# Paleoproterozoic U-Pb single zircons ages from Southern Siberia

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Along the southern margin of the Siberian craton a variety of syn- to postcollisonal granitoids occur. Together with these granitoid rocks of the Kitoi area also migmatites and mafic rocks of this region were investigated by isotopical and geochronological methods.

U-Pb single zircon analyses by TIMS revealed Early Proterozoic emplacement ages for several postmeta-morphic granites (1851 ± 7 Ma) and one quartz-diorite (1853 ± 5 Ma).

The migmatites revealed much older zircon ages and give some constrains to events happened in Late Archean to Early Proterozoic time. The oldest measured grains revealed even older $^{207/206}$Pb ages up to 2.9 Ga indicating a rather complex history for these rocks. As cathodo-luminescence (CL) images show, the internal structure of the granulite zircons has magmatic as well as meta-morphic components. Therefore, the documented events may reflect the protolith age of some migmatites (2.5 Ga) and the last metamorphic overprint just before the intrusion of the granitoids around 1.85 Ga. The oldest Archean ages give evidence for different granulite protoliths and the reworking of very old material.

The identification of the source material for the investigated rocks was done by whole rock Pb-Pb isotope analyses by TIMS.

The Pb system of the whole rock samples shows clearly that the postmetamorphic granites and the “younger” granulites incorporated dominatly older upper crust material. In contrast the quarz-diorite and the “older” granulites as well as some mafic rocks have typical upper mantle Pb-Pb isotopes. The $\mu_1$ values for all samples vary between 8.1 and 8.9. In contrast to the rather homogeneous $\mu_1$ values, the $\mu_2$ vary between 11.0 and 0.50, latter reflecting loss of uranium since the emplacement of this rock.

The Pb isotopes of the quarzdiorite reveal a Pb-isochron age around 1390 Ma, indicating a disturbance of the Pb systematics since the emplacement at 1.85 Ga. This age may reflect some geodynamic activity in this region during the formation of Rodinia.

As our new data show, southern Sibberia reached in Early Proterozoic time a peak in magmatic activity. Our data fit well with other parts of the South Siberian craton and give evidence for the assembling of a supercontinent around 1.85 Ga ago.

# Evidence for decompressional melting of garnet peridotite at the Kamchatka-Aleutian junction

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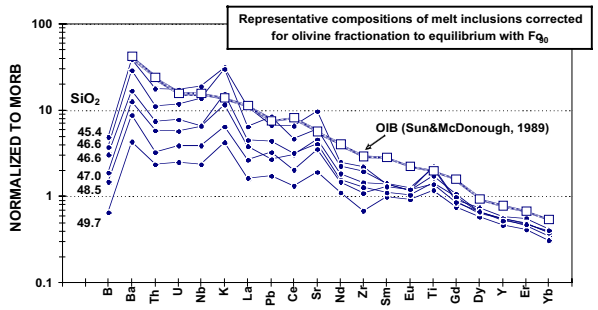
Recent geophysical and geochemical studies have suggested no subducting or relic slab north of the Kamchatka-Aleutian junction. Despite no source of water to promote magmatism, volcanoes which lie in the area are not extinct. Here we report data on the origin of their parental magmas.

The samples were collected from Late Pleistocene-Holocene cinder cones around Nachikinsky volcano on Ozernoy peninsula. The rocks are trachybasalts ($SiO_2$~52.5 wt%, $Na_2O+K_2O$~6.5 wt. %, MgO~5-6 wt.%), containing olivine phenocrysts ($Fo_{84-86}$) with Al-rich chromite (Cr/(Cr+Al)=0.1-0.6), primary fluid and melt inclusions. Melt inclusions in the olivine crystalls were re-heated to glass and studied in details. Despite the uniformity of the host basalts and olivines, compositions of the melt inclusions were found to vary broadly. Al, Ti, K, P, LREE, B, U, Th, Zr, Sr and Cl show good correlations and correlate negatively with $SiO_2$.




The systematics can hardly be explained by either fractional crystallization or crustal assimilation processes, and thus the melts are believed to represent batches of unmixed mantle magmas experienced only limited olivine crystallization. Low B/La, La/Nb and Pb/Ce preclude involvement of slab-derived fluids in the origin of the melts. Contribution of adakite-like melts presumably rich in silica and highly incompatible elements does not occur with our data too. More likely, the systematics of major and trace elements can be produced by decompressional melting of peridotitic mantle source in the garnet stability field as indicated by high $[Sm/Yb]_N$ (~2.6). The source is more enriched in incompatible elements than the typical MORB source and shows general similarity to the OIB sources, besides unusual enrichment in K, Sr and Ba.

In conclusion, our results ultimately confirm the existence of a “slab-window” at the Kamchatka-Aleutian junction, which allows mantle upwelling and production of the ocean-type mantle magmas.