AOB Seminar

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開催日時: 2014 年 6 月 6 日(金)　16:00 - 17:30
場　　所: 地震・噴火予知研究観測センター　別館 第一会議室

講演題目①:
" Late Quaternary tephrostratigraphy of Baegdusan and Ulleung volcanoes using marine sediments in the Japan Sea/East Sea"

要旨

Only two volcanoes have produced alkaline tephra deposits in the Japan Sea/East Sea region during the Quaternary (Ulleung volcano and Baegdusan volcano), but little is known about their detailed tephrostratigraphy, except for the extensive U-Oki and B-Tm tephras. The differences in chemical composition between alkaline tephras and hemipelagic sediments are usually so large that trace element analysis of bulk sediments can be used to identify alkaline cryptotephra. An INAA scanning method was used to detect alkaline cryptotephra layers in five marine sediment cores from the Japan Sea/East Sea in the stratigraphic interval between the widespread rhyolitic AT (29.4 ka) and Aso-4 (87 ka) tephras. EDS/SEM major element analyses of glass shards hand-picked from individual cryptotephra horizons allowed the source volcano to be determined. A total of five alkaline cryptotephra layers were detected: two from Ulleung volcano (U-Ym tephra, and the newly identified U-Sado tephra), and three from Baegdusan volcano (B-J tephra, and the newly identified B-Sado and B-Ym tephra). The eruption ages of these tephra layers were estimated from correlations with the regional-scale TL (thinly laminated) layer stratigraphy (produced by basin-wide changes in bottom-water oxygen levels in response to millennium-scale paleoclimate variations). The ages of the U-Ym, U-Sado, B-J, B-Sado, and B-Ym tephras are estimated to be 38 ka, 61 ka, 51 ka, 68-69 ka, 86 ka, respectively. This study has allowed the construction of an alkaline tephrostratigraphical framework for the late Quaternary linked to the global environmental changes in the Japan Sea/East Sea as recorded in the TL light/dark sediment color changes, and improves our knowledge of the eruptive histories of the Ulleung and Baegdusan volcanoes.

講演題目②:

" Adakites in East Asia Resulting From Plume-Slab Interaction: Numerical Model Study "

要旨

Adakites which have high Sr (>400 ppm), low Y (<18 ppm), high $^{143}Nd/^{144}Nd$ and low $^{87}Sr/^{86}Sr$ are attributed to partial melting of the eclogited oceanic crust (slab melitng) in the subduction zones. Generally, very young slab (<25 Ma) is required for the partial melting of the subducting slab, supported by numerical model calculations and petological studies. However, some adakites occurred in the subduction zone where even very old oceanic plate (~100 Ma) was subducted, which poses a problem because the old slab cannot be melted by the mantle wedge. For example, the Abukuma adakites in northeast Japan at ~16 Ma are inconsistent with the subducted Pacific slab of which age was ~100 Ma old. Although the injection of the hot asthenospheric mantle by the slab avalanche and opening of the East (Japan) Sea into the corner of the mantle wedge was suggested to explain the Abukuma adakites, it is not clear whether the adiabatic upwelling of the hot asthenospheric mantle is hot enough for the slab melting. In addition, the upwelling of the hot asthenospheric mantle cannot explain the localization of the adakites in the Abukuma region. Another example is the southwest to northeast migration of the adakites from Kyushu to central Japan (Itoigawa-Shizuoka) during Cretaceous. The the migration of the adakites is thought to be attributed to the southwest to northeast migration of the ridge subduction (Izanagi-Pacific plates) but, a recent plate reconstruction model negates the exsitence of the ridge subduction during the entire Cretaceous in East Asia, posing a problem because the old Izanagi plate cannot be melted. In this talk, I will suggest that temporal plume-slab interaction resulted in the Abukuma adakites and the migration of the adakites along the southeast Japan by using time-evolving numerical model experiments. These studies indicate that plume-slab interaction is a promising mechanism for the adakites in the subduction zones.