

24-month (renewable up to 48 months) postdoctoral position on climate tipping points at University of Bordeaux

A Postdoctoral fellowship is available at University of Bordeaux to work within the EU project named TipESM. This fellowship aims at better understanding and anticipating a number of potential tipping points that might occur in the near future, notably in the ocean circulation.

In the context of on-going climate change, there is a growing risk of crossing some tipping points in the climate system, leading to potential abrupt changes and irreversibility. Nevertheless, the exact global warming threshold at which such changes may occur, as well as the dynamics in place, and the capacity to predict them in advance, remain poorly known. The TipESM project proposes to improve our knowledge on the coming tipping points through the use of a number of state-of-the-art Earth System Models developed in Europe, their analysis and comparison with past and recent observations.

CNRS and University of Bordeaux are proposing new approaches to gain insights on those tipping points. As leader of the workpackage 4, dedicated to early warning of tipping points, but also strongly involved in the whole TipESM project, we propose a postdoctoral fellowship to :

- 1) understand the main dynamics in a few key tipping points, mainly in the ocean and sea ice systems;
- 2) evaluate our capability to provide useful early warning of them ;
- 3) assess to what extent observational constraints can help to reduce their uncertainty ;
- 4) estimate the risk of cascading impacts associated with the crossing of a tipping point in the ocean.

More in details, the successful candidate will firstly collect existing methods for early warning signals from Dynamical System Theory and test them both within observations and climate models showing abrupt changes. This will allow to test whether those types of early warning signals are really effective (which is a key prerequisite to avoid false alarms). Then, based on physical understanding of a few climate elements, new early warning signals will be developed, based on identified precursors. This includes the possibility of searching for spatial patterns preceding tipping points that might be detected, using remote sensing data for instance. The successful candidate will then analyse a few simulations produced within the project concerning the risk of cascade of tipping points following for instance the collapse of the Atlantic Meridional Overturning Circulation or of the Subpolar Gyre. Such assessment is actually largely missing in the context of climate change, while it can constitute a key “high impact low likelihood” event that we need to get prepared too.

The postdoctoral fellowship will be mainly located at EPOC laboratory, working with the other European laboratories from the consortium, including IPSL teams in Paris (Juliette Mignot, Pascale Braconnot), just two hours by train from Bordeaux. Some short stays at other key European laboratories from the consortium could be also envisaged.

Thus, we are searching for a multi-disciplinary profile, requesting a very open minded approach. Since a lot of the activities are related to climate physics and mathematics, we expect a PhD in environmental sciences related to those domains. The position is offered for 24 months, potentially renewable once. Payment will be in accordance with French public service salaries (between 2500 and 4000 Euros before taxes, depending on experience). The starting date is as soon as possible.

The postdoctoral fellowship will be primarily supervised by Didier Swingedouw, but also with interaction with people from the project and notably from IPSL colleagues in Paris. Applications will be accepted by e-mail only, **until the 1st of March 2024**. They should comprise: a CV with scientific experience, a letter of motivation with an availability date, and some referee name(s). Applications and queries should be sent to the following e-mail addresses: didier.swingedouw@u-bordeaux.fr