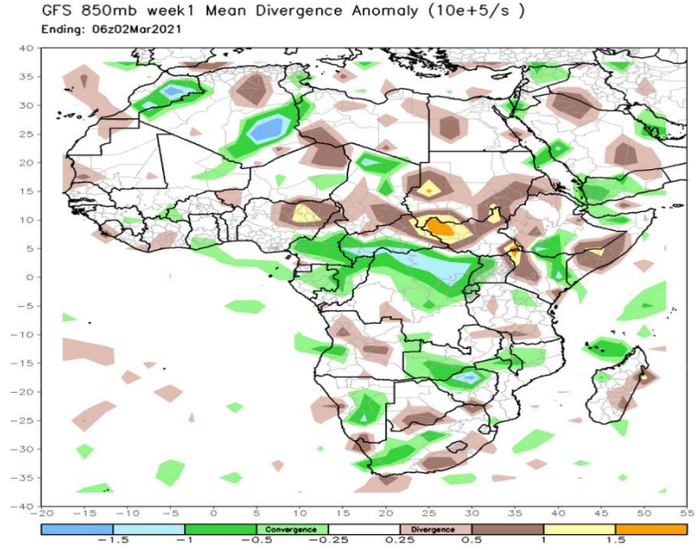
https://www.cpc.ncep.noaa.gov/products/people/wd52qz/mjo/chi/cfs.gif

Figure 21: Mjo forecast

WIND ANOMALY AND DIVERGENCE FORECAST FROM GFS WEEK1: 24 Feb - 02 Mar 2021







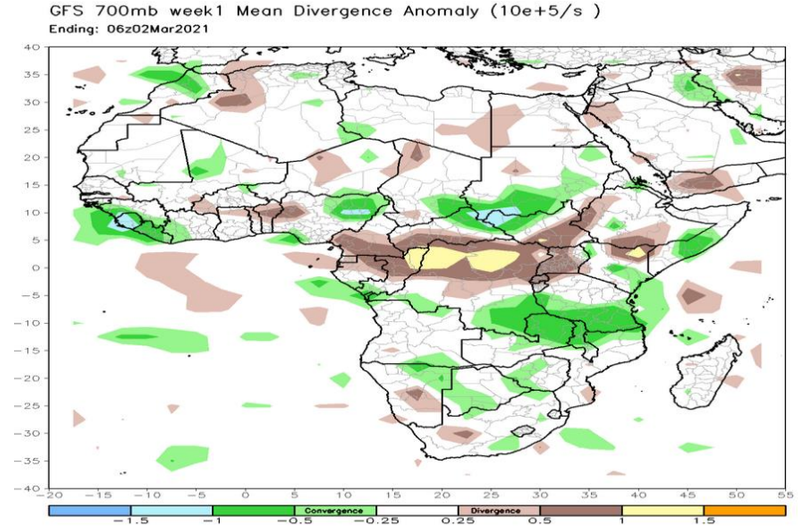
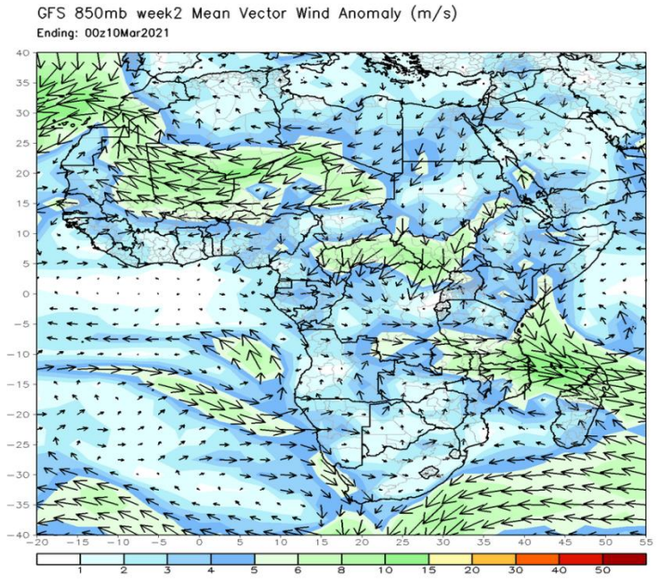
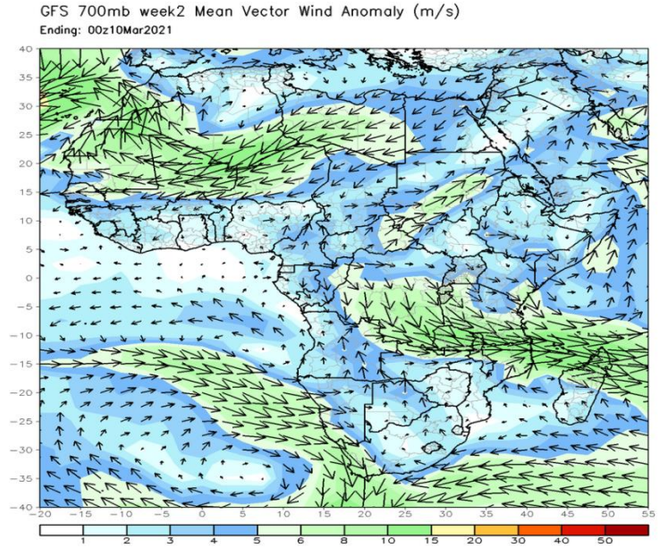


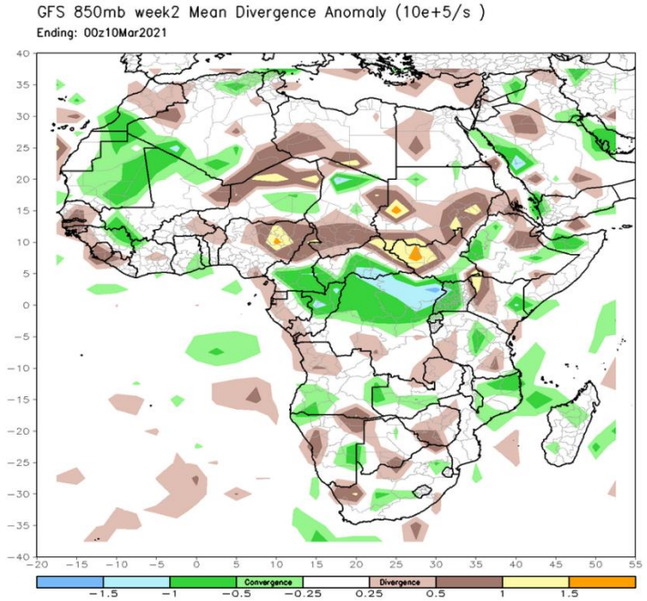
Figure 22 : Forecast from GFS https://www.cpc.ncep.noaa.gov/products/international/africa/africa.shtml

