South West Indian Ocean region

ACCOF-19

Laurent LABBE (Météo France Regional Center for Indian Ocean)

La Réunion - 30/05/2025

Content

1 – Tropical cyclone season summary

2 – Verification of the forecast for OND 2024 & JFM 2025

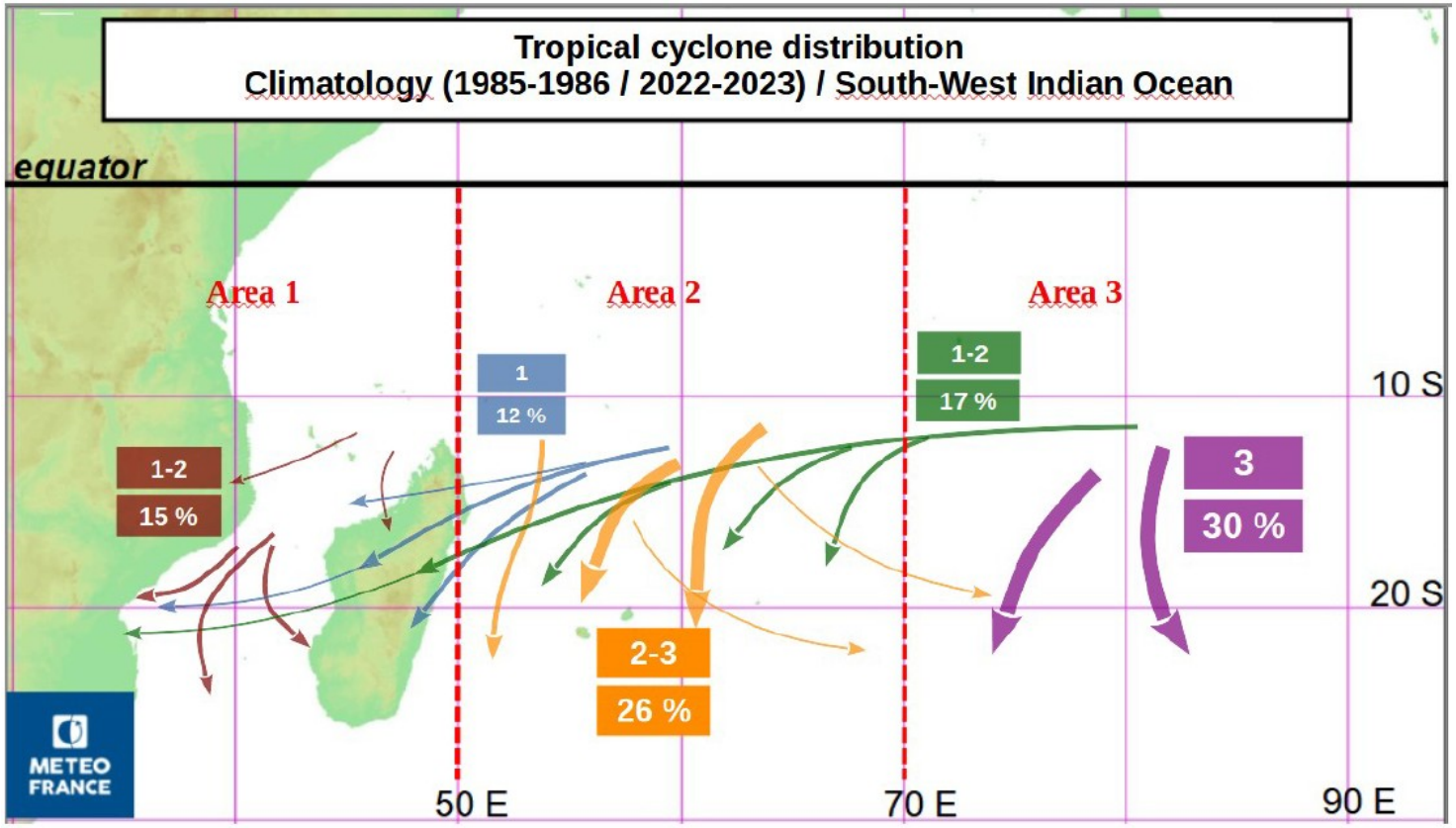
3 – 2025/05 forecast for JJA & JAS

1 – Tropical cyclone season summary

Recall of the climatology (1985-2023)

- Average : 10 named systems / 5 TC
- Season : 15 Nov – 30 Apr

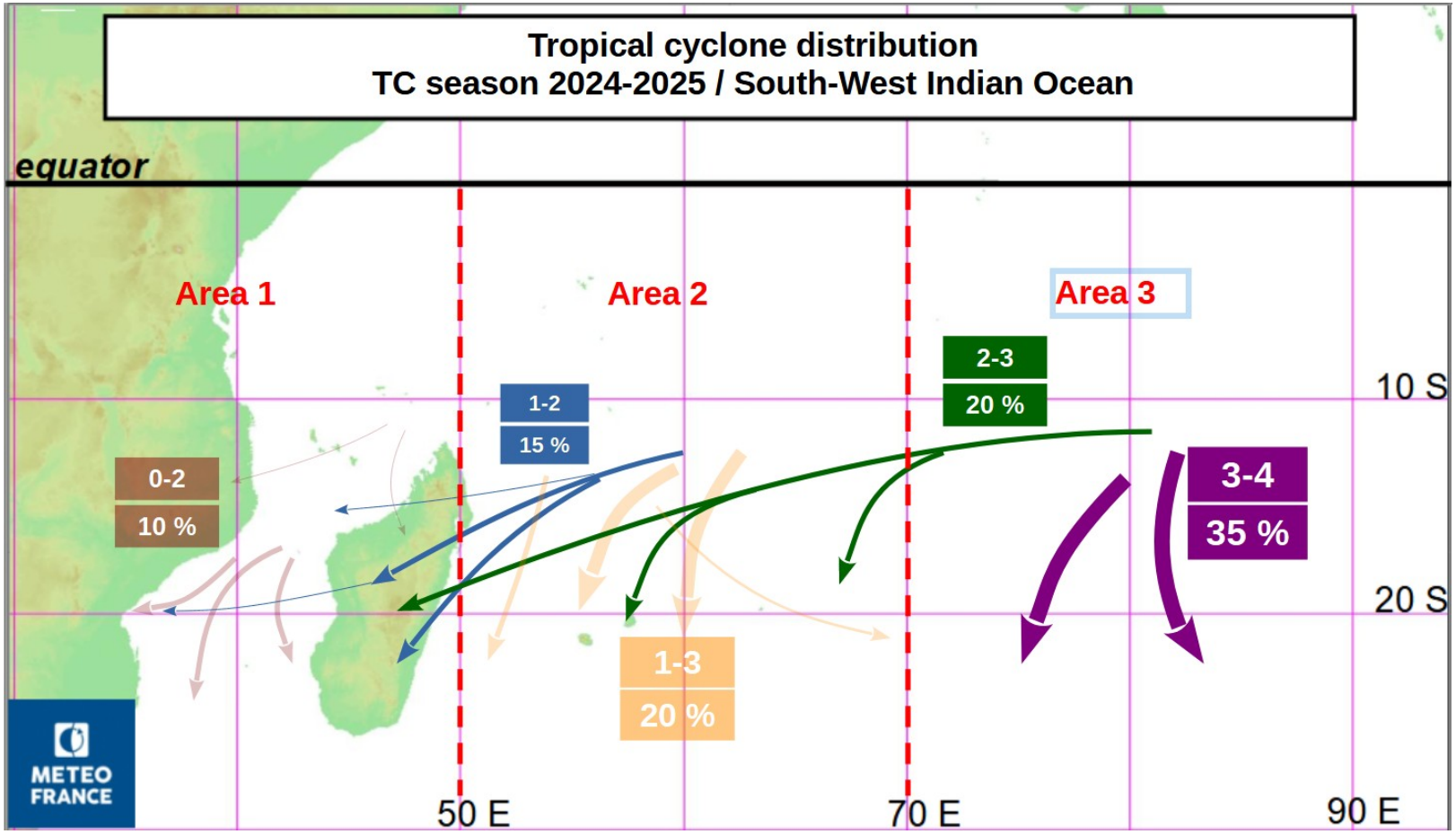
RSMC – La Réunion portal : http://www.meteo.fr/temps/domtom/La_Reunion/webcmrs9.0/



1 – Tropical cyclone season summary

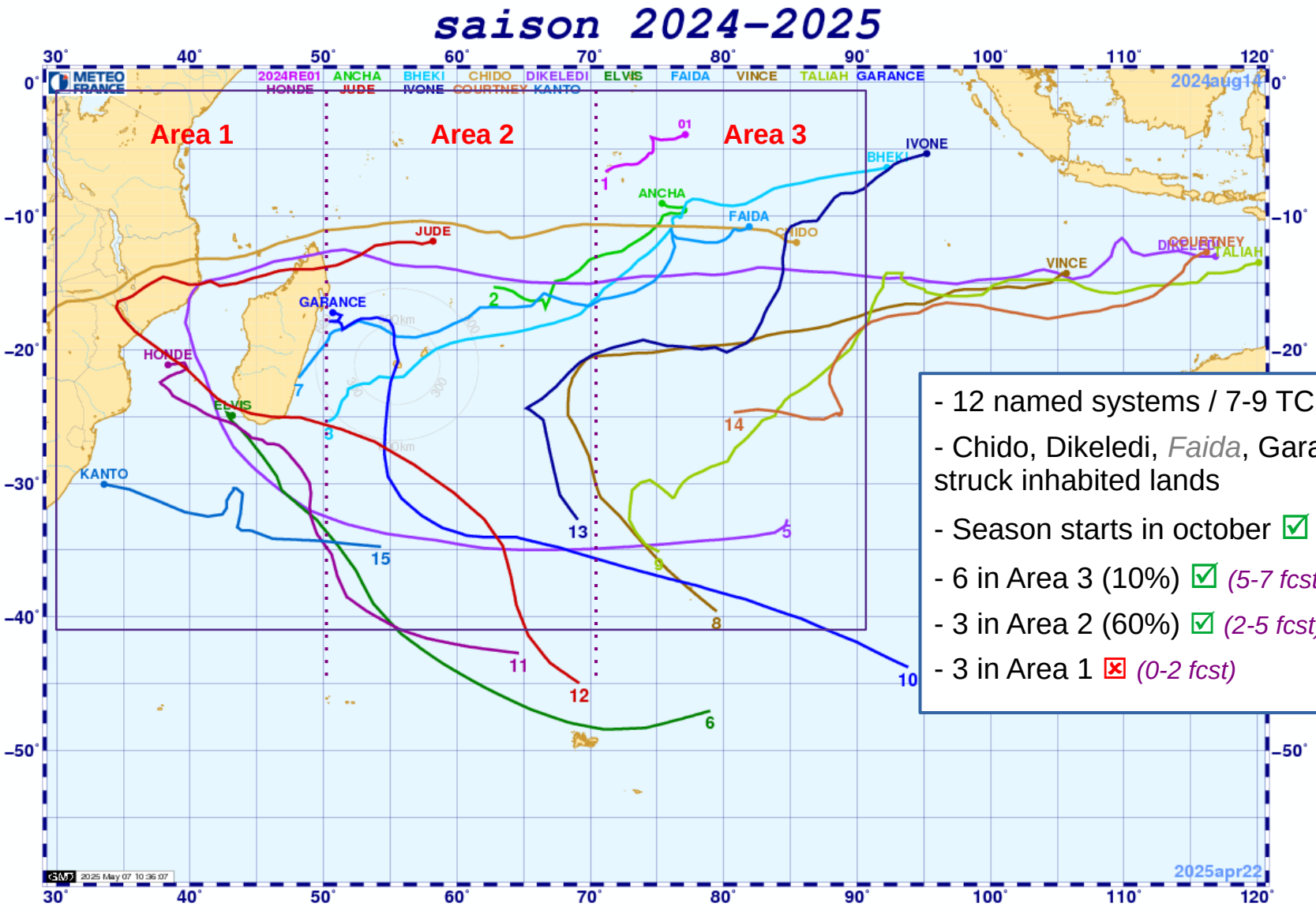
Recall of the forecast made in october 2024 (SWIOCOF-TC MiniForum)

- Normal to above normal TC season (9 – 13 named systems / 4 – 7 TC)
- TC activity mainly in central and eastern parts of the basin with zonal to parabolic tracks
- Impacts on inhabited lands could start before the end of 2024



