Transport of geofluid revealed by stable isotopic compositions of carbon and oxygen of carbonate rocks in Sør Rondane Mountains, East Antarctica

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Geological expedition party of JARE-51 had performed field survey from Nov 2009 to Feb 2010 in the Sør Rondane Mountains. Geological research on the Sør Rondane Mountains had been carried out since field season of JARE-49. JARE-49 covered mostly in the central part of the Sør Rondane Mountains, and JARE-50 was in the western part of the Mountains. As the final year of three year geological project, JARE-51 planed to survey in Balchenfjella and its surrounding areas where located in the eastern part of the Sør Rondane Mountains

The Sør Rondane Mountains was mainly composed from metamorphic and plutonic rocks. Additionally marble layers and related calc-silicate rocks were distributed from northwestern to south eastern parts of the Mountains. We collected carbonate minerals from pure and impure marble layers, associated marginal layers and blocks of calc-silicates. To reveal transport phenomena and effects of geofluid for metamorphic reactions during metamorphic process, we collected carbonate minerals from the marble layer with several intervals along a traverse line within the layer

Fig. 1 show survey points and sampling layers of marble: Parlebanded (western part), Brattnipene_Thumb Ridge, (central part) and Balchenfjella (eastern part). Thickness of the marble layers from 5 to 10 m, and usually associated with calc-silicate layers. Fig. 3 shows variation of carbon and oxygen isotopic compositions of the marble layer in the Brattnipene_Thumb Ridge. It is clearly to observe systematic changes of isotopic compositions for both of carbon and oxygen which indicates semi-qualitative composition of H_2O-CO_2 geofluid and metamorphic fluid flow.

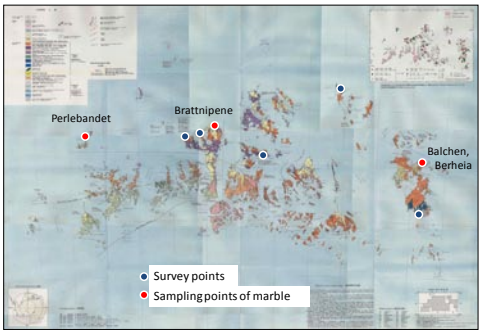

Fig. 1 Survey points and sampling layer of marble in the Sør Rondane Mountains.

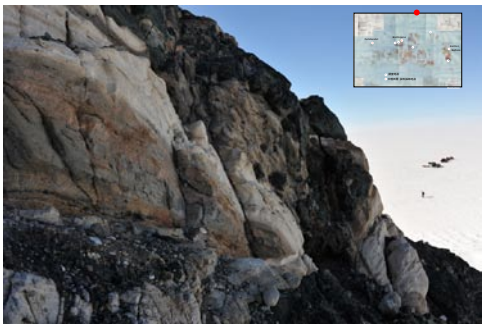

Fig. 2 Marble layer for systematic sampling along a traverse line, (ca. 5 m in thickness), Brattnipane, Thumb ridge, central part of Survey port the Sør Rondane Mountains.

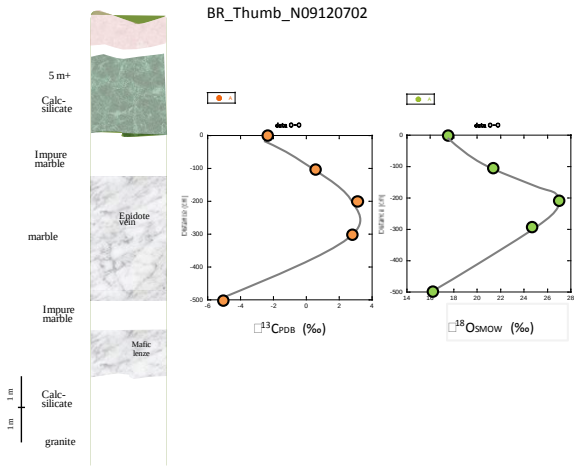

Fig. 3 Geological column and variations of carbon (PDB) and oxygen (SMOW) isotopic compositions along the traverse line in the marble layer, shown in Fig. 2.

Acknowledgments Earth science expedition in Sør Rondane Mountains, of JARE-51 involved three research teams of geology, geomorphology and meteorite. Field survey was performed with cooperation among three research teams. Thank you for all of members. We have special thanks to members of BELARE for logistic supports during whole period of expedition. We also thank to other members of summer and winter parties of JARE-51.