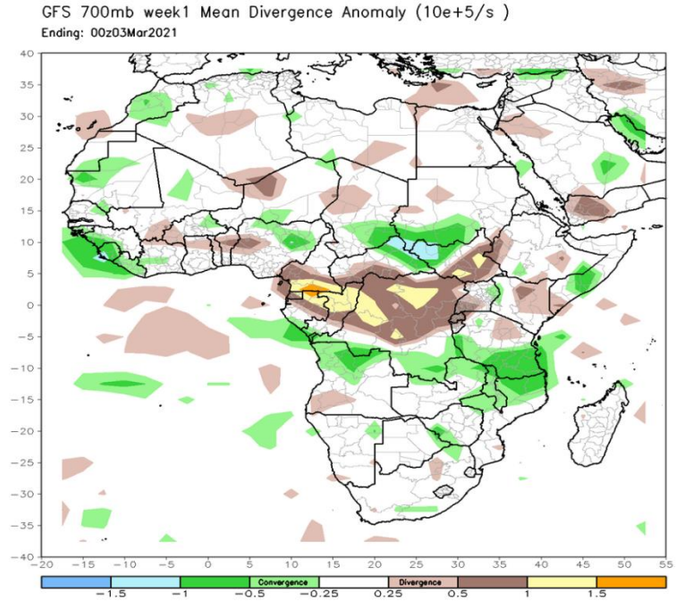
WIND ANOMALY AND DIVERGENCE FORECAST FROM GFS WEEK2: 23-01 Mar 2021





For the forecast of the divergent wind, for the first week at the 850 the wind is converging over the whole area of Africa as well as the 700





GFS WIND ANOMALY AND DIVERGENCE FORECAST Week1: -24 Feb-3 Mar 2021

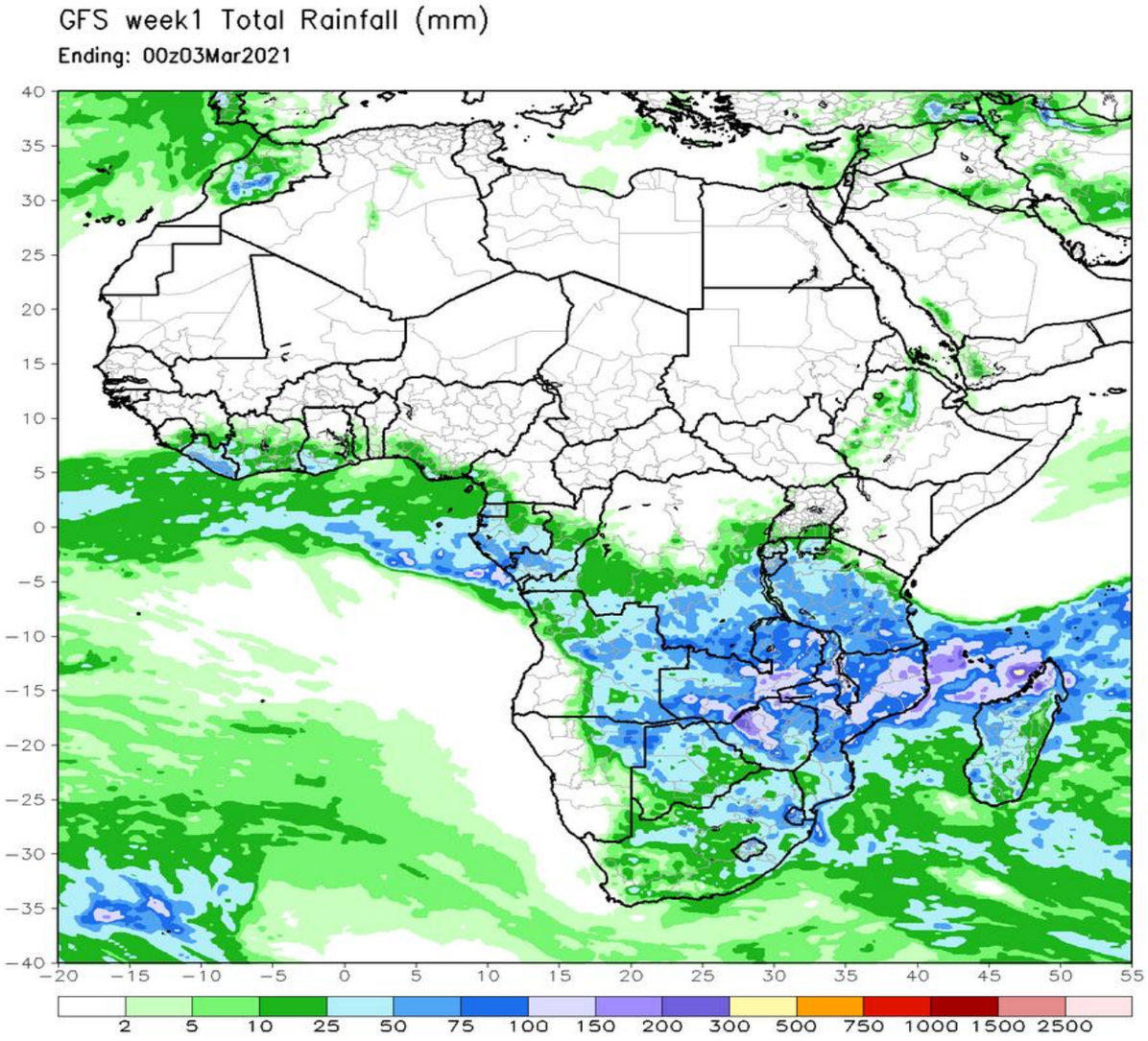


Figure 24 : GFS total precipitation forecast week1

The map indicate the low to moderate precipitation over southern of Guinea gulf countries, western of Central Africa region.