1 – Tropical cyclone season summary

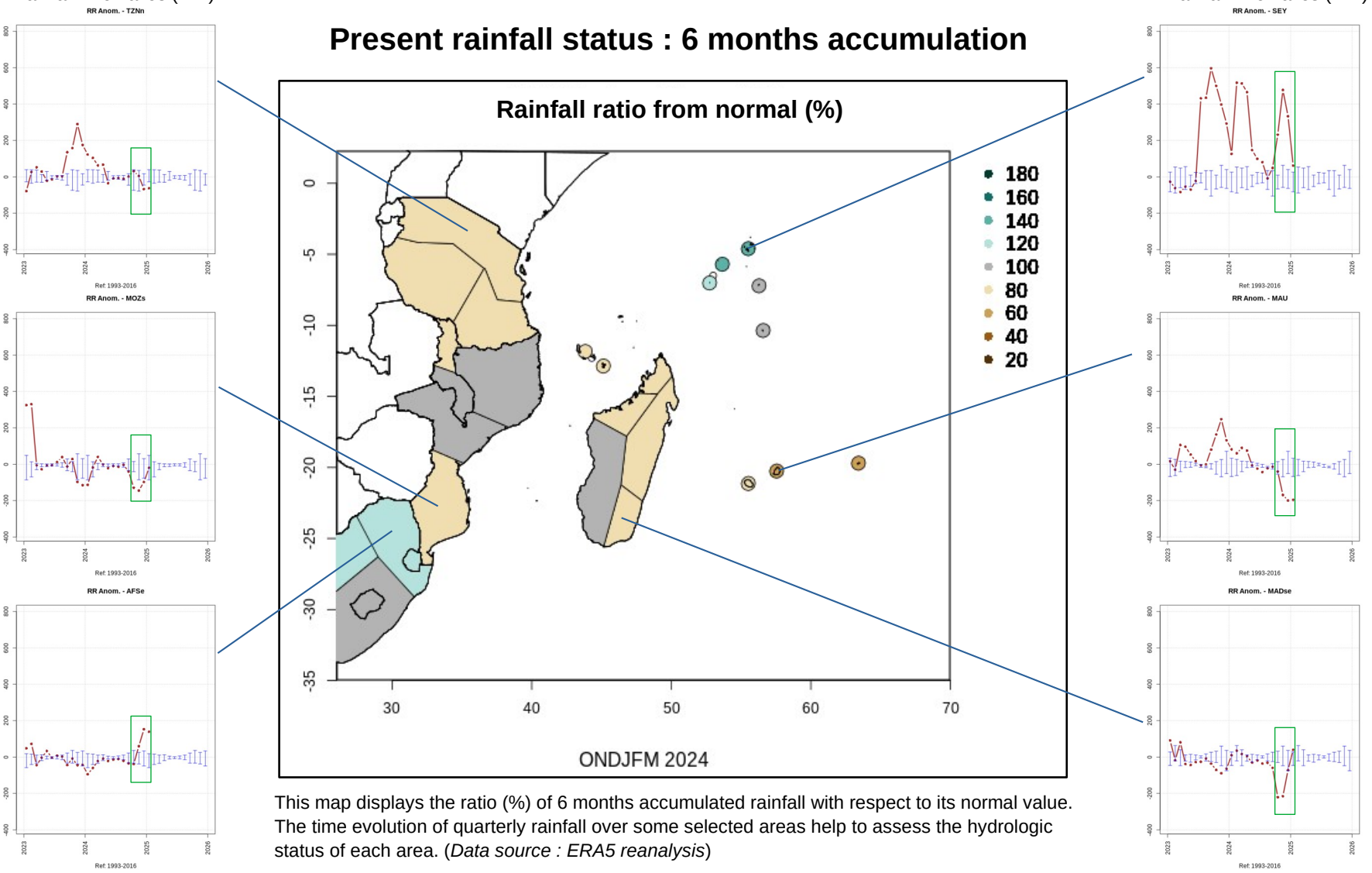
TC analysis from RSMC - La Réunion



- 12 named systems / 7-9 TC ☑ *(9-13 fcst)*
- Chido, Dikeledi, *Faida*, Garance, Honde, Jude struck inhabited lands
- Season starts in october ☑
- 6 in Area 3 (10%) ☑ *(5-7 fcst) (Area of maximum activity)*
- 3 in Area 2 (60%) ☑ *(2-5 fcst)*
- 3 in Area 1 ☒ *(0-2 fcst)*

1 – Rainy season summary

Present rainfall status : 6 months accumulation



This map displays the ratio (%) of 6 months accumulated rainfall with respect to its normal value. The time evolution of quarterly rainfall over some selected areas help to assess the hydrologic status of each area. (*Data source : ERA5 reanalysis*)

The rainfall status over the SWIO region for the rainy season is mainly near normal to below normal except for Seychelles islands and some parts of South Africa which shows above normal rainfall accumulation over the period. The lowest ratio are observed for Mauritius (60%) and Rodrigues (65%).

2 – Rainy season 2024-25 forecast verification

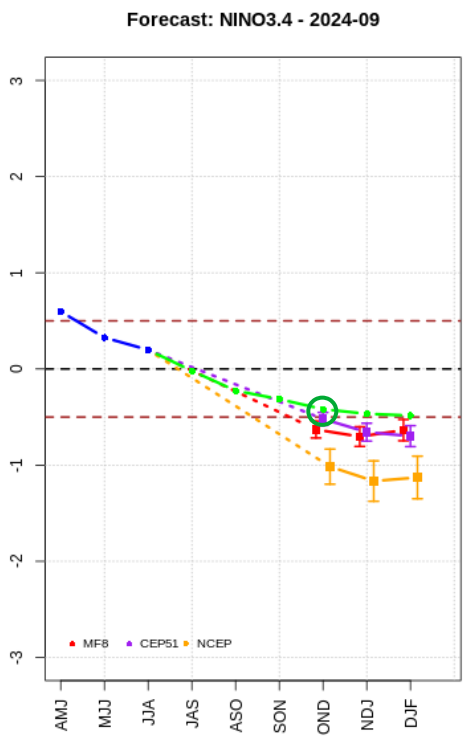
In this section we present the verification of the forecast issued in september 2024 and december 2024 for the quarters (OND 2024 & JFM 2025)

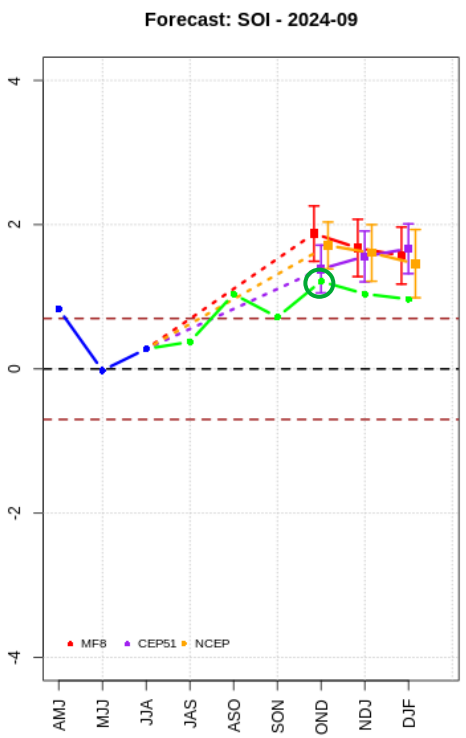
- First we recall the forecast produced at that time : It consist in the mixing of the statistical adaptation from 3 GCM (ECMWF, MF, NCEP)

- Then this forecast is compared to the corresponding verification data (Reference dataset for the region created from ERA5 reanalysis). The RPSS score issued from this comparison is also presented ;

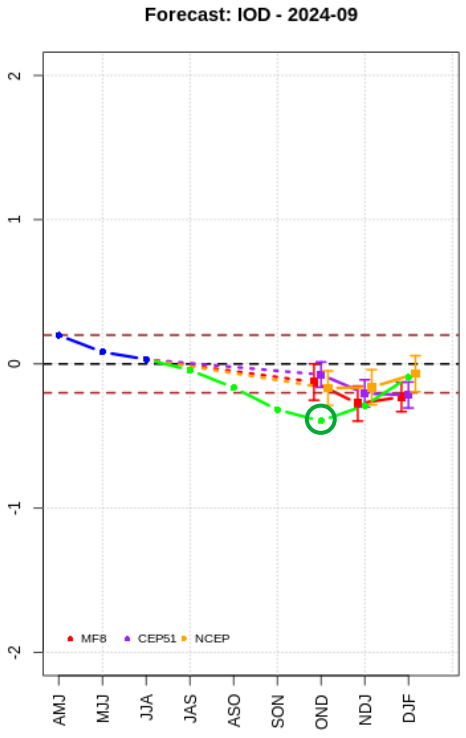
2 – OND 2024 forecast verification

September 2024 forecast and verification of oceanic indices for OND 2024

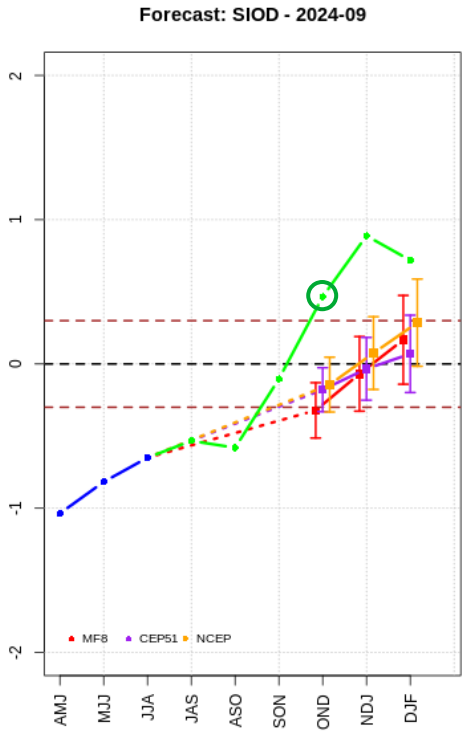




ENSO : Weak La Nina situation with feedback on the atmospheric circulation



IOD negative phase **slightly underestimated**



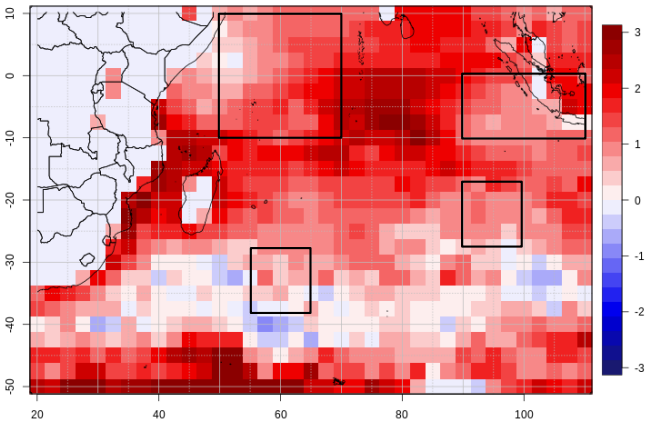
SIOD positive phase ***underestimated***

2 – OND 2024 forecast verification

September 2024 forecast for OND 2024 and verification of GCM parameters

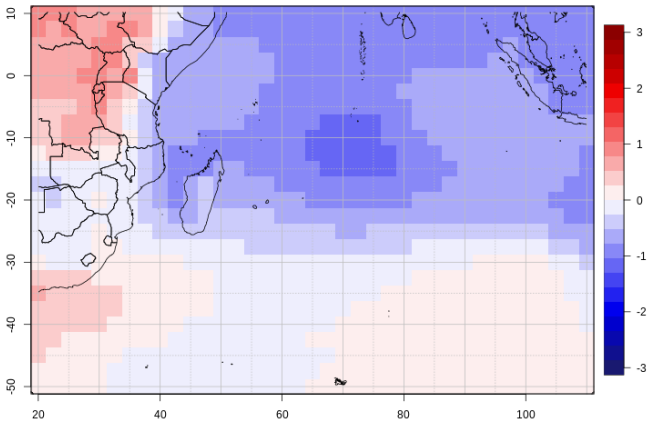
MME Forecast for : SST, MslP, Wind 850hPa

