Geochemistry of Sodium Alkaline Igneous Formations in NE Vietnam: Evidence of Paleohotspot & Mesohotspot Traces

NGUYEN TRUNG CHI[1] AND M.J.F.FLOWER[2]

[1]Petroleum Vietnam University (PVU), PVMTC Tower, Long Toan Village. Ba Ria City, Ba Ria-Vung Tau Prov., Vietnam. (*chint@pvu.edu.vn)

[2] University of Illinois—Chicago, USA (flower@uic.edu)

Researched results on geochemistry of major, trace and isotopic elements from igneous formations in NE Vietnam area have established a Sodium alkaline igneous Province (Chi Nguyen *et al* 2004), which consist of a chain of alkaline igneous formations: ijolite- melteigite- jacupirangite-nepheline syenite rocks from Pia Ma massif (Tuyen Quang) toward SE distance ~200km via Bang Phuc massif (Bac Kan), and then to Ngoi Biec one (Yen Bai) towards SW~ 250km, they created a assemblage of alkaline ultramafic-mafic and nepheline syenite rocks at Viet Bac Craton, that is a part of South China Platform margin. The research on petrogenesis of the above mentioned alkaline rocks show that :

1. Alkaline ultramafic – mafic rocks and nepheline syenite has a very high content of (Na_2O+K_2O) from (1.94-8.4%) to (9.62-16.7%), high Al_2O_3 from (6.88-16.93%) to (17.2 - 24.32%) belong to both alkaline ultramafic- mafic groups and nepheline syenite rock. The P_2O_5 content of those 2 groups is very high (0.7- 1.10%). Agpait Index (AI) of nepheline syenite rocks < 1, but Na > K and Ca,Mg contents is high, showing nepheline syenite is the miaskitic type. The total content of (REE+Y) varies from164÷432ppm with Ce/Y=2.83÷6.64,$(La/Sm)_N$=4.12,$(Ce/Sm)_N$=2.64, $(Yb/Lu)_N$ = 1.27, Eu/Eu*= 0.1-0.28. However, the range isotope content of Sr and Nd in whole rocks of Pia Ma and that of Cho Don are different, in Pia Ma: 0.705846 ÷ 0.706419 and 0.511831 ÷ 0.511975 with value of ε_{Nd} = - 2.35 ÷ +0.12 belong to EM1-type and aged in 519 ± 40Ma (Early Cambrian); in Cho Don: 0.709893 ÷ 0.718356 and 0.511854 ÷ 0.512010 with value of ε_{Nd} = - 9.79 to - 2.9 belong to EM2-type and aged in 231 ± 23 Ma (Late Triassic).

2. The geochemical characteristics of trace elements and isotope from above rocks indicated that, have fractional crystallization of a mixed magma liquid with composition of nephelinite derived from partial melting of depleted mantle source. This magma source may intruded into crust at Pia Ma in Early Paleozoic (Paleohotspot trace) and then at Cho Don and Ngoi Biec in Late Triassic (Mesohotspot traces) as they pass over "hotspot" in mantle. Possibly, this hotspot reactivated in Eocen and by the way to open the East Sea. The movenment speed of South China Plate towards North is about 0.7-2,2 mm/year.

Keywords: Sodium alkaline Igneous, Ijolite-Melteigite-Jacupirangite; nepheline syenite, Hotspot Traces