

Geological significance of unusually Fe-rich ultramafic cumulate of the Furudono ophiolite in Abukuma Mountains (NE Japan)

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Since Miyashiro (1961)'s concept of "paired metamorphic belts", the Abukuma LP-HT metamorphic belt of NE Japan has been thought as an eastern extension of the Ryoke belt that was paired with the Sambagawa HP-LT metamorphic belt. However as our recent study of the "Furudono ophiolite (FDO)" (Sato and Ishiwatari, 2015) showed the ophiolitic rocks provide new insights into a framework of pre-Jurassic geotectonic units of Japan. In this talk, we will introduce petrological characteristics of the FDO and will propose a few new ideas of correlation between the FDO and ophiolitic rocks not only in NE Japan but also in SW Japan.

Sato and Ishiwatari (2015) studied on small mafic-ultramafic bodies in the central part of the Abukuma Mountains; they proposed to distinguish the ophiolitic bodies from the Gosaisho-Takanuki metamorphic rocks as the "Furudono ophiolite". Key petrological features of the ophiolite includes: (1) highly-depleted residual peridotite, (2) unusually Fe-rich ultramafic, and (3) gabbroic rocks with arc-affinity. It is noteworthy that Fe-rich ultramafic cumulate is a rare rock-type in common ophiolites; it might have been produced by a partial melting at relatively great depths.

The recognition of a unique ophiolite in the Abukuma belt is significant in terms of the regional tectonic framework of Japan. What is the significance of the FDO? Sato and Ishiwatari (2015) agreed some similarities in highly-depleted residual peridotites between the FDO and the Hayachine-Miyamori ophiolite (HMO) of Kitakami Mountains (NE Japan). However here we also address a similarity between ultramafic rocks of FDO and these from the Higo belt in central Kyushu, in particular mineral assemblage and compositional similarity. Recently, Ichiyama (2015) reported unusually Fe-rich ultramafic cumulate (Mikame ultramafic body) from the Oshima metamorphic rocks of the westernmost Shikoku; he also pointed out the geological and petrological similarities between the Fe-rich ultramafic cumulate and ultramafic rocks from the Higo belt. Considering our study of the FDO together with recent finding of unusually Fe-rich ultramafic cumulates in the westernmost Shikoku, the FDO may correlate to ultramafic rocks of the Higo belt rather than HMO. It had been postulated a geological correlation between the Higo and Abukuma metamorphic rocks on the basis of protolith etc (e.g., Isozaki et al. 2010). Unusually Fe-rich ultramafic cumulates would be a new geological tracer to link between the Higo and Abukuma belts.

Keywords: Furudono ophiolite, Ultramafic cumulate, Supra-subduction zone, Abukuma belt