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Neoproterozoic Basic and Mid-acidic Intrusions in Welega Area

(Ethiopia) : Litho-geochemical Evidence for mantle and partly Crust Melting

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Based on the compilation of litho-geochemical data[1], this paper utilize the geochemical software of igneous petrology [2]to deal with these data of Neoproterozoic basic and mid-acidic intrusions in Welega area , Ethiopia in order to discuss its tectonic setting, mantle origin and partly melting of lower crust.

The basic intrusions are composed of olivine gabbro, meta-gabbro, hornblende gabbro, whereas the mid-acidic igneous are diorites, plagioclase, quartz diorites and tonalite. The basic rocks are products in continental rift (similar to middle ocean ridge and/or continental flood basalt area, CFB) and volcanic island arc located at the active continental margin near suture. And the mid-acidic igneous are originated from extensional zone of within plate (primitive rift) or post-arc basin setting.

According to litho-geochemical data and diagrams of tectonic setting, the mantle origin of the basic rocks may be determined by $La/Nb < 1$, $La/Ba < 0.1$ (Figure) [3], and the Nb/Ta ratio larger than the mantle value (> 17.5) [4]. However, the mid-acidic intrusions are generated from primary mantle to contaminated mantle (Figure) by an evolutionary progress from mantle to partly melting crust-assimilation-storage-homogenization (MASH) created at the lower crust [5] and/or assimilation-fraction-crystal(AFC) in syn-collision zone or post-collision zone.

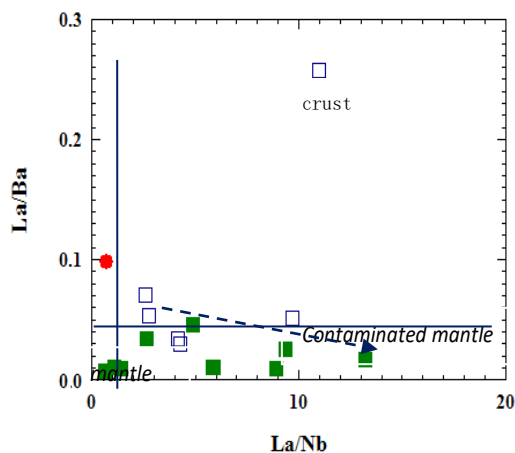


Figure La/Ba-La/Nb diagram showing the mantle origin for intermediate and mid-acidic rocks (after Xia et al.,2007) [3].

The area at the left-low corner of the figure showing primary mantle with La/Nb ratio < 1 and La/Ba ratio < 0.1 .

Legend : ■ - diorite; □ - quartz diorite and tonalite;

●- *Cenozoic basalt in Ethiopia rift (average value) [1]*

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