

# **Title: "Monitoring Earth's Dynamic Surface: Unveiling Climate-Induced Phenomena and Volcanic Activities through Long-Period Global Seismic Waves in the Context of Environmental Seismology"**

*Dr. Piero Poli*

## Project Summary:

The Earth's surface is undergoing rapid and profound changes, many of which are directly linked to **climate change**. These transformations are particularly evident in remote regions like **Greenland** and **Antarctica**, where the effects of a warming planet manifest dramatically. Rapid glacial movements, which can trigger destructive **tsunamis** and **seiches**, along with extraordinary underwater volcanic eruptions in places such as **Mayotte** and **Tonga**, showcase the growing urgency to understand these climate-induced events and their potential risks.

Seismic waves, generated by both **climate-driven processes** and volcanic activities, offer a powerful tool for unlocking the complex physical mechanisms behind these events. **Environmental seismology** is uniquely positioned to provide real-time insights into the **impacts of climate change** and the **mitigation of related risks** by continuously monitoring seismic activity on a global scale.

In this PhD project, we will harness **30 years** of continuous global seismological data to identify **new signals** linked to climate and volcanic phenomena. By focusing on long-period global seismic waves, we aim to pinpoint and catalogue previously unrecognized events associated with significant surface changes, such as glacial mass shifts and volcanic eruptions. Furthermore, through advanced **physical modeling**, we will explore the dynamics of these events, estimating critical parameters such as the **mass of ice** involved and the **forces driving** these processes.

Ultimately, this research will significantly enhance our understanding of the **Earth's surface dynamics** in the face of accelerating **climate change** and the growing risk of **volcanic hazards**. By identifying key seismic signals and modeling their impacts, we contribute vital knowledge to **mitigating climate-related risks** and improving preparedness for future environmental challenges.

**Support fundings:** DOR, FINAS-POLI