Position	
Job Title:	Post-doctoral fellow "sub seasonal divers in tropical cyclones" in the framework of the project entitled "ACACIA: Anticipatory Climate Adaptation for Communities in Africa" financed by the 2024 Call for EU HORIZON (HORIZON-CL5-2023-D1-01-11)

Job Description	
Category:	A
Corps:	Fixed-term contract agent

Affiliation	
Administrative:	University of Reunion Island / Unit: LACy (Atmosphere and Cyclone Laboratory)
Workload:	Full time
Location:	Saint-Denis, La Réunion (French Department in Indian Ocean)

Contract condition	
Starting date:	September 1, 2026 at the earliest
Length:	25 months
Financing:	HORIZON EUROPE

Activities

Research context:

Tropical cyclones (TCs) form over warm tropical oceans, typically where sea surface temperatures (SSTs) exceed approximately 26°C, and derive their primary energy from latent heat released from the upper ocean (Emanuel 2003). TCs occurrence are generated by the combination of deep convection over the warm ocean and favorable atmospheric conditions often driven by **subseasonal drivers** like the Madden Julian oscillation (MJO), equatorial waves (Schreck et al. 2012) and interannual modes of variability (ENSO, IOD). The drivers manifest as modulators of the atmosphere providing **favorable conditions for TC** to form with reduced wind shear and enhanced cyclonic vorticity for example. These drivers modulate the environment of TC can influence their formation (Schreck 2012) and likely some of their features (tracks, intensity). In particular the MJO is a key driver that conditions the skill of the forecast system (Schreck et al. 2023). Other equatorial waves are also at play with substantial impact on the TC formation at different periods from synoptic to longer timescale (Jonville et al. 2024, Schreck et al. 2011, Latos et al. 2023). Despite a relatively clear understanding of how a given wave modulates the environment of convection (Kiladis et al. 2009), there is still a knowledge gap in the mechanisms by which interannual and subseasonal drivers interact during the **cyclogenesis process** and **impact the TC features**. This gap is even more pronounced in the South West Indian Ocean region (SWIO) which is relatively understudied compared to the North Atlantic of Pacific basins. With a TC activity comparable to the North Atlantic, TCs forming in this region can impact numerous Indian ocean island nations and countries along the eastern coast of Africa.

Research objective:

This postdoctoral research aims to investigate **how subseasonal drivers influence historically significant TC events in the SWIO basin**, with a particular focus on rainfall and wind impacts. The study will primarily focus on two representatives historical TCs: TC Batsirai (2022) and TC Belal (2024). Both systems developed over regions of warm SST and intensified to Category 4 on the Saffir-Simpson scale, yet they followed markedly different trajectories. TC Batsirai moved predominantly southwestward, making landfall along the east coast of Madagascar after passing north of the Mascarene Islands, whereas Belal tracked mainly southward and made landfall over the Mascarene Islands. A comparative analysis of these two events will enable us to assess not only the influence of a warming climate on their lifecycle, but also the role of horizontal SST gradient in modulating changes in TC intensity.

The study will employ the **wavenumber–frequency filtering technique** to isolate the contributions of subseasonal drivers—such as interannual modes, the MJO, Equatorial Rossby waves, and Kelvin waves—to wind and thermodynamic perturbations (Wheeler and Kiladis, 1999; Peyrillé et al., 2023), and to quantify their impact on these two TC cases. A numerical modeling approach will then be applied by simulating the selected TCs using the convection-permitting Meso-NH model (Lac et al., 2019) to investigate their sensitivity to the removal of each driver's signal from the initial and boundary conditions (Ching, 2015; Diakhaté, Peyrillé, Chaboureau et al., in revision).

Within this framework, a control simulation driven by ECMWF analysis will first be conducted to evaluate the response of the simulated TCs to each driver by systematically removing their contributions. Subsequently, ECMWF forecasts will be assessed from a driver-based perspective for these cases to identify the signatures of ENSO, MJO, and other equatorial waves, and to compare them with TC forecast biases and skill. Typical patterns of drivers will then be derived from the forecasts and their evolution with lead time, and these patterns will be used in a second set of experiments. In these experiments, convection-permitting simulations will be forced by substituting a specific driver contribution with ECMWF subseasonal forecasts, allowing us to evaluate how the representation of these drivers in ECMWF forecasts affects TC characteristics, including occurrence, track, and intensity.