The moderate to heavy precipitation over southern East Africa region countries and eastern parts of SADC region

https://www.cpc.ncep.noaa.gov/products/international/gfs/gfs_week1_af_precip_obs.gif

WEEK 1 (15 – 24 FEB) AT 700 hPa RELATIVE VORTICITY FORECAST FROM CFS ECMWF

Figure 25: Relative vorticity forecast from cfs ECMWF,
For the forecast we see that there is an intense forecast in Kenya, Tanzania, Namibia, and South Arica

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

WEEK 1 (11 – 17FEB) AT 700 hPa DIVERGENCE WIND FORECAST ECMWF

Figure 26: Divergence Wind forecast ECMWF
Always for the first week the wind is divergent

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

MONTHLY FORECAST FROM WMO LEAD CENTRE SINGLE ENSEMBLE AND MULTIMODE

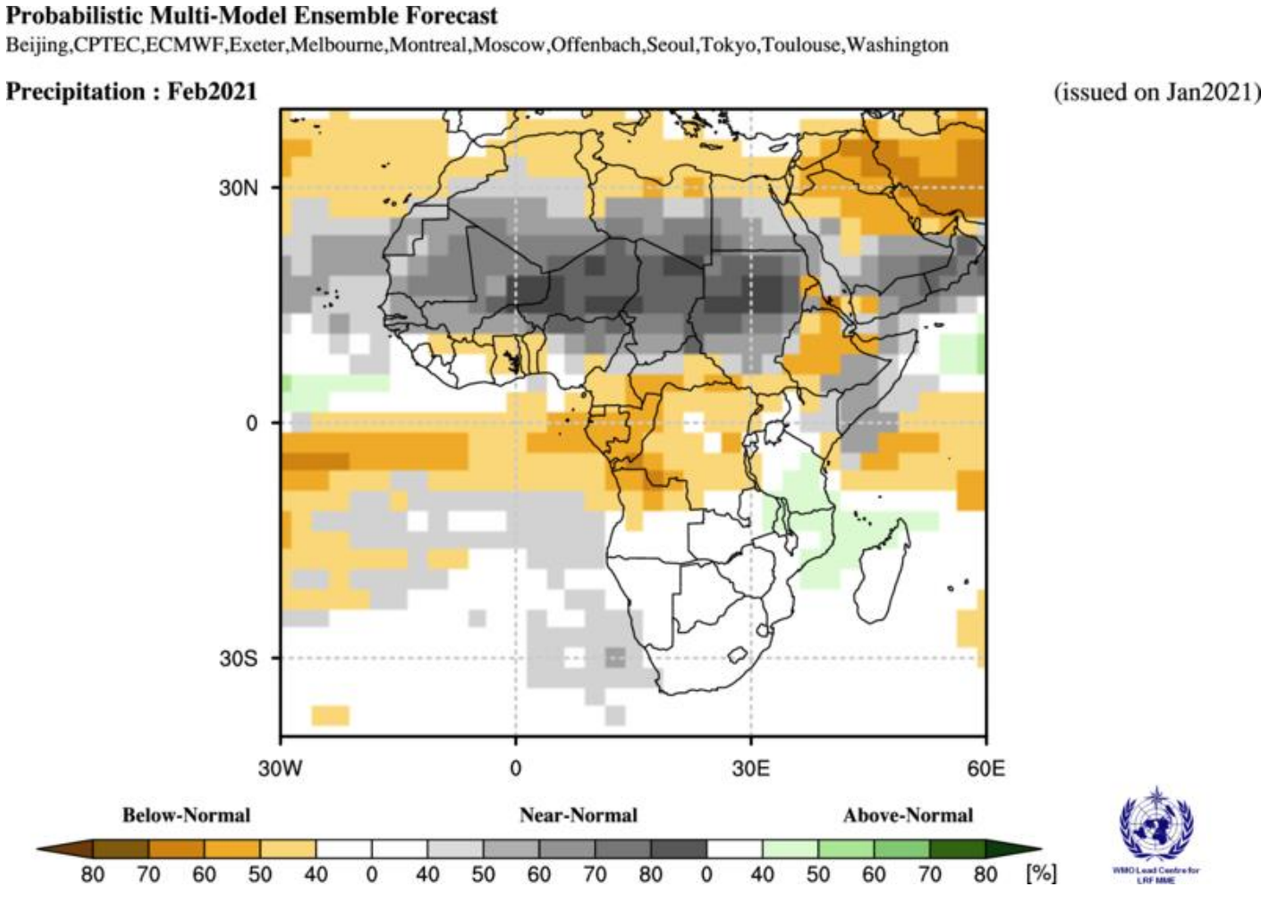


Figure 27: Monthly forecast

The LOMM-level model set tells us that part of the Africa region will have higher than normal rainfall.

