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Crustal structure across East Tibet from wide-angle seismic profile between Xiazhayu, Xizang and Gonghe, Qinghai

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Crustal structure reconstruction beneath East Tibet can provide constrains on understanding crustal thickening mechanism and its differences to the middle and western Tibet plateau, and to evaluate tectonic escaping and lower crustal channel flow model to accommodate eastward motion from the collision between India and Eurasia plates. Herein, we present our interpretation of crustal P-wave velocity model with the traveltime inversion on the wide-angle seismic profile (with a total length of about 900 km) acquired between Zhayu and Gonghe in East Tibet in 2001. Seismic data analyses find intra-crustal reflections are well-developed and crust are well-layering, which allow us to divide the crystalline crust into six layers beneath sedimentary cover southward to Jinsha suture, and five layers north to Jinsha suture. Crust thickness is about 60 km beneath Himalaya and Lhasa terrane, but suddenly thickens to about 70 km beneath Qiangtang terrane, with thickest one beneath Jinsha suture, then the crust displays stepwise thickening way northward from Jinsha suture to Gonghe basin (thins to about 65 km under Songpan-Ganzt, and about 62 km under East Kunlun). Our result illuminate different crustal thickening mechanism beneath different tectonic terrane: predominately lower crustal thickening for Himalaya, Lhasa and Qiangtang terranes, but both upper and lower crust thickening beneath Songpan-Ganzi and East Kunlun terranes. The remarkable feature along the profile is the well-developed seismic reflections within the middle and lower crust, which we interpreted to be responses from intra-crustal alternative high/lower velocity layering, as seismic evidence of channel flowing in the middle and lower crust.