Seasonal Forecasting & Climate Modelling Technical Training : report week 1

November 12-16, 2018

University of Seychelles Anse Royale Campus, Seychelles

1. Background

The weather and climate of Seychelles are greatly influenced by its marine environment and mountainous topography, which introduce substantial variability to the country's rainfall, wind and temperature patterns.

Climate change is set to cause changes in atmospheric and oceanic circulations, which are in turn expected to exacerbate variations in weather and climate patterns. As a Small Island Developing State, the Seychelles is already feeling the impacts of climate change, with a direct and adverse bearing on agriculture, human health, tourism and other socio-economic activities. Climate adaptation measures are needed to help the country cope with climate change impacts.

For the last 46 years, Seychelles Meteorological Authority (SMA) has dutifully served Seychellois communities through the provision of short-term, medium-term and seasonal forecasts, as well as early warning advisories and other specialized services. However, with the new and ever-changing uncertainty brought about by climate change, the demands on SMA have evolved to include the need to produce more accurate and customized weather and climate forecasts, improve on its early warning time lead services and to continually provide updated climate change scenarios and climate simulations in order to inform government planning and policy development.

It is with this background that the GCCA+ Seychelles project has partnered with SMA and Meteo-France La Reunion to offer a training workshop on seasonal forecasting and climate modelling to 10-15 participants to be selected from sectors that are highly affected by the impacts of climate change. This training workshop is designed to strengthen the capacity of the staff within these organizations in seasonal and climate analysis and forecasting. Through the training, participants will acquire theoretical and practical knowledge to use, create and apply seasonal forecast products in the climate sensitive sectors of the Seychelles.

2. Workshop objectives

The overall objective of the training is to strengthen the capacities of key professional and technical staff in SMA, PUC and SAA on Seasonal Forecasting and Climate Modelling and its application to the key sectors of Seychelles. Specifically the training intends to address:

1) The basic concepts and principles of seasonal forecasting, climate change and climate change modelling.
2) Seasonal forecasting and climate modelling tools available for the South-West Indian Ocean – specifically Seychelles.
3) Information requirements for the seasonal forecasting and climate modelling tools
4) How to use the tools to develop seasonal forecasts and use the models to predict climate impacts in key sectors of The Seychelles.
5) Development of seasonal forecasts and future likely climate scenarios for The Seychelles.

3. Participants week 1

Profiles of participants attending this first session workshop were quite diversed with :
- 7 meteorologists from SMA,
- 1 hydrologist from PUC,
- 1 representative from disaster risk management DRDM
- 1 repersentative from agriculture sector (SAA) that came only the first 2 days
- 2 students from UNISEY
- Few lecturers from UNISEY that attended essentially the first part of the week

4. Workshop agenda

The overall training is given in two separate weeks. The first week of the workshop had for main objective to familiarise the participants with climate general concepts, climate change and seasonal forecast issues and to introduce SEAFORDS tool under R by operating statistical analysis. It helped identifying main climate drivers for Seychelles.

The second session will focus on practical work on seasonal forecast for Seychelles.

The final agenda for week 1 is provided at the end of this report.

5. Main Ouputs

Several presentations are available on :
- Climate System
- Climate modelling
- Climate projections
- Seasonal forecasting
- Modelling for seasonal forecasting
- Downscaling methods

Composite analysis for a selection of years corresponding to different climate backgrounds (IOD, ENSO, SIOD…) with respect to identified climate drivers.

Canonical Correlation Analysis confirming the role of the drivers and giving useful information on predictability at seasonal scales and potentialities of seasonal forecast for Seychelles.

6. General comments and feedbacks from participants

- The training was very well organized by SMA. The training room was convenient and internet access fair enough for our needs. The pace of the training convenient too.

- Participants were invited to fill in an evaluation form. Feedbacks are very positive and reveal that the timing and the balance between general lectures and practical work was good. They mostly appreciated the manipulation of climate data using SEAFORDS to be able to highlight and better understand the climate dynamics and the role of the main climate drivers for Seychelles.

- The main difficulty for the facilitator came from the heterogeneity of the participants profile. It was quite a challenge to keep everybody on board during the whole week considering the fact that some participants had no experience or knowledge on climate issues, where others were professional meteorologists!

7. **Conclusion**

This first session of the training on seasonal forecast was very useful for participants and layed the scientific foundations for the second one which will focus mainly on practical aspects on seasonal forecasting and potential applications in terms of climate services.

This report will be completed after the second session has ended.

A complete document providing guidelines for seasonal forecasting activities in Seychelles especially for SMA staff will be produced after the second training session.

Agenda: Part One

MONDAY, 12TH NOVEMBER, 2018		
08:15 – 08:40	Registration of participants	Rouma Agricole & GCCA+
OPENING SESSION CHAIR:		
08:40 – 08:50	Introduction of participants	All
08:50 – 09:10	Welcome remarks from Team Leader GCCA+	Peter Brinn
09:10 – 09:30	Workshop objectives, programme and introduction of participants and participants expectations	Francois Bonnardot
09:30 – 10:00	Understanding global climate systems	Francois Bonnardot
10:00 - 10:30	Coffee Break	
SESSION I: GLOBAL CLIMATE CHANGE AND CLIMATE SYSTEMS		
10:30 – 12:00	Understanding global climate systems	Francois Bonnardot
12:00 – 13:00	**Lunch Break**	
13:00 – 15:30	Climate modeling: methods, climate projections	Francois Bonnardot
15:30 – 16:00	Coffee Break	

