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Modeling the influence of plate motions on subduction

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Subduction zones are widely studied complex geodynamical systems. Their evolution is influenced by a broad range of parameters such as the age of the plates (both subducting and overriding) as well as their rheology, their nature (oceanic or continental), the presence of a crust and the involved plate motions to name a few. To investigate the importance of these different parameters on the evolution of subduction we have created a series of 2D numerical thermomechanical subduction models. These subduction models are multi-material flow models containing continental and oceanic crusts, a lithosphere and a mantle. We use the sticky air approach to allow for topography build up in the model. In order to model multi-material flow in our Eulerian finite element code of SEPRAN (Segal and Praagman, 2000) we use the well benchmarked level set method (Osher and Sethian, 1988) to track the different materials and their mode of deformation through the model domain. To our knowledge the presented results are the first subduction model results with the level set method. We will present preliminary results of our parametric study focusing mainly on the influence of plate motions on the evolution of subduction.

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