

**EXPERIMENTAL CONSTRAINTS ON THE PERMIAN CONTACT  
METAMORPHIC EVENT IN METAPELITES FROM THE SOUTHERN RIM OF  
THE BRIXEN GRANODIORITE (SOUTH TYROL, ITALY)**

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The Permian Brixen Granodiorite is located south of the Periadriatic Lineament in the eastern part of the Southalpine basement complex and comprises a series of tonalitic, granitic and granodioritic intrusions which were emplaced during the Permian into the country rocks of the Variscan Brixen Quartzphyllites. The depth of the intrusion was less than 10 km ( $P \leq 0.3$  GPa) and only a small, about 200 meters wide, contact aureole formed at the southern rim of the Brixen Granodiorite near the village Franzensfeste and yielded an increase in temperatures from 540 °C in the outermost aureole to > 700 °C in the innermost aureole. Within the contact aureole four different zones can be distinguished based upon mineralogical, mineral chemical and textural features. Approximately 200 m from the granite contact zone I occurs. The rocks from this zone are macroscopically still quartzphyllites and are characterized by two texturally and chemically different generations of micas and the appearance of cordierite. Zone II is characterized by quartzphyllites containing pseudomorphs of cordierite + biotite after garnet. The inner contact aureole starts approximately 50 m from the granite contact and shows already typical hornfels textures. This zone is characterized by the first occurrence of andalusite. In the innermost area, ca. 10 m from the granite contact, spinel and corundum occur. Geothermometry (two-feldspar, Ti-in-biotite) yielded an increase in temperature from 540 °C in the outermost aureole to < 740 °C in the innermost aureole.

In order to put additional constraints on the metamorphic overprint besides geothermobarometric investigations, the aim of this investigation was to compare natural mineral assemblages and mineral compositions from the highest grade zones of the hornfelses at the southern rim of the Brixen granodiorite with mineral assemblages which are produced experimentally at approximately the same *P-T* conditions, using the same starting materials. Experiments were performed in a hydrothermal apparatus at 0.3 GPa and temperatures of 580 °C and 650 °C using two natural quartzphyllite samples from the area as starting materials. At a temperature of 650 °C the amount of H<sub>2</sub>O present varied from 0 µl to 5 µl H<sub>2</sub>O and newly formed cordierite and biotite were observed in all run products. At H<sub>2</sub>O = 5 µl, wide-spread melting occurs and K-feldspar, plagioclase, almosilicate and melt occur in addition. The agreement between the observed textures and mineral compositions therefore allows putting additional constraints on the *T* conditions of this contact metamorphic event.

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