Seasonal forecast methodology for South West Indian Ocean region

ACCOF-17

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1 – General principles

- **Seasonal forecast should be produced through an objective process :**
  - Traceable, Reproducible, Documented

- **Seasonal forecast should be based on :**
  - Constitute a Multi Model Ensemble of GCM outputs
  - Assessment of GCM performance (scores)
  - Display of the forecast as probabilistic information + uncertainties
  - Implementation of post-processing to provide unbiased forecasts with their scores

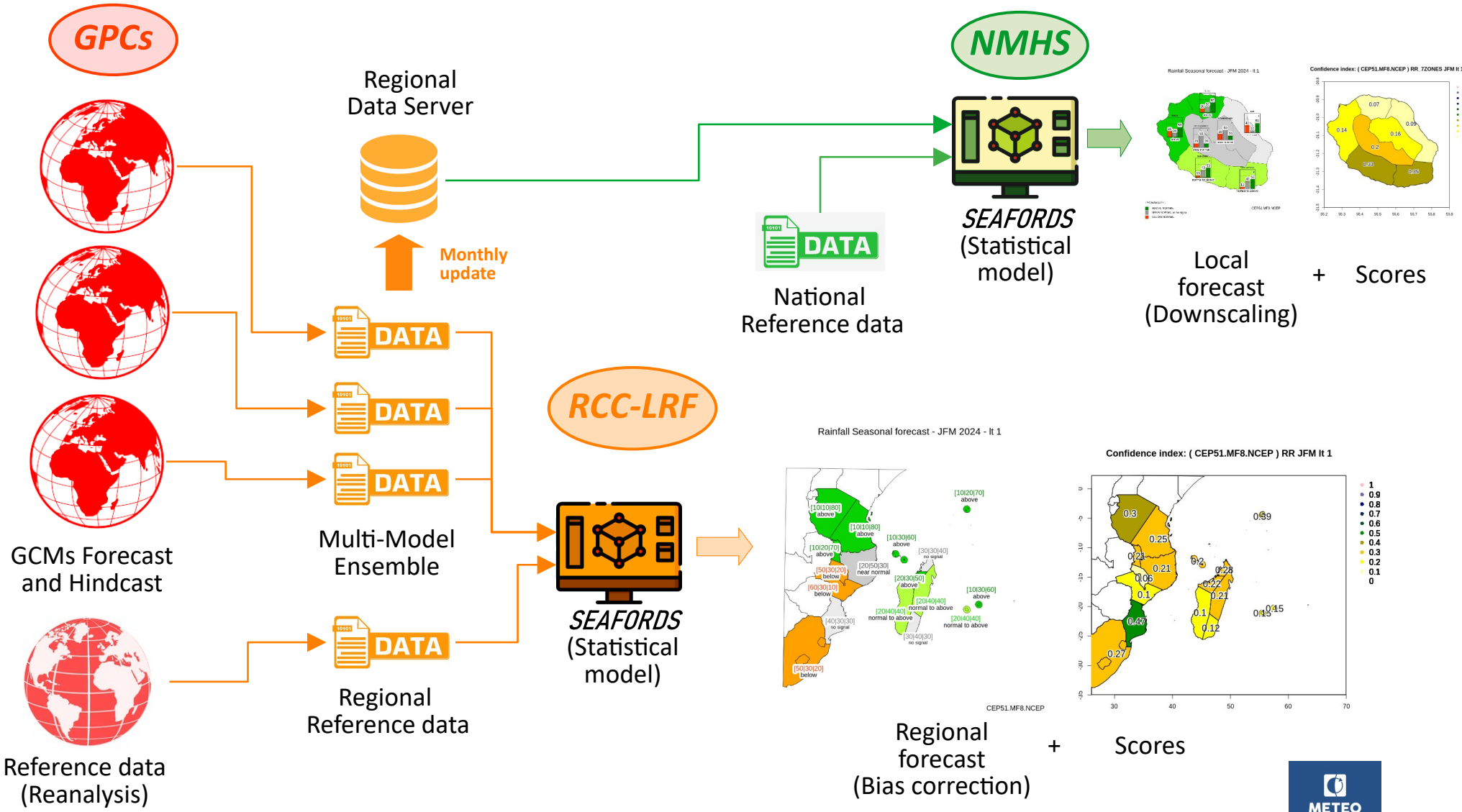
- **Supplement numerical forecast with climatology knowledge**
  - Document the regional climate, the associated drivers and their impacts on local parameters as well as synoptic parameters
  - Document local climate in order to illustrate the forecast in terms of weather types

- **SWIO region specific features :**
  - Island countries need a downscaling process of the forecasts
  - Regional forecast produced over a climatological zoning

