

Links between global magmatism and GIA -Future plan-

Tatsuo Kanamaru¹, Kenichiro Tani², Masahiro Ishikawa³, Kuniyuki Furukawa⁴, Masakazu Fujii⁵, Osamu Ishizuka⁶
and Jun'ichi Okuno⁵

¹*Nihon University*

²*National Museum of Nature and Science, Japan*

³*Yokohama National University*

⁴*Aichi University*

⁵*National Institute of Polar Research*

⁶*Geological Survey of Japan/AIST*

Does climate change truly influence global magmatism? Many studies show links between climate change and timing of magmatism. That is, post glacial rebound after the Last glacial maximum (LGM) enhanced volcanic activities in Icelandic volcanoes (e.g. MacLennan et al, 2002). Sea-floor topography around mid ocean ridge likely records the Milankovic cycle (e.g. Crowley et al., 2015; Tolstoy, 2015). Modeling by Nakada and Yokose (1992) shows that crustal stress change during glaciation-deglaciation cycle affects way of crustal evolution. In addition, Glacial Isostatic Adjustment (GIA) implies that the post-glacial rebound possibly affect world-wide magmatism, not only subareal volcanoes but also submarine volcanoes and mid ocean ridges, with various degree of time lag because of relatively slow propagation of crust and mantle deformation derived from post glacial rebound. Thus, we are now planning to investigate links between regional volcanic activity and GIA under international corroboration to reveal it. High resolution dating and petrological penetration from crustal and deep mantle substance over latitudinal extent (from the polar to the equator region) must help to understand it. As for Antarctica, region of our interests are hotspot volcanoes on the Victoria land. Alkali elements rich volcanic rocks of Mt. Erebus and Mt. Melbourne are suitable for high resolution Ar-Ar dating. Abundant content of mantle and crustal xenolith included in the rocks of these volcanoes must bring us much information from deep. Volcanological and petrological investigation for these volcano, which are open to investigation because of these strict location, lead us to new insight into global climate-magmatism interaction.

References

- Crowley, J.W., Katz, R.F., Huybers, P., Langmuir, C.H. and Park, S., Glacial cycles drive variations in the production of oceanic crust. 2015, *Science*, doi: 10.1126/science.1261508.
- MacLennan, J., Jull, M., McKenzie, D., Slater, L. and Grönvold, K., The link between volcanism and deglaciation in Iceland, *G³*, 2002. DOI:10.1029/2001GC000282.
- Nakada, M. and Yokose, H., Ice age as a trigger of active Quaternary volcanism and tectonism. *Tectonophysics*, 1992, 212, 321-329.
- Tolstoy, M., Mid-ocean ridge eruptions as a climate valve, 2015, *Geophysical Research Letters*, DOI: 10.1002/2014GL063015.