Corresponding assigned activities:

As part of the project entitled "**ACACIA**: Anticipatory Climate Adaptation for Communities in Africa" financed by the 2024 Call for EU HORIZON", you are recruited within the LACy unit for a period of 25 months as a postdoctoral researcher to reinforce the team to carry out successfully the project under the supervision of Dr. Keunok LEE, project leader of LACy while Dr. P. Peyrillé (CNRM, Toulouse) will co-supervise the postdoctoral researcher remotely. In this context, you will contribute to the WP3 "Advancing climate information for applications" and WP4 "Co-production of weather and climate information" of ACACIA project by undertaking the following tasks:

- Conduct high-resolution numerical simulation with multiple initial conditions generated through wavenumber-frequency filtering techniques.
- Characterize changes across the full life cycle of selected historical TCs (i.e., Batsirai and Belal) under observed and sensitivity driver-removal experiments.
- Assess the representation of drivers in ECMWF forecast for the two case studies and the corresponding TC forecast.
- Conduct high-resolution sensitivity experiments and examine the response of historically damaging TCs to prescribing subseasonal drivers from ECMWF forecasts with a focus on track and intensity.

At the end of your assignment, you will be required to submit a copy of your work to Dr. Keunok LEE, the project leader, in the form of data from the numerical simulations and a scientific report.

Conditions of employment:

Post-Doctoral candidates will be offered a 25-month period of employment.
The annual salary range is between 39k-45k€ depending on experience.

The recruitment and appointment procedures strictly comply with the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (ISBN 92-894-9311-9). The University is committed to transparent, merit-based selection processes that ensure equal opportunities, non-discrimination, and the promotion of gender balance at all stages of recruitment and employment.

The conditions of employment are structured to support high-quality research and sustainable career development. Particular attention is given to the recognition of the research profession, the provision of an enabling and stimulating research environment, appropriate working conditions, and stability of employment for the duration of the contract. The framework also ensures competitive funding and salary conditions, access to research training and professional development, and opportunities for national and international mobility.
Clear institutional policies govern intellectual property rights, authorship and co-authorship practices, as well as supervision and teaching responsibilities, thereby safeguarding academic integrity and ensuring that researchers' contributions are duly recognised and protected.

The University of La Reunion:

The University of Reunion Island (Université de la Réunion) is a French university in the Academy of Réunion. It is the first and only European university in the Indian Ocean. Established in 1982, it has grown steadily over the years in terms of student population, geographical sites occupied, courses offered and partnerships forged with local, national and international institutions. The school's ambition is to be the reference university in Indianoceania.

Laboratoire de l'Atmosphère et des Cyclones (LACy):

The LACy is a joint research unit between CNRS, Météo-France and University de La Réunion dedicated to the study of physical processes governing the tropical atmosphere. LACy has notably initiated the creation of the Maido atmospheric observatory, part of the Observatory of Atmospheric Physics of La Réunion (OPAR), which hosts various instruments for atmospheric measurements, including lidar systems, cloud radar, spectro-radiometers and in situ gas and aerosol measurements. The lab currently has 18 permanent staff (researchers, engineers, faculty members) and 8 PhD students.

Competences
Candidates should hold a PhD in meteorology or a closely related field.   They must have demonstrated experience working with large datasets and proficiency in analyzing numerical model outputs.   Knowledge in tropical dynamics, equatorial waves or equatorial convection is a plus.   A strong command of the Python programming language, particularly within a Linux environment, is essential.   Prior experience with regional numerical modeling will be considered an asset.   Excellent written and oral communication skills in English are required, along with the ability to work effectively and collaboratively within a research team.

Application	
Contact:	Camille Bonnet (camille.bonnet@univ-reunion.fr)
Application material:	Curriculum Vitae and Motivation Letter To be sent to « recrutement-biatss@univ-reunion.fr » keunok.lee@univ-reunion.fr, philippe.peyrille@meteo.fr and camille.bonnet@univ-reunion.fr
Deadline:	April 30, 2026, 11:59 PM (GMT +4)