the Tibetan mantle. This kind of Moho doublet challenges the property of the “rifts” developed in southern Tibet. How could these “rifts” form without a Moho cutoff and upper mantle uplift? These north-south oriented structures may have formed within the shallow part of the crust by crustal extension, caused by mantle flow during north-south compression. In this case, according to the definition of the rift, the north-south directed structures developed in southern Tibet are not typical rifts at all, or mature rifts, but at most rifts at their infancy stage.

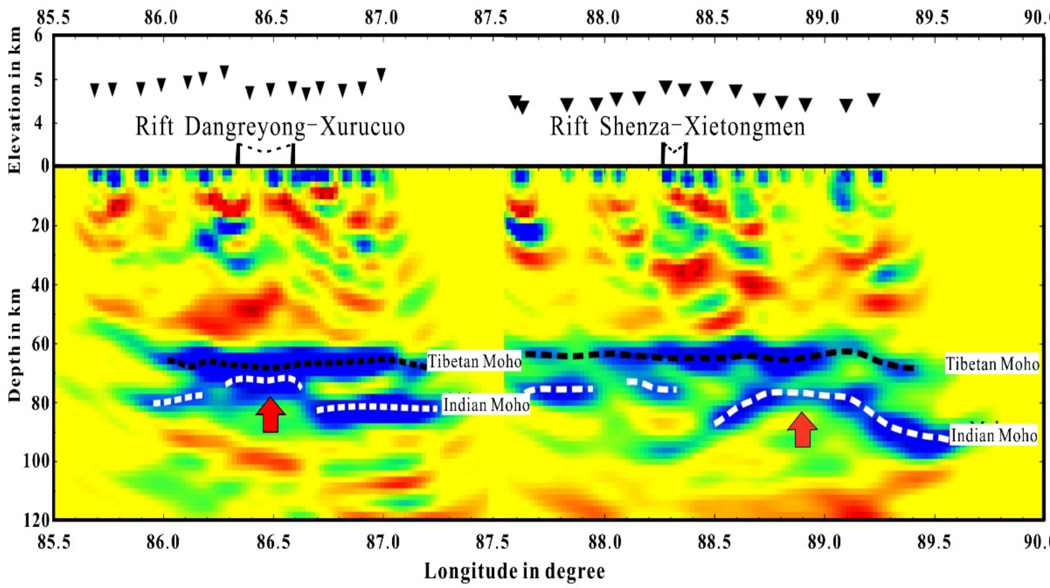

Figure2. Velocity of the crust and upper mantle along the ANTILOPE-III profile crossing the Dangreyong-Xurucuo and Shenza-Xietongmen Rifts.

At present, the Tibetan plateau is composed of three plates such as the Indian plate in the south, the Asian plate in the north and the Tibetan “plate” sandwiched between the two (Zhao et al., 2010). The Tibetan plate features high temperature, low speed, and high seismic anisotropy. The subducted Indian lithospheric mantle falls down to the Tibet "plate", as a “melting furnace”, and may flow eastwards under the influence of the extrusion stress. When it meets the rigid Sichuan Basin, the hot and soft material moves in four directions: to the southeast forming the Yunguichuan plateau; to the northeast helping the uplift of the northeastern Tibetan Plateau; going upward forming the Longmenshan Mountains and falling down into the Sichuan Basin after denudation; and going downwards into the deep mantle (here the thickness of the upper mantle transitional zone has increased, indicating that some material with low temperature went through it.

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