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

PRECIPITATION FORECASTS FROM ECMWF FOR WEEK 1 & 2

Figure 28: Precipitation forecast

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: Tercile 33 & 66

Figure 29: Monthly forecasting system

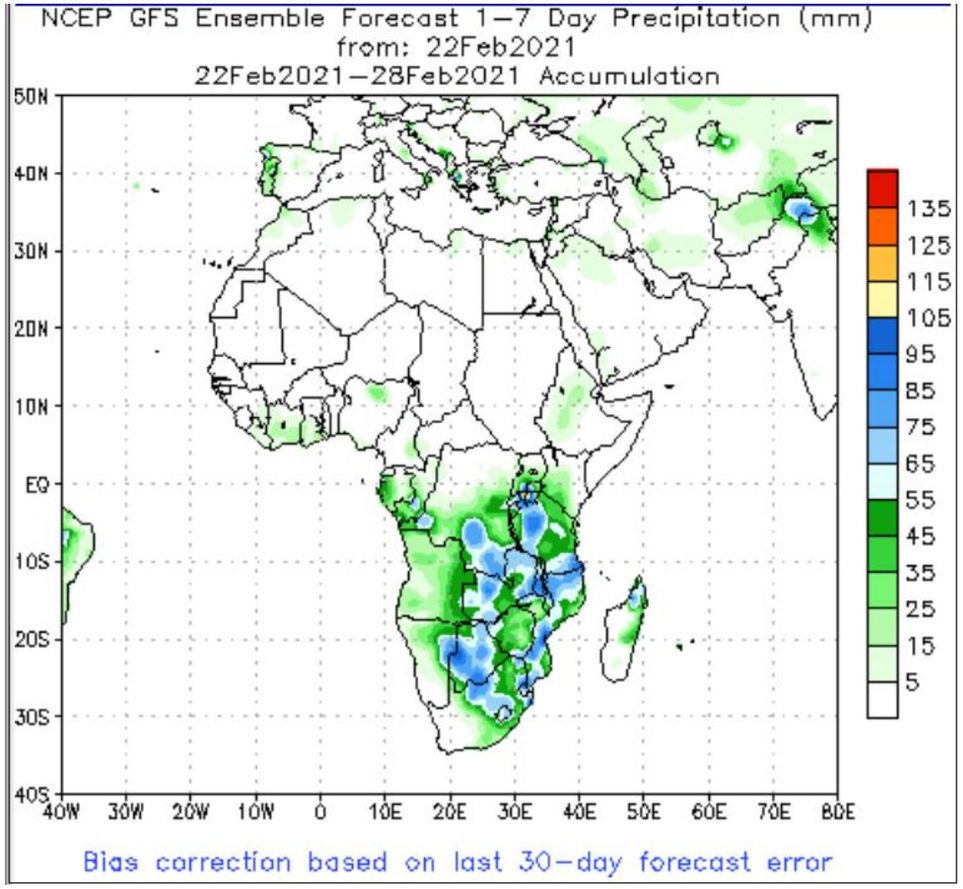
https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_anomaly?facets=undefined&time=2019112100,408,2019120800&parameter=precipitation&area=Global

PROBABILITY PRECIPITATION FORECASTS FROM ECMWF FOR WEEK 2: Tercile 33 & 66

Figure 30: Monthly forecasting system

https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_anomaly?facets=undefined&time=2019112100,408,2019120800&parameter=precipitation&area=Global

PRECIPITATION AND ANOMALY FORECAST FOR WEEK1:- 22-28 FEBRUARY 2021



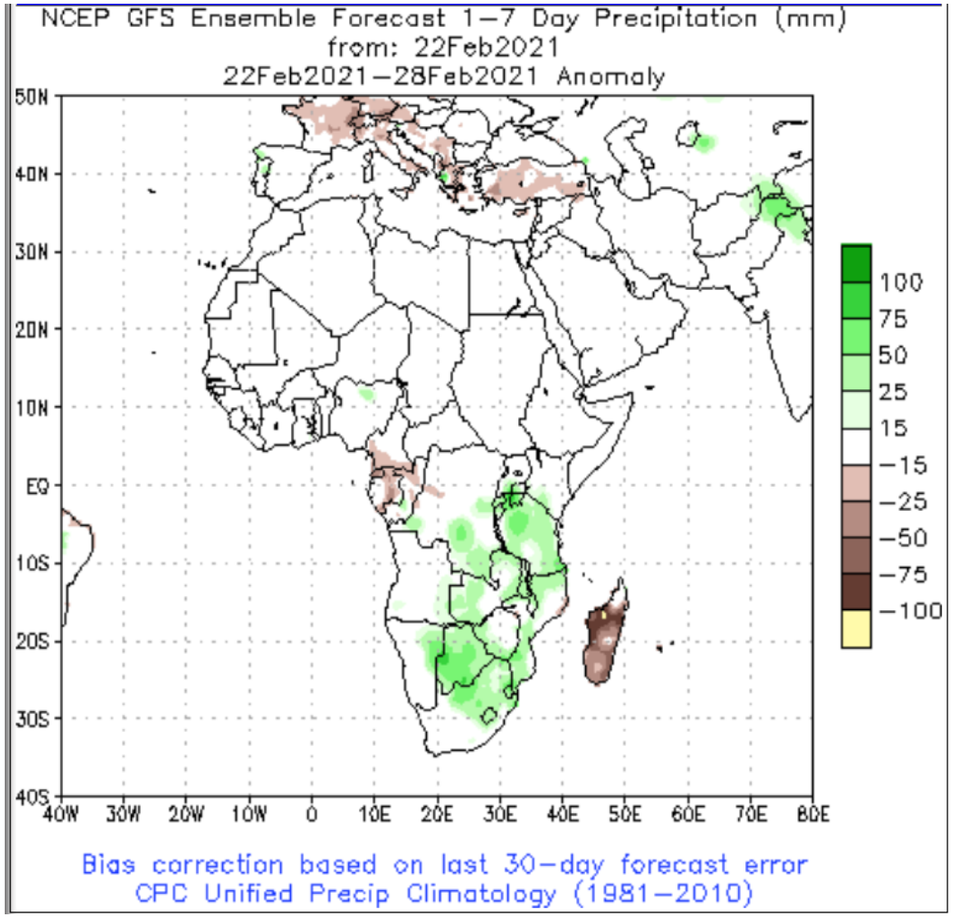
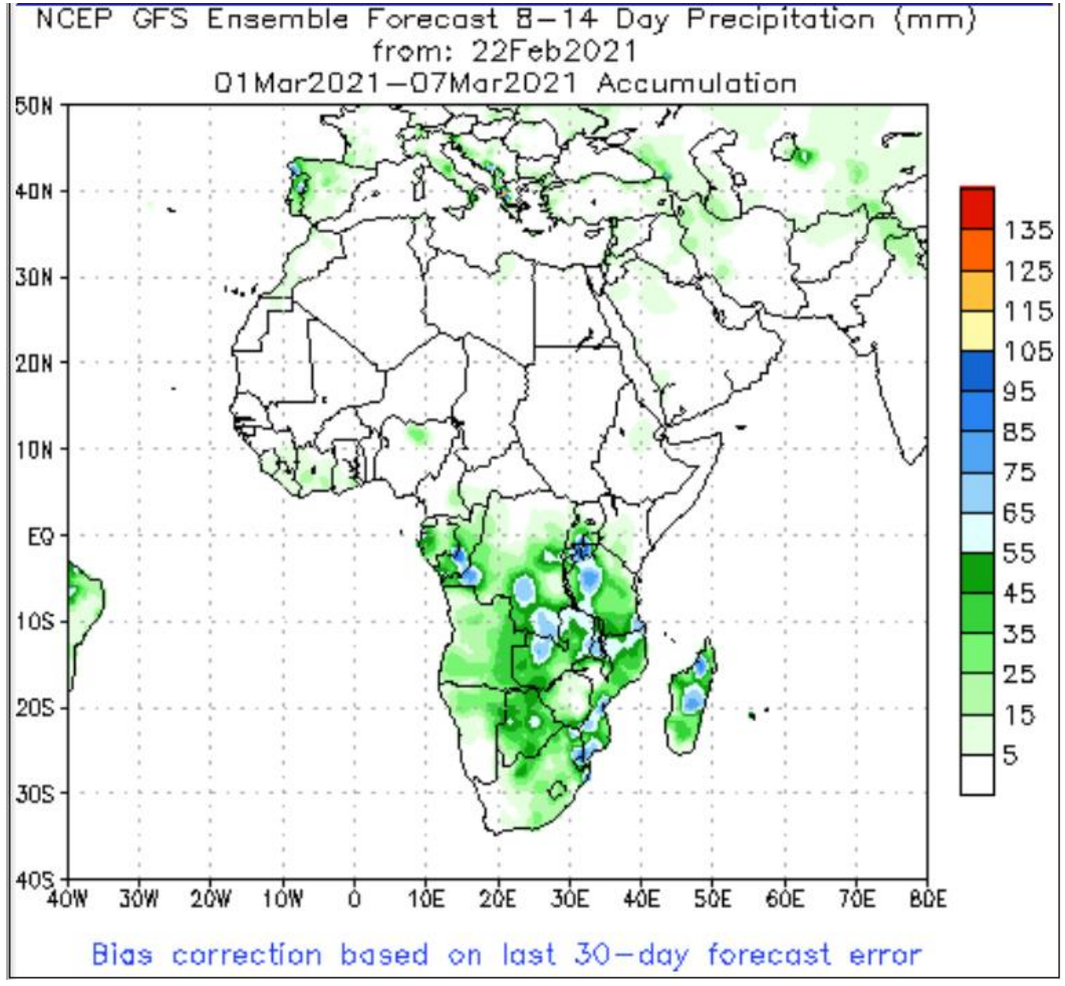


