

The genesis and relationship of the basalts in the South China Sea basin and the Leiqiong area

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The South China Sea (SCS) is the biggest marginal sea in western Pacific. The opening dynamics of the SCS is much debated due to complex tectonic setting. And the Hainan plume located in the north-western of the SCS has been widely considered to have significant influence on the opening of the SCS. And basalts are generated by partial melting of deep mantle, so that it can provide the information of deep mantle and further reflect deep geodynamics.

There are many Cenozoic basalts in Leiqiong area and the SCS basin. We present whole-rock major elements, trace elements and isotopes of basalts from Leiqiong area and the International Ocean Discovery Program (IODP) Expedition 349, and discover that the basalts in Leiqiong area have the geochemical characteristics which are similar to island arc basalts (IAB) and enriched large ion lithophile elements (LILE) relatively to light rare earth elements (LREE), whereas depleted high field-strength elements (HFSE), eg. high Ba/La, Th/Nb and low Ce/Pb, Ti/Y. Furthermore, these samples show a good continuity in some diagrams of element ratio, and by simulating mixture of two end members combined their geochemical characteristics we explain that the source of the basalts in Leiqiong area are the mixing of oceanic island basalts (OIB) and metasomatic mantle wedge by fluid. This result will contribute to the further studies of the paleo-plates movement and recognition the source of basalts in Leiqiong area. Simultaneously, we analyzed He isotopes which are sensitive to deep mantle material, and the results with Sr-Nd-Pb-Hf isotopes show that the source of basalts in the SCS exists deep mantle material, which have a great significance on the opening dynamics of the SCS.

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