



## **Lateral heterogeneity and vertical stratification of cratonic lithospheric keels: a case study of the Siberian craton**

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We present geophysical models for the lithospheric mantle of the Siberian craton, with focus on its structure and thermo-compositional heterogeneity as constrained by various geophysical data. The latter include thermal structure of the lithosphere based on surface heat flow data and supported by regional xenolith P-T arrays, lithosphere density heterogeneity as constrained by free-board and satellite gravity data, and the non-thermal part of upper mantle seismic velocity heterogeneity based on joint analysis of thermal and seismic tomography data.

Density structure of the cratonic lithosphere constrained independently by free-board and satellite gravity shows significant lateral variations, that are well correlated with crustal structure, surface tectonics, and regional xenolith data. Proterozoic sutures and intracratonic basins are manifested by an increase in mantle density as compared to light and strongly depleted lithospheric mantle of the Archean nuclei, particularly below the Anabar shield.

Since we cannot identify the depth distribution of density anomalies, we complement the approach by seismic data. An analysis of temperature-corrected seismic velocity structure indicates strong vertical and lateral heterogeneity of the cratonic lithospheric mantle, with a pronounced stratification in many Precambrian terranes. We discuss lateral and vertical heterogeneity of the cratonic lithosphere discussed in connection to regional tectono-thermal evolution.