

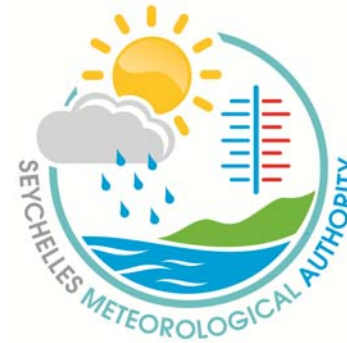


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COMMISSION DE
L'OCEAN INDIEN



DOWNSCALING METHODOLOGY DURING THE PRE-FORUM

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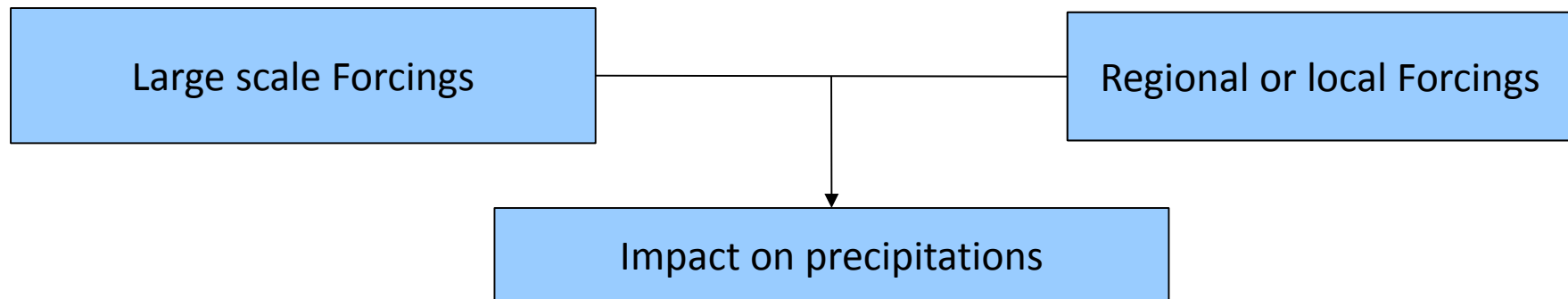
Météo-France – Indian Ocean (DIROI/EC)

Climatology Department

*SWIOCOF-5 Forum, 22 to 23 September 2016
Seychelles*

Fundamentals

- The main source of seasonal scale predictability lies in Tropical Oceans ; the atmosphere reacts to the main oscillations of the Sea Surface Temperature. It induces a modification of the large scale circulations.
- Seasonal Forecast is relevant if we can explain the **seasonal** variations of a **local** parameter by a **larger** scale parameter.



→ the First step is to find a predictor

Tools

■ Data sets:

- ◆ Local: precipitations (OND season) from all SWIOCOF countries
- ◆ Régional: GPCP precipitations (estimation from satellite observation)
- ◆ Large scale: Ocean Reanalyses (ERSST) and atmospheric reanalyses (ERA-interim)
- ◆ Learning period: 1979-2015

CPT Software(Climate Predictability Tool, IRI)

Reunion Island Software

■ Statistical Methods:

- ◆ composites, canonical correlation analysis to build the downscaling models
- ◆ skill scores for verification

