[EE] Evening Poster | S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Tectonophysics

[S-IT28]The lithosphere and the asthenosphere

convener:Catherine Rychert(University of Southampton), Hitoshi Kawakatsu(Earthquake Research Institute, University of Tokyo), Samer Naif(共同), Jessica M Warren (University of Delaware)

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The lithosphere-asthenosphere boundary (LAB) separates Earth's rigid tectonic plates from the underlying convecting mantle. The LAB is fundamental to our understanding of plate tectonics and mantle dynamics, although its depth and defining mechanism are highly debated. How it varies among tectonic environments and its relationship to the Moho, MLD, and anisotropy are also poorly understood. Ocean bottom seismic data is particularly important for constraining the young plate with relatively simple history, although this data is difficult to attain and rare. We will focus on the lithosphere, the asthenosphere, and the lithosphere-asthenosphere system in a variety of settings including but not limited to continents, oceans, margins, rifts, ridges, hotspots, plumes, and subduction zones. We welcome research contributions from diverse fields, including but not limited to seismology, magnetotellurics, petrology/mineralogy, dynamical modelling, and mineral physics.

[SIT28-P09]Numerical modelling of volatiles in Earth's mantle

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The transport and storage of water in the mantle significantly affects various material properties of mantle rocks and thus water plays a key role in a variety of geodynamical processes (tectonics, magmatism etc.) Geological and seismological observations suggest different inflow mechanisms of water via the subducting slab like slab bending, thermal cracking and serpentinization (Faccenda et al., 2009; Korenaga, 2017).

Most of the previous numerical models do not take different dip angles of the subducting slab and subduction velocities into account, while nature provides two different types of subduction regimes i.e. shallow and deep subduction (Li et al., 2011). To which extent both parameters influence the inflow and outflow of water in the mantle still remains unclear. For the investigation of the inflow and outflow of fluids e.g. water in the mantle, we use high resolution 2D finite element simulations, which allow us to resolve subducted sediments and crustal layers. For this purpose the finite element code MVEP2 (Kaus, 2010), is tested against benchmark results (van Keken et al., 2008). In a first step we reproduced the analytical cornerflow model (Batchelor, 1967) used in the benchmark of van Keken et al.(2008) as well as the steady state temperature field.

Further steps consist of successively increasing model complexity, such as the incorporation of hydrogen diffusion, water transport and dehydration reactions.

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