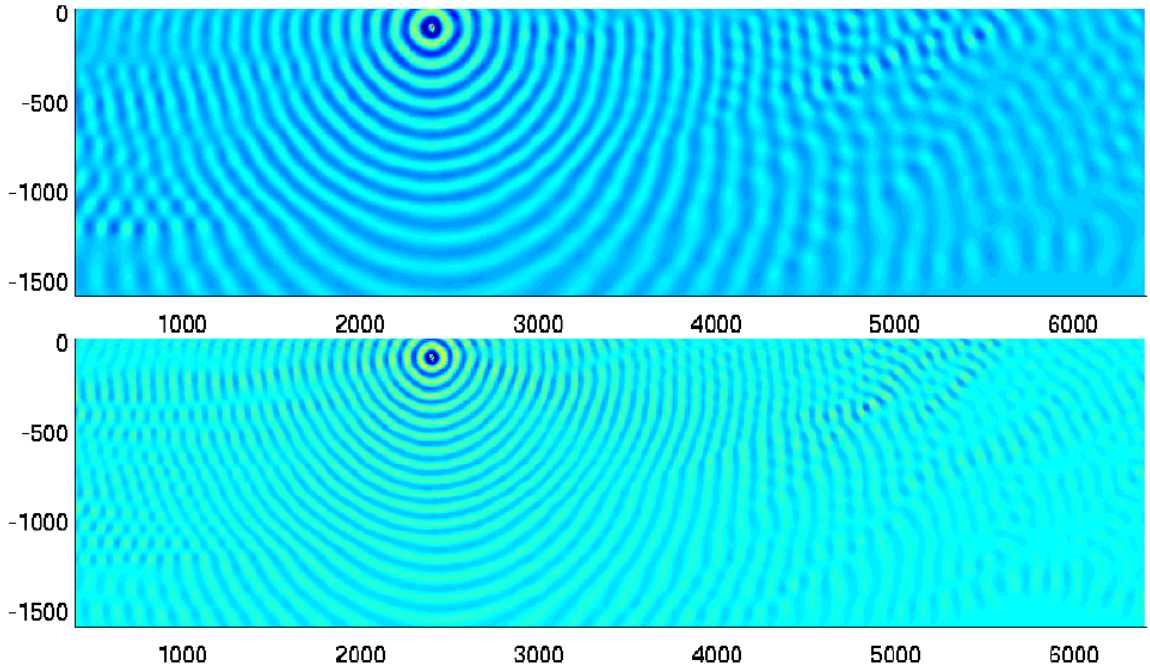
Micro- and macro-scale geodynamic modeling of convergent margins

(Proposer: Prof. Manuele Faccenda)

Seismic anisotropy is widely observed on Earth and is mostly associated with strain-induced mantle fabrics. The inversion of seismic anisotropy data is important because it allows to obtain information about the existing mantle fabrics at depth and consequently about the recent Earth's dynamics. However, the interpretation of seismic data is non-unique, and it is commonly aided by geodynamic forward modelling of large-scale mantle flow and related micro-flow simulations of strain-induced mantle fabrics. The prediction of strain-induced mantle fabrics has been limited so far by the scarcity of mantle outcrops displaying high-T deformational structures and by laboratory experiments conducted on monophase mineral aggregates at relatively small strains which can potentially bias our knowledge.

The project aims at improving the prediction of strain-induced mantle fabrics and related seismic anisotropy in oceanic settings by combining geodynamic and seismological modeling. Geodynamic modelling will provide a first-order approximation of the 2D oceanic lithosphere structure developing from the oceanic ridge to the subduction margin. This structure will be tested by forward seismological modeling and compared with observations. The misfit will provide corrections of the lithosphere structure and to the geodynamic modelling. By iterating this procedure, we expect to better calibrate the free parameters of the geodynamic simulations and to provide useful information about the creep mechanisms and overall structure of the oceanic lithosphere.



Funding: NEWTON project (ERC StG 2017 #758199)

Info: manuele.faccenda@unipd.it