Development of an integrated tool to process all the different tasks: *SEAFORDS* suite
> http://www.meteo.fr/temps/domtom/La_Reunion/meteoreunion2/climatologie/SWIO/swiocof-new.html

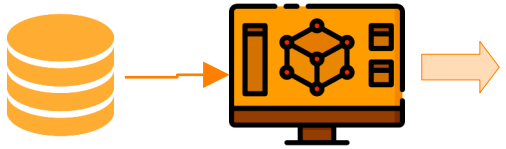
2 – Regional and local forecast processing

Seasonal forecasting at regional and local scale can be viewed as a cascading process :



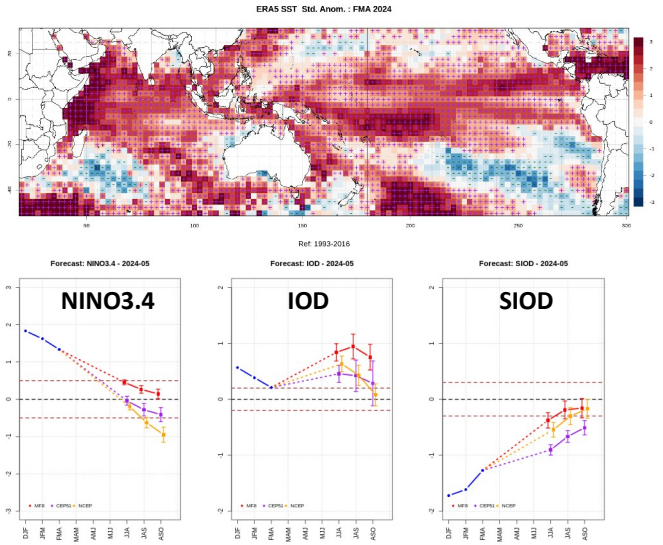
3 – Related tasks

3.1 – Additional information



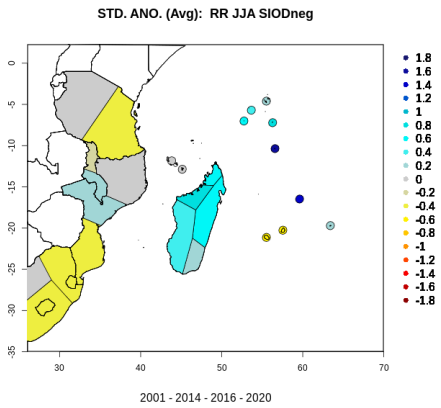
Drivers status / forecast

ex : SST anomaly (FMA 2024) + Drivers forecast (2024/05)



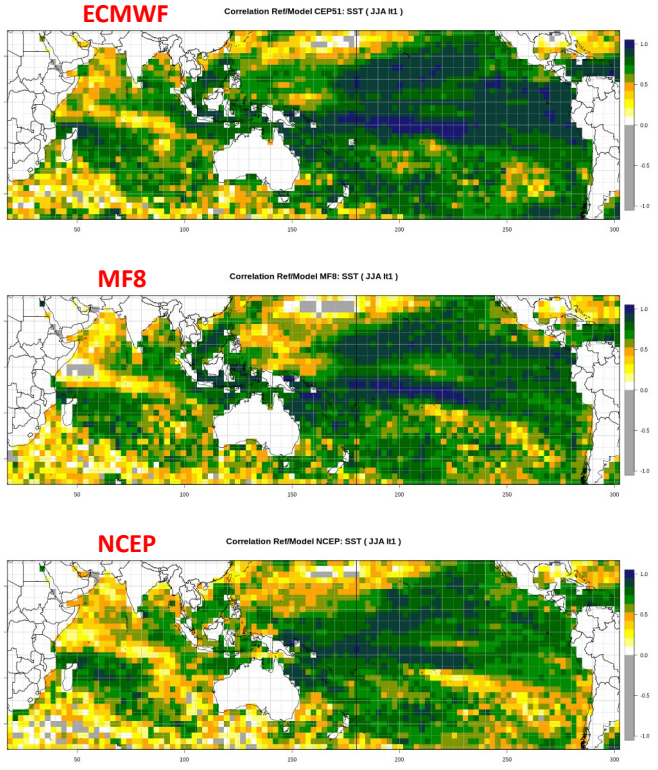
Composites

Rainfall anomalies associated to SIOD- (JJA)



