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The present-day geodynamics of the India-Asia collision system

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We present a full 3D geodynamic model of the present-day India-Asia collision system, that includes the lithosphere and upper mantle. The model is separated into multiple tectonic blocks, for which we estimate the first order rheological properties and their impact on the dynamics of the collision system. This is done by performing systematic simulations with different rheologies to minimize the misfit to observational constraints such as the GPS-velocity field. The simulations are performed with the parallel staggered grid FD code LaMEM using a numerical resolution of at least 512x512x256 cells to resolve dynamically important shear zones reasonably well. A fundamental part of this study is the reconstruction of the 3D present-day geometry of Tibet and the adjacent regions. Our interpretations of crust and mantle lithosphere geometry are jointly based on a globally available shear wave tomography and a global crustal model. We regionally refined and modified our interpretations based on seismicity distributions and focal mechanisms and incorporated regional receiver function studies to improve the accuracy of the Moho in particular. Results suggest that we can identify at least one 'best-fit' solution in terms of rheological model properties that reproduces the observed velocity field reasonably well, including the strong rotation of the GPS velocity around the eastern syntaxis of the Himalaya. We also present model co-variances.