Forecast Mix GCM SSTglobal - OND2024-lt1



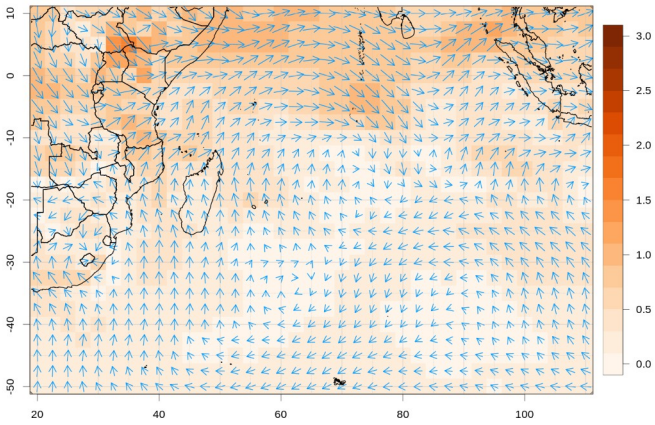
CEP51.MF8.NCEP

Forecast Mix GCM PMERglobal - OND2024-lt1



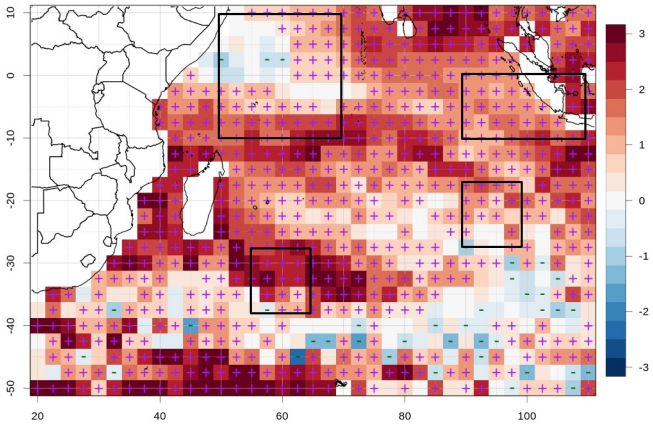
CEP51.MF8.NCEP

Forecast Mix GCM U850global - OND2024-lt1



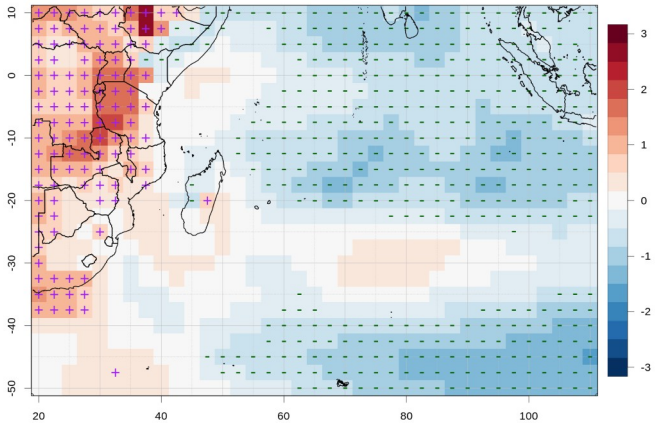
CEP51.MF8.NCEP

ERA5 SST Std. Anom. : OND 2024



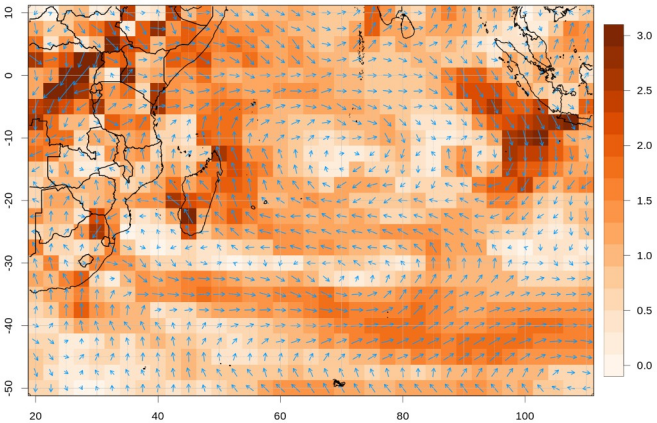
Ref: 1993-2016

ERA5 PMER Std. Anom. : OND 2024



Ref: 1993-2016

ERA5 850hPa Wind anomaly : OND

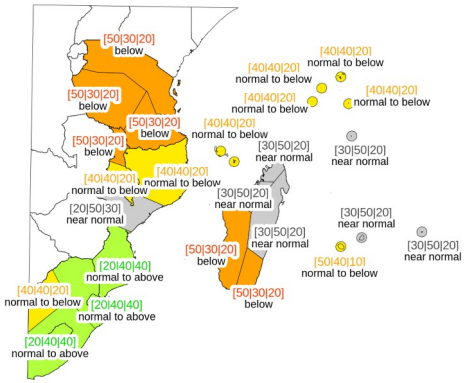


Ref: 1993-2016

2 – OND 2024 forecast verification

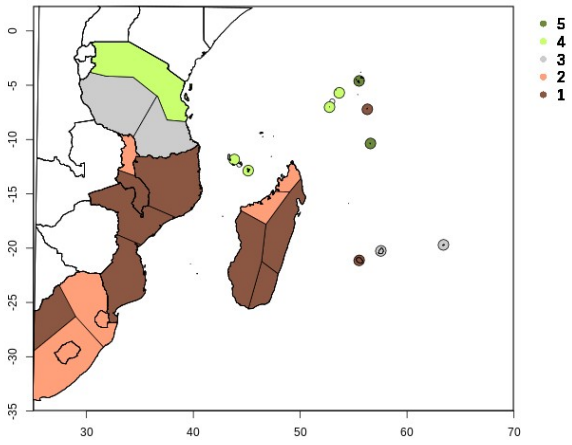
Rainfall Forecast

Rainfall Seasonal forecast - OND 2024



Observed anomalies
(verification Dataset ERA5)

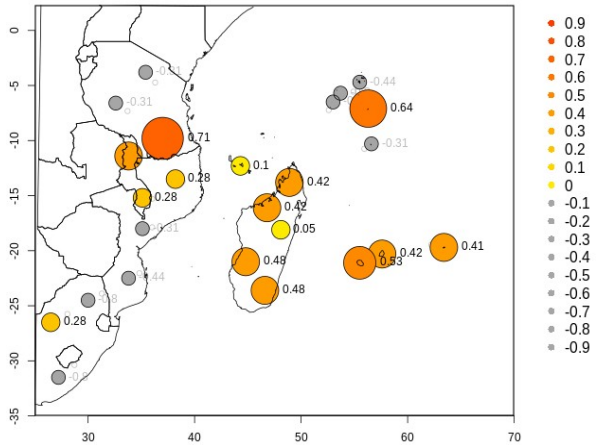
RR quintile class: OND 2024



Ref: 1993-2016

RPSS score

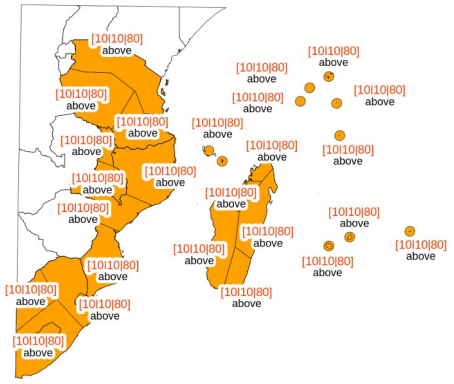
Score smooth RPSS: RR OND-2024 lt1



Final forecast

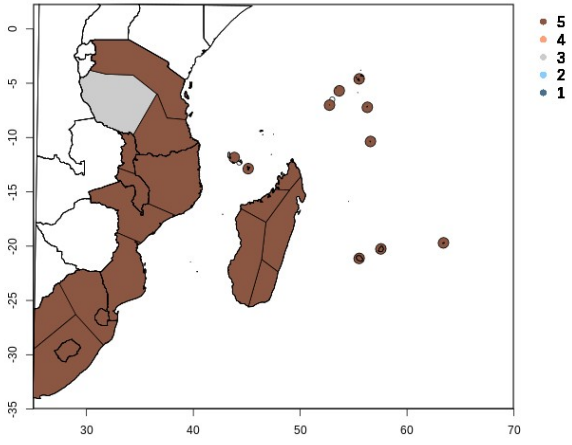
Temperature Forecast

Temperature Seasonal forecast - OND 2024



Observed anomalies
(verification Dataset ERA5)

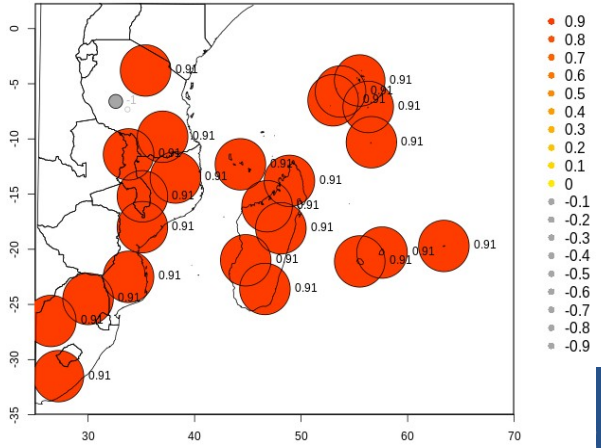
T2M quintile class: OND 2024



Ref: 1993-2016

RPSS score

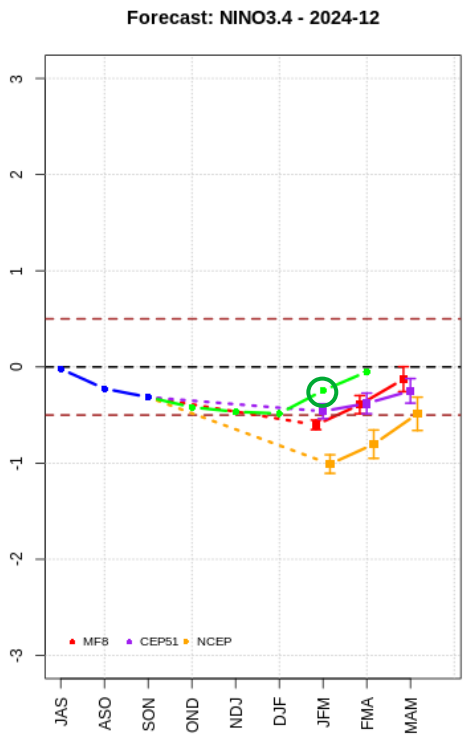
Score smooth RPSS: T2M OND-2024 lt1

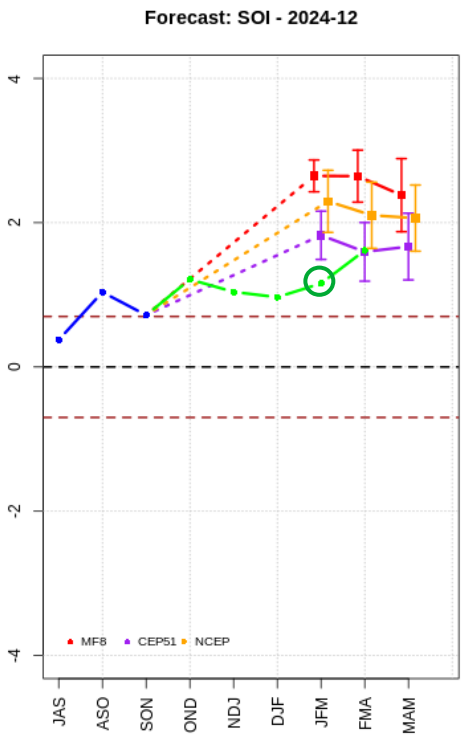


Final forecast

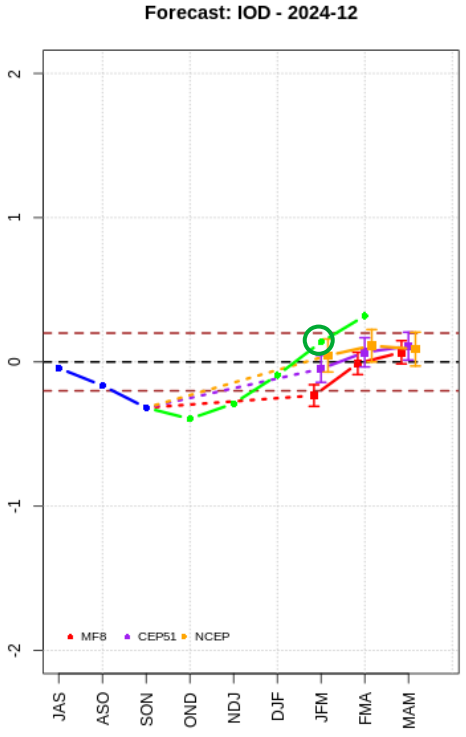
2 – JFM 2025 forecast verification

December 2024 forecast and verification of oceanic indices for JFM 2025

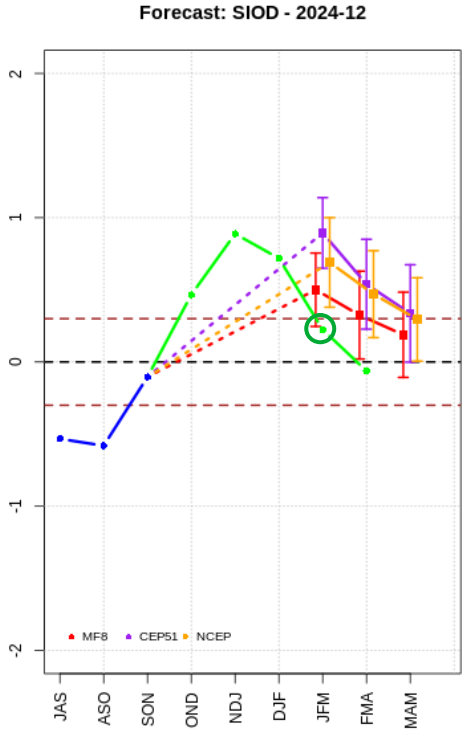




ENSO : Weak La Nina situation with feedback on the atmospheric circulation



IOD neutral phase (positive trend)



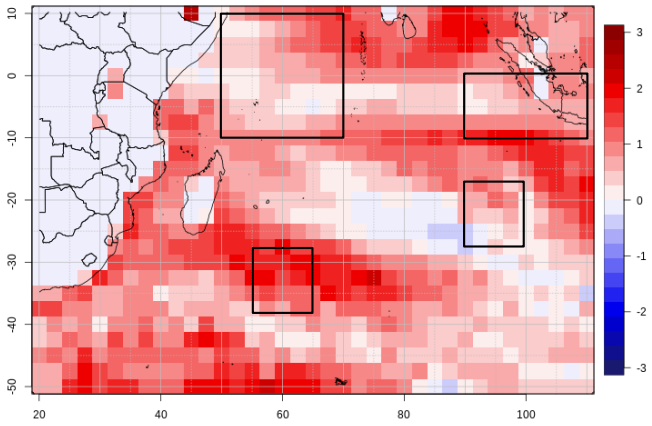
SIOD neutral phase ***misrepresented***

2 – JFM 2025 forecast verification

December 2024 forecast for JFM 2025 and verification of GCM parameters

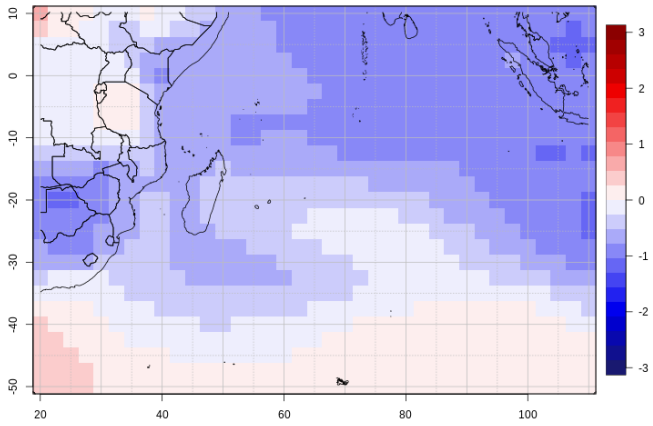
MME Forecast for : SST, MslP, Wind 850hPa

Forecast Mix GCM SSTglobal - JFM2025-lt1



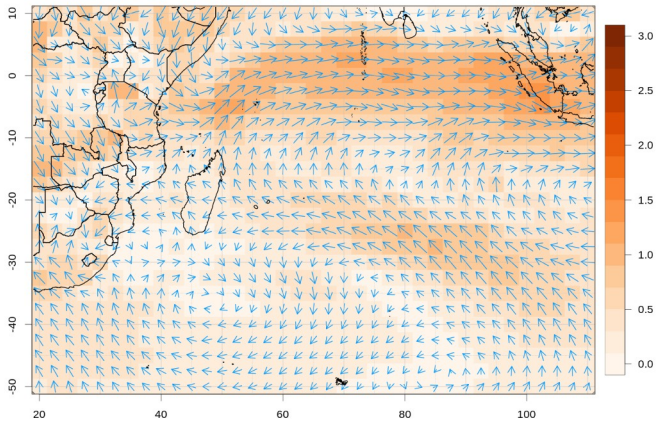
CEP51.MF8.NCEP

Forecast Mix GCM PMERglobal - JFM2025-lt1



CEP51.MF8.NCEP

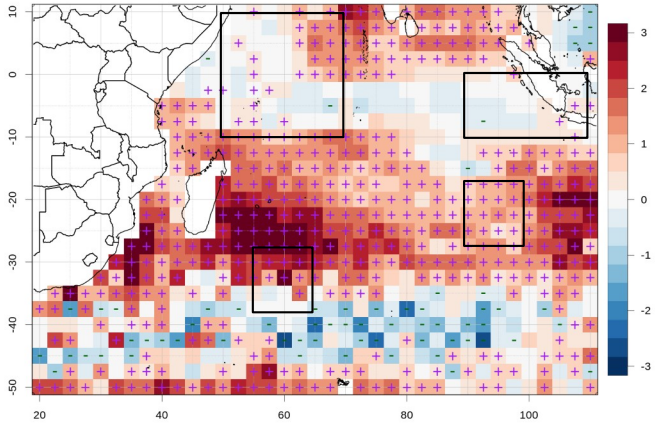
Forecast Mix GCM U850global - JFM2025-lt1



