Job offer – 2 year postdoc in coupled ocean-atmosphere modelling for the Pacific island territories

Marine Heat Waves (MHWs) are instances of exceptionally high ocean temperature anomalies compared to normal seasonal climate patterns. These extreme events can result in sea surface temperature anomalies as high as 5°C, ranging from hundreds to thousands of square kilometers, and lasting from several days to several months. In the past decade, several MHWs have garnered attention from the public and the scientific community due to their profound impacts on oceanic and coastal ecosystems. For example, in 2011, an MHW off the southwest coast of Australia caused coral bleaching and significant losses to aquaculture and fisheries, resulting in overall widespread damage to coastal ecosystems and in particular to coral reefs, which have experienced significant global decline due to thermal stress over the past decade. Such impacts can be particularly devastating to Pacific Island communities, which have close cultural ties to the ocean for resources and physical and spiritual sustenance. In addition, recent observations show a significant increase in both the frequency and intensity of MHWs over the last century, a trend expected to continue according to climate models projections.

Because MHWs are typically localized near the surface layer of the ocean, these events can be caused by abnormal heat exchange between the atmosphere and the ocean, resulting from short-term fine-scale oceanic/atmospheric fluctuations and large-scale climate patterns such as the El Niño Southern Oscillation (ENSO), both of which having the potential to influence the intensity and spatial characteristics of MHWs. However, our understanding of the physical attributes and both the triggering and intensifying mechanisms of MHWs in the Pacific Ocean remains limited. In this context, the Pacific Community (SPC)'s "Climate Change Flagship" project, recently funded by the New Zealand Ministry of Foreign Affairs and Trade (MFAT), aims to "develop a free and open data set of comprehensive climate change projections (oceanic and atmospheric) for all Pacific countries and territories", providing the necessary material to investigate the physical mechanisms involved in MHWs occurrence and their fate in a warming climate.

The postdoctoral researcher will implement a downscaling strategy from the Pacific Basin to the Exclusive Economic Zones (EEZs) of the Southwest Pacific Islands. In particular, using basin-scale ocean-atmosphere coupled simulations conducted previously (with a spatial resolution of 1/12˚ for the Ocean and 1/4˚ for the Atmosphere), this postdoctoral research aims to develop downscaled high-resolution coupled ocean-atmosphere simulations with finer resolutions of approximately 2 km in the ocean and 6 km in the atmosphere over selected EEZs. These simulations will span the past 40 years and also project into a future climate scenario covering another 40 years. The postdoctoral researcher will analyze the statistics and associated physical mechanisms of Marine Heatwaves (MHWs) in both the present and future climate. This analysis will involve investigating the roles played by large-scale phenomena such as ENSO, as well as fine-scale coupled oceanic and atmospheric circulations due for example to eddies and island-mass effects.

The postdoctoral researcher will join the newly created MOANA (Modeling of the Ocean and Atmosphere: Numerical Approaches) team at LEGOS (Toulouse, France) under the supervision of J. Boucharel and L. Renault. A strong collaboration with other researchers and postdocs from LEGOS (S. Cravatte, C. Conejero), SPC (Pacific Community) in Nouméa (New Caledonia) and Fiji (J. Aucan), LOPS (S. Jullien), the IRD (Institute of Research for Development) center and ENTROPIE in Nouméa (C. Menkes) is also expected.

Requested qualifications:

- The postdoctoral researcher, with a Ph.D. in oceanography, climate science, or another relevant field, is expected to have experience in regional climate modeling (experience in coupled modeling is highly appreciated)
- Good programming skills in Matlab, Fortran, Python and Linux shell scripting
- Good English language skills
- Rigorous, autonomous, creative team worker wishing to contribute to the CROCO community with strong interest for collaborative actions and agile development

Working conditions:

- Contract duration 2 years starting as early as March 2024 when possible
- Location: LEGOS, Toulouse
- Employer: IRD
- Remuneration commensurates with qualifications and experience.
- The selected candidate will work with smart-working practices, having good flexibility for schedule and remote-working conditions. Work meetings and collaboration with the Pacific is submitted to a 10h timelag
- Travel to New Caledonia will take place occasionally as well as one or several stays of several weeks in PICTs

How to apply:

Interested candidates are invited to apply by sending cover letter and C.V. lionel.renault@ird.fr, Julien.boucharel@ird.fr, swen.jullien@ifremer.fr, christophe.menkes@ird.fr and sophie.cravatte@ird.fr

Closing date of the call is February 15th, 2024.