

# Metamorphic overprint of the Kamuikotan metamorphic rocks by fluid migration during exhumation around Asahikawa City, central Hokkaido, Japan

\*Wonji Shin<sup>1</sup>, Toru Takeshita<sup>1</sup>

1. Graduate School of Science, Hokkaido University

Subduction zone is a place where fluid cycling occurs from surface through the lithosphere to the lower mantle of the Earth. However, for high-P/T metamorphic rocks in intermediated depths of subduction zone, fluid migration associated with metamorphism remains unclear. The Kamuikotan metamorphic rocks in northern Japan are the typical high-P/T metamorphic rocks in the world, formed by subduction during Early Cretaceous to early Eocene (Sakakibara and Ota, 1994). Around Asahikawa City, they have evidence implying thermal overprint which might have been caused by fluid migration. Kamuikotan metamorphic rocks in study area show relatively high geothermal gradient (Sakakibara and Ota, 1994), spatially heterogeneous distribution of K-Ar ages (Ota *et al.*, 1993; Ota, 1999; Iwasaki *et al.*, 1995) and pervasive development of quartz veins while high-P/T mineral assemblages recording prograde metamorphism were only locally preserved. The purpose of this study is to reappraise the tectonics of the Kamuikotan metamorphic rocks in respect of metamorphic overprint by fluid flow during exhumation. In this study, we conducted petrographic and mineralogical analyses for mafic rocks and Raman spectroscopy of carbonaceous material for pelitic rocks to elucidate the spatial center and effect of the thermal overprint. The mafic rocks contain lawsonite, pumpellyite along the Ishikari River, glaucophane, pumpellyite, actinolite and Na-pyroxene along the branch of Ishikari River, and epidote, actinolite along the Orowen River from north to south. chlorite exists in all of the analyzed metabasites. Six pelitic rocks were analyzed to infer the peak metamorphic temperature by using Raman CM geothermometer (Kouketsu *et al.*, 2014). The metamorphic temperature estimated from full width at half maximum of D1-band is approximately 313°C from the Ishikari River, 300°C from the branches of Ishikari River, 351°C from the Orowen River, and 325°C from the Pankehoronai River areas from north to south. Glaucophane and lawsonite are restrictively distributed in the northern part of this area and the overgrowth of actinolite on alkali amphibole indicates the Kamuikotan metamorphic rocks underwent metamorphic overprint (greenschist facies at 58 Ma; Ota, 1999) during exhumation. It is inferred that the effect of fluid migration was most intense around the Orowen River area within the study area. Further research is needed to determine the origin of fluid.

Keywords: Kamuikotan metamorphic rocks, tectonics, fluid migration, exhumation, metamorphic overprint, Raman spectroscopy