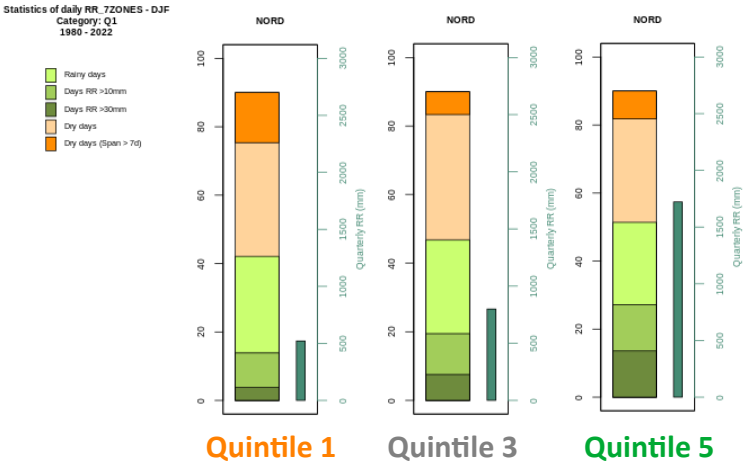
GCM scores

ex : Correlation score for SST forecast (JJA lt1)



Local Climatology

ex : Rainfall typology / rainfall category for DJF
- La Réunion Northern region -



- Statistics based on **Daily** data
- Nb Rainy / Dry days
- Nb Significant rain days (>30mm)
- Length Dry period

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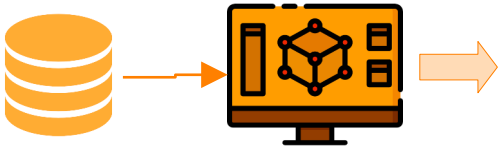
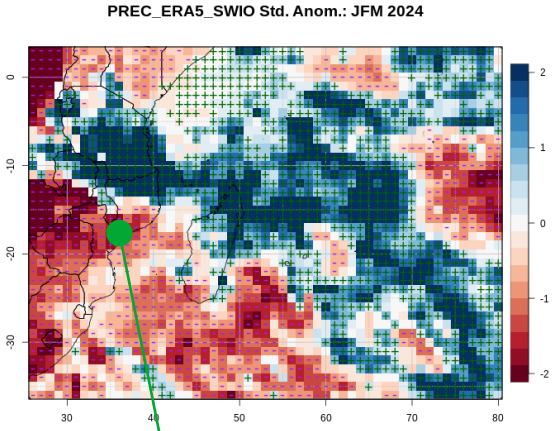
3 – Related tasks