TUESDAY, 13TH NOVEMBER, 2018			
SESSION II: SEASONAL WEATHER FORECASTING			
09:00 – 10:30	Seasonal forecast: from weather to climate, predictability issues	Francois Bonnardot	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Climate modeling for seasonal forecast (GPCs, skill scores)	Francois Bonnardot	
12:00 – 13:00	**Lunch Break**		
13:00 – 15:30	Case studies : relevant data & analysis with SEAFORDS	Francois Bonnardot	
15:30 – 16:00	Coffee break		

WEDNESDAY, 14TH NOVEMBER, 2018			
SESSION III: SEASONAL WEATHER FORECASTING			
09:00 – 10:30	Local data processing	Francois Bonnardot	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Downscaling methods – climate drivers analysis	Francois Bonnardot	
12:00 – 13:00	**Lunch Break**		
13:00 – 15:30	Practice 1: Climate drivers for Seychelles – PCA, CA, YA analysis	Francois Bonnardot	
15:30 – 16:00	Coffee break		

THURSDAY, 15TH NOVEMBER, 2018			
SESSION IV: SEASONAL WEATHER FORECASTING			
09:00 – 10:30	Practice 2: Climate drivers for Seychelles – CCA analysis	Francois Bonnardot	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Practice 2 Cont'd: Climate drivers for Seychelles – CCA analysis	Francois Bonnardot	
12:00 – 13:00	**Lunch Break**		
13:00 – 15:30	Seasonal forecast skill: potentialities for Seychelles	Francois Bonnardot	
15:30 – 16:00	Coffee break		

FRIDAY, 16TH NOVEMBER, 2018			
SESSION V: SYNTHESIS			
09:00 – 10:30	Synthesis session: Climate system dynamics and modeling		
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Synthesis session: Seasonal climate predictability, potentialities for Seychelles		
12:00 – 12:15	Close of Part One of Training		
12:00 – 13:00	Lunch Break		

Proposed Agenda: Part Two

MONDAY, 03RD DECEMBER, 2018			
SESSION I: CLIMATE MODELLING			
09:00 – 09:30	Opening Remarks	(University of Seychelles, GCCA+ & SMA)	
09:30 – 10:30	Tools for Climate Modelling	Laurent Labbe	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Downscaling Climate Model Outputs: Theory	Laurent Labbe	
12:00 – 13:00	Lunch Break		
13:00 – 15:30	Practical 1: Downscaling Climate Model Outputs	Laurent Labbe	
15:30 – 16:00	Coffee break		

MONDAY, 03RD DECEMBER, 2018			
SESSION I: CLIMATE MODELLING			
09:00 – 09:30	Opening Remarks	(University of Seychelles, GCCA+ & SMA)	
09:30 – 10:30	Tools for Climate Mode	Laurent Labbe	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Downscaling Climate Model Outputs: Theory	Laurent Labbe	
12:00 – 13:00	Lunch Break		
13:00 – 15:30	Practical 1: Downscaling Climate Model Outputs	Laurent Labbe	
15:30 – 16:00	Coffee break		
TUESDAY, 04TH DECEMBER, 2018			
SESSION II: SEASONAL WEATHER FORECASTING			
09:00 – 10:30	Statistical Issues and Methods in Seasonal Weather Forecasting	Laurent Labbe	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Statistical Issues and Methods in Seasonal Weather Forecasting Cont'd	Laurent Labbe	

12:00 – 13:00	Lunch Break		
13:00 – 15:30	Practical 2: Statistical Issues and Methods in Seasonal Weather Forecasting	Laurent Labbe	
15:30 – 16:00	Coffee break		

WEDNESDAY, 05TH DECEMBER, 2018			
SESSION III: SEASONAL WEATHER FORECASTING			
09:00 – 10:30	Practical 3: Statistical Issues and Methods in Seasonal Forecasting	Laurent Labbe	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Practical 4: Statistical Issues and Methods in Seasonal Forecasting Cont'd	Laurent Labbe	
12:00 – 13:00	Lunch Break		
13:00 – 15:30	Practical 5: Seasonal Forecast using Perfect PROG/MOS methods	Laurent Labbe	
15:30 – 16:00	Coffee break		

THURSDAY, 06TH DECEMBER, 2018			
SESSION IV: SEASONAL WEATHER FORECASTING			
09:00 – 10:30	Practical 6: Downscaling using different local and Regional Datasets: Precipitation, Temperatures and Other Indices	Laurent Labbe	
10:30 – 11:00	Coffee Break		
11:00 – 12:00	Practical 7: Downscaling using different local and Regional Datasets: Precipitation, Temperatures and Other Indices Cont'd	Laurent Labbe	
12:00 – 13:00	Lunch Break		
13:00 – 15:30	Practical 8: Tailoring Products for Specific Users (Water, Agriculture etc.)	Laurent Labbe	
15:30 – 16:00	Coffee break		

FRIDAY, 07TH DECEMBER, 2018			
SESSION V: SEASONAL WEATHER FORECASTING			
09:00 – 10:30	Practical 9: Towards a Monthly Production of Climate Services Including Seasonal Forecasts	Laurent Labbe	
10:30 – 11:00	Coffee Break		
SESSION VI: CLOSING CEREMONY			
11:00 – 11:10	Remarks from University of Seychelles	Representative University of Seychelles	
11:10 – 11:20	Remarks from GCCA+	Team Leader GCCA+	
11:20 – 11:30	Remarks from SMA	CEO, SMA	
11:30 – 11:40	Remarks from MEECC	Representative from MEECC	
11:40 – 11:50	Remarks from Chief Guest	French Embassy	
11:50 – 13:00	Awards of Certificates	GCCA+/SMA	
12:00 – 13:00	Lunch Break		