Strain Rates from Snowball Garnets?

C. Biermeier, K. Stüwe

Institut für Geologie und Paläontologie, Universität Graz, Austria

Spiral inclusion trails in garnet porphyroblasts are likely to have formed due to simultaneous growth and rotation of the crystal during syn-metamorphic deformation. Thus, they contain information on the strain rate of the rock. Strain rates may be interpreted from such inclusion trails if two functions are known: 1) The relationship between rotation rate and shear strain rate. 2) The growth rate of the crystal. We have investigated details of both functions using a garnetiferous mica schist from the Gleinalm Complex as an example. The rotation rate of garnet porphyroblasts was determined using finite element modeling of the geometrical arrangement of the crystals in the rock. The growth rate of the porphyroblasts was determined by using the major and trace element distributions in garnet crystals, thermodynamic pseudosections and information on the grain size distribution. For the largest porphyroblast size fraction we constrain a growth interval between 540°C and 590°C during the prograde evolution of the rock. Assuming a reasonable heating rate and using the angular geometry of the spiral inclusion trails we are able to suggest that the strain rates decreased from 1.2×10^{-13} s^{-1} to 1.6×10^{-14} s^{-1} during the growth of the crystal. While many of the assumptions we had to make for these calculations may be subject to large uncertainties, most of these errors are systematic, so that they may shift the estimates to higher or lower strain rate values, but the qualitative result that the strain rates decrease during crystal growth is robust towards errors. Our estimates are also consistent with independent estimates for the strain rates during the evolution of this part of the Alpine orogen.

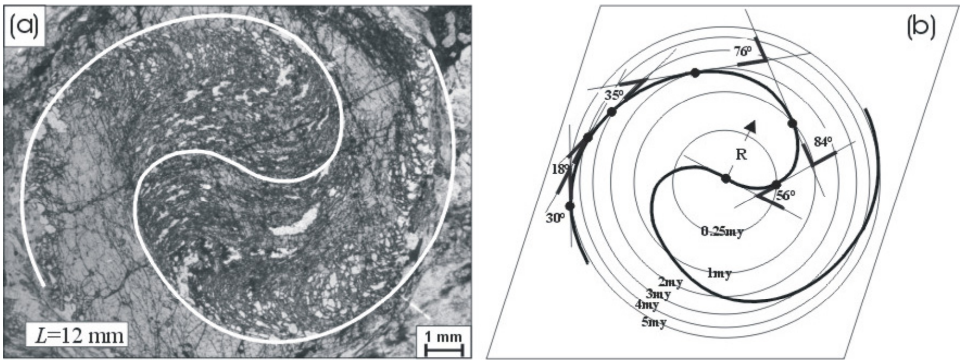

***Figure 1**. (a) Spiral inclusion trail in a snowball garnet from the Gleinalm Complex in the Eastern Alps (3 Pfarren locality). (b) Schematic sketch of the crystal from (a) contoured from crystal sizes during the growth as constrained from petrological data and labeled for angular change of the inclusion trail during different growth stages. These angles were then used to calculate stain rates.*

Seismicity and deformation in Surma Basin (Bengal Basin, Bangladesh)

S. Biswas, B. Grasemann

Institut für Geologie, Universität Wien, Austria

The Surma Basin, an oval shape sub-basin of the Bengal Basin, is characterized by active faults and lineaments forming conjugate sets of active zones. The seismic activity is an indication of ongoing tectonic activity characterized by propagation of fractures from the adjacent EW trending Dauki Fault System in the north and NNE-SSW Tripura Folded Belt in the east.

Possible interaction of Dauki Fault and northwestward compression from Tripura Folded belt produces complex tectonics and increasing seismicity in the Surma Basin. The earthquake data and few focal mechanism solutions show that seismicity in the east margin of the basin mainly in the Tripura Folded belt correlates with its north-striking structures and reflects the westward convexity of Burmese arc. In the north, it follows east-west trend of southward thrusting of Dauki Fault zone. Few earthquake activities also follow the NW trending Modhupur lineament in the west of the basin. The majority of the tectonic activity concentrates along the junction of NW-SE compression from Tripura belt and