Job offer – 2 year postdoc in high-resolution ocean modelling for the South Pacific island territories: marine heatwaves evolution in a future climate

Marine Heatwaves (MHWs) are discrete and prolonged warm ocean temperature extremes that can cause substantial impacts on marine ecosystems and species. They can last for a few days to several months, with surface temperature anomalies up to 6°C. Recent MHW events all around the world have drawn public and scientific attention, due to their dramatic impacts on oceanic and coastal ecosystems. In 2011, a MHW off western Australia led to the collapse of marine ecosystems and services, including seagrass and kelp forests habitat loss, mass coral bleaching, and severely impacted aquaculture and fisheries. In 2016, MHWs in the South Pacific led to unprecedented coral bleaching and mass mortality of fishes and invertebrates across several islands. Superimposed onto the long-term ocean warming trend, these warm ocean extreme events represent a serious and growing threat for Pacific Island territories, which are strongly dependent on oceanic conditions and marine resources.
Recent observations indicate that the frequency and severity of MHWs have increased substantially over the last century, and climate models predict globally more frequent, more intense and longer-lasting MHWs in the coming decades, at a global scale. However, global climate model present a number of key biases in the South Pacific that are tied to misrepresentations of the main convective engine of the region: the South Pacific Convergence Zone (SPCZ). On the second hand the coarse resolution of these models (~100 km) does not allow an adequate representation of the effect of the Pacific island countries on the oceanic and the atmospheric phenomena. For instance, it is very likely that local oceanic, atmospheric and coupled ocean-atmospheric features arising at much smaller scales than those simulated in global climate models modulate MHWs. How these scales interact with MHW dynamics remain to be investigated in the present and future climates.

In this context, the Pacific Community (SPC)'s "Climate Change Flagship" project (2024-2026), funded by the New Zealand Ministry of Foreign Affairs and Trade (MFAT) and in coordination with IRD (Institut de Recherche pour le Développement) 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.

Toward that end, a regional dynamical downscaling must be implemented with, for instance, a pseudo-global warming strategy for the future simulation using a number of CMIP6 forcings to correct as best as possible the present-day CMIP6 bias over the region. Using basin-scale ocean-atmosphere forced and coupled simulations conducted previously (with a spatial resolution of ~1/10˚ for the Ocean and ~1/4˚ for the Atmosphere), this postdoctoral researcher will implement a downscaling strategy around Exclusive Economic Zones (EEZs) of the Southwest Pacific Islands (New Caledonia and Vanuatu) with finer resolutions of approximately 2 km in the ocean, with the CROCO oceanic model. These simulations will span the historical and future periods. Aside from characterizing the potential ocean futures of these EEZs in general, the postdoctoral researcher will also analyze how the dynamics of Marine Heatwaves (MHWs) will be affected by the small scale processes produced in these high resolution configurations in both the present and future climate.

The postdoctoral researcher will join the scientific team of the SPC-IRD Flagship and will be based in Nouméa, New Caledonia (working with C. Menkes, S. Cravatte). He will have strong collaborations with Swen Jullien at LOPS (Brest, France), and J Boucharel and L. Renault at LEGOS (Toulouse, France). A strong collaboration with other researchers and postdocs (C. Conejero, LEGOS), SPC (Pacific Community) in Nouméa (New Caledonia) and Fiji (J. Aucan) will occur.

Requested qualifications:

- The postdoctoral researcher, with a Ph.D. in oceanography, meteorology, climate science, or another relevant field, is expected to have experience in regional climate modeling (experience in ocean or coupled modeling is highly appreciated)
- Excellent programming skills in 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 July 2024 when possible
- Location: Nouméa, New Caledonia
- Employer: IRD
- Remuneration commensurate with qualifications and experience.
- The selected candidate will work with smart-working practices, having good flexibility for schedule and remote-working conditions.
- Travel to France 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 christophe.menkes@ird.fr and sophie.cravatte@ird.fr, swen.jullien@ifremer.fr before 30 April, 2024.