Figure 32: Précipitation and Anomaly forecast

Precipitation of anomalies for the first week will generate more precipitation at the level of East Africa when we look at the level of the anomaly finds that this area is always in surplus.

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

PRECIPITATION AND ANOMALY FORECAST FOR WEEK2:- 01-07 MARCH 2021



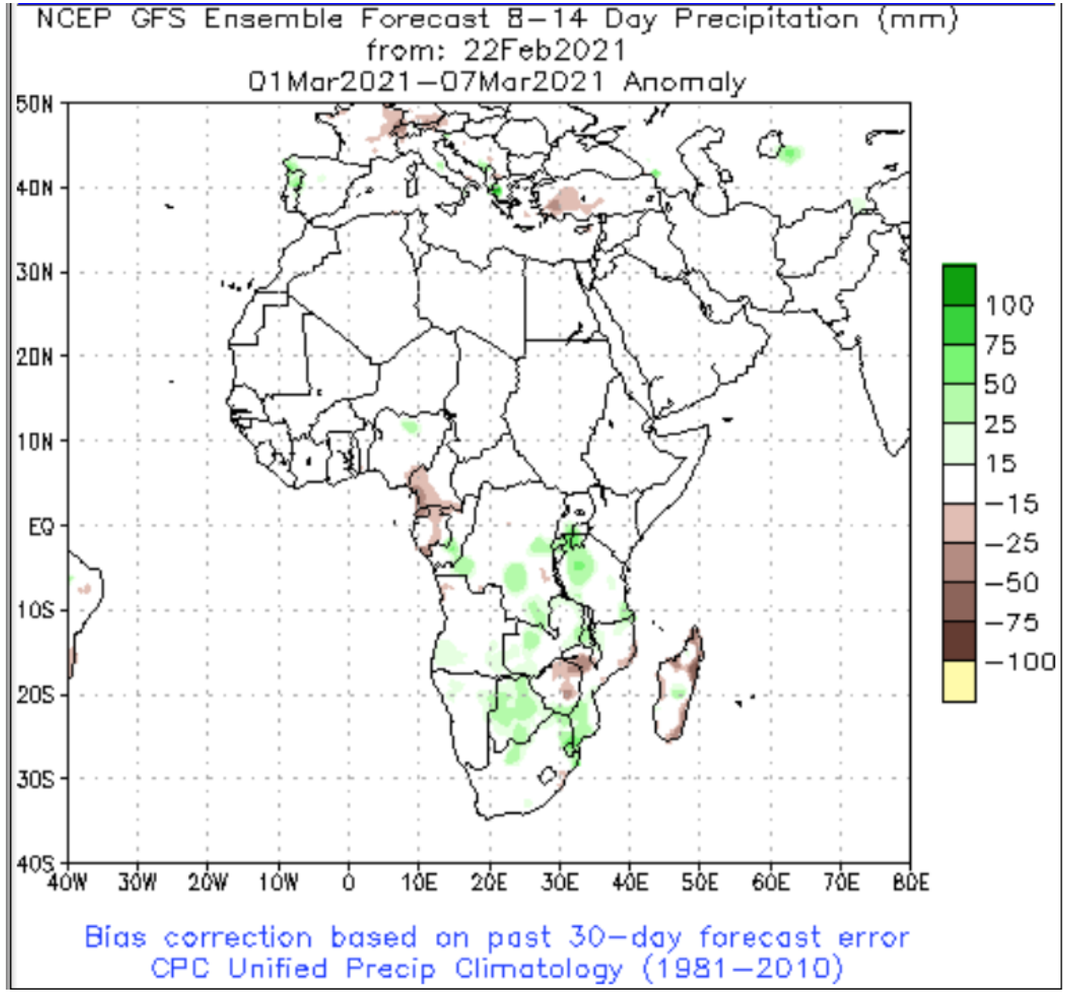


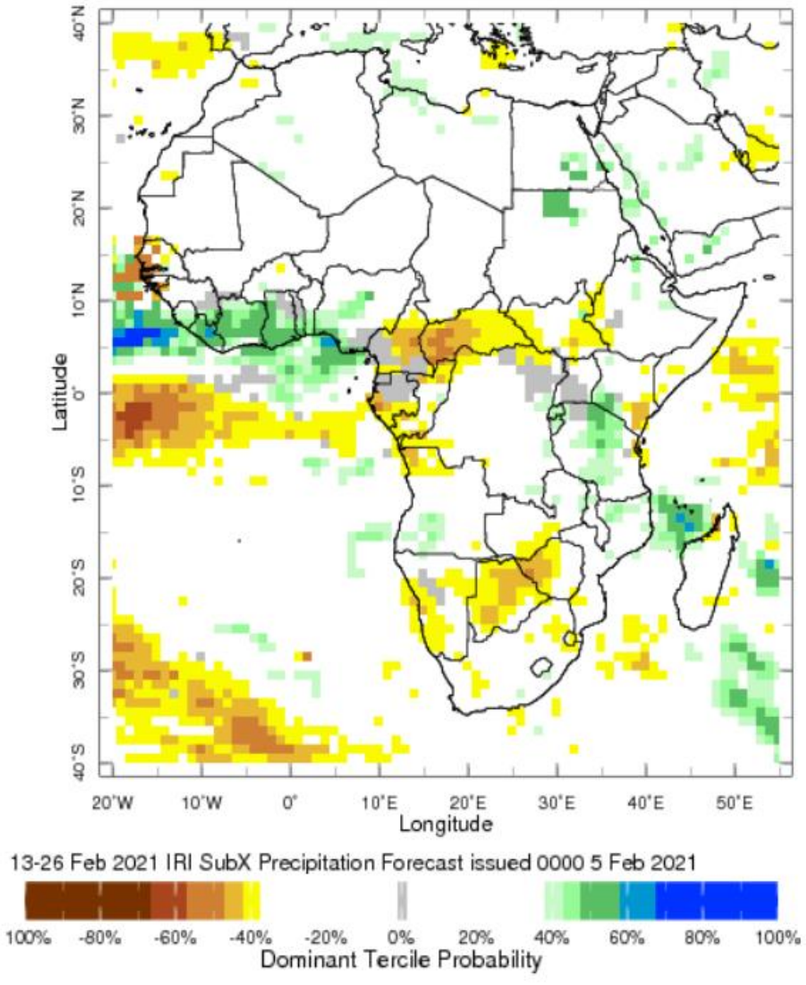
Figure 32: Précipitation and Anomaly forecast

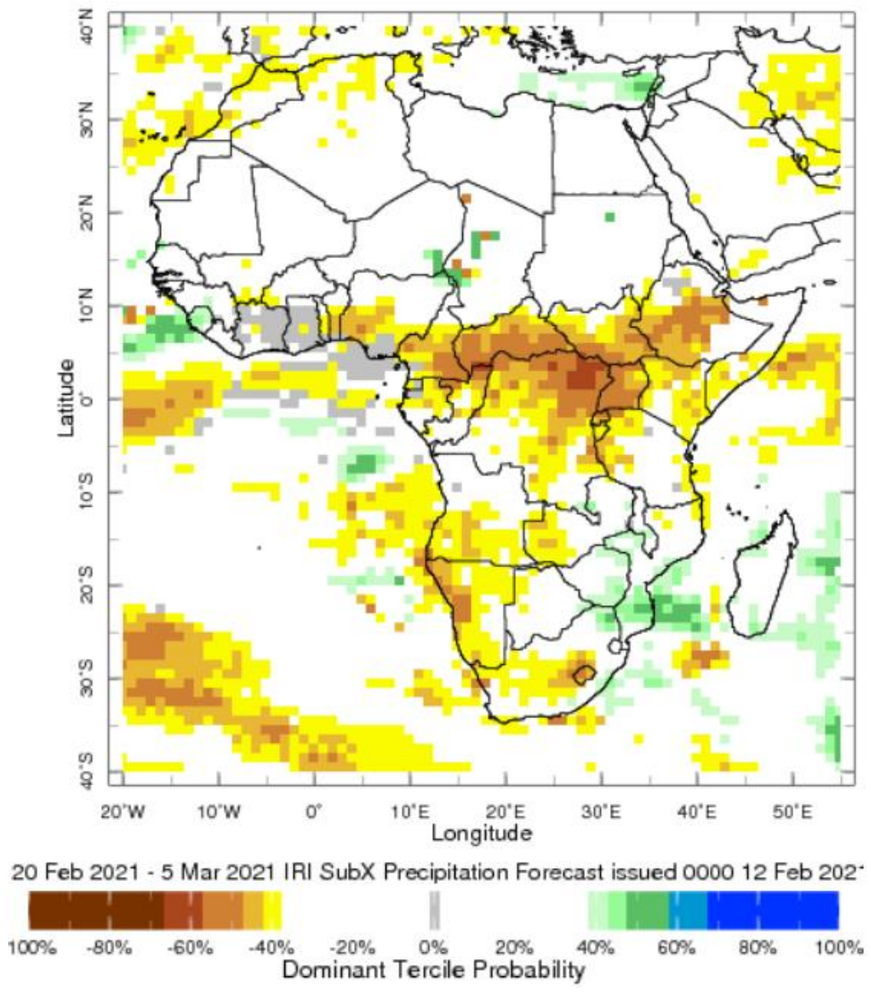
Precipitation of anomalies for the first week will generate more precipitation at the level of East Africa when we look at the level of the anomaly finds that this area is always in surplus.

