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藏东同普杂岩体年代学、地球化学、Sr-Nd同位素特征及大地构造意义

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#### 摘要:

同普杂岩体位于藏东江达地区。本文对该杂岩体岩相学、年代学、主微量元素以及Sr-Nd同位素进行了详细的研究。结果表明,该杂岩体主要由石英闪长岩、花岗闪长岩、含黑云母花岗岩和斑状花岗岩4种岩石类型组成,前三者形成时代分别为 $262.8 \pm 1.5$  Ma、 $263.9 \pm 1.9$  Ma、 $263.7 \pm 1.6$  Ma。其中,含黑云母花岗岩与斑状花岗岩呈渐变过渡关系,它们和花岗闪长岩一起均具有高 $\text{SiO}_2$  (65.1%~76.6%)、高 $\text{K}_2\text{O} + \text{Na}_2\text{O}$  (4.84%~8.13%)、低 $\text{MgO}$  (0.25%~2.28%)、低 $\text{FeO}^T$  (0.99%~4.44%)、高A/CNK值(除一件样品外两者A/CNK值均大于1.1),以及Ba、Sr、Eu亏损等,均符合强过铝质S型花岗岩的特征。但前两者与后者CaO/Na<sub>2</sub>O、Rb/Ba、Rb/Sr值均存在明显差异,哈克图解上也不存在线性关系,表明它们源区存在差异。石英闪长岩则具有相对低的 $\text{SiO}_2$  (54.2%~55.4%)、低 $\text{K}_2\text{O} + \text{Na}_2\text{O}$  (3.15%~4.72%)、高 $\text{MgO}$  (3.78%~4.79%)、高 $\text{FeO}^T$  (6.13%~8.09%)等特征。其还具有明显的Nb负异常,不具有Sr的负异常,以及轻稀土相对富集等,均符合岛弧岩浆岩的特征。Sr-Nd同位素特征显示,斑状花岗岩与花岗闪长岩具有相似的初始Sr比值(分别为0.7099, 0.7125)和 $\epsilon_{\text{Nd}}(t)$ 值(分别为-8.6, -10.3),而石英闪长岩则具有较低的初始Sr比值(0.7062),较高的 $\epsilon_{\text{Nd}}(t)$ 值(1.37)。前两者均落入研究区S型花岗岩与高硅流纹岩区域,后者落在金沙江MORB的下方。通过综合分析,本文认为同普杂岩体形成于火山弧环境,且各岩石类型具有不同的源区:含黑云母花岗岩、斑状花岗岩与花岗闪长岩的源区分别为古老的泥质变质岩和贫泥质的变质砂岩;石英闪长岩则来自富集地幔。表明在晚二叠世早期(~263Ma)金沙江洋盆仍处于俯冲阶段,江达地区主要受金沙江洋盆俯冲消减体系控制而非地幔柱体系。

#### 英文摘要:

Tongpu intrusive complex, located in eastern Tibet, consisting of biotite granite, porphyritic granite, granodiorite and quartz diorite. In this paper, we report detailed petrography, zircon U-Pb ages, whole-rock major and trace elements, Sr-Nd isotopic compositions of the Tongpu intrusive complex. The results suggest that the biotite granite, granodiorite and quartz diorite formed at the similar time with crystallization ages  $263.7 \pm 1.6$  Ma,  $263.9 \pm 1.9$  Ma,  $262.8 \pm 1.5$  Ma, respectively. Biotite granites, porphyritic granites and granodiorites contain high  $\text{SiO}_2$  (65.1%~76.6%) and  $\text{K}_2\text{O} + \text{Na}_2\text{O}$  (4.84%~8.13%) contents but low  $\text{MgO}$  (0.25%~2.28%) and  $\text{FeO}^T$  (0.99%~4.44%) contents. They also have high A/CNK values (mainly from 1.15 to 1.51) and depleted Ba, Sr and Eu contents, which are comparable to the strongly peraluminous S-type granites. However, CaO/Na<sub>2</sub>O, Rb/Ba and Rb/Sr ratios of them are significantly different, and they also show no correlation in Hark variation diagrams, suggesting that they have different source regions. On the other hand, the quartz diorites exhibit low  $\text{SiO}_2$  (54.2%~55.4%) and  $\text{K}_2\text{O} + \text{Na}_2\text{O}$  (3.15%~4.72%) contents but high  $\text{MgO}$  (3.78%~4.79%) and  $\text{FeO}^T$  (6.13%~8.09%) contents. They show arc affinity with depleted Nb, enriched in LREE compared to HREE and no Sr anomaly. In terms of isotopic compositions, porphyritic granite and granodiorite have high initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios (0.7099 and 0.7125, respectively) and negative  $\epsilon_{\text{Nd}}(t)$  (-8.6 and -10.3, respectively), consistent with the S-type granites and high- $\text{SiO}_2$  rhyolite of our research area. However, quartz diorite has low initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios (0.7062) and positive  $\epsilon_{\text{Nd}}(t)$  (1.37), which resembles the Jinshajiang MORB field. Therefore, we suggest that Tongpu intrusive complex was formed under volcanic arc setting. The four rock types of it have different source regions: biotite granite, porphyritic granite and granodiorite were derived from partial melting of crust materials mainly of pelite and greywacke, respectively while quartz diorite was derived from the enriched mantle. Our research also suggested that the Jinshajiang ocean was still under a subducted setting at the early stage of Late Permian.

关键词: [藏东](#) [同普杂岩体](#) [年代学](#) [地球化学](#) [Sr-Nd同位素](#)

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