Genesis of tourmaline-quartz-wolframite veins in the Schwarzwald, SW Germany

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The Schwarzwald in SW Germany forms part of the internal zone of the Variscan foldbelt in central Europe. The basement rocks mainly consist of high-grade metapelitic to metapsamitic rocks, which were intruded during the late Carboniferous by a number of post-collisional, mainly S-type granites. In a regionally restricted area within the broader contact zone between one of these granite bodies (the Nordrach granite) and the surrounding high-grade gneisses, numerous mm- to dm-thick mineralized fissures and veins occur. These consist predominately of tourmaline (schorl-dravite) and quartz, with minor amounts of muscovite, wolframite, scheelite, native bismuth and cassiterite.

These tourmaline occurrences may have originated either (i) from late-magmatic melts or fluids formed by magmatic differentiation and subsequent fluid exsolution of the Nordrach granite itself or (ii) by the influx of externally derived boron-rich fluids or (iii) by a combination of both processes (i.e. during metasomatic exchange between the magmatic and the externally derived fluids).

In this study we discuss the compositional evolution of tourmalines based on major, minor and trace element data (electron microprobe and LA-ICP-MS). Combined with oxygen isotope data of tourmaline-quartz pairs and with fluid inclusion data (microthermometry and crush-leach analysis) we present a model for the genesis of this regionally unique occurrence of tourmaline-rich rocks.

Validating the use of scleraxonian Southern Ocean deep-sea corals for radiocarbon ventilation age dating

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One key debate in the paleoceanographic community currently focuses on the question of whether an isolated deep ocean carbon reservoir existed during the last glacial period, that stored the additional respired carbon drawn from the atmosphere compared with the present interglacial. While several lines of evidence suggest it did [e.g. 1, 2], results as yet remain controversial [3]. The deep Southern Ocean potentially plays an important role in this context [4], but so far suitable paleoceanographic archives to test the hypothesis of a deep carbon reservoir there are largely missing.

Here we present calibration work on a set of calcitic deep-sea scleraxonian corals from the Marie Byrd Seamounts in the Amundsen Sea sector of the Southern Ocean (~123°W, ~69°S, 2500 m to 1430 m water depth), emplying the ^{230}Th/U-dating method. Since the coral U concentrations are significantly lower than those of aragonitic deep sea corals (between 80 to 250 ng/g) our specimens are prone to U diffusion from Mn oxide coatings. Micromilled sections along the coral rims show highly elevated $^{234}U/^{238}U$, strongly suggesting preferential movement of alpha-recoiled ^{234}U into the coral [cf. 5]. However, since corals of Holocene age reproduced the present-day seawater $^{234}U/^{238}U$ it seems likely that internal ^{234}U diffusion in specimens dating back to at least the Last Glacial Maximum can be accounted and corrected for. We will complement our findings with a first set of radiocarbon ages derived from the same coral samples.

[1] Marchitto *et al*. (2007) *Science* **316**, 1456-1459. [2] Jaccard *et al*. (2009) *EPSL* **277**, 156-165. [3] Broecker *et al*. (2008) *EPSL* **274**, 322-326. [4] Marinov *et al*. (2006) *Nature* **441**, 964-967. [5] Robinson *et al*. (2006) *G-Cubed* **7**, Q05022.