CEP51.MF8.NCEP

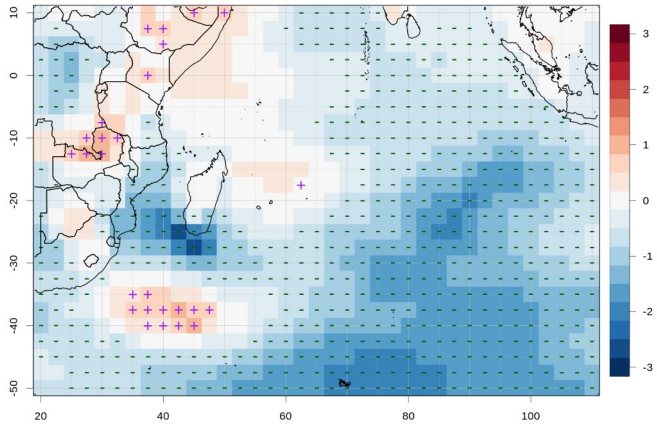
ERA5 SST Std. Anom. : JFM 2025

IOD



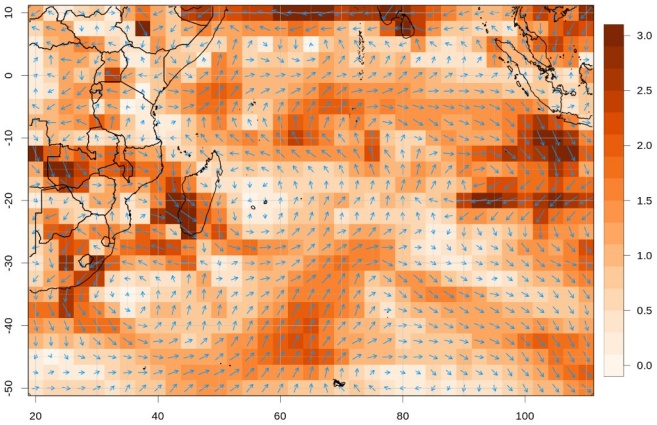
SIOD Ref: 1993-2016

ERA5 PMER Std. Anom. : JFM 2025



Ref: 1993-2016

ERA5 850hPa Wind anomaly : JFM



Ref: 1993-2016

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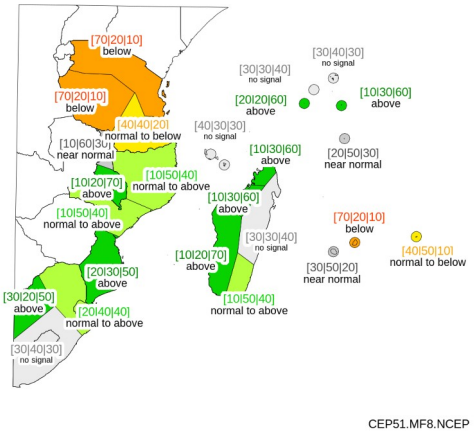
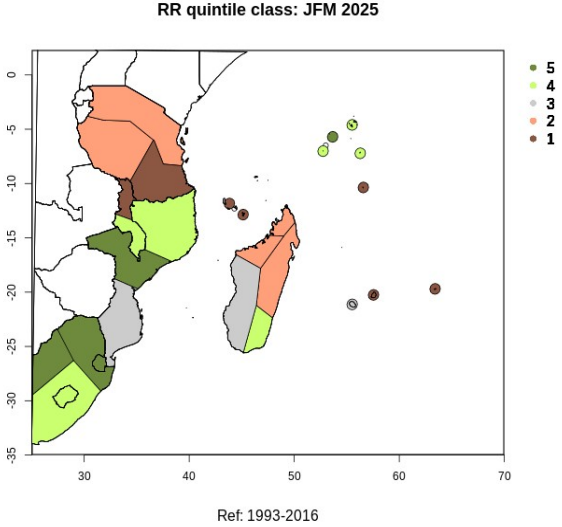
2 – JFM 2025 forecast verification

Rainfall Forecast

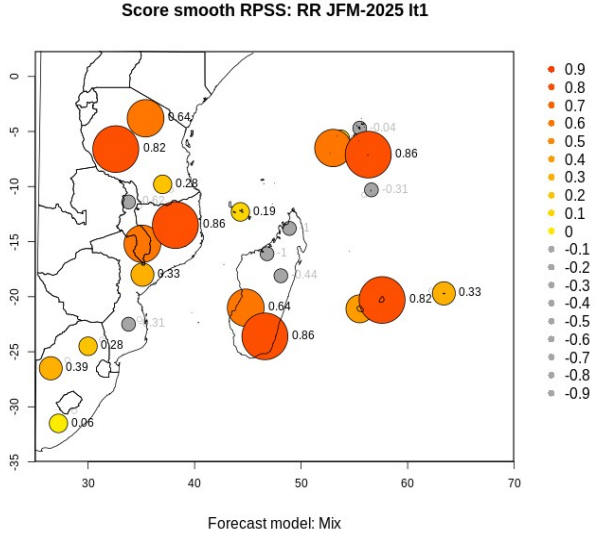
Rainfall Seasonal forecast - JFM 2025 - lt 1



Observed anomalies
(verification Dataset ERA5)

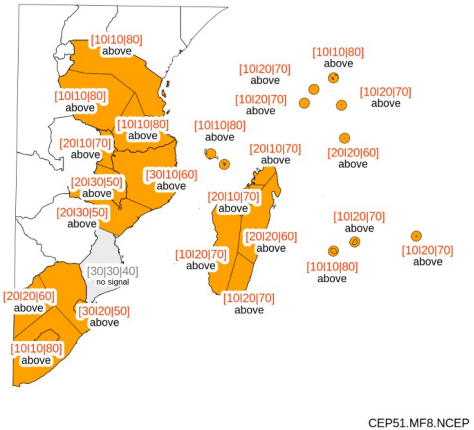


RPSS score

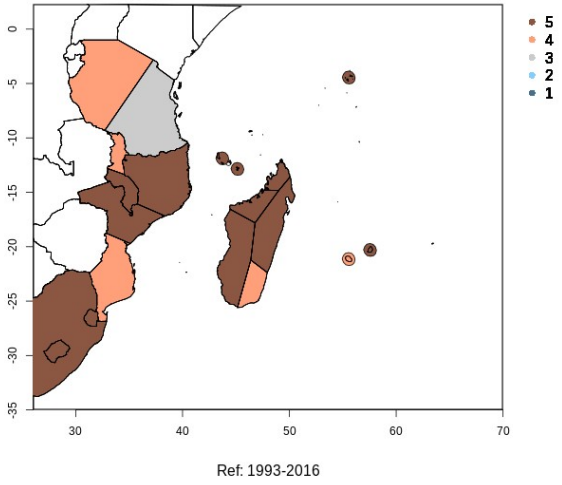


Temperature Forecast

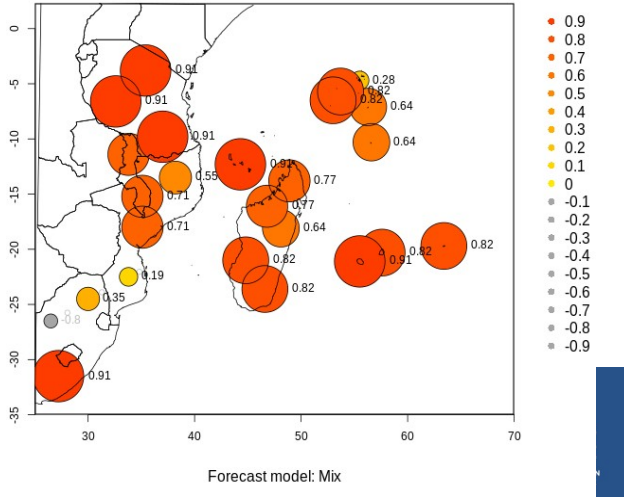
Temperature Seasonal forecast - JFM 2025 - lt 1



Observed anomalies
(verification Dataset ERA5)



RPSS score



3 - Objective forecast (JJA & JAS 2025)

In this section we present the objective forecasts from start month : May 2025, for leadtimes 1 (JJA) and 2 (JAS)

- First the current and predicted state of climate indices are displayed

- Second the expected Large scale situation over the region is discussed from the GCM forecasts

- Then the forecast produced with the SEAFORDS tool is showed for each leadtime
  - It is a synthesis of statistical adaptation of 3 GCM (ECMWF, MF, NCEP)
  - The « No signal » result mans that no specific scenario can be determined. It is generally associated with low score for the model or a too large dispersion of the members.
  - The confidence index of the large-scale parameters provided by the GCMs as inputs for the statistical model, are displayed. They consist of correlation score computed over the Hindcast period

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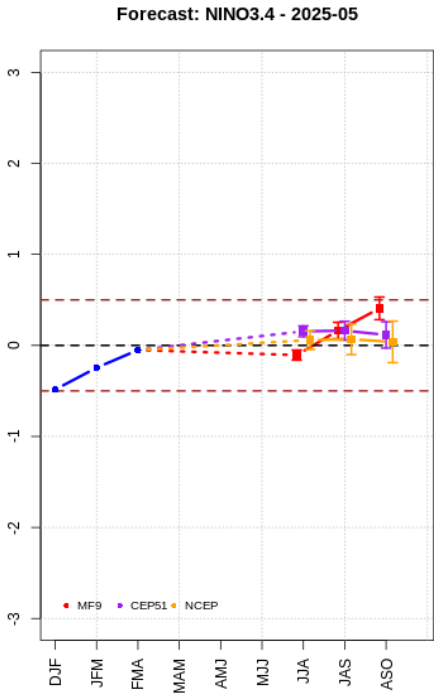
3 - Objective forecast (JJA & JAS 2025)

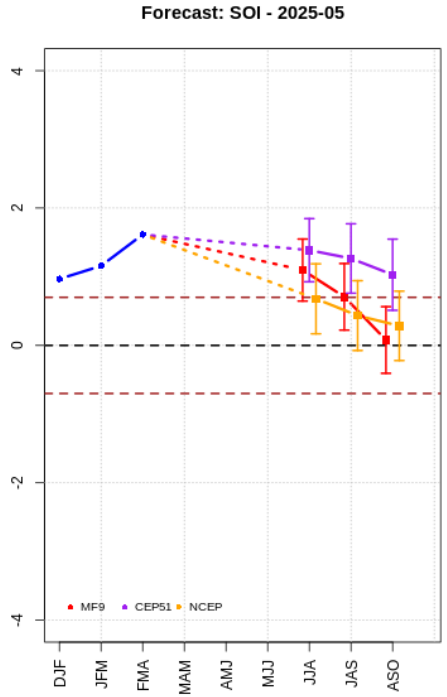
Large scale drivers context :

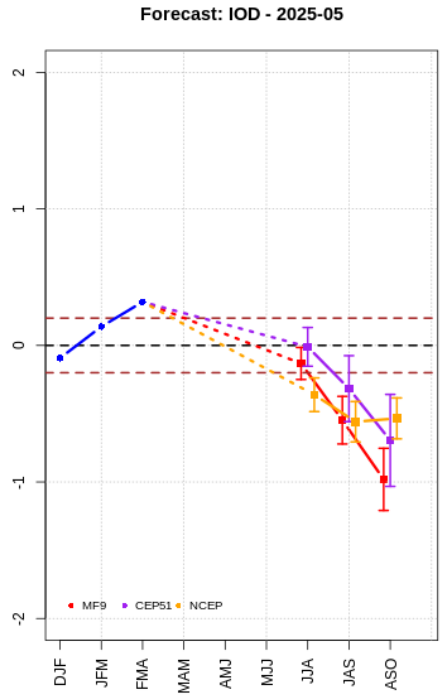
ENSO : NINO3.4 near neutral – expected to stay neutral / SOI positive – expected to stay positive JJA and JAS

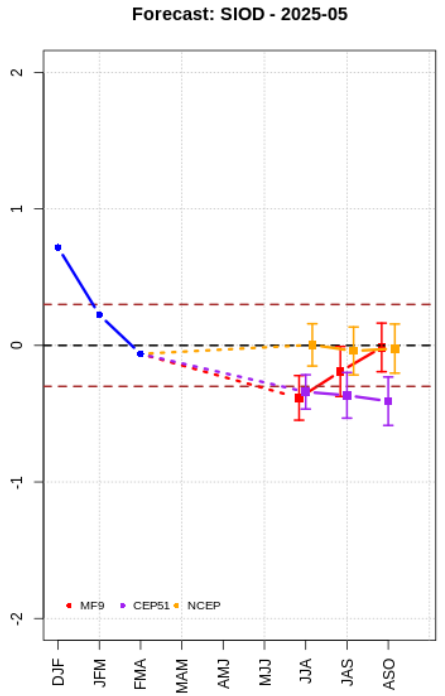
IOD : Slightly positive – expected to be neutral in JJA, negative in JAS

SIOD : Neutral phase – expected to be still slightly negative / Strong uncertainty





