Genetic relationship between Ag-(Pb-Zn) mineralization and W-specific Mesozoic magmatism in the Nanling belt (China) based on data from the Wutong deposit

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More than 50 % of the world's total reserves of tungsten are in China, and most tungsten deposits are located in the Nanling range (Cathaysia block, southeast China). This study explores the genetic relationship between W-specific magmatic events and shallow (W)-Ag-Pb-Zn deposits in the Nanling range based on data from the Wutong deposit, Guangxi Province.

Because the temperatures obtained from mineral thermometry and homogenization temperatures of fluid inclusions are the same (~300°C), the fluid inclusion homogenization temperatures are interpreted to be approximately equal to the trapping temperatures, indicating formation at low pressures, i.e., slightly above the liquid-vapor curve. This, in turn,indicates that the deposit formed at relatively shallow levels. The C-O-S-Sr-Pb isotopic composition of minerals indicate that one single fluid was responsible for mineralization. The chemical composition of fluid inclusions indicates that the fluid evolved from a fractionated magma. Therefore, the Wutong deposit is likely to represent the shallow expression of a magmatic-hydrothermal system. The Sr-Pb isotopic data indicate that the magmatic fluids are associated with melting of crustal rocks of the Cathaysia block.

The age of the Wutong mineralization, obtained from hübnerite dating, is Late Yanshanian (Cretaceous). Most Ag-Pb-Zn deposits in this region are typically attributed to Late Jurassic mineralization. In contrast, Wutong is a Cretaceous system formed during the Cretaceous mineralization peak in south China. As this relatively shallow hydrothermal system is related to deeper magmatism, Cretaceous mineralization is not limitted to the western limit of Cathaysia but may extend eastward at least to the Nanling range. Furthermore, regional grouping of the age of granite-related magmatism indicates that the same kind of crustal source has been melted repeatedly, possibly in different tectonic settings.

The turnover time of organic carbon in boreal riparian zones – A hydrological approach

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Boreal regions are large stores of organic carbon (OC). The majority of the OC found in boreal inland waters is allochthonous, i.e. originally from terrestrial sources. Allochthonous carbon is especially dominant in headwater streams, which also show high concentration and fluxes. The link between the terrestrial and the aquatic compartments in these headwaters is dominated by organic matter-rich riparian zones (RZ). RZ have been described as near-infinite organic matter sources [1] [2] because large amounts of OC originate here and are exported to streams by lateral fluxes. But, how long can RZ sustain the high lateral OC fluxes in boreal catchments? To answer this question we estimate the turnover times of OC in 13 RZ profiles in a boreal catchment in northern Sweden by comparing pools and lateral fluxes. The lateral fluxes can be mathematically estimated using the Riparian Flow-Concentration Integration Model (RIM) approach [3] [4], in which lateral discharge and concentration profiles in the RZ are combined. Our calculations with this approach indicate that 90% of the lateral OC fluxes come from a 36 ± 18 cm (± SD) shallow soil layer accounting in all the 13 studied riparian profiles. Preliminary analyses suggest long turnover times of OC in these 'active' layers. That would imply that there is no long term supply shortage. The results from this study will have implications for the global carbon cycle in relation to human perturbations.

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