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Thermal history of the Siberian platform: Apatite Fission-Track data from the Permian-Triassic magmatic complexes

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The largest continental igneous province, the Siberian Traps, was formed within the Siberian platform at the Paleozoic-Mesozoic boundary, ca. 252 million years ago. Despite the continuous and extensive investigation of the duration and rate of trap magmatism on the Siberian platform, these questions are still debated. Moreover, the post-Paleozoic thermal history of the Siberian platform is almost unknown. This study aims to reconstruct the thermal history of the Siberian platform during the last 250 Myr using the low-temperature thermochronometry. We have studied intrusive complexes from different parts of the Siberian platform, such as the Kotuy dike, the Odikhincha, Magan and Essey ultrabasic alkaline massifs, the Norilsk-1 and Kontayskaya intrusions, and the Padunsky sill. We use apatite fission-track (AFT) thermochronology to assess the time since the rocks were cooled below 110°C. Obtained AFT ages (207-173 Ma) are much younger than available U-Pb and Ar/Ar ages of the traps. This pattern might be interpreted as a long cooling of the studied rocks after their emplacement ca. 250 Ma, but this looks quite unlikely because contradicts to the geological observations. Most likely, the rocks were buried under a thick volcanic-sedimentary cover and then exhumed and cooled below 110°C ca. 207-173 Ma. Considering the increased geothermal gradient up to 50°C/km at that times, we can estimate the thickness of the removed overlying volcanic-sedimentary cover up to 207-173 Ma as about 2-3 km.

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