Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)
©2011. Japan Geoscience Union. All Rights Reserved.

SMP006-02 Room:303 Time:May 25 15:00-15:15

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

J. Gregory Shellnutt[1*], Yoshiyuki Iizuka[1]

[1]Academia Sinica

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. ferrorichterite 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 FeOt wt% and TiO{sub}2{/sub}wt%. Whole-rock Zr saturation temperature estimates indicate the initial average magma temperatures were ˜940 +/- 21{sup}o{/sup}C for the Panzhihua pluton, ˜860 +/- 17{sup}o{/sup}C for the Baima pluton, and ˜897 +/- 14{sup}o{/sup}C for the Taihe pluton. The initial F{sub}melt{/sub}(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{sub}melt{/sub}(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{sub}melt{/sub}(wt%) value for the Baima pluton can be accounted for. The presence of titanite + magnetite + quartz in the Baima syenites indicates oxidized fO{sub}2{/sub} 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.

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