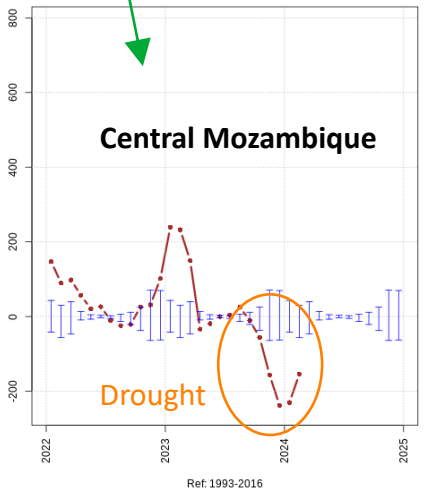
3.2 – Monitoring and Verification



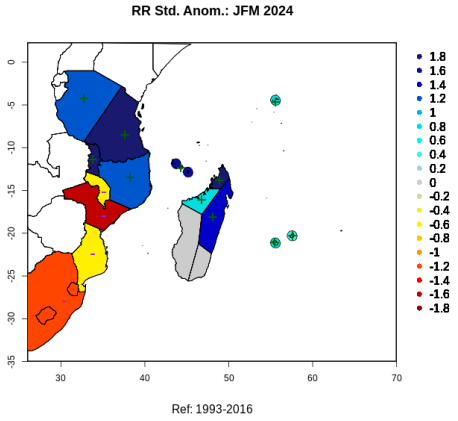
Régional / local monitoring

ex : JFM 2024 Reference data

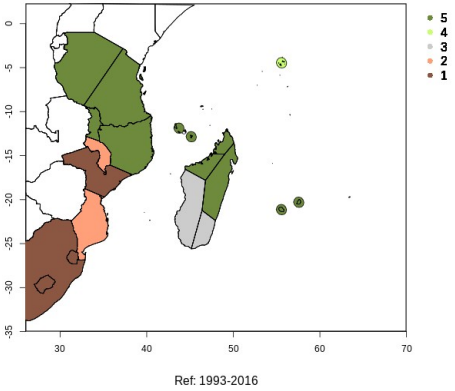




Rainfall anomalies for JFM 2024 over SWIO zones

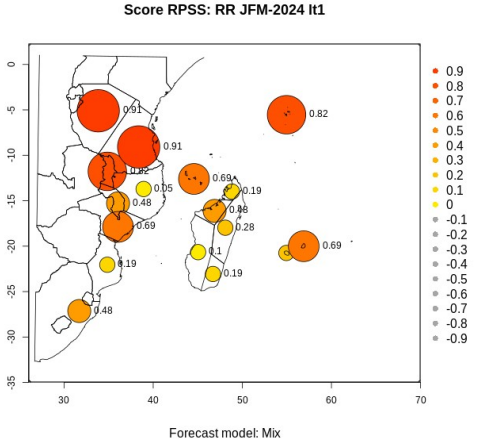


Rainfall quintiles classes for JFM 2024 over SWIO zones



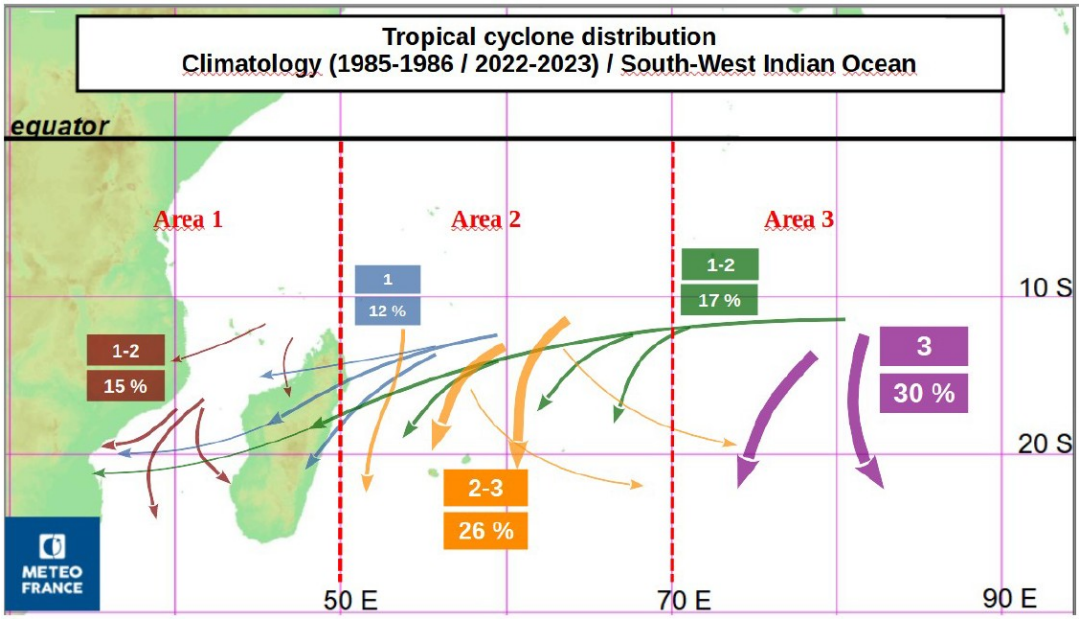
Forecast verification : RPSS score

ex : RPSS for JFM 2024 regional forecast



4 – Seasonal Forecast of cyclonic activity

- **Seasonal forecast issued at the beginning of the season :**
  - first guess issued during SWIOCOF (september)
  - final outlook issued during TC-MiniForum (late october)



Avg : 10 named systems
(5 TC)

Classification following :
- 3 development areas
- tracks direction

- **TC seasonal forecast after expert analysis considering:**

- ECMWF TC products
- Statistical adaptation (***SEAFORDS***) of Multi-GCM parameters for TC activity (number, ACE)
- Tracks composites associated to climate drivers status

Guidance outlook for TCC member states and regional users (Humanitarian sector, PIROI)

5 – Synthesis

- **In the SWIO region, the seaonal forecast activity is carried out through an automated process involving the *SEAFORDS* toolbox in order to :**
  - Consitute and update a regional dataset needed for LRF production and verification, and for basic monitoring
  - Produce rainfall and temperature forecast
  - Verify past forecast
  - Make these datasets and results available through a web portal :

    http://regionalclimate-change.sc/swiocof_data_portal/

- **Additionnal climatological information is made available :**
  - Climatological averages of local and large scale parameters for the region
  - Composites associated to the relevant climate drivers
  - GCM scores computed after their hindcast period

- **Building objective consensus :**
  - Blending the forecast of a given parameter from various sources : multiple GCMs or output of different statistical models based on various predictors
  - The different forecast should be made available at the same **spatial resolution**
  - The mixing of the forecast should take into account the **scores** associated to each system in order to buld the most efficient consensus

Follow us on : http://regionalclimate-change.sc/swiocof_data_portal/