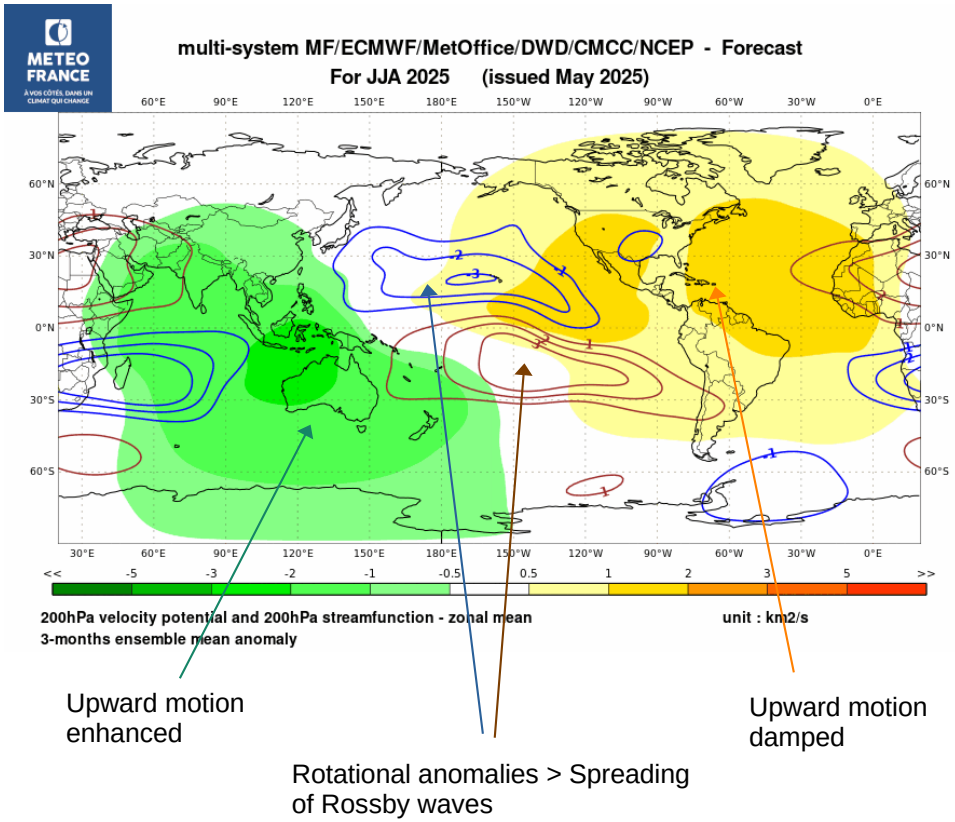


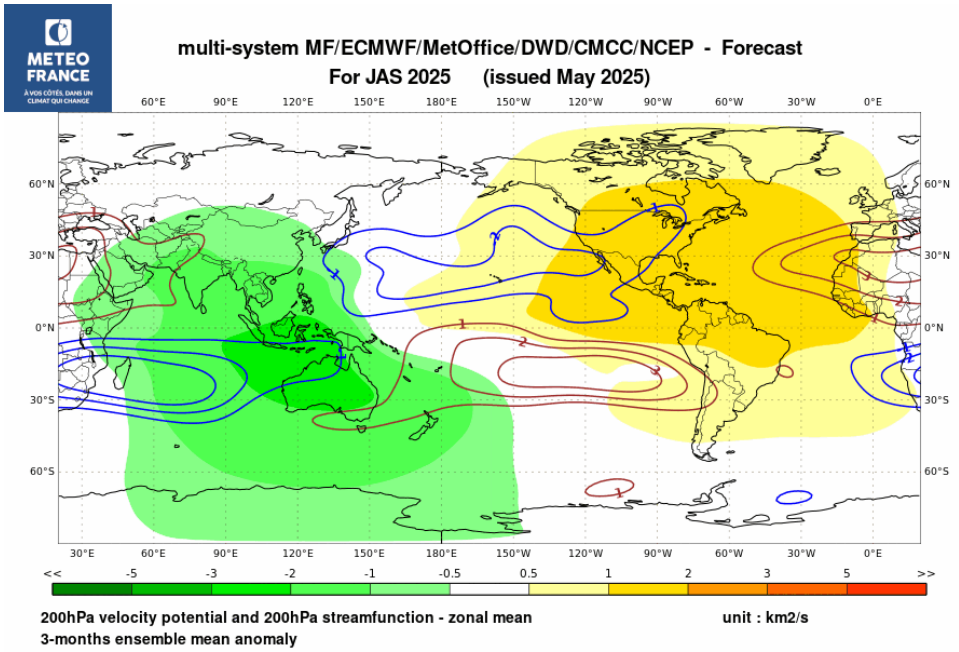


3 - Objective forecast (JJA & JAS 2025)

Large scale drivers impacts

Multi-model forecast of altitude (200hPa) circulation anomalies (Velocity potential & streamfunction)

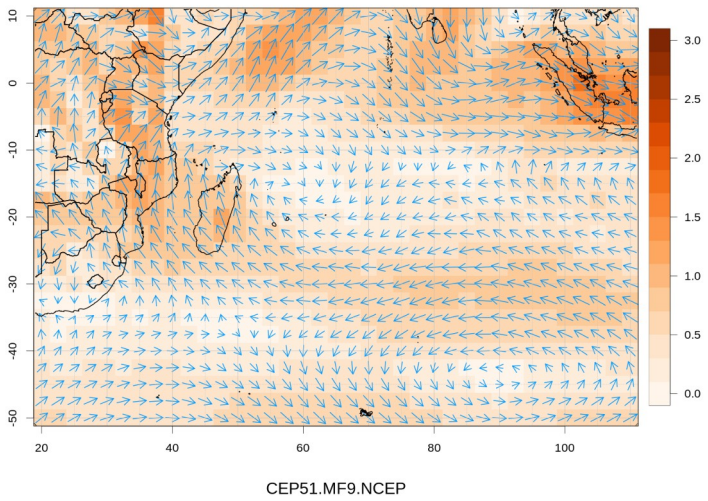




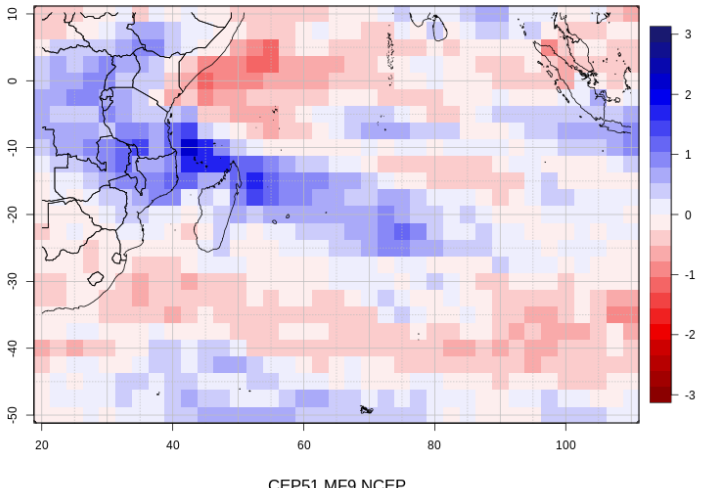
3 - Objective forecast (JJA & JAS 2025)

Large scale synthesis maps from MF, ECMWF, NCEP GCMs: Base may 2025 - JJA

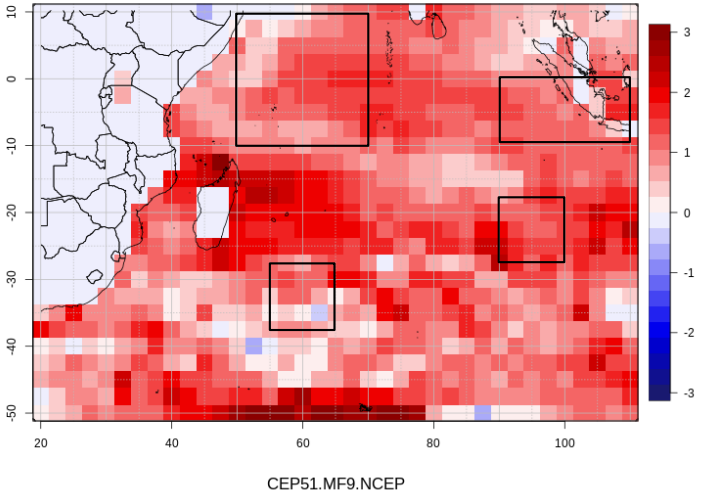
Wind 850



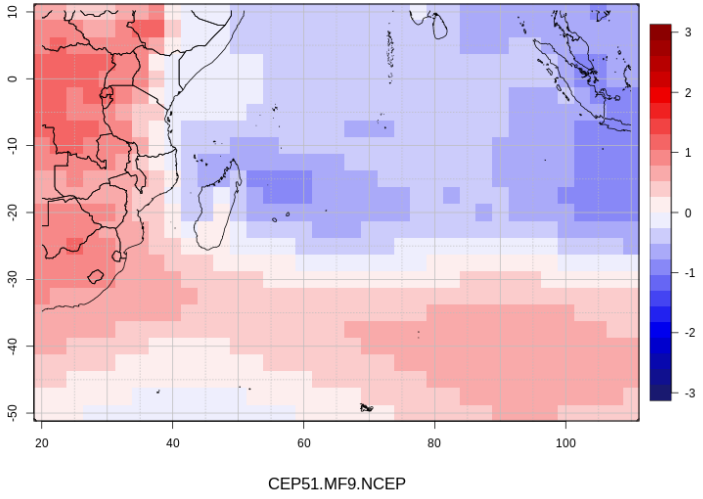
Rainfall



SST



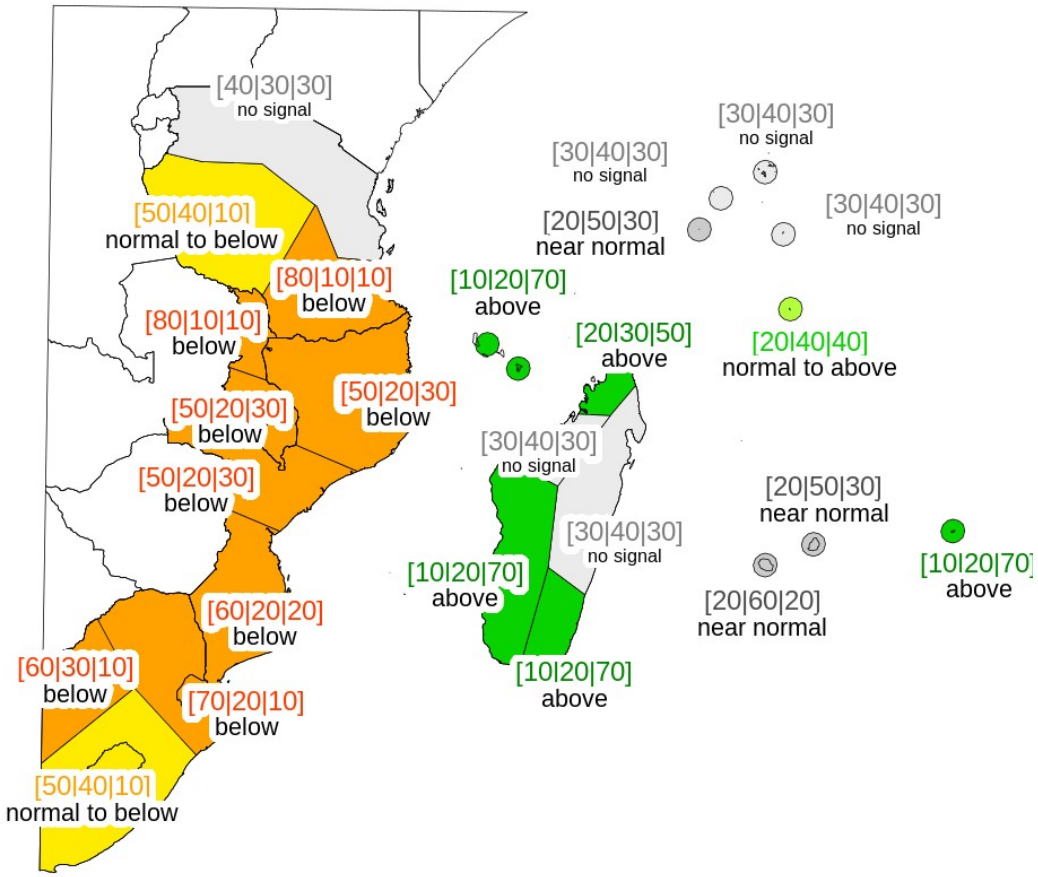
MSLP



3 - Objective forecast (JJA & JAS 2025)

Rainfall Seasonal forecast - JJA 2025 - lt 1

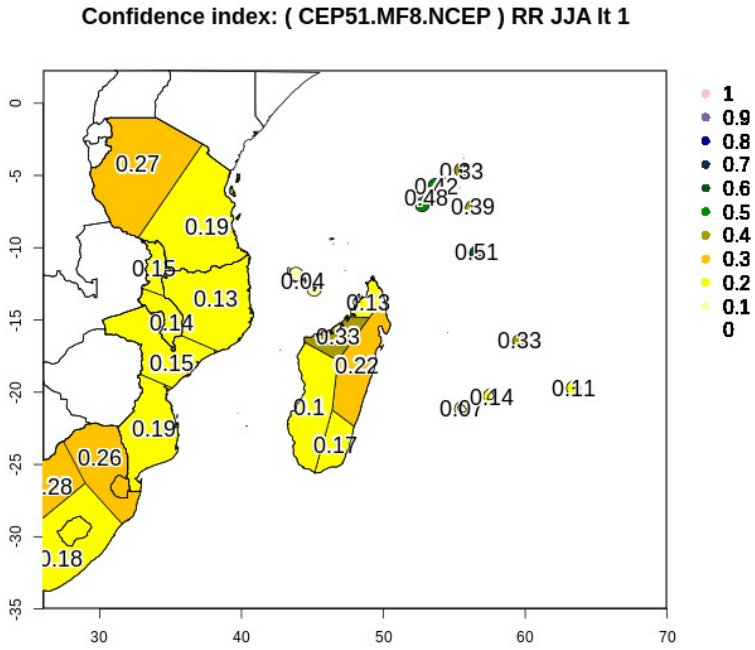
Objective Rainfall forecast issued in May 2025



