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Mapping crustal structure beneath southern Tibet: new seismic evidence for continental crustal underthrusting

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Receiver function image along a temporary seismic array (ANTILOPE-2) reveals detailed information of the underthrusting of the Indian crust beneath southern Tibet. The Moho dips northward from ∼50 km to 80 km depth beneath Himalaya terrane and reaches locally a depth of 90 km beneath the Indus-Yalung suture (IYS). It remains at ∼80 km in Lhasa terrane and shallows to ∼70 km in Qiangtang terrane. A lower crustal interface at ∼60 km depth beneath Lhasa terrane can be clearly followed southward through the Main-Himalaya-Thrust (MHT) and connects the Main-Boundary-Thrust (MBT) at the surface, which represents the border of the Indian crust that is underthrusting the Tibetan crust until south of Bangong-Nujiang Suture (BNS) at ∼32°N. We also observed a wide-spread mid-crustal low velocity zone with increasing depth from ∼15 km in Lhasa terrane southward to ∼35 km beneath high Himalaya that is terminated at the MHT. The low-velocity zone is thought to be formed by partial melt and/or aqueous fluids.