

Origin of zircons from the Kondyor platinum-bearing massif (Russia): evidence from U-Pb and Hf-O isotopic data

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The Kondyor massif is one of several zoned clinopyroxenite-dunite complexes within the Aldan Province, SE part of the Siberian Craton. The ultramafic rocks of the Kondyor massif have been subdivided into three lithologies [1]: a main dunite core, an apatite-phlogopite-magnetite-rich clinopyroxenite that cuts dunite in the southwestern part of the massif, and a pyroxenite rim. The significant variability of ages, collected using different geochronological methods, has been reported for platinum-bearing rocks (107–650 Ma) and platinum-group minerals (112–532 Ma) inviting contrasting interpretations of their origin.

We report in-situ U-Pb and Hf-O-isotope data collected for morphologically and compositionally distinct zircons recovered from a 1.5 kg sample of dunite in the southern part of the massif. The first zircon population characterized by oval and rounded shapes gave two Paleoproterozoic age clusters (2477±18 and 1885±52 Ma), with ϵHf values in the range from -2.3 to +0.3 and a mean $\delta^{18}\text{O}$ value of 7.8±0.3. These signatures are consistent with xenogenic nature of zircons and inheritance from basement rocks of the Siberian Craton. The second zircon population represented by prismatic crystals are characterized by two subsets of Mesozoic ages (176±1.2 and 143.0±2.0 Ma) and wide variations of $\epsilon\text{Hf}_{(T)}$ values (from -8.4±0.8 to +20.3±0.6). The significant range in $\epsilon\text{Hf}_{(t)}$ values indicates interaction of a ‘juvenile’ mantle source ($\epsilon\text{Hf}_{(t)} \sim +15$) with distinct magma sources, possibly equivalent to a subcontinental lithospheric mantle [2] and/or a continental crust. A restricted range of $\delta^{18}\text{O}$ values (i.e., 7.4-7.8) observed in *ca* 176 Ma zircons is consistent with their xenocrystic and crustal origin.

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[1] Burg *et al.* (2009) *Journal of Petrology* **50**, 289-321. [2] Griffin *et al.* (2000) *GCA* **64**, 133-147.