Forecast based on :

Statistical adaptation of GCM output at regional scale

>>> MME (MF + ECMWF + NCEP)

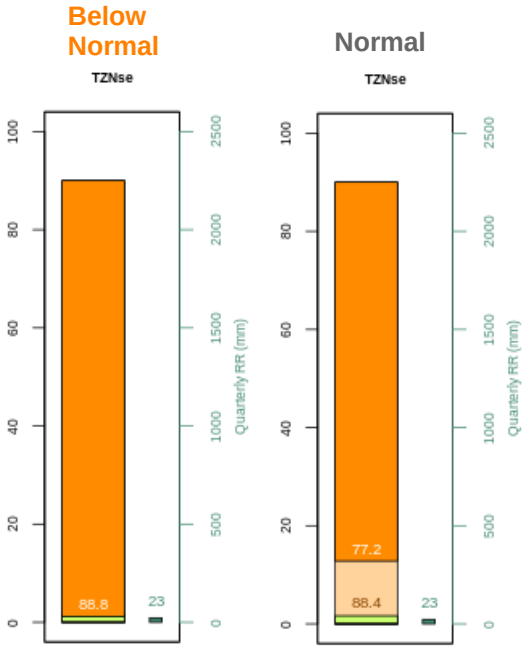


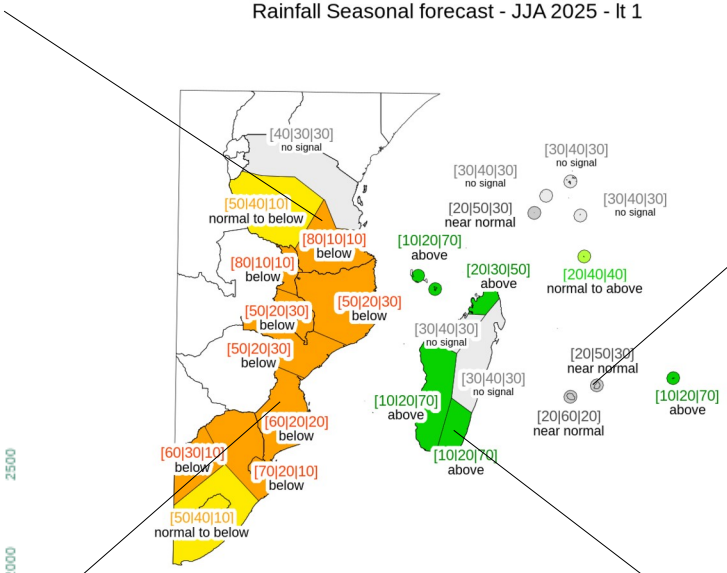
CEP51.MF9.NCEP

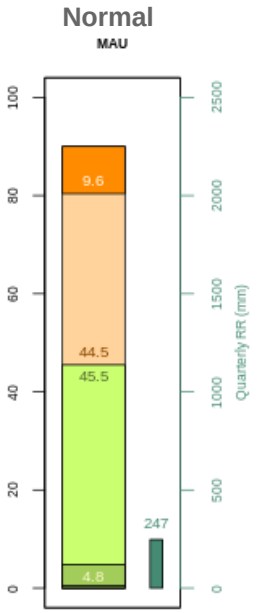
3 - Objective forecast (JJA & JAS 2025)

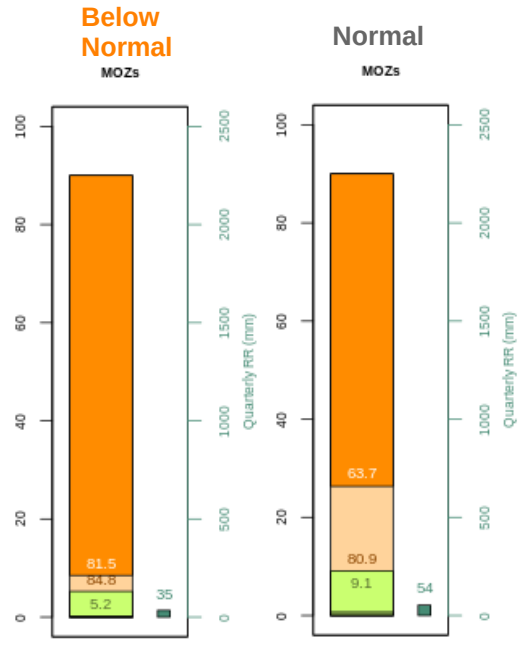
Daily Rainfall statistics related to the terciles of the quarterly accumulation

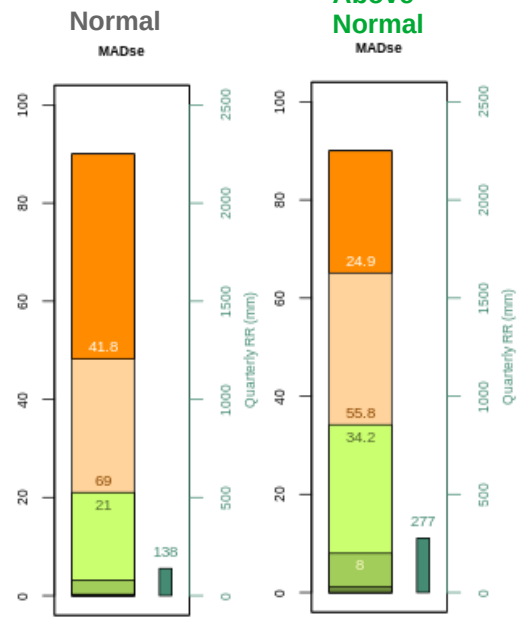
(GPCC data)







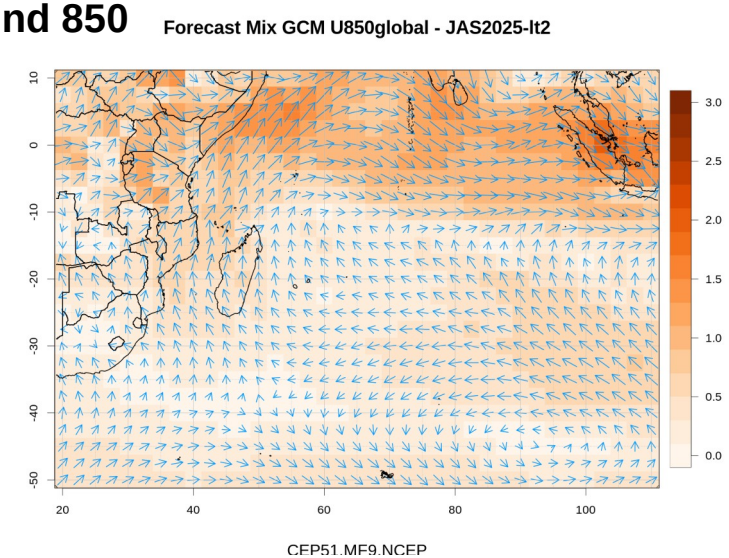




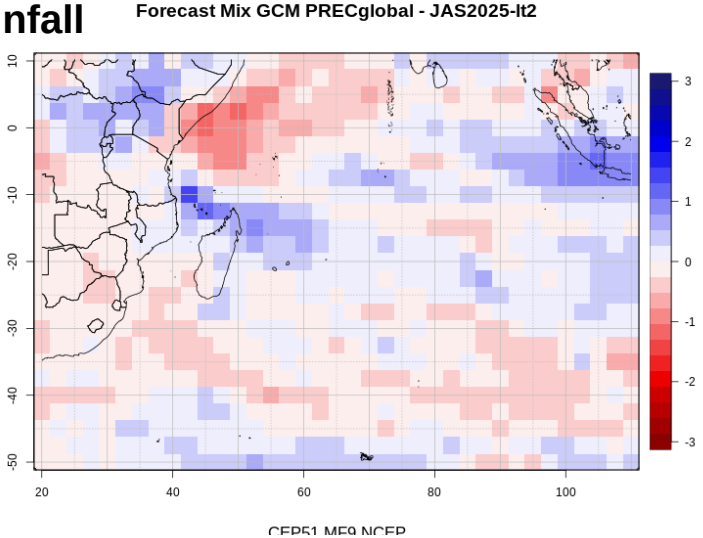
3 - Objective forecast (JJA & JAS 2025)

Large scale synthesis maps from MF, ECMWF, NCEP GCMs: Base may 2025 - JAS

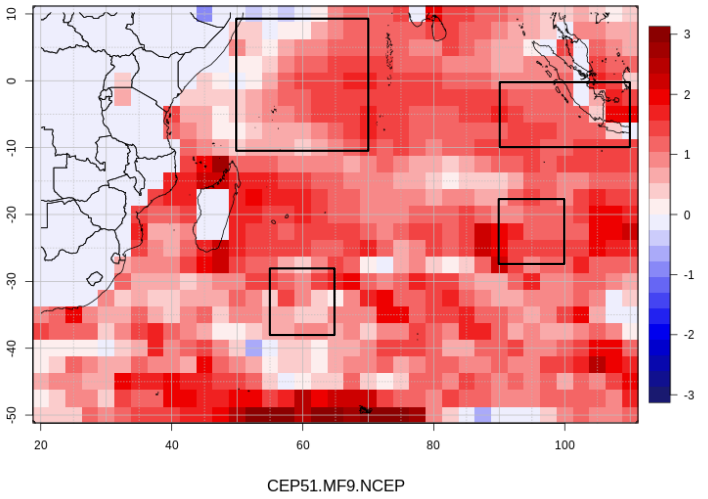
Wind 850



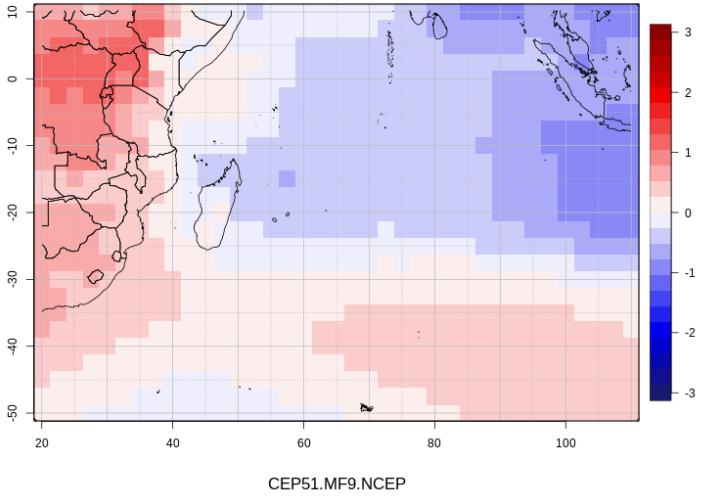
Rainfall



SST



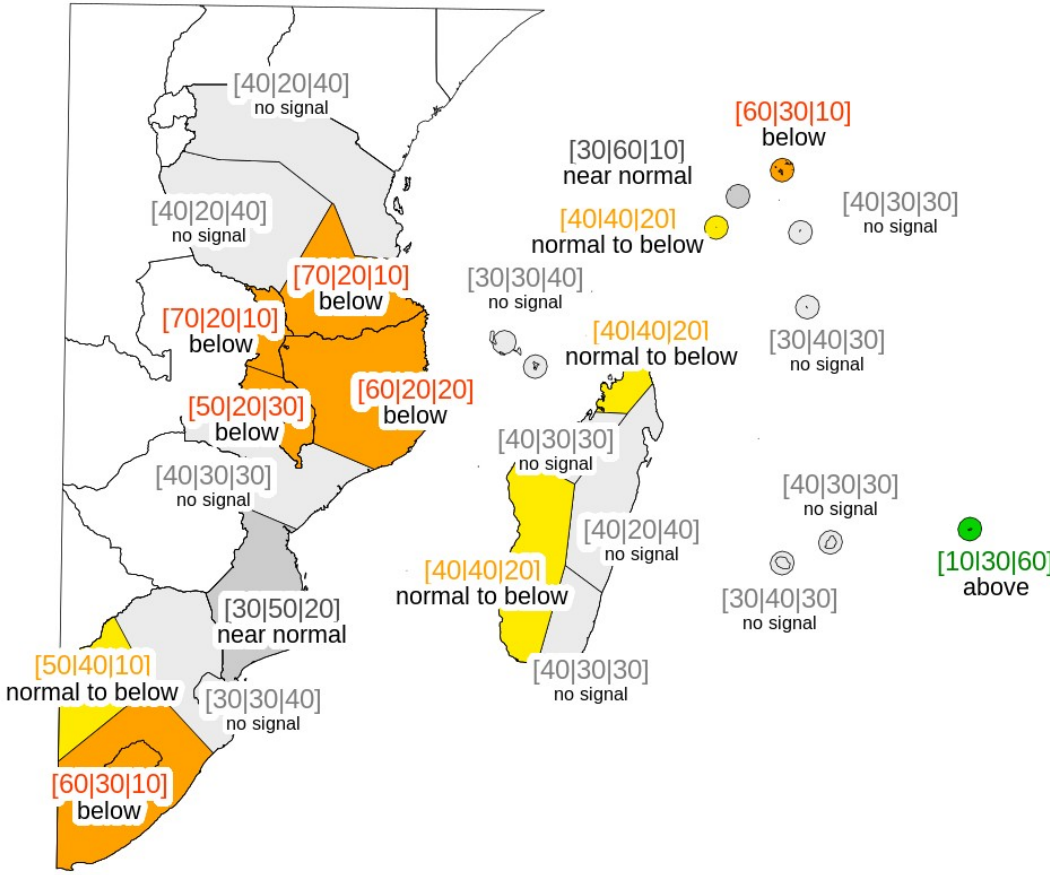
MSLP



3 - Objective forecast (JJA & JAS 2025)

