The Mesozoic mantle-derived magma underplating and magmatic processes in the Tongling area, Anhui Province

Y. DU, X. QIN, W. ZHOU AND H. ZHANG

Department of Earth Sciences, China University of Geosciences, Beijing 100083, P. R. China (ysdu@cugb.edu.cn)

Petrologic and geochemical characteristics of the magmatic rocks with different types of xenoliths and megacrysts in the Tongling area, Anhui Province are used to determine and discuss the mantle-derived magma underplating and magmatic processes. Two types of lithologic associations of magmatic rocks occur in this area. The first type is high-K calc-alkaline intermediate-acidic granitoids (KCA) with xenoliths of diorite and megacrysts of amphibole and pyroxene in the Tongguanshan, Shizishan and Datuanshan plutons. The other type is high-Na alkaline-calc intermediate-basic intrusive rocks (NAC) containing xenoliths of pyroxenolite, hornblende pyroxenolite and hornblendite and megacrysts of amphibole and pyroxene with exsolutions of sulfide in the Baimangshan, Caoshan and Jiguanshan plutons. Samples from the KCA yield Rb-Sr isochron ages of 136~137Ma with $(^{87}Sr/^{86}Sr)_o$ = 0.7072~0.7101, while those from the NAC yield Rb-Sr isochron ages of 133~135Ma with $(^{87}Sr/^{86}Sr)_o$ = 0.7069~0.7070. In addition, Rb-Sr data on the pyroxenolite, hornblende pyroxenolite and hornblendite in the Jiguanshan and Baimangshan plutons give isochron ages of 137~140Ma with $(^{87}Sr/^{86}Sr)_o$ = 0.7067~0.7069.

The Sr isotope ratios, Cr/Th ratios (1.4~3.1), Eu/Eu* ratios (0.79~1.05) and initial epsilon (Nd) values (-16.6~-6.3) for the KCA are consistent with magma derivation from old metamorphic basement rocks through a two-stage process of mantle-derived magma underplating caused by primary lithosphere extension and subsequent partial melting. On the basis of the Sr isotope data, Cr/Th ratios (3.4~13.8), Eu/Eu* ratios (0.86~1.13) and initial epsilon (Nd) values (-7.7~+1.4), the NAC is considered to be formed through syntaxis with material input from the mantle that resulted from further lithosphere extension followed by mantle-derived magma underplating on a large scale. The Sr isotope data and P-T calculation results (T=1100~1220°Ê, P=6.11~16.65kb) support an origin of the xenoliths of pyroxenolite, hornblende pyroxenolite and hornblendite and megacrysts of amphibole and pyroxene with exsolutions of sulfide through differentiation crystallization of the underplated magma of mantle derivation at the bottom of lower crust.

Manganese micronodule composition as possible indicator of biological productivity of the ocean

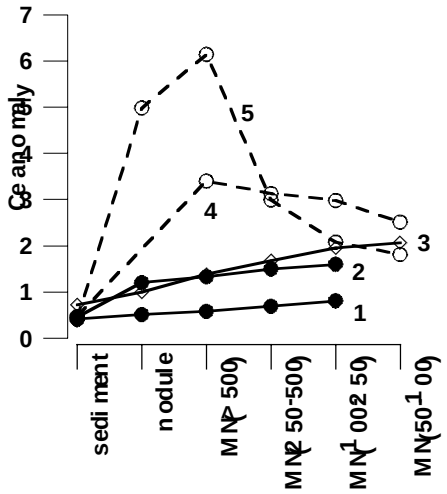
A.V.DUBININ AND V.N.SVAL'NOV

P.P.Shirshov Institute of Oceanology. Russian Academy of Sciences. Moscow. Russia (dubinin@sio.rssi.ru)

Manganese micronodules (MN) are widespread in pelagic sediments. They are formed at bottom water - sediment interface and their abundance and chemical composition reflects local condition of sedimentation and early diagenesis.

In order to investigate the evolution of chemical composition during MN growth three or four fractions of MN (see fig.1) were separately analyzed from areas with high and low biological productivity. Together with MN the associated sediments and their labile fraction and Fe-Mn macronodules or their upper and bottom parts were studied.

Figure 1: The variations of Ce anomaly, calculated as $2\times Ce/Ce^{NASC}/(La/La^{NASC} + Nd/Nd^{NASC})$, in bottom deposits from Guatemala Deep (1), Peru Basin (2), Clarion-Clipperton fracture zone (3), South Basin (4-5) of Pacific ocean. For MN the size of fraction in _m is shown in brackets.



Data from figure demonstrate that Ce anomaly in MN is decreased with size fraction increase for regions with high biological productivity – Guatemala Deep, Peru Basin and Clarion-Clipperton zone. In contrast from areas with low productivity (South Basin) Ce anomaly is increased with MN size growth.