

## Uplift and denudation history of the Akaishi Range, central Japan: Constraints from low-temperature thermochronology

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Zircon He, zircon U-Pb, and additional fission-track (FT) analyses are used to identify the denudational history and pattern of the Akaishi Range, which has been uplifted since the late Pliocene. Zircon He grain ages from nine samples range from 21.5 to 3.0 Ma, while the ages are systematically younger to the east. These ages are interpreted to reflect the uplifting of the Akaishi Range because the youngest ages are consistent with the age at which uplifting was initiated according to the depositional ages of gravel. The decreasing ages to the east can be explained by subsequent denudation of the uplifted Akaishi Range, assuming a westerly tilting uplift of the region west of the Itoigawa-Shizuoka Tectonic Line (ISTL). Although denudation cannot be identified exactly because of a lack of precise estimates of the paleo-geothermal gradient of the study area, it is certain that the entire area between the Median Tectonic Line and ISTL has been denuded by a few kilometers since the onset of the range uplift. This implies that the topography of the Akaishi Range reflects post-uplift factors, e.g., spatial distribution of bedrock uplift rates and various denudation processes, rather than inherited geometry from the pre-uplift topography. Considering younger apatite FT ages previously reported in the southern part of the Akaishi Range, the Akaishi Range is considered to have had at least two uplifting stages, i.e., uplifting of the northern part since the late Pliocene and uplifting of the southern part since ~1 Ma, probably attributable to faulting of ISTL and collision of the Izu block to the south Fossa Magna area, respectively.

Keywords: low-temperature thermochronology, (U-Th)/He method, fission-track method, U-Pb method, denudation, Akaishi Range