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Petrology and oxygen isotope geochemistry of the cretaceous mafic-ultramafic intrusions from Dabie terrane (Central China)

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Several mafic-ultramafic intrusions crop out discontinuously within the UHP Dabie Shan region and are commonly interpreted as the result of late Mesozoic post-collisional magmatism (Bor-ming Jahn et al., 1999; Bin Chen et al., 2001). Mafic-ultramafic rocks are usually associated with coeval large granitoid plutons and often occur as small bodies and enclaves within granitic rocks. A collection of samples from some of the best exposed mafic-ultramafic Dabie intrusions (Yanzihe, Zhujiapu, Laibang, Shacun and Jiaoziyan bodies) has been studied by means of oxygen isotope analyses on mineral separates and by in situ LAM-ICP MS on the main mafic minerals, to characterise the composition of the primary melts and the role of AFC processes during magma emplacement. All gabbroic rocks are characterised by the presence of abundant amphibole and phlogopite as late-magmatic crystallisation products. Phlogopite is found as interstitial phase also in the ultramafic cumulates implying high fluid activity during crystallisation. Whether the presence of abundant hydrous phases is the result of mantle source metasomatism or crustal contamination is not clear. Oxygen isotope analysis revealed that probably both processes play a role in the petrology of the Dabie mafic intrusives. The greater part of analysed plagioclase samples have δ^{18}O spanning between 5.0 and 6.5 $\perthousand$, whereas three samples have $\delta^{18}O_{plagioclase}$ of 6.9-7.8 $\perthousand$. $\delta^{18}O_{pyroxene}$ varies generally between 6.3 and 5.2 $\perthousand$; $\delta^{18}O_{zircon}$ has nearly constant values of 5.2 $\pm$ 0.2 $\perthousand$. Some fresh rocks samples contain clinopyroxene and zircon with relatively low δ^{18}O (4.5-4-9 $\perthousand$). These low values suggest that the oxygen isotopic composition of the mantle sources may have been affected by a low δ^{18}O component from the subducted slab (Yui et al. 1995). Conversely we interpret the high observed δ^{18}O in few plagioclase samples as the result of magma

interaction with the crustal-derived granitic melts.

References

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