

Petrological and Geochemistry Characteristics of The Mantle Peridotite From Yemen; an insight in to Continental Rifting Processes

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I would like to inform you that I am studying under the supervision of Prof. Dr. / Shoji Arai at the Department of Earth Sciences, Graduate School of Natural Science and Technology, Kanazawa University. After my arrival at Kanazawa at Oct, 2nd, 2004 I successfully entered the Doctoral Course program of Kanazawa University. My proposal research is dealing with Mantle Xenolith Samples from Bir Ali and Ataq Southern part of Yemen.

I have been working on the Plio-Quaternary flood alkali volcanics associated with mantle xenoliths. These areas were selected as they are the youngest, hottest and most active volcanic rifted margins. The petrology, geochemistry and isotopic signature of volcanics and the associated mantle-derived xenoliths suites from Ataq and Bir Ali rifted areas, will form the main items of the present proposed research program. This study will give us the best information about the age, character and the evolution of the Arabian lithospheric mantle. These data which will be obtained will be correlated with other known data of intraplate and arc provinces such as Japanese islands, Saudi Arabia, Ethiopia, Australia, India, South Africa, Central Atlantic etc.

It is worthy to mention that I brought a pile of representative mantle xenoliths samples with me and I have started successfully the program With the Doctoral courses. Following are some of my activates research

I have prepared more than 250 thin sections for petrographical study in detail by the aid of the petrographic microscope to deduce the different rock types of mantle xenoliths. Some of the above mentioned thin sections were analyzed to check chemical properties of olivine, orthopyroxene, clinopyroxene, spinel, plagioclase, Amphibole, and phlogopite with a JEOL electron-probe microanalyzer at Kanazawa University, we have obtained new and interesting data from our petrographical study and geochemistry about this area. Peridotite from Bir Ali Area comprises both hydrous and anhydrous peridotite spinel. Some of which show evidence of melting with melt pocket connecting by glass films along grain boundaries. cpx-rich lherzolite is characteristic of Bir Ali peridotite xenoliths suite.

We can divided the Bir Ali spinle lherzolites into two types, ordinary lherzolites and cpx rich lherzolite. The cpx rich lherzolite is characteristic of the xenolith suite of the Bir Ali area. These peridotite xenoliths may represent the nature of the mantle portion of lithospheric beneath Yemen. These samples show a great variety of rocks types (anhydrous and hydrous spinel lherzolites, spinel harzburgite, pyroxenites, dunite, wherlite, granulite, and, banded plagioclase peridotite).

The xenolith suites have different textural characteristics and also can be distinguished by the occurrence and relative abundance of accessory amphibole and mica in some samples.

We will further extend our study on geochemical analysis of spinel peridotite, which will mainly focus on clinopyroxene, as well as rare-earth elements (REE) in anhydrous and hydrous xenoliths. Their results will be used with confidence in petrogenetic interpretation. Also chemical composition of the different peridotite minerals can be used to study the nature and composition of fluid circulating in the mantle and the nature of the interactions between these fluids and the peridotite matrix.

These petrographical and petrological characteristics of peridotite xenoliths from Yemen may have been related with the activity of the Afar plume. The Afar plume is remarkable because of its large volume and the persistence of volcanic activity for at least 30My, during the spreading of Arabian plate from Africa at the Gulf of Aden to form Red Sea rift

I have attended two conference held by the 2/st Century COE of Kanazawa University in Feb. 28th to March 2nd 2005 and 8 to 9 March 2006. Respectively.