

## **RATE INFORMATION FROM METAMORPHIC REACTIONS: THE CASE FOR STRAIN RATE**

STÜWE, K. and BIERMEIER, C. Department of Geology & Palaeontology, University of Graz, Heinrichstr. 26, Graz, Austria

Metamorphic reactions record much more than PT-path information, for example rate information. As such, metamorphic reactions become an important tool for geophysicists because process rates give an insight into the fundamental physical processes governing orogenesis. Among studies investigating rate information, strain rate information has less often been extracted from mineral textures than cooling rate information, in part because of the complications involved with the necessity to derive both microstructural and petrological parameters in rocks. Here, we present an integrated approach in which we use spiral inclusion trails in garnets to derive the strain rate of an outcrop in the Gleinalm Complex / Austria. The spiral inclusion trails form as the consequence of the interplay of 3 parameters: 1.) Strain rate; 2.) The growth rate of the crystals and 3.) The rotation rate of the crystals - all as a function of time. In our study, we use growth- and rotation rate to extract strain rate. The former, we derive from a thermodynamic approach using the known PT path, serial sectioning and petrogenetic pseudosections for the relevant bulk compositions. The latter, we derive from a numerical study of rotation rates of porphyroblasts in a matrix with a non-linear viscous rheology. Comparison of modelled and observed spiral trails in porphyroblasts shows that the investigated outcrop experienced acceleration of strain rate during the heating path of the Gleinalm complex.