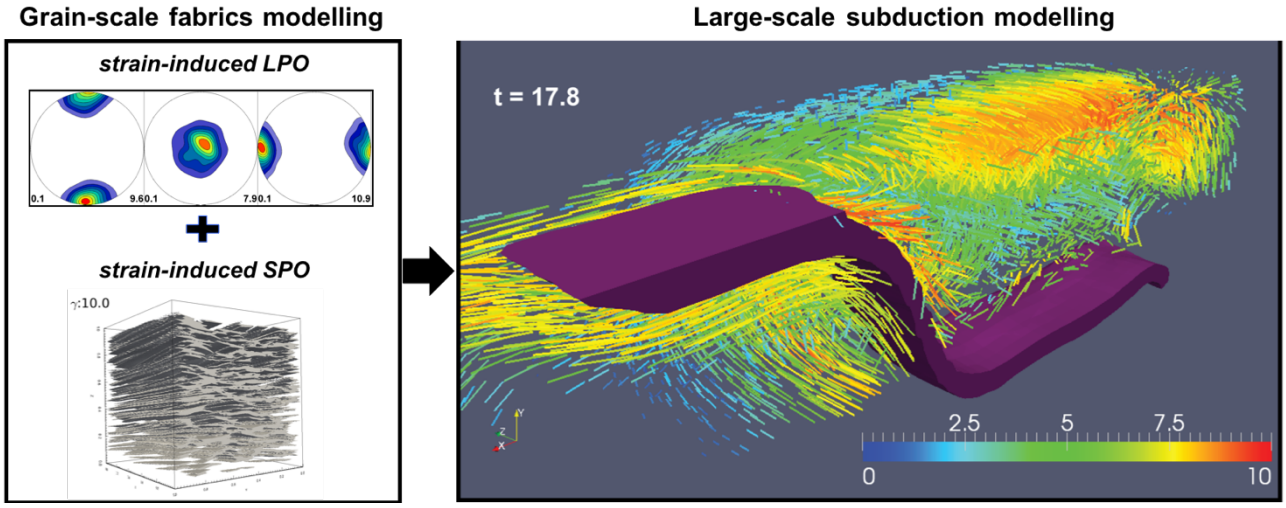
Three-dimensional modelling of mantle convection in a mechanically anisotropic mantle

(Proposer: Prof. Manuele Faccenda)

Mantle convection has been typically modelled assuming mechanical isotropy. However, exhumed crustal and mantle rocks often exhibit a clear, strain-induced mechanical anisotropy whose effects on mantle convection has been poorly constrained so far. The spatial variation of the mechanical properties is related to the preferential orientation of intrinsically anisotropic crystals (CPO) and/or the preferential orientation of compositional heterogeneities (SPO) such as those associated with foliation and lineation microstructures.



The PhD candidate will thus explore the effects of mechanical anisotropy on mantle convective patterns, with particular attention to convergent margins and plume-lithosphere interactions where sustained deformation and anisotropic fabrics are produced. The elastic behavior of the strain-induced mantle fabrics will be constrained with seismological synthetic experiments and comparison with observations. A background in geodynamics/mechanical engineering, computational geodynamics/ seismology is therefore required.

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