Position	
Job Title:	Post-doctoral fellow "tropical cyclones in warming climate" 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). Understanding how TCs respond to rising SSTs under global warming is therefore critical importance. Assessments by the Intergovernmental Panel on Climate Change (IPCC) indicate that the frequency of TC genesis in the **South-West Indian Ocean** (SWIO) basin is likely to decrease under **future climate conditions**. However, despite a projected decline in TC frequency, the storms that do form are expected to become more intense and potentially larger in spatial extent as a result of warmer SSTs (Villarini et al., 2010; Ramsay and Sobel, 2011; Villarini and Vecchi, 2012; Sobel et al., 2016; Walsh et al., 2016).

Substantial research efforts have examined the influence of climate change on TC tracks and intensities, as well as on associated coastal impacts such as **extreme rainfall**, **storm surge**, and **wind damage** (Emanuel et al., 2008; Mendelsohn et al., 2012; Emanuel, 2017). In contrast, the SWIO basin remains relatively understudied, despite exhibiting TC activity comparable to that of the North Atlantic. TCs forming in this region frequently affect numerous island nations and coastal countries along the eastern Africa. In particular, many systems make landfall on highly vulnerable regions such as Madagascar—home to approximately 22 million people, with fragile infrastructure and an economy heavily dependent on agriculture—or the Mascarene Islands, including La Réunion (870 000 inhabitants) and Mauritius (1.3 million inhabitants). Several of these countries face significant socioeconomic challenges and lack adequate disaster warming systems or risk-mitigation strategies. Nevertheless, relatively little research has examined the inland impacts of landfalling TCs under climate change scenarios in the SWIO basin (Leroux et al., 2018).

Research objective:

This postdoctoral position aims to study how **warming signals**—representing future climate change perturbations—may alter historically damaging TC events in the SWIO basin, with a particular emphasis on rainfall and wind impacts. A series of high-resolution numerical simulations will be performed using the **Pseudo Global Warming** (PGW) approaches, which provides a robust framework for examining how the characteristics of historical TC events may evolve under future (and

past) climate condition (Lynn et al., 2009; Lackmann, 2015). Selected CMIP6 multi-model ensemble dataset—including, for example, the Max Planck Institute Earth System Model Medium Resolution (MPI-ESM-MR), the Centre National de Recherches Météorologiques Coupled Global Climate Model, version 5 (CNRM-CM5), and the Geophysical Fluid Dynamics Laboratory Climate Model, version (GFDL-CM3) among others—will be used to represent a range of projected climate conditions. **Climate perturbations** will be derived from selected **CO_2 emission scenario** by calculating the difference between the 2050–2099 and 1950–1999 climatological monthly means. These perturbations will be applied to construct the initial and boundary conditions for target TC simulations. The simulations will be conducted using the **Mesoscale Non-Hydrostatic model** (Meso-NH), potentially coupled with CROCO ocean model.

TC Batsirai (2022) and TC Belal (2024) have been selected as representative case studies. Both systems developed over regions of warm SST and intensified to Category 4 on the Saffir-Simpson scale, yet followed markedly different trajectories. 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 allow us to assess not only the influence of a warming climate on their lifecycle, but also the role of horizontal SST gradient in modulating the changes in TC 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 24 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, and Dr. Kevin HOARAU. In this context, you will contribute to the WP3 "Advancing climate information for applications" of ACACIA project by undertaking the following tasks:

● Analyze **high-resolution numerical simulation** results conducted with multiple initial conditions generated through PGW technique and a selection CO2 emission scenarios
● Characterize changes across the full life cycle of **selected historical TCs** (i.e., Batsirai and Belal) under present-day and future climate conditions.
● Examine the **response of historically damaging TCs** to a **warming climate**, with particular emphasis on their translation direction within the basin (i.e., southwestward versus southward motion).
● **Quantify changes** in rainfall and wind characteristics—particularly duration and peak intensity—during TC passage and/or landfall, as well as associated changes in cyclone trajectories under warming climate conditions.

At the end of your assignment, you will be required to provide 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 candidate 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 Re-searchers 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 con-tract. 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.

The University is an equal opportunity employer and is committed to providing a workplace free from all forms of unlawful discrimination, harassment, bullying, vilification and victimisation. The University is committed to all aspects of equal opportunity, diversity and inclusion in the workplace and to providing all staff, students, contractors, honorary appointees, volunteers and visitors with a safe, respectful and rewarding environment free from all forms of unlawful discrimination, harassment, vilification and victimisation. The University values diversity because we recognise that the differences in our people's age, race, ethnicity, culture, gender, nationality, sexual orientation, physical ability, religion and background bring richness to our work environment.

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

The LACy is a joint research unit between CNRS, Meteo-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 22 permanent staff (researchers, engineers, faculty members) and about 10 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.
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, kevin.hoarau@univ-reunion.fr and camille.bonnet@univ-reunion.fr
Deadline:	April 30, 2026, 11:59 PM (GMT +4)