Geophysical Research Abstracts
Vol. 14, EGU2012-6638, 2012
EGU General Assembly 2012

Geochemical Characteristics of Metavolcanics in the Area from Slate Formations of Southern Central Range, Taiwan

W.-S. Lyu (1), W. Lo (1), and S.-R. Song (2)

(1) Institute of Mineral Resources Engineering, National Taipei University of Technology, Taipei, Taiwan(lowei93@ntut.edu.tw), (2) Department of Geosciences, National Taiwan University, Taipei, Taiwan (srsong@ntu.edu.tw)

The Central Range of Taiwan located at the convergent boundary of the Eurasia Plate and the Philippine Sea Plate accounts for 60% of total area of Taiwan. The rock types of Central Range include slates, phyllites, schists, gneisses, amphibolites, marbles, and some metaigneous rocks. In recent years, much attention has been given to the tectonic history in the Central Range of Taiwan. This notwithstanding, before the arc-continent collision began tectonic evolution that either passive continental margin of the South China Sea or active continental margin of the East China Sea has been a subject of much debate. Therefore, the petrogenesis of the metavolcanic rocks has the inseparable relation with the tectonic evolution of the Taiwan. According to previous studies, these metavolcanic rocks are exposed at widely scattered places in the Central Range of Taiwan. The purpose of this study is to present petrological, geochemical data (major and trace elements) and Sr-Nd isotopic analyses of the metavolcanic rocks of Shinkangshan area and the nearby associated Hsiangyangshan area.

According to the chemical compositions, the metavolcanic rocks from the Shinkangshan area have SiO_2 contents in the range of 48.29-51.35 wt.%. On the other hand, the metavolcanic rocks from the Hsiangyangshan area are characterized by SiO_2 contents from 49.79 to 65.93 wt.%. On the Chondrite-normalized REE patterns, the Shinkangshan metavolcanic rocks show $(La/Sm)_N$ =1.88-2.87 and $(La/Yb)_N$ =3.41-5.89 and minor positive to non-existent Eu anomalies (Eu/Eu*=0.89-1.00), similar to the oceanic island basalts. The Hsiangyangshan metavolcanic rocks show fractionated REE patterns with $(La/Sm)_N$=1.23-2.07, $(La/Yb)_N$=1.42-2.68 slightly negative Eu anomalies (Eu/Eu*=0.59-1.18).

Primitive mantle-normalized abundance patterns and Sr-Nd isotopic compositions show that the Shinkangshan metavolcanic rocks have geochemical patterns characterized by enrichment in HFSE and LREE relative to HREE, as well as depletion in LILE. Sr–Nd isotopic compositions of samples from the Shinkangshan metavolcanic rocks were analyzed and fall in a range of 0.70364 to 0.70372 for $^{87}Sr/^{86}Sr$ and of +5.93 to +8.0 for εNd. These data indicate that the metavolcanic rocks of the Shinkangshan area are tholeiitic basalts in composition and exhibit a range of intra-plate environments. By contrast, the Hsiangyangshan metavolcanic rocks are volcanic arc basalts and chemical composition exhibit the depletion of Nb, Ta and Ti with remarkable enrichment in Th concentrations, the enriched Sr-isotopic ($^{87}Sr/^{86}Sr$ ratios from 0.70510 to 0.70571) and slightly depleted Nd-isotopic (εNd values from +2.95 to +3.08). These geochemical characteristics and isotopic compositions suggest significant contributions of subduction zone-related source rocks.