— 2-year Postoc opportunity —

The Future Evolution of Global Ocean Overturning Cells at Different Global Warming Levels

Deadline for application : 25 November 2024

Supervisors: Jean-Baptiste Sallée, Roland Séférian

Project Overview:

The project focuses on understanding how global ocean overturning circulation systems, particularly the Atlantic Meridional Overturning Circulation (AMOC) and the Bottom Meridional Overturning Circulation (BMOC), will evolve under various levels of global warming. This research is crucial to improving predictions of long-term climate change and informing effective climate policies. While there is substantial understanding of climate change during active warming, climate change after stabilization of global surface air temperatures are not as well understood. This phase—referred to as "committed climate change"—is key to evaluating the long-term impacts of policies that target specific temperature thresholds (such as 1.5°C, 2°C, and beyond).

The project will leverage a unique set of multi-century simulations already performed using the CNRM Earth System Model. These simulations simulate the climate system's response to a sudden stabilization of external forcing at various levels of global warming ranging from 1.1°C to 5°C above pre-industrial levels. The specific objectives include:

- Analyzing the response of the ocean overturning circulation at multi-centennial timescales following stabilization at each warming level.
- Investigating the processes that drive the stabilization, recovery, or potential collapse of the AMOC and BMOC under different global warming scenarios.
- Examining how the ocean’s role in heat and carbon storage evolves in these scenarios and how it impacts climate stabilization and feedback mechanisms.

The successful candidate will primarily analyze existing model output from simulations already run for the project. These simulations cover several centuries post-stabilization, allowing detailed investigation of the ocean’s long-term behavior. However, the opportunity exists to perform additional sensitivity simulations, depending on the specific scientific questions arising from the analysis.

The tools used will include state-of-the-art climate model diagnostics, with a focus on ocean dynamics, thermohaline processes, and deep-water formation patterns in both the Atlantic and Southern Oceans.

Required/Desired Skills:

We are seeking a highly motivated candidate with the following background:

- A PhD in **climate science**, **physical oceanography**, **atmospheric science**, or a related field.

- Strong skills in climate modeling, data analysis, and ocean dynamics.
- Experience with Earth System Models and knowledge of ocean circulation
- Proficiency in scientific programming (e.g., Python, MATLAB, Fortran) for climate data analysis is essential.

Research Environment:

The postdoc will be recruited by Sorbonne Université (Paris) and be based at CNRM (Centre National de Recherches Météorologiques), part of Météo-France, in Toulouse, France. CNRM is a leading climate and weather research institute with cutting-edge computational resources and a vibrant scientific community, offering an excellent environment for collaboration and interdisciplinary research. The successful applicant will join, and active and dynamic group of scientists, and early career scientist working in related fields.

Application:

To apply, please submit:

- A CV
- A brief cover letter outlining your research experience and interests
- Contact information for two academic references

For inquiries, feel free to contact Jean-Baptiste Sallée at jean-baptiste.sallee@locean.ipsl.fr