



Crustal Structure across The North China Craton from long-range seismic wide angle reflection/refraction profile

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The North China Craton (NCC) is the oldest craton in China, which formed around 2.5Ga and had a 200 km thick lithosphere during the Paleozoic. The cratonic lithosphere of NCC has experienced strong thinning since the Mesozoic. In the past 30 years, a lot of excellent research about NCC have provided some different tectonic models, however, craton destruction is a sophisticated process. Though there have been many deep seismic sounding profiles in North China, but none of them is long enough to sample the complete section of thinned and preserved Craton. Recent long range seismic wide angle reflection/refraction experiment have provided the best opportunities to obtain better knowledge of seismic structure and properties of lithosphere. A 1500 km long wide angle reflection/refraction profile was completed in 2009. Our long range profile extends from west end of Ordos Plateau, across Shanxi Plateau, Taihang Mountains, to Luxi Uplift. We present a hybrid tomographic and layered velocity model of the crust and uppermost mantle along the profile crossed whole the north China craton. The model shows the crustal thickness of the region is very variable. The Moho topography varies more than 10km in the Central part of the north China craton. In particular, the crust appears the thinnest in the North China Plain, where the crust consists of very thick upper-mid crust and very thin lower crust, and the lower crust is with a lower velocity (~ 6.8 km/s). The Moho dip with thinner lower crust beneath the Shanxi plateau may support the Central NCC has been affected at some time since its formation in the Archean. Furthermore, the TFZ is manifested in the deep structure. Our model provide the seismic evidences supporting that the TFZ extend deep into the uppermost mantle. It is the hypothesis that TFZ is a major channel for asthenosphere upwelling accompanying the tectonic extension and lithospheric reactivation in the Mesozoic–Cenozoic time. The different structural features may reflect different lithospheric tectonics among the three parts of NCC. The thinned crust beneath the NCP may have resulted from the lithospheric reactivation during the late Mesozoic. The crust of Shanxi plateau may have been affect during the its formation in the Archean. Supported by NSFC (grant No. 41104038 and No. 41340007) and state key laboratory open foundation(grant No. SKLGED2013-1-3-E).