

Indicators of mercury reactivity and bioavailability in a torrential river system impacted by former mercury mining

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A number of studies have been carried out in the river system impacted by former mercury mining, addressing Hg behavior in river and marine water and sediments, bank, soil and biota [1-8]. Modelling tools were developed in order to simulate mercury transport, mass balances and transformation [9, 10]. It was demonstrated that the partitioning of Hg was mostly controlled by the variable content of suspended solids and complexation with various ligands present in water, among which DOC seems to be the most important [10]. Hg is transported downstream from the mine mainly as finely-suspended material resulting from erosion of contaminated surfaces rather than Hg in the dissolved phase. The released Hg is biologically available, evidenced by the increase of monomethyl Hg (MeHg) concentrations downstream from the mine. One of the major objectives of these studies was to search for the best indicators of change in mercury loading in the river water (sediments, water, bacteria, periphyton, fish, and other aquatic organisms). Studies confirmed that speciation of mercury in the river water (Hg (II), dissolved Hg (0) and MeHg) is potentially a good predictor and correlates well with Hg species identified in the biota. Systematic studies showed that the periphyton community alone is too complex and unpredictable to be used as a sole indicator of mercury concentrations and changes in the river system, while mercury speciation fish tissues provide more integral information of mercury availability.

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Geochemical and Sr–Nd–Pb isotopic compositions of late Mesozoic dioritic porphyries in the Zhonggu iron ore field, Middle–Lower Yangtze River belt, Eastern China: Petrogenesis and tectonic setting

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Several small dioritic porphyries that host huge iron oxide deposits occur in the Zhonggu iron ore field, in the eastern part of the Middle-Lower Yangtze River Belt (MLYRB) in the Yangtze block. These porphyries are sodium-rich and evolved. Enrichment of large ion elements, light earth elements and Pb, together with relatively depletion of Nb, Zr, Ti and high radiogenic Pb isotope, suggest the mantle sources were enriched in incompatible elements. Their initial Nd ($\epsilon_{Nd} = -4.7$ to -6.8) and Sr ($(^{87}Sr/^{86}Sr)_i = 0.7056-0.7092$) isotopic composition, distinguish those derived from enriched lithospheric mantle which represented by the Mesozoic Kedoushan basalt in the MLYRB. The elemental and Pb–Nd–Sr isotopic data imply that these dioritic porphyries were originated from partial melting of an enriched mantle source which can be modeled by mixing between DMM component represented by asthenospheric mantle and EMII represented by subducted oceanic crust.

In combination with the geochemical and isotopic characteristics of Cenozoic basalts from the MLYRB, we propose that these porphyries were dominantly emplaced in an extensional tectonic regime, in response to asthenosphere upwelling, which was followed by lithospheric thinning during the early Cretaceous, probably due to subduction of the paleo-Pacific plate beneath East Asia.