RB-SR ISOTOPE STUDIES ON MICROSCALE OF EXHUMATION INDUCED METAMORPHIC STRUCTURES IN HP-LT METAMORPHIC ROCKS FROM THE CYCLADIC BLUESCHIST BELT ON EVIA, GREECE

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In the present study we explore the potential of Rb-Sr isotopic analyses of minerals in specific microstructural settings to constrain the pressure-temperature-deformation-time history of high pressure - low temperature metamorphic rocks. The study area is situated on southern Evia, Greece, where a unit composed of various high pressure metamorphic (T = 380 ± 50°C; P = 10 ± 2 kbar) rocks has been exhumed undergoing continuous deformation. The microstructural evolution from blueschist to greenschist facies conditions during near-isothermal decompression allows to distinguish several generations of structures and related minerals. As a first step, calcite-bearing schists and impure marbles were investigated. Monomineralic microsamples of calcite and white mica with a weight of 50-400 µg each were drilled out of thick sections. The Rb and Sr isotopic ratios of these minerals allow to calculate isotopic ages of white mica related to its microstructural setting using the $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of calcite as Sr initial ratio. In addition, the calcite $^{87}\text{Sr}/^{86}\text{Sr}$ ratios can be interpreted in terms of Sr isotopic homogenisation. These ratios of calcite appear to be constant on cm-scale within a rock specimen, but vary between different lithologies with $0.721419 \pm 0.0042$ (n=8) or $0.712125 \pm 0.0066$ (n=8), respectively. The derived mica ages cluster in three groups, which are 24 Ma (n=2), 30 to 35 Ma (n=8) and 37 to 50 Ma (n=5). Most ages determined for micas arranged in the second schistosity S2 are between 30 and 35 Ma. In contrast, mica ages of 24 Ma are associated with the first schistosity S1, while ages of 37 to 50 Ma are found for micas from various structural settings. These
preliminary results show that the correlation between the isotopic record of mica and its microstructural setting is more complex than expected and at present, we can only speculate about the reasons. It is possible (1) that generations of similar microstructures were not necessarily contemporaneous for different rock types or (2) that mica grains were not completely recrystallized or newly formed at a certain stage of the history, and thus are composed of different generations including e.g. clastic relics. It is hoped that ongoing systematic work will provide deeper insight into the correlation between isotope systematics and microstructures.