

# *<sup>87</sup>Sr/<sup>86</sup>Sr isotope study of marbles of the Austroalpine Basement (Eastern Alps): tectonometamorphic implications and age constraints*

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During this study about 100 marble samples of different tectonic units of the Austroalpine Basement (Eastern Alps) were investigated regarding their <sup>87</sup>Sr/<sup>86</sup>Sr-ratios. The aim of the study was firstly to characterize the different units by distinct <sup>87</sup>Sr/<sup>86</sup>Sr-ratios of the marbles and secondly to get some information of the sedimentation age.

The Austroalpine Basement can be subdivided into four major nappe systems (Schmid et al., 2004), which can be further subdivided into lithostratigraphic units. In the following results from samples of the Koralpe-Wölz nappe system are presented: In the tectonically lowermost Wölz Complex the Sr-values of marbles scatter in a broad range between 0.708811 and 0.711090 (18, number of samples). Pure calcitic marbles lie between 0.708811 and 0.709269 (6), whereas dolomitic marbles are about 0.709165 (2). The Rappold Complex yielded low Sr-ratios between 0.707997 and 0.708387 (19). Within the Koralpe-Saualpe Complex two groups can be distinguished: samples of the Koralpe area yield low values of 0.708016 to 0.708465 (6) whereas samples of the Pohorje area range between 0.708691 and 0.708780 (2). Samples from thick and very pure marbles of the Millstatt Complex east of the Tauern Window near Villach and from its equivalent west of the Tauern Window ("Laaser Serie") show Sr-ratios between 0.708555 and 0.78833 (8). The Plankogel Complex is characterized by low values between 0.708127 and 0.708389 (5). The Radenthein and Schneeberg Complexes (to the east and the west of the Tauern Window, respectively) are the lithostratigraphic uppermost units and their Sr-values scatter in a wide range of 0.708682 to 0.709763 (8). To get more information about the exchange of Sr between the country rocks and the marbles a section in the Wölz Complex, passing from micaschist into a layered, silicate bearing marble was investigated. The results indicate no significant exchange of Sr between the different lithologies and between individual marble layers and therefore only minor influence on the Sr-isotopic ratio even at epidote-amphibolite facies conditions.

The data identify a group of marbles with low Sr-ratios (0.70799-0.70850) occurring in the Rappold, Plankogel and in the northern part of the Koralpe-Saualpe Complex. These units show more similarities and form a specific type of basement in the South-eastern part of the Austroalpine unit. According to the Sr-seawater curve (McArthur et al., 2001) three age intervals in the Lower Paleozoic (370-384, 398-407 or 426-444 Ma) are possible deposition ages for these marbles. For the very thick and pure marbles of the Millstatt Complex a different deposition age in the range of 409-423 Ma (Silurian-Devonian border) is likely.

McArthur JM, Howard RJ, Bailey TR (2001). Strontium isotopic stratigraphy: LOWESS-Version3. Best-fit line to the Sr-isotope curve for 0 to 509 Ma and accompanying look up table Version 4: 08/03 for delivering numerical age. Journal of Geology 109, 155-169.

Schmid SM, Fügenschuh B, Kissling E, Schuster R (2004). Tectonic map and overall architecture of the Alpine orogen. Eclogae Geologicae Helvetiae 97, 93-117.