

# **Seismic Monitoring of Crustal Water Circulation for Addressing Contemporary Societal Challenges**

*(Proposer: Dr. Piero Poli)*

In the face of significant climatic changes and the associated challenges, monitoring the evolution of water volumes within the Earth's crust has become a critical societal imperative. The increasing impact of severe droughts on freshwater supply and agricultural activities underscores the need to enhance our understanding of water behavior in the shallow crust. This knowledge is pivotal for devising solutions to mitigate the impact of droughts. In this project, we propose an innovative approach to track the spatiotemporal evolution of water within the crust through the utilization of seismic waves.

Changes in water content manifest as pronounced variations in seismic velocity, presenting an opportunity for measurement through repeated seismic experiments.

Leveraging cutting-edge seismological techniques and existing data, our objectives include: i) constructing time series of velocity changes in the Po plain region and its surrounding areas, ii) developing models to pinpoint temporal variations in velocity, and iii) creating physical models capable of elucidating the spatiotemporal evolution of water content. By achieving these goals, this research aims to contribute valuable insights towards addressing contemporary challenges associated with water circulation in the crust, ultimately aiding in the development of effective solutions for managing and mitigating the impact of droughts.

**FUNDS:** DOR, FINAS-POLI