Geophysical Research Abstracts
Vol. 15, EGU2013-9061, 2013
EGU General Assembly 2013

Zircon growth in shear zones

Tatiana Kaulina
Geological Institute of the KSC RAS, Apatity, Russian Federation (kaulina@geoksc.apatity.ru)

The possibility of direct dating of the deformation process is critical for understanding of orogenic belts evolution. Establishing the age of deformation by isotopic methods is indispensable in the case of uneven deformation overlapping, when later deformation inherits the structural plan of the early strains, and to distinguish them on the basis of the structural data only is impossible.
A good example of zircon from the shear zones is zircon formed under the eclogite facies conditions. On the one hand, the composition of zircon speaks about its formation simultaneously to eclogitic paragenesis (Rubatto, Herman, 1999; Rubatto et al., 2003). On the other hand, geological studies show that mineral reactions of eclogitization are often held only in areas of shear deformations, which provides access of fluid to the rocks (Austrheim, 1987; Jamtveit et al., 2000; Bingen et al., 2004).
Zircons from mafic and ultramafic rocks of the Tanaelv and Kolvitsa belts (Kola Peninsula, the Baltic Shield) have showed that the metamorphic zircon growth is probably controlled by the metamorphic fluid regime, as evidenced by an increase of zircon quantity with the degree of shearing. The internal structure of zircon crystals can provide an evidence of zircon growth synchronous with shearing. The studied crystals have a sector zoning and often specific "patchy" zoning (Fig. 1), which speaks about rapid change of growth conditions. Such internal structure can be compared with the "snowball" garnet structure reflecting the rotation of crystals during their growth under a shift. Rapidly changing crystallization conditions can also be associated with a small amount of fluid, where supersaturation is changing even at a constant temperature.
Thus, the growth of metamorphic zircon in shear zones is more likely to occur in the fluid flow synchronous with deformation. A distinctive feature of zircons in these conditions is isometric shape and sector "patchy" zoning.
The work was supported by Russian Foundation of Basic Research (project: 13-05-00035.) and the DES-6 program.