2-Yr Postdoc position at the Institute of Research for Development (IRD) and Meteo-France on regional simulations of the New-Caledonia - Vanuatu climates (South Pacific).

The CLIPSSA 2021-2024 project

CLIPSSA (Pacific climate, local knowledge and adaptation strategies) is a joint regional project developed by IRD (Institut de Recherche pour le Développement, https://en.ird.fr/), Météo-France (the French Meteorological Service) and AFD (Agence Française de Développement: https://www.afd.fr/en). It aims at accompanying Vanuatu, New Caledonia, Wallis-and-Futuna and French Polynesia, in drafting adaptation plans against climate change threats.

First, the project aims at building reliable estimates of the South Pacific regional future climates, at scales ranging from those of the South Pacific Convergence Zone to synoptic scales (e.g. tropical cyclones). Second, it aims at better understanding the fate of local climates and extremes for the targeted countries. Third, the project aims at providing key information on a few climate-related sectorial impacts as prioritized by Vanuatu and the French territories. These three aspects are all necessary steps towards a better appropriation of the future of the South Pacific climates and societal impacts by the population and local authorities, in support of their national/local adaptation plans. This proposed 2-year postdoc position targets the second objective of CLIPSSA: “a better understanding of the local climates and extremes in the New-Caledonia/Vanuatu region”.

Scientific background of the opened position.

The South Pacific is made of a myriad of islands. Pacific island countries and territories (PICTs) are highly vulnerable to the effects of climate variability and longer-term changes. Even more than developed countries, these islands are highly vulnerable to the amount of precipitation that will dictate their water resources and they are deeply affected by a number of meteorological events ranging from extreme events (e.g. cyclones, heat waves, heavy rains etc.) to the impacts of large-scale phenomena such as ENSO (El Niño Southern Oscillation). All of these can cause major social, economic and ecological damage on land and in lagoons and on their ecosystems as many of the island countries' resources depend on their coral ecosystems.

At present, IPCC models do not possess the spatial resolution that can resolve the appropriate scales needed in the case of the many Pacific Island countries, which are mountainous such as New Caledonia and the Vanuatu archipelagoes. For instance, previous studies in New Caledonia have shown that even at 20km scales, the main climatological atmospheric features are badly captured (Dutheil et al., 2020). This not only suggests that knowledge provided by IPCC models are irrelevant at these scales but also that the future of extremes events that deeply affect these islands cannot be assessed. Therefore, we lack at present the key information to understand what may be the future climates of such islands in general and therefore their impacts on sectorial activities. That in turn prevents public bodies to include the climate change risks in their long-term environmental policies and in particular in the many adaptation plans that are currently developed in these countries to face climate change.

The first challenge is thus to be able to provide pertinent and robust information about the many possible future climates at island scales and the associated uncertainties that emerge from the IPCC scenarii and models. The CLIPSSA project offers a 2-year postdoc position starting in early 2023 to downscale the climate information from the IPCC model futures to provide:

- Local-scale dynamical downscaling of CMIP6 models in the New-Caledonia/Vanuatu region for the next 100 years in SSP scenarii such as 126, 245, 370, 585 using the atmospheric model AROME (e.g Fumière et al., 2020)
- Analyze the fate of the local climates in terms of seasonal and interannual variability (e.g ENSO) and extremes such as heat waves, rainfall, droughts.
- Give insights on how the numerous uncertainties (e.g., boundary conditions from climate models, internal variability, model parameterizations etc.) impact the previous atmospheric features.

The local atmospheric modeling will be developed in synergy with ongoing studies in CLIPSSA on similar questions at the South Pacific scale (20km) using ALADIN and in the French Polynesia region using AROME. The postdoc will collaborate with the human&social science team of CLIPSSA who is studying how local knowledge can be mobilized and integrated in the country adaptation plans and also with the public authorities which define the sectors where the impact models will be developed.

Working conditions and financial conditions

The candidate will be hired by IRD and will spend part of its time at Météo-France, Toulouse, France where the simulations will be produced. He/she will also spend time at IRD and Météo-France in New Caledonia/Vanuatu/French Polynesia with the project partners. The salary will range between 2,500 and 3,400€ before tax deduction, depending on the candidate experience. Travels between partners and countries are provided as well as participations to key national and international conferences.

Candidate requirements and applications

The candidate should have a good knowledge of spoken and written English. The candidate should have a PhD in climate sciences, preferentially in atmospheric sciences. Experience with regional climate modeling and climate issues and models is appreciated. Candidates are expected to send a detailed CV as well as a motivation letter emphasizing the work aspects that he/she would like to particularly develop within the modeling framework described above. Those should be sent before December 15th 2022 to:

fleur.vallet@ird.fr, christophe.menkes@ird.fr, matthieu.lengaigne@ird.fr, jerome.vialard@ird.fr, alexandre.peltier@meteo.fr, agathe.drouin@meteo.fr, lola.corre@meteo.fr , cyril.dutheil@io-warnemuende.de

The position will ideally start early 2023 in Toulouse, France.

Bibliography

Dutheil, C., Menkes, C., Lengaigne, M., Vialard, J., Peltier, A., Bador, M., Petit, X., 2020. Fine-scale rainfall over New Caledonia under climate change. Clim Dyn. https://doi.org/10.1007/s00382-020-05467-0

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