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Minor element variations across the metapelitic Permian contact aureole of the Brixen granodiorite (Franzensfeste, S-Tyrol, Italy)

W.F. Thöny, S. Wyhlidal, **P. Tropper**

Institute of Mineralogy and Petrography, Faculty of Geo- and Atmospheric Sciences, University of Innsbruck, Innrain 52, A-6020 Innsbruck, AUSTRIA (peter.tropper@uibk.ac.at / Fax +43-(0)512-507-2926 / +43-(0)512-507-5513)

In the Southalpine domain, the Permian intrusive complex of the Brixen granodioritic pluton is aligned along the Periadriatic Lineament, and covers an area of ca. 180 km^2. A contact aureole has been identified at the southern rim of the pluton but no $P-T-t$ data have been available for the contact aureoles so far. Although the chemical evolution of the intrusive body is well established, and the contact aureole was identified and partly mapped at the turn of the last century, there are almost no quantitative mineral chemical data available from this contact aureole.

Besides textural evidence, the first chemical evidence of contact metamorphism can be found in newly grown biotite and muscovite from the outer contact aureole (ca. 300 m from the contact). These biotites are enriched in Ti (1.5 wt.% TiO_2) compared to biotites from the thermally unmetamorphosed Brixen Quarzphylite, which contain 0.3 wt.% $TiO_2$and. Newly grown muscovite also shows higher paragonite component, than muscovite from the relict foliation. Approaching the intrusion, the Ti-contents of biotite increases to values of about 3.5 wt.% TiO_2 in the innermost (within 1 m from the contact) part of the contact aureole. A positive correlation, very similar to Ti with decreasing distance to the contact, was found for Cl which ranges from 0.022 wt.% Cl, in the newly grown biotites 300 m from the contact, up to 0.147 wt.% Cl in close proximity to the contact. Such a clear variation could not be detected for F in the biotites, and it seems that F contents are constant across the contct aureole. Furthermore

the variation in Cl was also detected in the apatites, which show increasing Cl contents from 0.045 wt.% up to 0.175 wt.% at the contact. In contrast, Y only shows little increase from 0.1 wt.% to 0.2 wt.% approaching the contact. On the other hand, a strong variation of Y was observed in monazite associated with the thermal breakdown of garnet. While monazite far from the contact shows $\sim$ 0.7 wt.% Y_2O_3, monazite near the contact shows Y contents of ca. 2.0 wt.% Y_2O_3. Latter monazite is newly grown and gives Permian ages between 270 – 280 Ma. A systematic chemical variation of plagioclase composition was also observed. In contrast to biotite, cordierite shows no systematic variation in Na_2O as a function of distance, which might be due to additional factors such as variations in $a(H_2O)$ and fO_2.