MESOPROTEROZOIC CFB MAGMATISM IN THE CENTRAL FENNOSCANDIAN SHIELD: SOURCE VARIATION AND TECTONIC SIGNIFICANCE

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The central part of the Fennoscandian shield in southwestern Finland and central Sweden hosts the remnants of a 1265-Ma tholeiitic magmatic system associated with fault-bounded basins and continental red-beds. The magmatic rocks are represented by transitional basalt dykes and sills - possibly feeders to once-extensive lavas - that delineate an area of circa 500 km in diameter. Farther to the east, a suite of 1460-Ma dolerites is found in the Lake Ladoga basin of Russian Karelia. These are more alkaline and form at least two major sills that can be followed circa 150 km along strike. In the Lake Ladoga region, an extrusive lava succession is also present. Epsilon-Nd (at 1265 Ma) values of the Finnish (Rämö, 1990 and unpublished data) and Swedish (Patchett et al., 1994) tholeiites range from +0.4 to +3.7 and average at +2.2 ± 0.9 (1 S.D., n = 25). The geographic position of the analysed samples reveals regionally different initial Nd isotope compositions that are not correlative with the Nd isotope composition of the enclosing Palaeoproterozoic crustal country rocks. The alkaline dolerites of the Lake Ladoga basin are distinctly less radiogenic (lower long-term Sm/Nd) than the Finnish and Swedish transitional and tholeiitic basalts, having epsilon-Nd (at 1460 Ma) values between -8.6 and -9.2 and a mean value of -8.8 ± 0.2 (1 S.D., n = 7). Overall, the initial Nd isotope compositions probably reflect variation in the mantle source composition of the basalts rather than crustal contamination. The 1265-Ma magmatism in southwestern Finland and central Sweden may reflect the onset of the Sveconorwegian-Grenvillian Wilson cycle, while the 1460-Ma magmatism in Russian Karelia probably reflects thermal contraction of ruptured, relatively thin crust in the
aftermath of the thermal perturbations that created the classic Finnish rapakivi granite suites.