Petrogenesis and geochronology of the Xilushan granitic complex in the Bengbu Uplift: Constraint on the timing of the Yanshan Movement

JIE CHEN XIANG WANG*AND XIAOJUN WANG

State Key Latoratory for Mineral Deposit Research, Nanjing University, Nanjing 210093, China
(* correspondence: xwang@nju.edu.cn)

The Xilushan granitic complex in the Bengbu Uplift, southeastern margin of the North China Block (NCB), consists of a gneissic monzogranite and a porphyritic granodiorite.

The gneissic monzogranite shows fracturing, deformation and anatectic textures, indicating it has suffered post-crystallization migmatisation. It contains mainly two zircon phases: igneous zircon (IZ) and metamorphic zircon (MZ). IZ shows strong CL brightness and clear oscillatory zoning, and its contents of Hf, U, Th and REE are comparatively low. It yields a weighted mean age of 223.6±2.9 Ma, representing the intrusion age of the geneissic monzogranite. MZ shows extremely weak CL brightness, weak to absent oscillatory zoning, and its contents of Hf, U, Th and REE are high and variable. It yields a weighted mean age of 156.1±2 Ma, and this age is interpreted as representing the climax of compressional orogenesis of the Yanshan Movement.

The porphyritic granodiorite has low abundances of HREE and Y, high contents of Sr and resulting high Sr/Y ratios, reflecting that the magma derived from partial melting of the base of the thickened lower crust. It plots in the field of post-orogenic granite in the Rb vs. (Y+Yb) discrimination diagram. The zircon from this rock is generally of magmatic origin, showing strong CL brigheness, fine-scale oscillatory zoning and developed sector zoning, and relatively low contents of Hf, U, Th and REE. It has a weighted mean age of 133.6±1.3 Ma, considered to be the onset time of the post-orogenic calc-alkaline magmatism of the Yanshan Movement.

According to the two ages of metamorphic and magmatic events revealed by the Xilushan complex and the previous studies on the tectonics in the NCB, the Yanshanian movement in the NCB can be divided into three successively evolutionary periods: (1) Compressional orogenesis period (180-156 Ma); (2) Stress transformation period (156-135 Ma); (3) Extensional collapse period (135-125 Ma).

Iron isotopes in the suspended load of the Seine River (France): natural versus anthropogenic sources

JIUBIN CHEN[12], VINCENT BUSIGNY[2], JÉRÔME GAILLARDET[2] AND PASCALE LOUVAT[2]

[1] State Key Laboratory of Environmental Geochemistry, Institute of Geochemistry, CAS, Guiyang 550002, China.
[2] Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Univ. UMR 7154 CNRS, 75238 Paris, France

The determination of fluxes and isotope compositions of Fe transported to the ocean is essential for understanding global surface Fe cycle. Fe isotope composition in anthropogenically-impacted rivers is poorly constrained up to now. We present the first Fe isotope data in suspended particulate matter (SPM) of the Seine River (France). Iron concentrations and isotope compositions (also major and trace elements) were measured for two sample sets: a geographic transect along the river to estuary, and a temporal series collected in Paris. While Fe concentration in SPM clearly increases downstream, Fe isotope composition shows a very slight decrease (δ^{56}Fe from 0.10 to -0.07‰). Calculation of Fe enrichment factor relative to Al points to the anthropogenic input (~17% higher than the natural background). Correlations between Fe concentration and isotopic compositions with those of Zn (from a previous study) confirm that Fe is mainly derived from a mixing of natural and anthropogenic sources. The natural sources are dominantly composed of clay materials, with minor carbonates and heavy minerals. Sulfides and organic matter may be the main anthropogenic Fe phases, and dominate during low-water and high-water stages, respectively.

Our data have two major implications. Firstly, although Fe flux from continents to ocean is significantly increased after anthropogenic input, polluted rivers bring a Fe isotope signature essentially indistinguishable from the natural detrital Fe flux. Secondly, the markedly positive δ^{56}Fe values measured in the Pacific Ocean (up to 0.6‰), which contrast with the mostly negative (or 0‰) δ^{56}Fe values in Fe sources to the ocean (hydrothermalism, rivers, marine benthic Fe flux, atmospheric particles), are unlikely to be produced by anthropogenic Fe input, supporting the explanation of Fe isotope fractionation related to phytoplankton assimilation processes.

www.minersoc.org
DOI: 10.1180/minmag.2013.077.5.3