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Joint inversion for crustal structures: Implications for the growth and deformation in Northeastern Tibetan Plateau

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Several geodynamic models have been proposed for the deformation mechanism of Tibetan Plateau, but it remains controversial. Here we included P-wave velocity result from active source studies in joint inversion of receive functions and dispersions and applied it to one dense linear array in the NE Tibet. The results show that the geological blocks, separated by major faults at surface, are characterized by distinct features in the crust, the Moho, and the uppermost mantle. Prominent zones of low velocities and high Vp/Vs ratio in the mid-lower crust cut across blocks. The low velocity varies in strength but appears in every block, which seems not the drive for the plateau growth, but is resulted from the shear heating and facilitated by the basal heating (delamination). The results suggest a coupled velocity pattern between crust and mantle, indicating a lithospheric scale deformation. The deformation is affected by the strength of the lithosphere blocks and accommodates localized lithosphere-scale deformation, providing new insights into the processes of strain partitioning, topographic variation and lithosphere delamination of the plateau growth.