

A LA-ICP-MS chronological and tectonic environment study of the ore-bearing volcanics in Baiyin orefield

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The Northern Qilian orogenic zone is one of the most important massive sulfide deposit provinces in our country and the world, especially, the Baiyin mine field which located at its east is a representative massive sulfide deposit. After the porphyroclastic lava extruding and the quartz albitophyre intruding which belong to the later acidic volcanic, The Baiyin mine field began mineralization, and ends at a relatively quiet period before a large-scale basic volcanism. Therefore, there is an important meaning to research the age and tectonic environment about the acid volcanic and the basic volcanic. In this paper, by using LA-ICP-MS zircon U-Pb isotope dating techniques we were determine the age of the basic volcanic in Baiyin orefield, the formation time of the basic volcanic in Baiyin orefield is 465.0 ± 3.7 Ma, this age should be belonging to Middle Ordovician; Researched by predecessors and with the same method, the age of acid volcanic in Baiyin orefield is 467.3 ± 2.9 Ma, So we think the age of the rocks and the mineralization of the Baiyin orefield should be appertaining the later Middle Ordovician. All the discovered industrial deposits were produced in marine bimodal volcanic rocks, the marine bimodal volcanic rocks are composition of quartz keratophyre, spilite and a small amount of keratophyre, Chondrite-normalized trace element distribution patterns display that there is a negative anomalies for the Nb, Ta and Ti, combined with tectonic evolution of the North Qilian Mountains, and the ore-bearing volcanic rocks of the Baiyin mine should be formed in the island arc--rift environment in the later Middle Ordovician. The results of the study has a very important significance for tectono-magmatic evolution of the Qilian orogenic belt and also for the guiding the regional geological prospecting.

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Sources and fate of nitrate in a dam-controlled subtropical river, Southwest China

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The concentrations and dual isotopic ($\delta^{15}\text{N}$ and $\delta^{18}\text{O}$) values in NO_3^- were analyzed from 23 samples collected along the Jialing River, a major tributary of upper Yangtze. Unlike other ions, the concentrations of NO_3^- were higher in rainy season than in dry season. Heavy use of nitrogen fertilizer with low use efficiency is responsible for nitrogen loss and high NO_3^- content in the river water during rainy season. The dammed river may provide preconditions for algal growth that would assimilate NO_3^- , which led to concentration of NO_3^- decreasing, $\delta^{15}\text{N}_{\text{NO}_3}$ and $\delta^{18}\text{O}_{\text{NO}_3}$ values increasing during rainy season. There was no obvious trend of $\delta^{15}\text{N}_{\text{NO}_3}$ and $\delta^{18}\text{O}_{\text{NO}_3}$ in dam area during dry season. To interpret the sources of nitrate, the co-variation of $\delta^{15}\text{N}_{\text{NO}_3}$ and $\delta^{18}\text{O}_{\text{NO}_3}$ was examined (Figure 1).

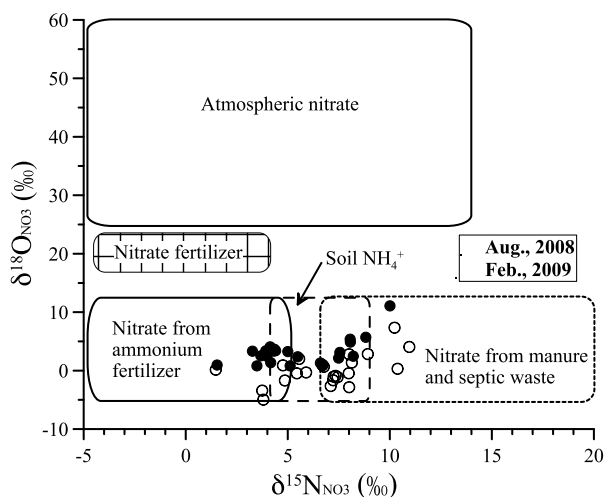


Figure 1: $\delta^{15}\text{N}_{\text{NO}_3}$ vs. $\delta^{18}\text{O}_{\text{NO}_3}$, along with ranges for potential sources. (Aug., 2008-rainy season; Feb., 2009-dry season)

The sources of NO_3^- are mainly resulted from the nitrification of ammonium fertilizer and domestic sewage during rainy season while the sewage is the major source during dry season in the Jialing River catchment.

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[1] Panno *et al.* (2008) *J Hydrol* **359**, 174–188. [2] Chen *et al.* (2009) *Biogeochemistry* **94**, 163–174.