



Lithospheric mantle density structure of the North China Craton

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We construct a density model of lithospheric mantle for the North China Craton based on analysis of gravity, seismic and thermal data. A new seismic crustal model is applied to remove the effect of the sedimentary cover and crystalline crust from observed gravity field. An updated thermal lithosphere thickness data is used to calculate density of lithospheric mantle by removing gravity effect of lithosphere depth variation. Density structure of the lithospheric mantle shows strong lateral heterogeneity (at standard P-T condition the value ranges from 3.32 g/cm³ to 3.42 g/cm³) in different tectonic blocks of the North China Craton, and the lithospheric mantle is denser than typical Archean cratonic lithosphere mantle (3.31 ± 0.02 g/cm³). The Trans North China Orogen which is a Paleoproterozoic collision belt is characteristic by high lithospheric mantle density (3.38 – 3.39 g/cm³ can up to 3.42 g/cm³). The lowest density values of 3.32 – 3.36 g/cm³ are observed in the northern part of the Eastern Block, central part of the Trans North China Orogen and most of the Western Block. These low density values suggest the presence of depleted Archean – Proterozoic lithosphere mantle. The density of the lithospheric mantle in the southern part of the Eastern block is 3.36–3.38 g/cm³ with density values typical of Phanerozoic fertile mantle.