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The Geochemistry of Late Mesozoic Mafic Dyke Swarms in Fujian Province, Southeast China

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Mafic dyke swarms is a special geologic terrain in continent, which can provide us abundant geodynamic information, mafic dyke swarms were an important symbol of the lithospheric extension, which were mainly derived from asthenospheric mantle or mantle-lithosphere under the environment of continental extension-breakup. The mafic dyke swarms were the trace of continental extension-breakup, a key role for reconstruction for collision and breakup of ancient continental block (Windley, 1984; Hall, 1987; Li et al., 1997; Zhou et al., 1998; Hou et al., 2008; Hou et al., 2009), and a direct evidence for understanding about paleotectonic stress state of continental plate (Li et al., 1997). The mafic dyke swarms were composed of special rocks and carry some information about mantle sources, which is called "petroprobe" for research the mantle. The geochemical and isotopic geology of the mafic dyke swarms are important information to research the basic magmatism, mantle source and evolution of mantle (Li et al., 1997). The late Mesozoic mafic dyke swarms are widely spread in Fujian Province, belong to sun-alkaline and mainly distribute along NE-NW direction. The mafic dykes are characterized by high Al₂O₃ (from 13.46 to 20.4 wt. %) and moderate CaO (from 4.09 to 13.21wt. %) compared with Cenozoic basalts in the studied area. In addition, the mafic dyke have high Na₂O and Na₂O/K₂O (from 1.01 to 12.52). Based on the geochemical features (trace elements and Sr-Nd isotopes), these rocks can be divided into two kinds. The first group rocks have relatively low SREE (47-63 ppm) and flat modle [(La/Yb)_N=2.0-

2.1)] of REE patterns, various Nd isotopic values ($\epsilon_{Nd}(t)$ from -1.1 to 2.3) and Sr isotopic ratios [(⁸⁷Sr/⁸⁶Sr)_i from 0.70783 to 0.70909]. However, the second group rocks have higher SREE (66-247 ppm), enriched in LREE [(La/Yb)_N=4.63-19], and relatively negative Nd isotope values ($\epsilon_{Nd}(t)$ from -10.4 to -0.5). In the primitive mantle-normalized spider diagrams, the first kind dykes show positive Pb and absent in Ta-Nb-Ti depletion. In contrast, the other group dykes are shown by enrichment in LREE and LILE, but depletion in HFSE (Nb, Ti and Ta). The geochemical features indicate that the dykes were derived from partial melting of mantle source, the first kind rocks almost from a depleted source, the other rocks mainly from an enriched source, however, there is no obvious crustal contamination during genetic process. K-Ar ages of the mafic dykes show they are the result of Cretaceous magmatism. In Fujian province, systematical investigations on the mafic dykes indicate that there are various lithospheric mantles (i.e., enriched and depleted ones) in the Late Mesozoic.

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