Compilation of low-temperature thermochronometric data in NE Japan Arc:A preliminary report of apatite fission-track ages

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We are trying the estimation of vertical deformation on geologic time scale in NE Japan Arc based on low-temperature thermometric methods, as a part of “Crustal Dynamics –Unified understanding of intra-island deformation after the great Tohoku-oki earthquake-”project. All of the 30 samples were collected from Cretaceous or early Paleogene granitic rocks across two profiles; the northern profile (N-profile) ranges the Kitakami Mountains, Ou Backbone Range (OBR), and Shirakami Mountains, while the southern profile (S-profile) ranges Abukuma Mountains, OBR, and Iide Mountains. So far, apatite and zircon (U-Th)/He (AHe and ZHe) ages on the S-profile, and AHe ages on the N-proile are obtained. The previous apatite Fisson-Track (AFT) ages of Cretaceous on the Pacific side of NE Japan were obtained from granitic rocks of Kitakami and Abukuma Mountains (Goto 2001, Ohtani et al., 2004), which imply the total amount of denudation is estimated at about ~3 km from late Cretaceous to present. On the other hand, young AFT ages of Miocene or Pliocene were reported in Iide and Echigo Mountains on the Japan Sea side(Goto 2001, Sueoka unpublished data), which may reflect rapid uplift and denudation since Neogene. AHe and ZHe ages of S-profile indicate about 50 Ma in Abukuma Mountains, whereas AHe ages of both profiles are estimated at younger than 10 Ma on all the based on sampling localities to the west of Fukusima Basin. These young ages reflect the thermal histories since the opening of the Japan Sea (25-15 Ma), and they are consistent with the initiation of the uplift of Dewa Hills and Asahi Mountains (Moriya et al., 2008). In addition, the compression field in NE Japan Arc initiated since the end of middle Miocene, and the mountains started to be uplifted since the end of Miocene or Pliocene (Ota et al., 2010). The young AHe ages are attributable to cooling and denudation accompanied with the mountain uplifting. Thermal reset due to volcanism is less possible considering the distance from the Quaternary volcanoes and adjacent high-geothermal gradient regions (Tanaka et al., 2004) and Neogene caldera (Yoshida et al., 2013).
In this presentation, we report the new AFT ages of S-profile at which He ages were previously obtained, and discuss uplift and denudation history of NE Japan Arc by combining with the previously reported FT and He ages. AFT ages were measured by following procedures of Hasebe et al. (2004) in which uranium contents are estimated by using LA-ICP-MS. For more detailed constraints of the thermal histories, we are planning to apply U-Pb and zircon FT methods, and to conduct additional measurements of AFT ages.

Keywords: thermochronology, (U-Th)/He age, fission track age, NE Japan Arc

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