Crust-mantle velocity structure in Shanxi rift, Central North China Craton

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North China Craton is the oldest craton in the world. It contains the eastern, central and western part. Shanxi rift and Taihang mountain contribute the central part. With strong tectonic deformation and intense seismic activity, its crust-mantle deformation and deep structure have always been highly concerned. In recent years, China Earthquake Administration has deployed a dense temporary seismic array in North China. With the permanent and temporary stations, we obtained the crust-mantle S-wave velocity structure in the central North China Craton by using the joint inversion of receiver function and surface wave dispersion. The results show that the crustal thickness is thick in the north of the Shanxi rift (42km) and thin in the south (35km). Datong basin, located in the north of the rift, exhibits large-scale low-velocity anomalies in the middle-lower crust and upper mantle; the Taiyuan basin and Linfen basin, located in the central part, have high velocities in the lower crust and upper mantle; the Yuncheng basin, in the southern part, has low velocities in the lower crust and upper mantle velocities, but has a high-velocity layer below 80 km. We speculate that an upwelling channel beneath the west of the Datong basin caused the low velocity anomalies there. In the central part of the Shanxi rift, magmatic bottom intrusion occurred before the tension rifting, so that the heated lithosphere has enough time to cool down to form high velocity. Its current lithosphere with high temperature may indicate the future deformation and damage. There may be a hot lithospheric uplift in the south of the Shanxi rift, heating the crust and the lithospheric mantle. The high-velocity layer in its upper mantle suggests that the bottom of the lithosphere after the intrusion of the magma began to cool down.