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Age of the Druksiai-Polotsk deformation zone, Lithuania: a U-Pb dating of metamorphic titanite

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The studied Druksiai-Polotsk deformation zone (DPDZ) transects the East Lithuanian Domain (ELD), representing the southern margin of the major Polotsk-Kurzeme zone of faulting in the Baltic-Belarus region. The DPDZ is of 35-40 km wide, E-W trending, and marked well by linear gravity and magnetic anomalies. The crystalline rocks within the DPDZ are granulites, biotite granites, and migmatites, the latter consisting of amphibole-plagioclase paleo- and mesosomes, and plagioclase-quartz-biotite±microcline±amphibole neosomes. Because of ductile shearing gneisses, augen mylonites, mylonites and ultramylonites were produced while tectonic breccias and pseudotachyllite were formed by later brittle deformation. According to geophysical data and the surface morphology of the crystalline basement, a horst-graben structure have recognized along the DPDZ. The graben is filled with Vendian, Cambrian, Ordovician, Silurian and Devonian deposits.

A U–Pb dating of titanite from an augen granitoid mylonite in the DPDZ has yielded a concordant age of 1534±9 Ma. This light brown titanite follows the folation in the host rock and was obviously formed during retrogression from amphibolite- to epidote-amphibolite facies and coeval mylonitization. Shear zones of the same age are known in southern and central Sweden and in NE Poland. These E-W trending deformation zones accommodate both mafic and granitoid intrusions and are probably related to an extensional period in the Mesoproterozoic evolution in the western part of the East European Craton.

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