



Lithospheric inhomogeneity - the main factor controlling the Permo/Triassic Siberian plume location

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Northwestern part of the Siberian platform is one of the interesting places to study the relations between the intraplate tectonics and the short-term large scale magmatic events. We will focus on four events which affected nearly the same area: (1) Vendian (~Ediacaran) to Early Paleozoic rapid subsidence without rifting; (2) Late Carboniferous to Early Permian syncompressional subsidence; (3) Permo/Triassic large-scale Siberian (Tunguska) plume-related basaltic magmatism; (4) large-scale intraplate inversional tectonic events, close to the Triassic/Jurassic boundary.

During the Riphean, several large sedimentary rift-related and passive margin related basins occupied the marginal parts of the platform. The total thicknesses of sediments locally exceeds 10 km. Approximately at the Riphean-Vendian boundary (630-620 Ma), a major collision took place along the northern (Taymyr), western (the Enisey Ridge) and southeastern (Transbaikal area) parts of the platform. The compression was transmitted to the inner domains of the platform, causing the long-wavelength intraplate basement-involved folding and thrusting, followed by general uplift and erosion. This compression was followed by rapid regional Vendian to Silurian subsidence, with the vertical amplitude of up to 5-7 km. This subsidence is likely thermally controlled, and does not reveal any relation with rifting. We propose this subsidence was related with lithosphere cooling which followed the postcollisional delamination (figure). Rapid subsidence occurred at nearly the same place during the Late Carboniferous-Early Permian times, synchronously with the main Uralian-West Siberian orogeny. It could have a syncompressional nature.

The depocentre of Permo/Triassic Siberian traps (flood basalts) is located rather close to the depocentre of previous, Vendian to Permian, subsidence. So we can imagine that the location of mantle plume intrusion in the lithosphere was not occasional. At the same time, the Permo/Triassic boundary is characterized by maximum sea-level fall, and possible global stress event. We can propose that the ascent of the mantle plume could be controlled by some factors, which reveal the correlation with the previous tectonic history of the region.

A major Phanerozoic compressional event took place during the Late Triassic and Early Jurassic. The abnormally hot platform was subjected to strong intraplate deformation. It is recorded by the widespread regional-scale pre-Jurassic unconformity. Sinistral thick-skinned transpression took place within the broad area between the West Siberian basin and the Siberian platform, including the western part of Siberian trap region (e.g., the Norilsk area). This unique event could be explained by the softening of the cratonic lithosphere after the mantle plume impact.