Granitic porphyry dykes in the Qitianling batholith, Hunan Province, South China: Evidence for the multistage mineralization

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The Qitianling Sn deposit, Hunan Province, China, is famous for its super-large reserves. Two granitic dykes enriched in Sn at Qitianling are subvolcanic counterpart of Sn-bearing granites. Textural relationships provide evidence for a quenched silicate melt with phenocrysts, consisting of albite, quartz, K-feldspar, and zinnwaldite. The porphyry tin deposit arises from abundant cassiterite and rutile enriched in W and Nb. An affinity with Qitinaling (amphibole-) biotite granites arises from the geochemistry and their compositions are quite similar to each other. It is highly evolved, strongly peraluminous and enriched in W, Sn, Nb, Ta, Li and F. The melt belongs to the residual melt throughout the fractional crystallization. Analyses of zircon proved the high evolution of the source. Different textures of cassiterite grains provided the magmatic and hydrothermal process. The result of geochronological work shows the zircon U-Pb age of the dyke of 147.15 ± 0.45 Ma, providing that it belongs to the third stage of Qitinaling magmatism. The formation of a porphyry tin deposit is believed to be one of the last events at Qitianling. This super hypabyssal intrusive mass contains cryptoexplosive breccia. The occurrence at depth of a hidden granitic body could be the source of the granitic dykes. Therefore the fine-grained Qitinaling felsic dykes is appropriate recorder for the concealed granitic body and mineralization. The late-stage mineralization related to the fine-grained granitic dyke is believed to be distinguished important in the multi-stage mineralization.

Response of Antarctic Intermediate Water to weaker Atlantic Meridional Overturning Circulation during the last deglaciation

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The modes of ocean circulation in response to climate change have been a subject of intense interest. During the last deglaciation, cold periods such as the Younger Dryas (YD) and Heinrich 1 (H1) are thought to be coincident with significant reductions in North Atlantic Deep Water (NADW) formation. Yet, the role that Antarctic Intermediate Water (AAIW) played during these cold events is still poorly constrained. Benthic Cd/Ca data from sediment cores in the Florida Straits suggest a reduced contribution of AAIW in the North Atlantic western boundary current during the YD [1]. However, ε_{Nd} evidence in sediment cores from Tobago basin and Brazil margin suggests a greater influence of AAIW in the North Atlantic during YD and H1 [2].

In this study, we measure Nd radiogenic isotope ratios of the authigenic Fe-Mn hydroxides in two sediment cores, KNR166-2-26JPC (546 m water depth) and KNR166-2-31JPC (751 m water depth), within the Florida Straits in an effort to investigate the waxing and waning of AAIW during the last deglaciation. Both cores are located within the Florida Current, which under modern conditions represents a mixture of recirculated North Atlantic subtropical gyre water and Southern origin waters. Our preliminary results for both cores show significantly less radiogenic ε_{Nd} values during the YD than during the Holocene (~1 epsilon unit for 26JPC and ~0.6 epsilon units for 31JPC). We interpret the lower ε_{Nd} during the YD as signifying a decreased input of Southern-sourced waters arriving at these sites, in agreement with the study of Came et al.[1]. Additional high-resolution Nd isotope analyses of Florida Straits sediments deposited during earlier Heinrich Events and the Last Glacial Maximum will be presented in an effort to constrain the role of intermediate waters during periods of reduced NADW formation.

[1] Came et al. (2008) *Paleoceanography* **23**, PA1217 [2] Pahnke et al. (2008) *Nature Geoscience* **1**, 870-874