

SMP006-02

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Evidence for contrasting magmatic conditions of A-type granitoids from the Emeishan large igneous province (SW China)

Evidence for contrasting magmatic conditions of A-type granitoids from the Emeishan large igneous province (SW China)

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The Emeishan large igneous province contains a diverse assemblage of igneous rocks including mildly peralkaline granitic rocks of A-type affinity. The granitic rocks from the Panzhihua, Baima and Taihe plutons are temporally, spatially and chemically associated with layered mafic-ultramafic intrusions. Electron microprobe analyses of the major and accessory minerals along with major and trace element data were used to document the magmatic conditions of the three peralkaline plutons. The amphiboles show magmatic/subsolidus trends and are primarily sodic-calcic in composition (i.e. ferrichterite or richterite). Sodic (i.e. riebeckite-arfvedsonite) amphiboles are restricted to the Panzhihua and Taihe plutons. The amphiboles from the Panzhihua and Taihe granites are very similar in composition whereas amphiboles from the Baima syenites have higher MgO wt% and lower FeO wt% and TiO_2 wt%. Whole-rock Zr saturation temperature estimates indicate the initial average magma temperatures were $\sim 940 \pm 21$ °C for the Panzhihua pluton, $\sim 860 \pm 17$ °C for the Baima pluton, and $\sim 897 \pm 14$ °C for the Taihe pluton. The initial F_{melt} (wt%) values were calculated to be 1.1 ± 0.1 , 0.8 ± 0.1 and 1.1 ± 0.1 wt% for the Panzhihua, Baima and Taihe plutons, respectively. The estimated F_{melt} (wt%) values are higher than what can be accounted for in the Panzhihua and Taihe plutons and indicate that they may have lost F during crystallization. In contrast the F_{melt} (wt%) value for the Baima pluton can be accounted for. The presence of titanite + magnetite + quartz in the Baima syenites indicates oxidized $f\text{O}_2$ conditions whereas the presence of aenigmatite and ilmenite in the Panzhihua and Taihe granites indicate that they were relatively reducing. Although the A-type granitoids formed by the same processes (i.e. fractional crystallization of mafic magmas), their differences in major element and mineral chemistry are likely related to a combination of initial bulk magma composition and magmatic oxidation state.

キーワード: A-type granite, Peralkaline, Late Permian, Zr saturation thermometry, Ferrichterite, Aenigmatite

Keywords: A-type granite, Peralkaline, Late Permian, Zr saturation thermometry, Ferrichterite, Aenigmatite