Origin of the Beilou Cu-bearing intrusive rocks, North China Craton: Elemental and Sr–Nd–Pb–Hf isotopic constraints

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The Beilou porphyry Cu deposit, hosted in the early Cretaceous monzonite porphyry of Zouping volcanic basin, formed in an extensional tectonics and active margin of North China Craton. The zircon U-Pb age of the Beilou monzonite porphyry is approximately 128.5 Ma. The rocks are characterized by high concentrations of K_2O (3.53 ~3.99wt.%), Al_2O_3 (15.31~16.62 wt.%), LILEs (e.g., Sr and Ba), LREEs and $Mg^{\#}$ (40.80~50.07), and low concentrations of HFSEs (e.g., Nb, Ta, P and Ti) and HREEs. The high initial $^{87}Sr/^{86}Sr$ ratios (0.70646 ~ 0.70649), $\varepsilon_{Nd}(t)$ values (-2.34 ~ -2.11), radiogenic Pb isotope compositions[$(^{206}Pb/^{204}Pb)_i$=18.3474 ~ 18.4666, $(^{207}Pb/^{204}Pb)_i$ =15.5431 ~ 15.5692, $(^{208}Pb/^{204}Pb)_i$ =38.1859 ~ 38.39604] and high zircon Hf ($\varepsilon_{Hf}(t)$=0.11 ~ 4.24) isotopic compositions indicate that the magmas were likely derived from melting of the subducted Izanagi plate with some subducted sediments and then mixed with some mantle materials when ascend through the mantle wedge. The ocean crust has high oxygen fugacity and Cu content, which contributed to the Cu deposits in the Zouping volcanic basin (Plank and Langmuir, 1998).

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[1] Plank, T., and Langmuir, C.H., 1998. The chemical composition of subducting sediment and its consequences for the crust and mantle. *Chemical Geology* **145**, 325–394.