

Thermochronologic mapping of the Japan Arc: Toward reconstruction of the long-term uplift-denudation history

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Recent progress of low-temperature thermochronology, e.g., developments of (U-Th-Sm)/He method and fission-track inversion modeling, enables to analyze uplift-denudation-cooling histories of the island-arc mountains with good confidence. This is particularly fruitful for studying the topographic evolution of the Japan Arc, because many of the Japanese mountains are started to uplift in recent time (e.g., late Pliocene to Quaternary) after an extended period of relative tectonic quiescence, and hence the resultant smaller amount of total denudation is only resolvable by low-temperature thermochronology. This was first demonstrated by elucidating the uplift-denudation-cooling process of the Kiso and Akaishi Mountains, in which average topographic changes of the tilted mountain block were quantitatively reconstructed¹⁻². Such analyses also allow to estimate the background paleo-temperature (depth) of neo-tectonic faulting episodes.

In this presentation, we give brief overviews of thermochronology and tectonic background of the Japan Arc, and then highlight some of the ongoing thermochronologic research projects, such as: Compilation of previously reported thermochronologic data from the Japan Arc, (U-Th-Sm)/He and fission-track analyses of the NE Japan Arc³, which is a main subaerial part of the overriding plate of the Mega-earthquake epicenter, (U-Th-Sm)/He, fission-track and U-Pb analyses of the Hida Mountain, which is a part of central mountain ranges that are formed by recent collisional convergence between the NE and SW Japan Arcs, and may have suffered an overspread deformation with great strain rates, as deduced from the exposure of youngest granites on the Earth⁴⁻⁵.

References[S1]

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