Rainfall Seasonal forecast - JAS 2025 - lt 2

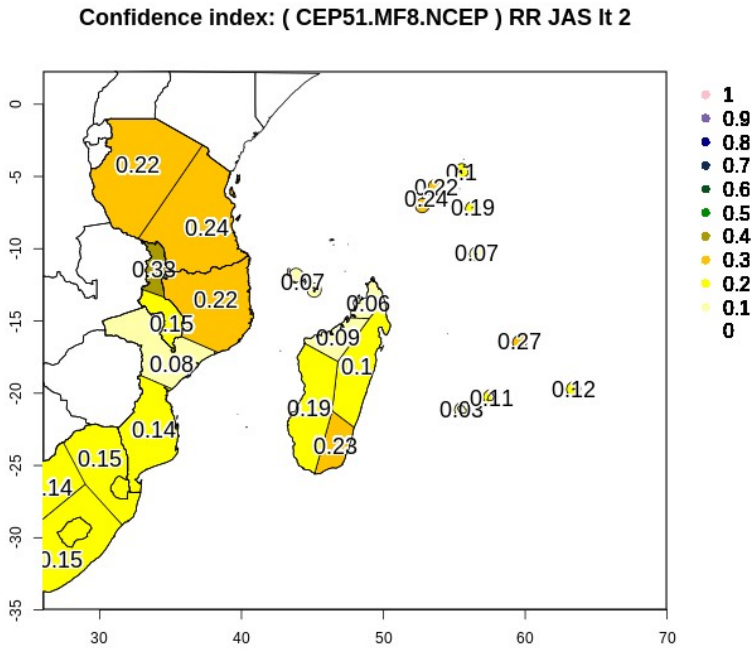
Objective Rainfall forecast issued in May 2025



Forecast based on :

Statistical adaptation of GCM output at regional scale

>>> MME (MF + ECMWF + NCEP)



CEP51.MF9.NCEP

3 - Objective forecast (JJA & JAS 2025)

Assessment of a confidence level associated to rainfall forecast :

Hindcast (24 years) for 3 GCM (NCEP, ECMWF, MF8) ran over the SWIO region for **JJA** (lt1) season.
> Production of 24 rainfall forecasts.
> Verification of the forecasts by comparison with de reference dataset (ERA5)

JJA Global statistics for the region (25 zones):

	FCST	OBS	
- Nb positive anomalies (Normal to above normal / Above normal) :	196	131	67 %
- Nb negative anomalies (Normal to below normal / Below normal) :	227	135	59 %

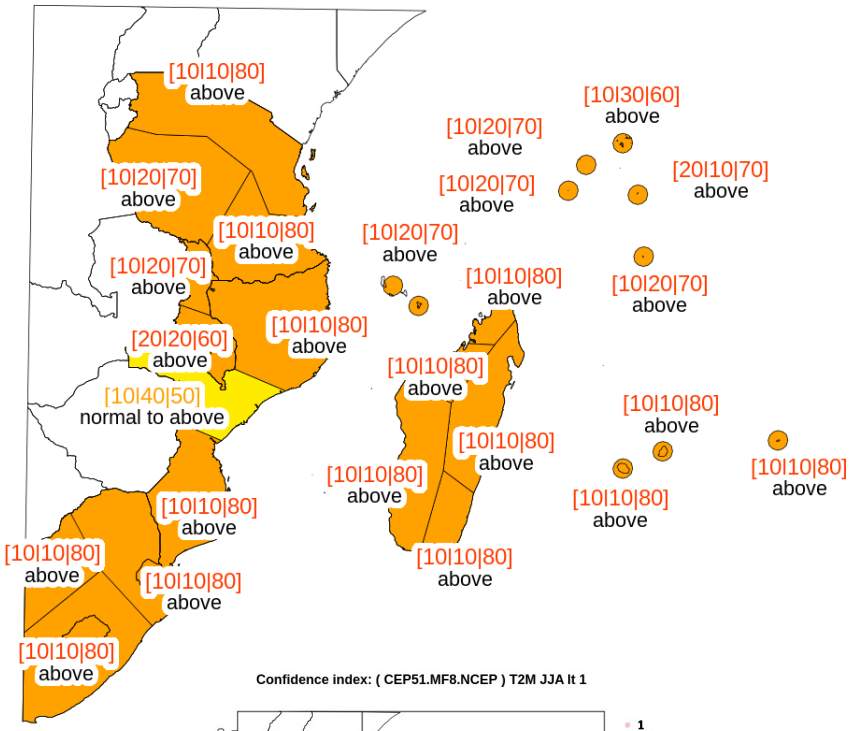
- Nb missed Above normal cases : 64 / 199 = 32 %

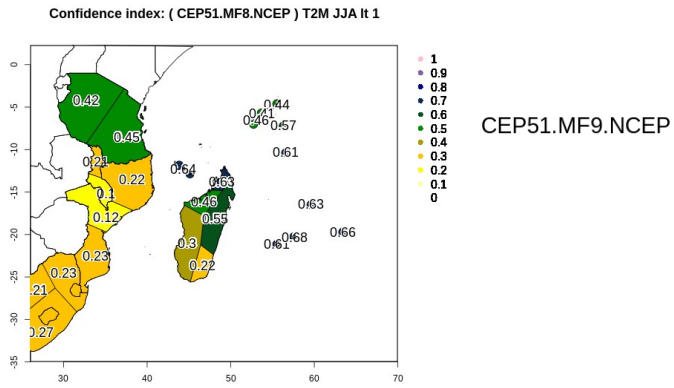
- Nb missed Below normal cases : 71 / 202 = 35 %

3 - Objective forecast (JJA & JAS 2025)

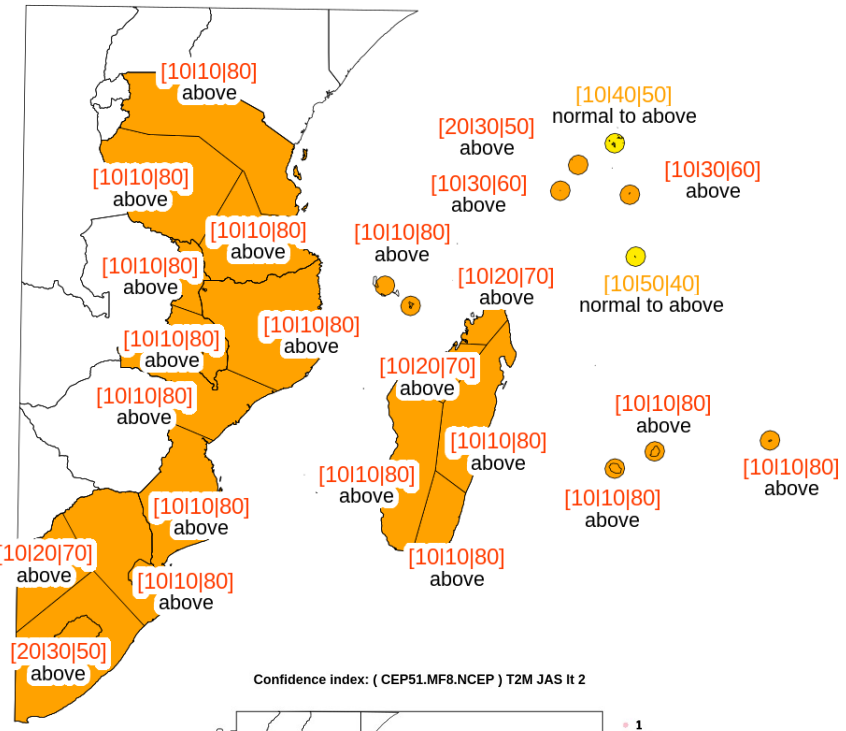
Objective Temperature forecast issued in May 2025 for lt1 and lt2

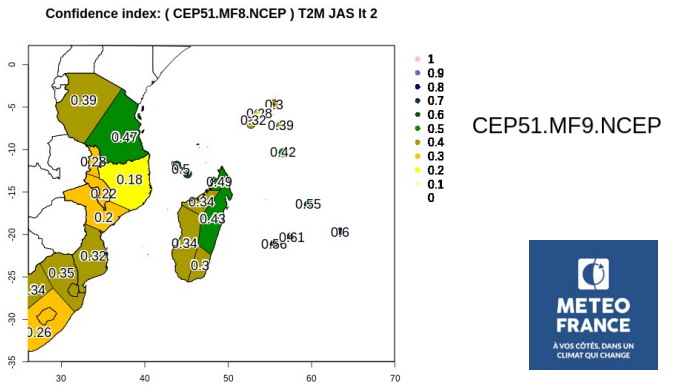
Temperature Seasonal forecast - JJA 2025 - lt 1





Temperature Seasonal forecast - JAS 2025 - lt 2





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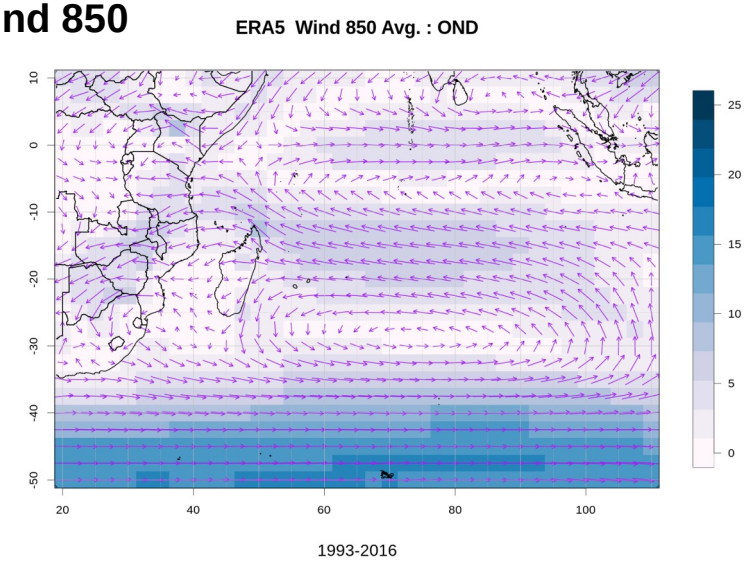
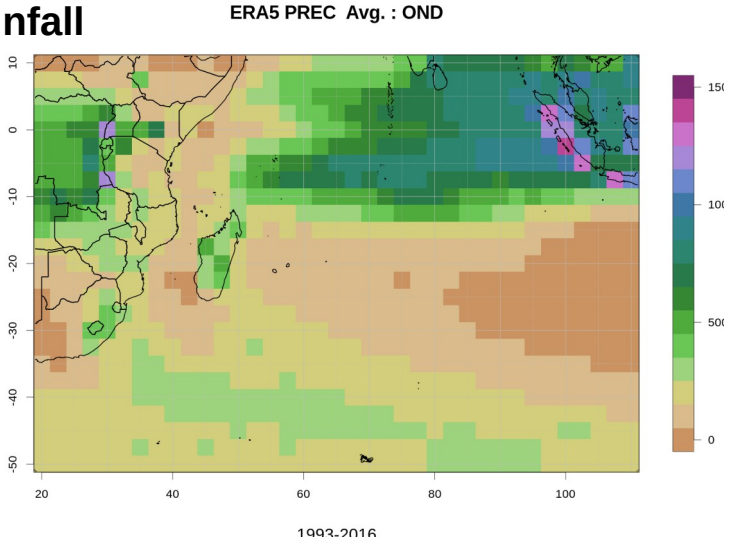
Climatological context