Search for Predictors

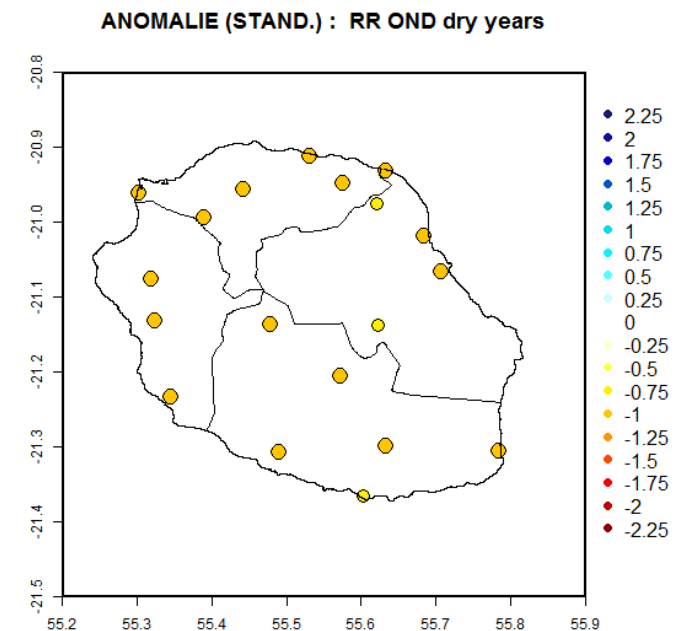
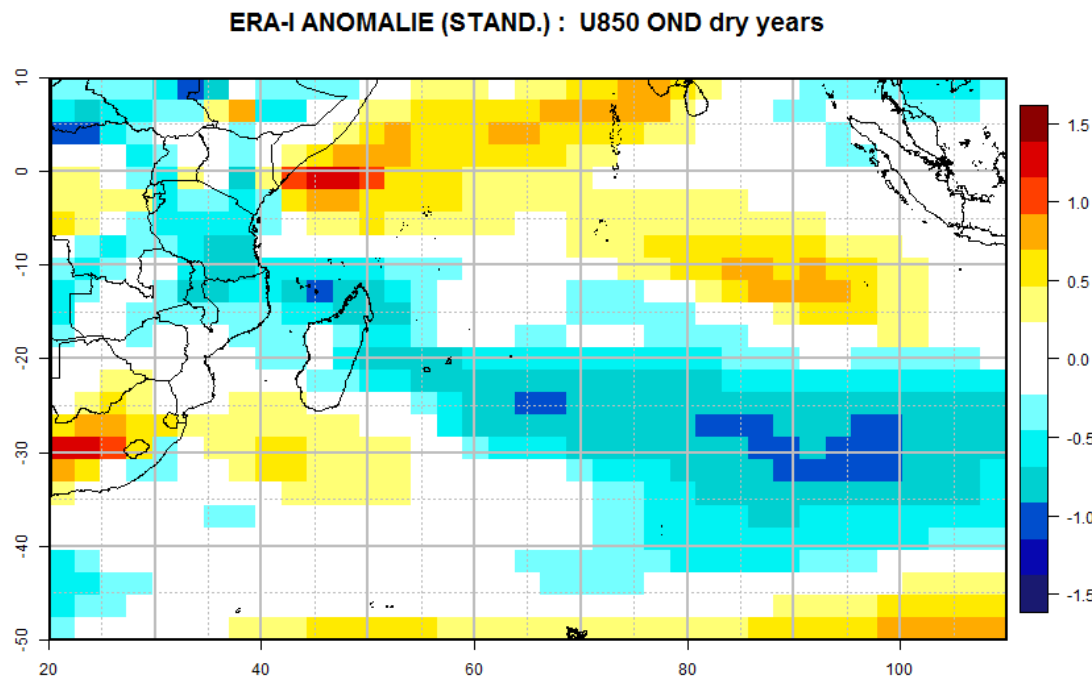
■ Composite analysis by two approaches:

- ◆ Precipitation mean anomaly linked to a large scale event (e.g. El Niño event)
- ◆ Mean Anomaly of a large scale field parameter (possible predictor) linked to wet or dry years on a territory

Search for Predictors

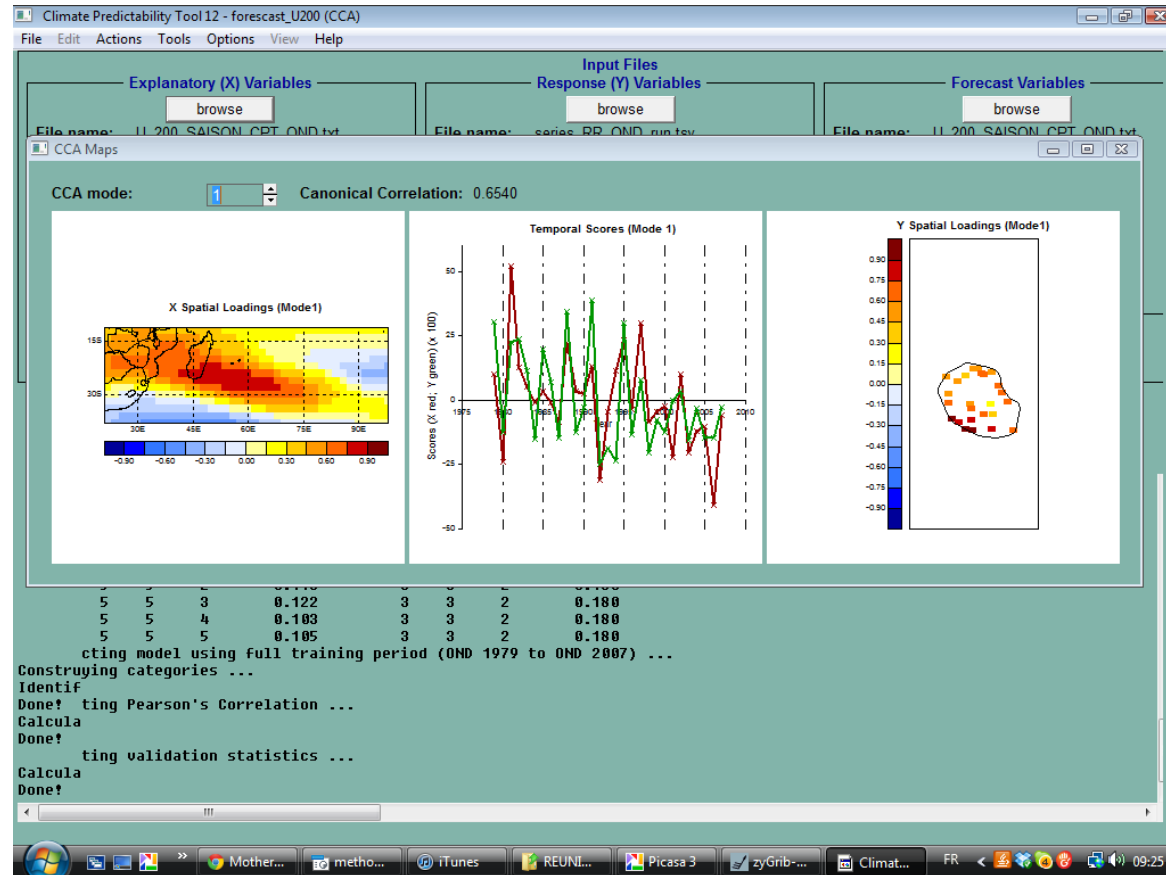
■ Exemple:

