

## Titanite composite grain as an evidence of alkaline granite evolution

BORIS V. BELYATSKY<sup>1</sup>, NICKOLAY RODIONOV<sup>2</sup>,  
ELENA LEPEKHINA<sup>2</sup>, ANTON ANTONOV<sup>2</sup>, ANDREY  
ARZAMASTSEV<sup>3</sup> AND SERGEY SERGEEV<sup>2</sup>

<sup>1</sup>VSEGEI, CIR

<sup>2</sup>A.P.Karpinsky Russian Geological Research Institute

<sup>3</sup>Institute of Precambrian Geology & Geochronology RAS

Presenting Author: bbelyatsky@mail.ru

The Baltic Shield is one of the world's largest (*ca* 2500 km<sup>2</sup>) provinces of alkaline granites which are confined to the Keivy segment of the Kola fold system and are represented by three series of mantle-source rocks of different origin, but close in time of formation linked to the Late Archaean mantle plume (Vetrin, 2018).

We have studied by SHRIMP-II the U-Pb system of titanite from the Western Keivy and Ponoy massifs of alkaline granitoids. The studied titanite is represented by irregular-shaped fragments of crystals up to 400-500 mkm which have well-pronounced growth zoning, both oscillatory and sectorial, and contain microinclusions of accessory and rock-forming minerals. The grain partial recrystallization with unconformity to crystal forms is also noted. All studied titanites were characterized by insignificant variations in U within 10-100 ppm, whereas Th/U varied from 0 to 13, and non-radiogenic Pb from 0.1 to 60-70%. Nevertheless, all calculated ages turned out to be concordant within the error limits after correction by the non-radiogenic Pb and grouped around two figures: 2700 and 1750 Ma (Figure). The temperature of the U-Pb system closing is comparable to the crystallization temperature of granite melts (600-800°C), which makes it possible to correspondence the U-Pb age of titanite with the primary crystallization of alkaline granite massifs at 2710 Ma, but the latest titanite formed at about 1750 Ma reflects the influence of the tectonometamorphic paleoproterozoic event widespread on the Kola Peninsula. These estimations are well supported by single local age determinations on zircon inclusions in titanite.

Figure. U-Pb concordia diagram for titanites from alkaline granite of Keivy, Kola peninsula, with BSE image of composite titanite grain with zircon inclusion.