Large scale ERA5 climatology maps - OND

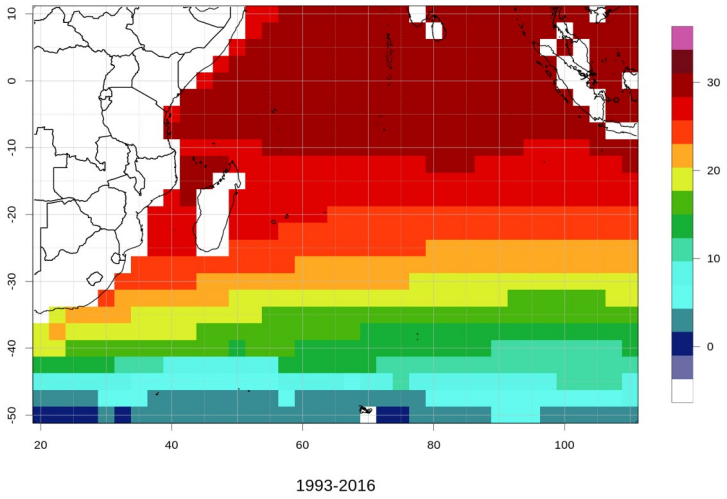
Wind 850



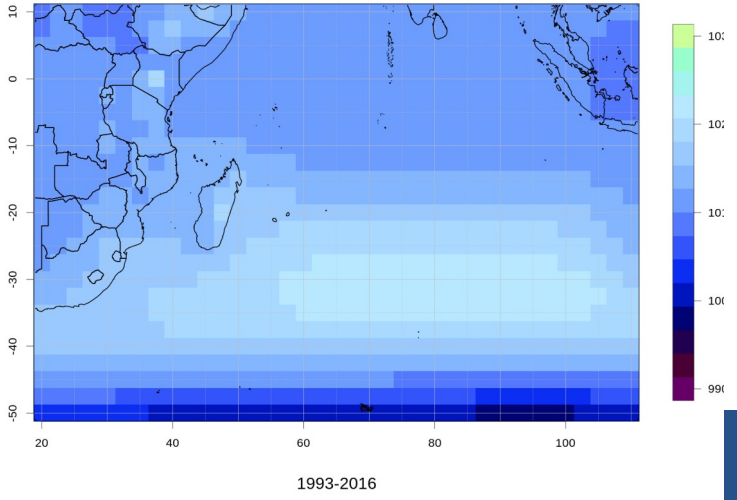
Rainfall



SST



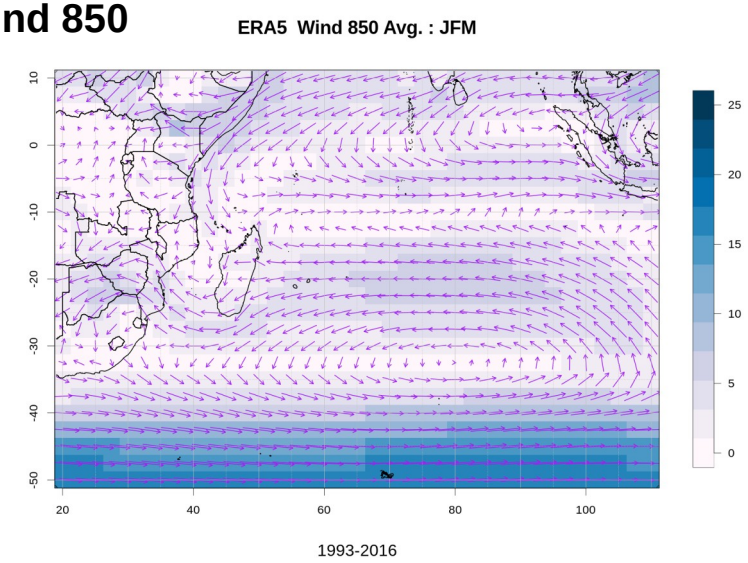
MSLP



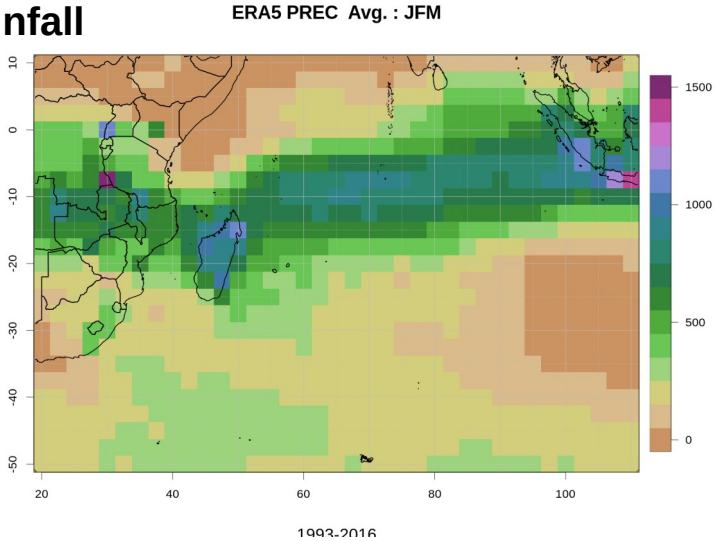
Climatological context

Large scale ERA5 climatology maps - JFM

Wind 850



Rainfall



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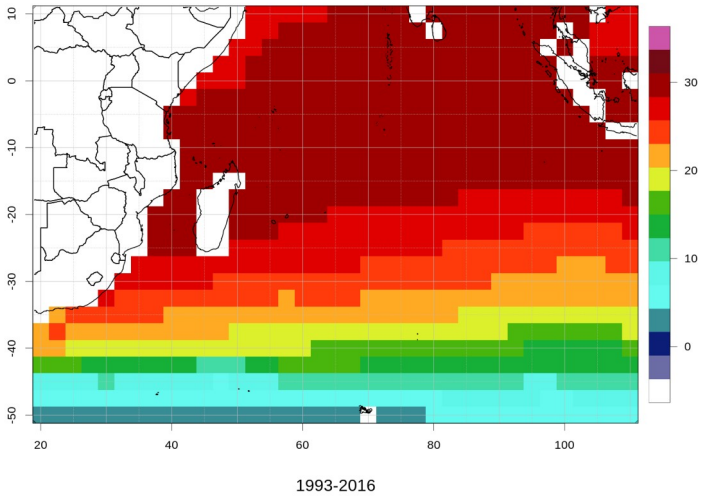

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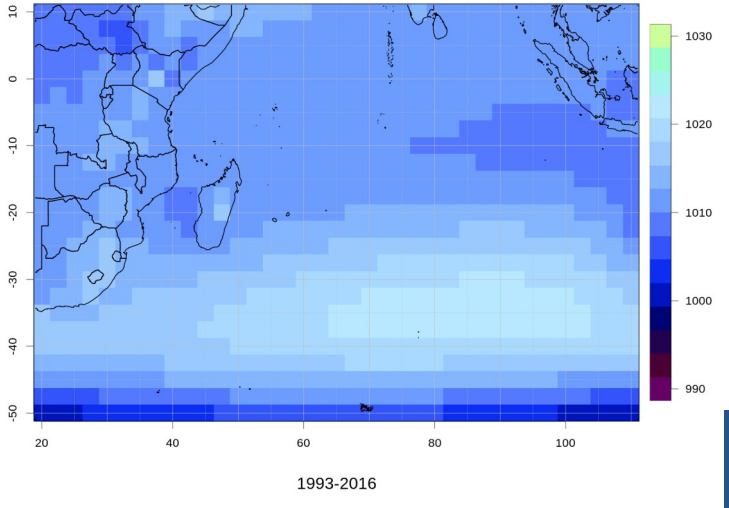
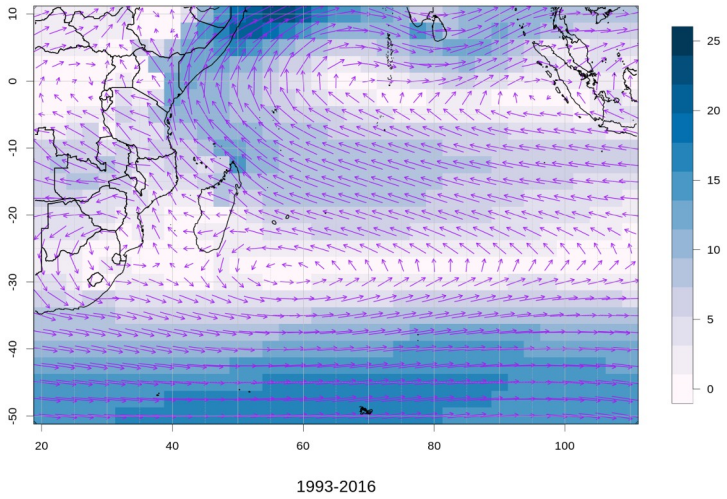


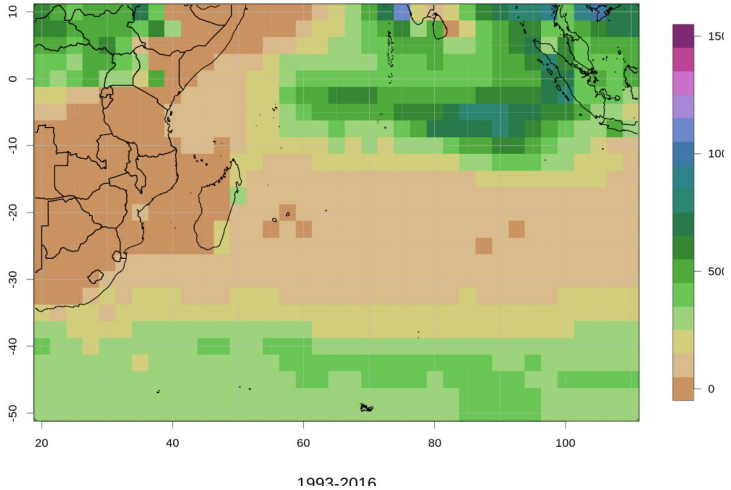
Climatological context

Large scale ERA5 climatology maps - JJA

Wind 850



Rainfall



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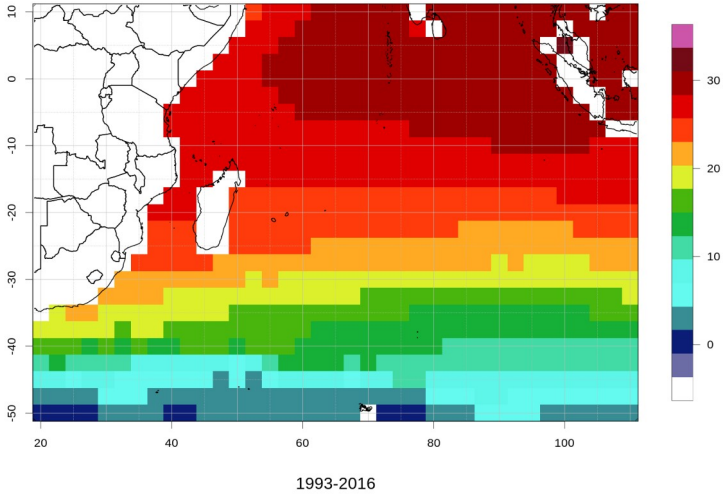

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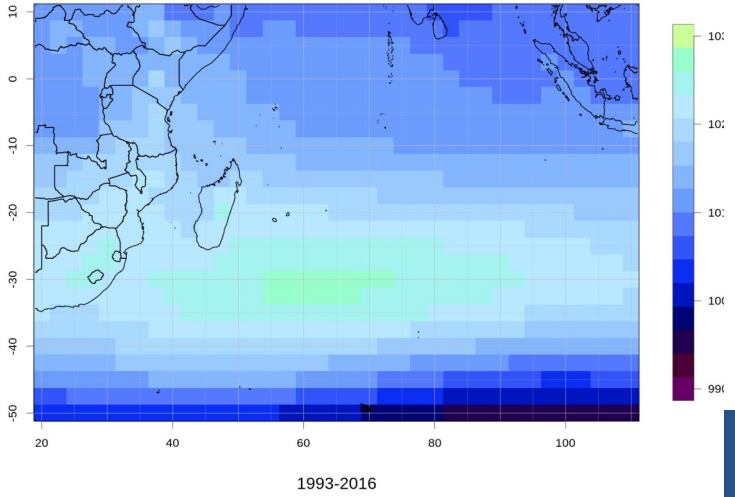
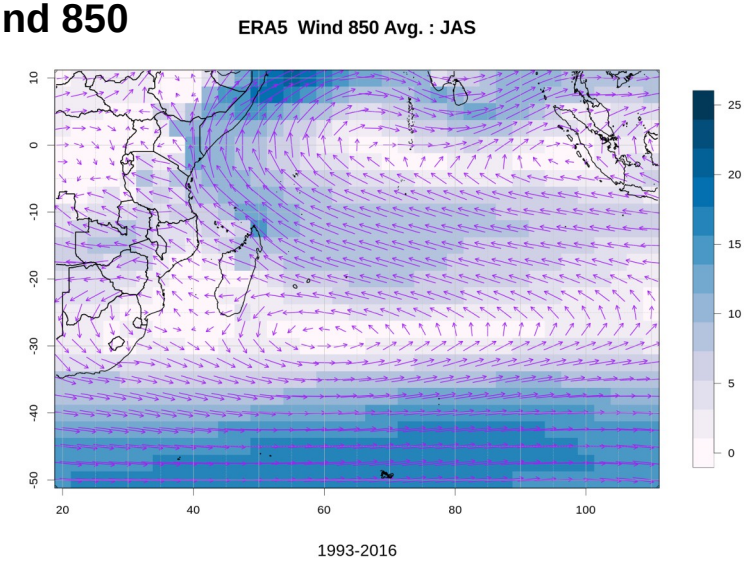


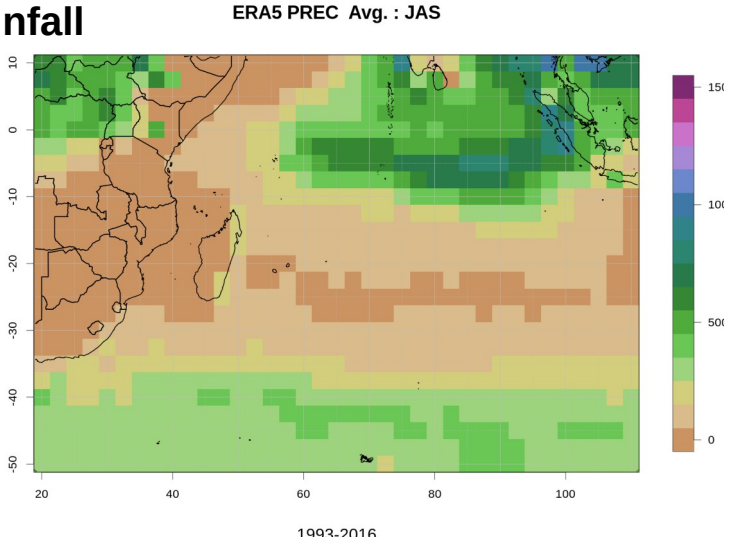
Climatological context

Large scale ERA5 climatology maps - JAS

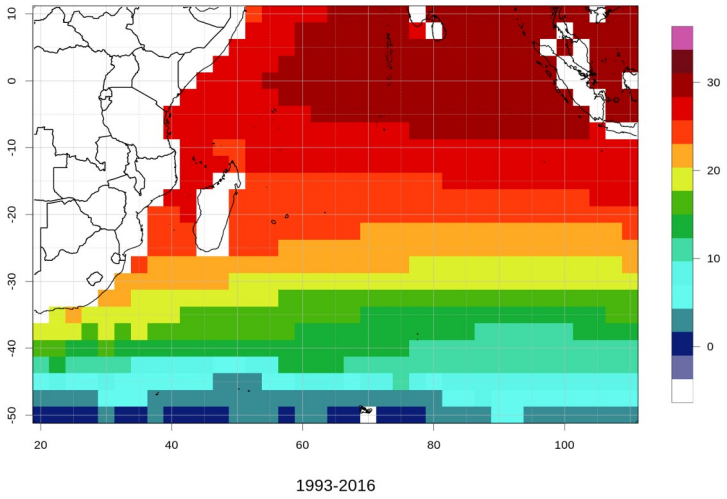
Wind 850



Rainfall



SST



MSLP