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

PRECIPITATION PROBABILITY FORECAST subx: 13 Feb – 12 Mar 2021





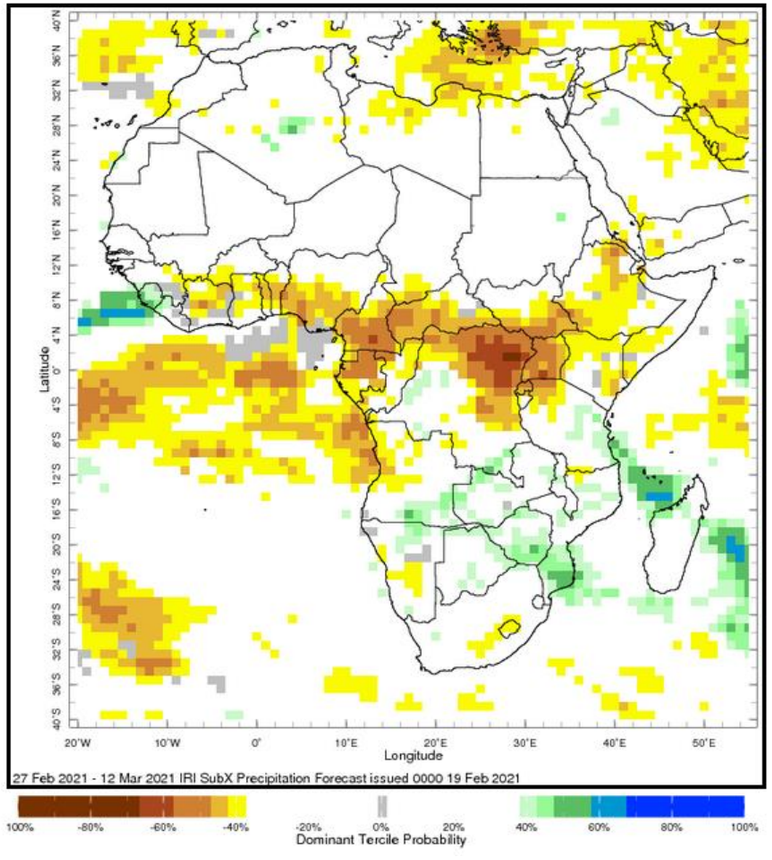


Figure 31: Precipation forecast subx
For the forecast model, this model defines nearly 50% of rain observed in southern Sudan Kenya Rwanda and Burundi**.**

