# Dynamical processes driving turbulent mixing over the Reykjanes Ridge and their impact on ocean circulation.

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The Reykjanes Ridge is a major topographic feature of the North Atlantic Ocean, localized in a strategic place for the Meridional Overturning Cell (MOC), which is the primary mechanism for the meridional transport of heat, salt and carbon by the ocean. However, the structure and variability of the currents along and over the ridge are still poorly understood. Numerical models show large discrepancies in the representation of the flow and water mass properties in this region and more generally in the subpolar gyre of the North Atlantic. Flow-topography interactions at small scales play a key role but are not adequately resolved by most numerical models.

The aim of this project is (1) to identify and investigate the dynamical processes responsible for the observed levels of turbulent mixing and energy dissipation over the ridge, and (2) to understand how these small-scale processes, unresolved by most numerical models, modify water mass properties, generate transport through the ridge via small fractures and set the structure and variability of the flow in the region.

Very high-resolution realistic simulations (up to 100m horizontal resolution), will be carried out to resolve the details of the flow-topography interactions and investigate the sources of the turbulent mixing. Sensitivity studies will be performed to isolate the impact of the tidal forcing. Non-hydrostatic simulations will allow to better characterize the dynamics of the processes, in particular internal waves emission and small scale centrifugal and symmetric instabilities.

As part of the “The Reykjanes Ridge Experiment” (RREX), new in-situ observations are being acquired to document the circulation around the ridge. This project will be tightly linked, at all stages, to the observations performed during the RREX experiment.

**Key-Words:** Current-topography interactions, high-resolution modeling, submesoscale turbulence, tides, internal waves, turbulent mixing, energy dissipation, North Atlantic circulation

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