

Sveconorwegian underplating and granitic magmatism in the Baltic Shield: LAM-ICPMS Hf isotope evidence

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The Baltic Shield consists of Archaean to Paleoproterozoic domains in the N and E, and progressively younger crustal domains towards the SW. Important events of crustal growth related to convergent plate margins have been recognized at ca. 1.7-1.9 Ga, and at ca. 1.5-1.6 Ga. The southwestern part of the shield has been the site of repeated anorogenic magmatism from ca. 1.48 to 0.92 Ga [1]. Geochemical data on the youngest group of intrusive rocks (0.92-0.95 Ga) indicate that mixing of mantle-derived material and material with Paleoproterozoic crustal material is required, but the residence-time of the mantle-derived component within the deep crust has not been supported by data. There is clear evidence of crustal rejuvenation at ca. 1.50-1.48 Ga [2], but whether new, mantle-derived material was introduced into the lower crust in Sveconorwegian (Grenvillian) time has been debated [1,2,3]. New LAMICPMS Lu-Hf isotope data on single zircons from (a) 1.19- 1.22 Ga granodiorite and granite, and (b) the 0.966 Ga Vrådal granite in central Telemark (southern Norway) demonstrate that juvenile material was indeed introduced into the deep crust of the Baltic Shield at ca. 1.2 Ga, and that this component later contributed to the petrogenesis of the late, anorogenic granites in the region. These data help identify a hitherto unknown event of mafic underplating in the region. They provide new and important constraints for the crustal evolution of the SW part of the Baltic Shield, and indicate the presence of a geochemical component in the deep crust that must be considered when modelling the petrogenesis of the 0.92-0.95 Ga anorogenic magmatism in the region, which includes both A-type granites and AMCG-type intrusions.

References

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