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%201%20Nov%202019&region=bb%3A-20%3A-40%3A55%3A40%3Abb

CLIMATOLOGY OF PRECIPITATIONS FOR UPCOMING WEEK 1 and 2

01 – 08 March 2021_PPT Climatology

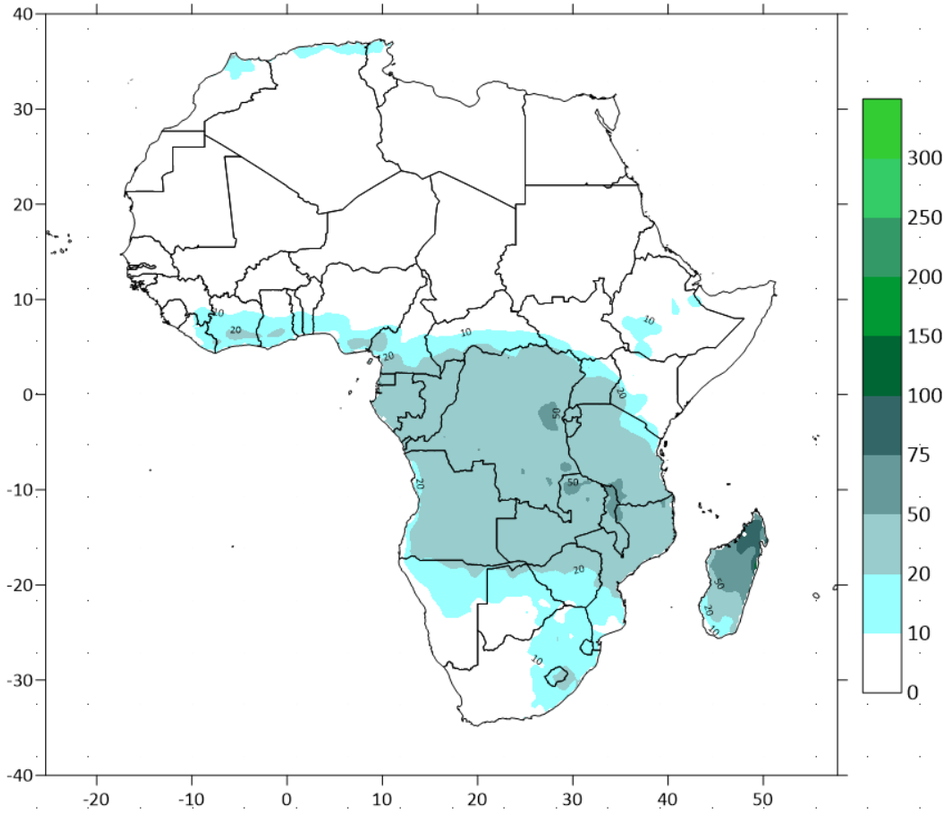
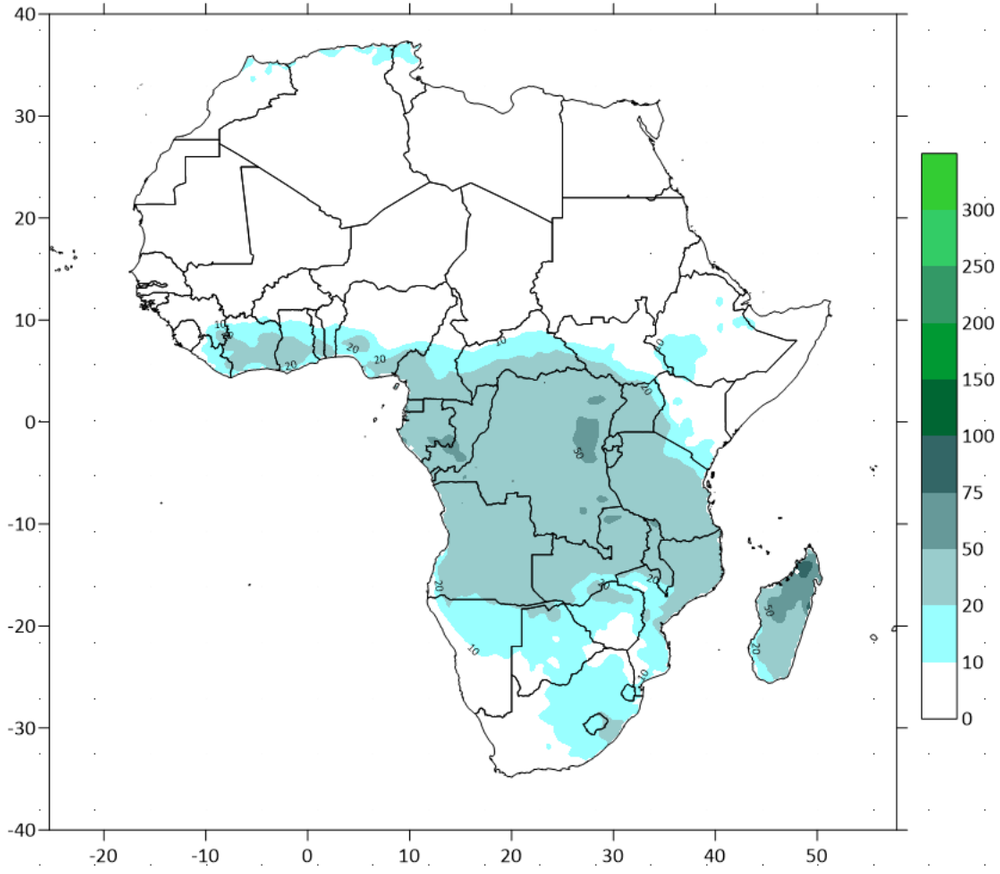
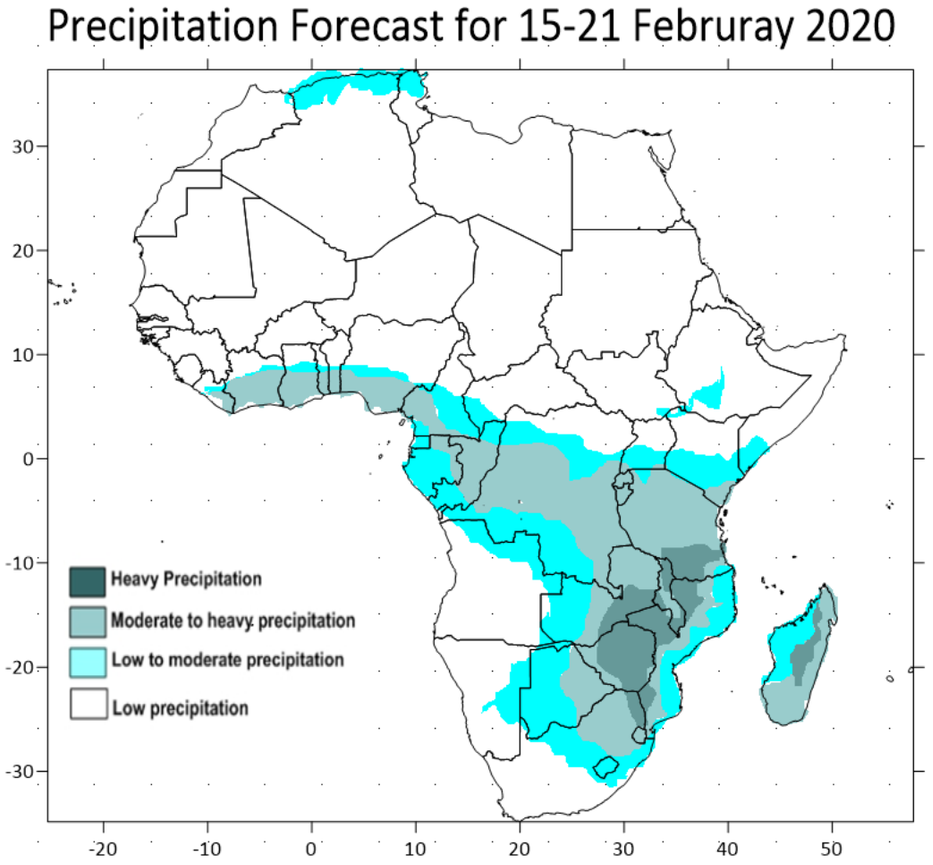


