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TITLE: Imaging the crust and mantle structure below the northern margin of the Tibet-Pamir plateau *(Invited)*

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ABSTRACT BODY: The main goal of this contribution will be to present a deep crustal and mantle section across the northeast margin of Tibet and a deep crustal section across the northern margin of the Pamir, based mainly on seismological studies during the INDEPTH IV (INternational DEep Profiling of Tibet and the Himalaya) and TIPAGE (TIen shan—PAmir GEodynamic program) projects. Low Poisson's ratios throughout much of the crust beneath much of the high plateau areas in both Tibet and the Pamir indicate that the upper crust consists mainly of felsic rocks rich in quartz in the α state and that the lower crust comprises felsic schists and gneisses and intermediate granulites in the upper part transitioning to granulite-facies and possibly also eclogite-facies metapelites in the lower part. Beneath the northeast margin of Tibet, the change in crustal thickness from about 70 km beneath the Songpan-Ganzi terrane and Kunlun mountains to 54 km beneath the Qaidam basin is actually located almost 45 km north of the southern edge of the Qaidam basin. The Qaidam basin Moho is underlain by crustal velocity material for almost 45 km near the crustal thickness transition. The apparently overlapping crustal material may represent lower crust of northern Tibet underthrusting or flowing northward beneath the Qaidam basin Moho. As the pre-Cenozoic Qaidam basin crust has probably not lost any of its lower crust during the present Himalayan orogenic cycle in the Cenozoic and only has a Poisson's ratio of 0.245-0.25, then it appears that this crust involved in the collision is more felsic and thus weaker and more easily deformable than normal continental crust. South of the Qaidam basin, the crust of the Songpan-Ganzi terrane and Kunlun mountains has an even lower average crustal Poisson's ratio of 0.23-0.24 and is thus presumably even weaker and more easily deformable than the crust beneath the Qaidam basin. Thus the high plateau may be thickening northward into south Qaidam as its weak, thickened lower crust is injected beneath stronger Qaidam crust. At greater depths beneath northern Tibet, the

Asian lithospheric mantle is overlain by a low-velocity, less dense and warm Tibetan plate consisting of both an upper lithospheric and a lower asthenospheric part. The section through the Pamir and southern Tien Shan shows that crustal thickness varies from 65 to 74 km beneath the Pamir itself and decreases to about 58 km beneath the southern Tien Shan. The seismic velocities in the uppermost mantle beneath the Pamir indicate, assuming an isotropic situation, an intact mantle lid and the section calls for nearly horizontal underthrusting of relatively cool (700–800°C) Indian mantle lithosphere, the leading edge of which is outlined by the Pamir seismic zone. This cool Indian mantle lithosphere is overlain by significantly shortening, warm Asian crust. The Moho trough beneath the northern Pamir may mark the southern tip of the actively underthrusting Tien Shan crust along the Main Pamir thrust.

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