



Directions of the lithosphere interactions in the Pamir - Hindu Kush knot inferred from anisotropic tomography

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The Pamir and Hindu Kush is an example of a puzzling collision system where a complex knot of colliding lithosphere plates coexist with intermediate depth seismicity at 300 km. In this study, we constructed a new tomography model using travel time data from local events recorded by the TIPAGE (Tien Shan Pamir Geodynamic program) network. Besides the P- and S-wave velocities down to 200 km, we derived the azimuthal anisotropy. The velocity anomalies were consistent with the results of previous studies. In the crust, the velocity structure and the anisotropy directions were mainly oriented along major suture zones. At depths of 80–120 km, a narrow low-velocity anomaly coinciding with the distribution of deep seismicity was interpreted as a trace of entrained crustal material by the dipping lithosphere. The local tomography model was supplemented by previously computed regional tomography that expanded the area both laterally and axially. Beneath Pamir, both Asian and Indian continental plates form a drop-shaped anomaly that will possibly delaminate in time. Beneath Hindu Kush, we could clearly trace a continuous subduction of the marginal part of the Indian Plate, which is presumably oceanic. Thus, the continental collision beneath Pamir and subduction beneath Hindu Kush are separate processes with different rates and directions of plate movement.