

The 1.98 Ga mafic sills in the Karelian province as an integrated part of Phanerozoic-type LIP

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Gabbroic sills represent the most wide spread component of ca. 1.98 Ga igneous event in the Karelian province (KP), Eastern Fennoscandia. These sills occur within the 2.30-2.06 Ga volcanic-sedimentary sequence of the Onega basin and smaller sedimentary structures in the eastern and central parts of the KP. The sills vary in thickness from several hundred to tens meters. Thin sills are homogeneous. They composed of low-Mg tholeiites with unfractionated HREE suggesting melting of shallow mantle source in equilibrium with a garnet-free residue. The ϵ_{Nd} values vary from -2 to +2 and show positive correlation with 1/Nd values suggesting crustal contamination of primitive melts. Thick sills (>100 m) vary in composition: 1) dolerite of the lower chilled zone, probably primitive melt; 2) Mg-Al-Cr enriched cumulate gabbro; 3) Fe-Ti cumulate ferrogabbro; 4) LILE enriched gabbro-diorite at the upper part, probably residual melt. PGE concentrations are very low (<5 ppb) in the primitive and residual melts and high in the Fe-Ti cumulate ferrogabbro (Pt+Pd up to 2 ppm).

The 1.98 Ga PGE-bearing sills are simultaneous with OIB-type basalts of Onega basin considered as a component of ca. 1.98 Ga Pechenga-Onega event [1]. The same age have kimberlites and carbonatites [2] in the KP. According to the available data, the rocks belonging to the 1.98 Ga LIP in the KP could be formed due to mantle plume ascent [1]. At the same time the 1.98 event is simultaneous with 1.98-1.96 Ga subduction-related processes within adjacent Lapland-Kola Dvina orogenic belt [3, 4]. Geochemical characteristics as well as a “dual” geodynamic position of the 1.98 Ga LIP in the KP are very similar to those of the Phanerozoic LIPs of the East Siberian Craton [5].

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[1] Puchtel *et al.* (1998) *CMP* **130**, 134-153. [2] Corfu *et al.* (2011), *Cent. Eur. J. Geosci.* **3**, 302-308. [3] Daly *et al.*, *Geol. Soc. London, Mem.* **32**, 579-598. [4] Samsonov *et al.* (2012). *Kimb.Conf.* 10IKC35. [5] Ivanov (2007) *Geol. Soc. Am. SP* **430**, 669-691.