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Geochemistry of Cenozoic basaltic rocks from Jiashan County of Nushan Geopark, China: Implications for Petrogenesis and Tectonic Setting

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Abstract : The present paper analyzed the major, trace elements, rare earth elements of these Cenozoic basalts and combined with Sr-Nd isotopic compositions to discuss the petrogenesis of these basalts and the tectonic setting of the study area. Based on major, trace elements and fractional crystallization model we suggest that the basaltic magma has experienced olivine, clinopyroxene, and plagioclase fractionation during its evolution. Spidergrams and REE patterns reveal that Cenozoic basalts found in the Jiashan County, Anhui Province have geochemical characteristics similar to those of ocean island basalts(OIB) suggesting a derivation related to OIB-like mantle source. The slight positive Nb and Ti anomalies found in basaltic rocks of this study suggest the presence of Ti-bearing minerals in the mantle source and these Ti-bearing minerals had contributed to basaltic magma during partial melting, indicating a metasomatic event might have occurred before the partial melting. Based on 143Nd/144Nd vs. 87Sr/86Sr diagram we suggest that basalts of this study can be produced by MORB and EM-I components mixing and small degree of partial melting may be the major controlling factor during generation of basaltic magma. Some basaltic magma may be derived from partial melting of EM-I heated by the upwelling asthenospheric mantle. The basalts fall within the WPB field in the discriminant plot of 2Nb-Zr/4-Y indicate that the volcanic activities in this region may be closely related to deep continental rifting process.

Keywords : geochemistry, cenozoic basalts, Anhui Province, Nushan Geopark, tectonic setting, fractionation
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