RECORDING TWO METAMORPHIC EVENTS ON A SINGLE MICAS POPULATION: A Rb/Sr STUDY ON GRANULITES AND ECLOGITES FROM THE BERGEN ARC COMPLEX (NORWAY)

J. Schneider (1), D. Bosch (1), and P. Monié (2)

(1) Laboratoire de Tectonophysique, CNRS UMR 5568, Université Montpellier II, Place E. Bataillon, 34095 Montpellier Cedex, France. schnei@dstu.univ-montp2.fr (2) Laboratoire de Dynamique de la Lithosphère, CNRS UMR 5573, Université Montpellier II, Place E. Bataillon, 34095 Montpellier Cedex, France.

Since the pioneering work of Dodson (1973), geochronological data have been widely used to constrain the cooling history of rocks. However, it has been demonstrated that a wide number of parameters can significantly affect the diffusion kinetic of an isotopic system (i.e. pressure, fluid involvement, deformation, chemical and/or modal composition...) and therefore interpretation of ages in terms of crystallisation, cooling or recrystallisation is still a matter of debate. Correlating geochronological data with the metamorphic history of a rock has important implication, especially in the case of high pressure rocks, as it should bring insights on the exhumation velocity which is an important parameter to elaborate geodynamical models.

In order to constrain the diffusion kinetic of a given geochronological system, major and trace elements analyses, combined with an intensive geochronological study have been achieved. The study was carried out on anorthositic rocks from the Lindås Nappe (Bergen arc, Norway) where Precambrian granulites ($T = 800 – 900^\circ\text{C}, P < 1 \text{ GPa}$) have undergone an eclogitic overprint ($T = 600 – 700^\circ\text{C}, P > 1.5 \text{ GPa}$) during the Caledonian orogeny. The selected samples are from the edge of a granulitic boudin and from an eclogite at the contact in the shear zone. These samples show evidences of a strong ductile deformation associated with fluids. Rb/Sr analyses have been performed on 14 phengite fractions from the granulite and 9 phengite fractions from the eclogite. These fractions were separated according to grain size, and magnetic and
density properties and subsequently analysed separately by ICP-MS in order to determine the trace element signature. Reported in an isochron diagram, micas fractions from each single rock defined two distinct slopes corresponding to the Precambrian and Caledonian events. Using the Rb/Sr chronometer on micas, this emphasizes the possibility to record, on a single rock, the imprint of two distinct metamorphic events. This has significant implication to Rb/Sr dating interpretation on such a context, and suggests that even in a fluid deformation context the Rb/Sr chronometer on phengite is not totally reset under high pressure conditions.