



Physics of the subduction polarity switch: Constraints from first 2D thermo-mechanical models

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The deep dynamics of continental collision is one of the least understood plate tectonic processes. One interesting process that is believed to be a feature of continental collision is a flip in subduction polarity. A prominent location where such a flip is proposed by different seismic tomography studies (e.g Kissling et al. (2006)) is the eastern alps region. Some numerical models of continental collision also show a flip in subduction polarity (e.g Faccenda et al. (2008)) but do not explore the physical conditions necessary to obtain the flip.

We use the thermo-mechanical 2D finite-difference code FDCON that can handle a free surface (e.g Schmeling et al. (2011)) to model continental collision. In our study we vary several input parameters (initial thermal structure and model geometry, crustal and mantle rheology, convergence velocity) to get detailed knowledge under which conditions a flip is possible and to get an idea of the physical mechanisms (e.g dissipational heating) that can produce a flip in subduction polarity.