Figure 34: Climatology of Precipation

09 – 16 March 2021_PPT Climatology



PRECIPITATION FORECAST FOR THE COMING TWO CONSECUTIVE WEEKS



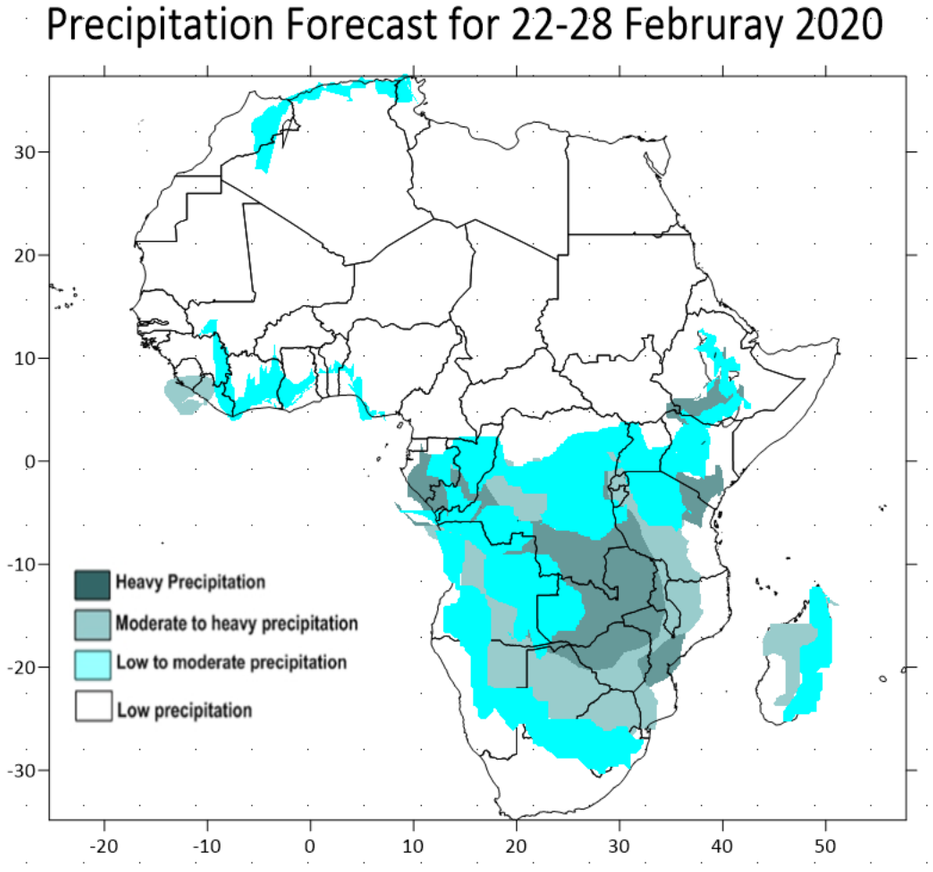


Figure 35: Precipation forecast Analysis