The evolution of the magnetic texture in the hornfelses across the southern contact aureole of the Brixen granodiorite (Poster)

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The Permian contact aureole of the Brixen granodiorite within the Southalpine domain shows an excellent opportunity to study the effect of contact metamorphism on petrological and geophysical rock attributes. Different analytical methods (electron microprobe analysis, micro-Raman spectroscopy, anisotropy of magnetic susceptibility) were used to get a complete mineralogical/petrological and geochemical overview of the aureole. First mineralogical evidence for the contact metamorphic overprint can be detected around 300 m away from the contact by the appearance of newly grown biotite and muscovite. Biotites in the aureole get more enriched in titanium (1.5 wt% - 3.5 wt%) with decreasing distance to the contact while the biotites from the thermally unmetamorphosed Brixen Quarzphylite only contain 0.3 wt% TiO_2. Furthermore plagioclase also shows a change in chemical composition with decreasing distance to the contact. The An component increases from 20 mol.% (oligoclase) in the outer contact aureole up to 40 mol. % (andesine) in the innermost part. In comparison with the contact aureole the plagioclase from the Brixen Quarzphylite only contains <2 mol.% An. Cordierite shows no clear variation in MgO, FeO, Na_2O across the aureole which might be due to additional factors like bulk composition, fO_2 or $a(H_2O)$. The innermost part of aureole is characterized by the occurrence of andalusite and hercynite.

Along a thermometrically (inner aureole: 660℃ for Ti in biotite, 620℃ feldspar thermometry; outer aureole: 520℃ for Ti in biotite , 485-520℃ feldspar thermometry) well-defined profile from the contact into the thermally unmetamorphosed basement, five palaeomagnetic sites were selected. The paleomagnetic investigations focused on the detection of a pre-Permian anisotropic fabric in the visibly textureless hornfelses as well as the possible change of the magnetic fabric (AMS) and the characteristic remanent magnetization across the hornfelses. The first site is within the granodiorite and shows a typical isotropic magnetic fabric. The hornfels samples closest to the contact (1 meter distance) are characterized by a prolate magnetic fabric with a small degree of anisotropy of 4.2 %. For comparison, samples taken 10 m away from the intrusion already show an increase in anisotropy since the magnetic fabric changes into a clearly oblate fabric with a degree of anisotropy of 6.5 %. With increasing distance from the intrusion the degree of anisotropy increases to 11.6 % in the outer contact aureole. The thermal unmetamorphosed phylite shows an oblate fabric and the highest degree of anisotropy of 13.5 %. In all sites, characterized by an oblate magnetic fabric, the foliation is striking ENE(WSW), gently dipping to SSE. Additional palaeomagnetic data from the granodiorite clearly document that the Permian emplacement of the magmatic body took place in the southern hemisphere.