Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

SMP09-P06 会場:コンベンションホール 時間:5 月 27 日 18:15-19:30

インド西ダルワールクラトンのチトラドゥルガ周辺に産する古始生代TTG および新始生代高 K 花崗岩の地球化学
Geochemistry of Paleoarchean TTGs and Neoarchean high-K granites around Chitradurga, western Dharwar Craton, India

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The western Dharwar Craton (WDC) mainly comprises TTG-type peninsular gneiss, greenstone belts, and high-potassium granites (e.g. Chadwick et al., 2000; Jayananda et al., 2013). The TTGs are widely distributed in the WDC as 3.4?3.2 Ga basement rock and occasionally contain more elder sediments and volcanics (i.e. the Sargur Group) (e.g., Peucat et al., 1993). The greenstone belts, named the Bababudan and the Chitradurga Group, unconformably overlies the TTGs as 2.9?2.6 Ga sedimentary covers (Hokada et al., 2013), consisting mainly of conglomerate/quartzite, BIFs, and mafic to felsic volcanics (e.g. Chadwick et al., 1981). The high-potassium granites crop out as several isolated intrusions in both the TTGs and the greenstone belts. The intrusive ages of the granites are mostly around 2.61 Ga (e.g. Jayananda et al., 2006). The aim of this paper is to make clear the petrographic and geochemical characteristics of the Paleoarchean TTGs and the Neoarchean high-potassium granites around Chitradurga in the WDC, southern India.

The TTGs are largely grouped into two types; K-feldspar (Kfs)-poor meta-trondhjemite and K-feldspar-rich meta-granite. The Kfs-poor meta-trondhjemite has petrographic and geochemical features of slab-derived TTGs. On the other hand, the Kfs-rich meta-granite contains abundant K-feldspar, a mineral phase that is not common in the TTGs. Additionally, the meta-granite shows different geochemical characteristics than that of TTGs. In particular, their Al2O3 and Sr contents are not enriched, and their K2O/Na2O ratios are higher, which look like continental type of TTGs. These features of rocks suggest that the Kfs-poor meta-trondhjemite are derived from oceanic crust melting, whereas the Kfs-rich meta-granite are derived from the re-melting of crustal materials. In Paleoarchean western Dharwar Craton, many slab-derived TTGs had intruded in to the crust. In addition, it is probable that the crustal recycling has already started.

The Neoarchean high-potassium granites around Chitradurga area are divided into three intrusions; Chitradurga granite, Hosdurga granite, and Jampalnaikankote granite (Jayananda et al., 2006). We revealed that they have different petrographic and geochemical features each other. The Chitradurga granite is a massive and coarse-grained. The Hosdurga granite is characterized by mylonitic foliation and consists of pinkish medium-grained rocks. The Jampalnaikankote granite is essentially including hornblende and is locally associated with gabbroic rocks. Chitradurga and Hosdurga granites can be geochemically classified into within-plate type granites, whereas the Jampalnaikankote granite is possibly of volcanic-arc origin. This suggests that the high-potassium granites are derived from different sources implying that the Neoarchean western Dharwar crust maybe composed of heterogeneous materials including volcanic arcs and matured continents. Based on detailed geochemical, we discuss the magmatic evolution and origin of the Paleo- to Neoarchean plutonic activity in the western Dharwar Craton.

References:
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キーワード: TTG, 高 K 花崗岩, ダルワールクラトン, インド
Keywords: TTG, High-K granite, Dharwar Craton, India