- Lower zonal wind **composite** (1500 m altitude) of the 4 driest OND in Reunion Island (1987,1992,1994,2010)



Search for Predictors

■ Canonical Correlation Analysis (CPT Tool):



Statistical Models selected

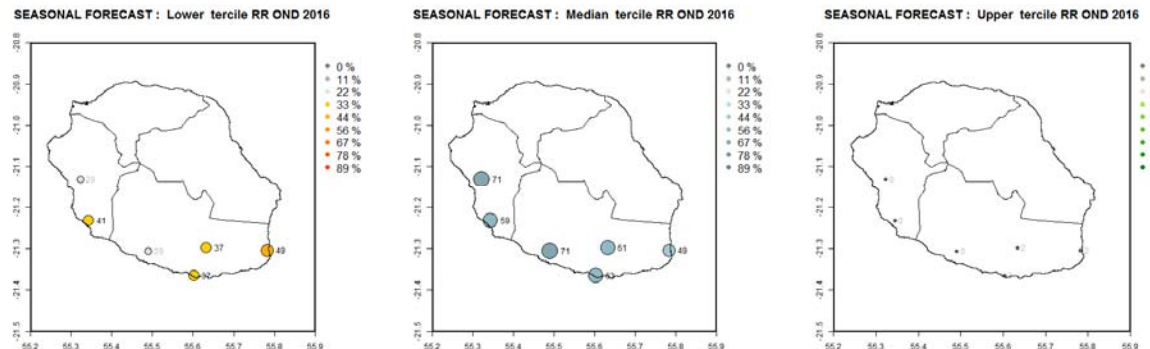
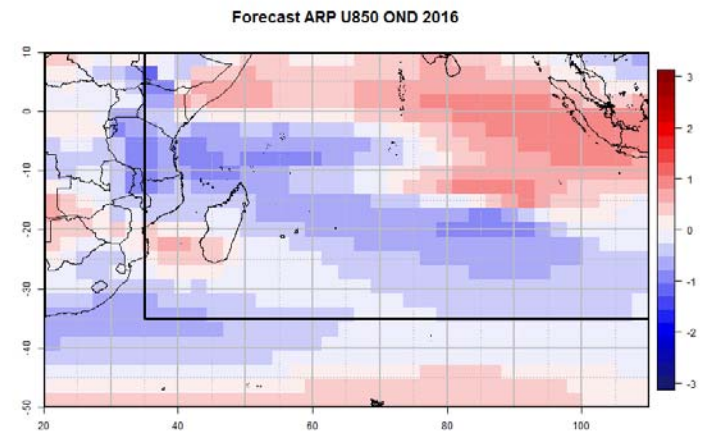
- Model Quality (scores...)
- Capacity of the climate model to reproduce the variability of the selected predictor
- Model bias issue for some parameters in some regions
- It is necessary to calibrate the statistical models build from the observed fields

The selected models are not necessarily the ones with the best scores. We have to deal with the best compromise.

OND 2016 Forecasts using the selected models



- Large scale forecasts : ARPEGE, ECMWF
- 51 members → **probabilistic information** on the local parameter (Reunion Island Software)



THANK YOU