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浙江临海猫狸岭岩体的成因: 年代学、地球化学与Sr-Nd-Hf同位素制约

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#### 摘要:

猫狸岭岩体位于浙江省临海县仙人桥-猫狸岭一带, 其主体岩性为石英二长闪长岩、石英二长岩和细粒花岗岩。LA-ICP-MS 锆石U-Pb定年表明石英二长闪长岩和细粒花岗岩的年龄分别为 $105.6 \pm 1.0$  Ma和 $104.8 \pm 0.9$  Ma。主量元素组成上, 石英二长闪长岩具准铝质、钙碱性和富钾的特征, MgO、 $\text{Fe}_2\text{O}_3^{\text{T}}$ 、CaO等含量较高,  $\text{Mg}^{\#}$ 值变化于47.6~50.6; 细粒花岗岩同样具富钾和准铝质特征, 但偏酸性, MgO、 $\text{Fe}_2\text{O}_3^{\text{T}}$ 、CaO等含量相对偏低,  $\text{Mg}^{\#}$ 值变化于41.6~47.0。微量和稀土元素组成上, 石英二长闪长岩富集Rb、Th、U、Pb, 贫Nb、Ta、P、Ti, 且Zr、Hf、Sr含量相对较高, 铕负异常不显著( $\text{Eu}/\text{Eu}^* = 0.77 \sim 0.95$ )。细粒花岗岩具有相似的微量元素特征, 但P、Ti亏损程度更明显, 且明显贫Sr, 并具有一定程度的铕负异常( $\text{Eu}/\text{Eu}^* = 0.55 \sim 0.78$ )。石英二长闪长岩和细粒花岗岩具有相似的Sr-Nd同位素组成,  $I_{\text{Sr}}$ 分别为0.7088和0.7079~0.7088,  $\varepsilon_{\text{Nd}}(t)$ 值分别为-7.57~-7.56和-8.06~-7.95。同时, 二者具有大致相似的锆石Hf同位素组成,  $\varepsilon_{\text{Hf}}(t)$ 值分别为-12.2~-6.6和-9.6~-4.4。综合分析表明, 猫狸岭石英二长闪长岩和细粒花岗岩最可能是在区域伸展拉张的构造背景下, 由底侵或内侵的幔源岩浆与其诱发的壳源岩浆经混合后, 并经过不同程度的分异演化, 最后在浅成环境侵位的产物。

#### 英文摘要:

The Maoliling pluton, lithologically consisting mainly of quartz monzodiorite, quartz monzonite and fine-grained granite, is outcropped around Xianrenqiao and Maoliling of Linhai County, Zhejiang Province. LA-ICP-MS zircon U-Pb ages show that the quartz monzodiorites and fine-grained granites were emplaced at  $105.6 \pm 1.0$  Ma and  $104.8 \pm 0.9$  Ma, respectively. Geochemically, the quartz monzodiorites show metaluminous, calc-alkaline and potassium-rich signatures, and have relatively high concentrations of MgO,  $\text{Fe}_2\text{O}_3^{\text{T}}$  and CaO with high  $\text{Mg}^{\#}$  values (47.6~50.6), whereas the fine-grained granites show similar signatures in metaluminous and potassium-rich, but have lower contents of MgO,  $\text{Fe}_2\text{O}_3^{\text{T}}$  and CaO with lower  $\text{Mg}^{\#}$  values (41.6~47.0) than the quartz monzodiorites. The quartz monzodiorites are enriched in Rb, Th, U, Pb, and depleted in Nb, Ta, P, Ti, and have relatively high contents in Zr, Hf and Sr, with unobvious negative Eu anomalies ( $\text{Eu}/\text{Eu}^* = 0.77 \sim 0.95$ ). The fine-grained granites show similar trace and rare earth elements characteristics to those of quartz monzodiorites, but are more depleted in P, Ti and Sr, and display some degrees of negative Eu anomalies ( $\text{Eu}/\text{Eu}^* = 0.55 \sim 0.78$ ). The quartz monzodiorites and fine-grained granites show similar Sr and Nd isotopic compositions, with  $I_{\text{Sr}}$  values of 0.7088 and 0.7079~0.7088, and  $\varepsilon_{\text{Nd}}(t)$  values of -7.57~-7.56 and -8.06~-7.95, respectively. Meanwhile, they also have similar zircon Hf isotopic compositions, with  $\varepsilon_{\text{Hf}}(t)$  values of -12.2~-6.6 and -9.6~-4.4, respectively. The integrated petrology, elemental and isotopic compositions suggest that the quartz monzodiorites and fine-grained granites from Maoliling pluton were most likely generated under a post-collisional extensional setting, and via a process including formation of parental magma by mixing of a underplated or an intraplated mantle-derived magma and an induced crustal-melted magma in the deep crust, then suffered differentiation during magma ascent to varying degrees and at last emplaced at a hypabyssal environment.

关键词: [石英二长闪长岩](#) [细粒花岗岩](#) [岩浆混合作用](#) [壳幔相互作用](#) [浙江猫狸岭岩体](#)

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