[JJ] Evening Poster | S (Solid Earth Sciences) | S-GL Geology

[S-GL30]Geochronology and Isotope Geology

convener:Takahiro Tagami(Graduate School of Science, Kyoto University), Yuji Sano(Division of Ocean and Earth Systems, Atmosphere and Ocean Research Institute, University of Tokyo)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Reliable reconstruction of geohistory is of primary importance to better envision the present and future of the Earth. Geochronology and isotope geology play major roles in the reconstruction. This session offers an opportunity to present the results of fundamental studies, including the developments / improvements of analytical methods and age calibration, as well as applications to the Earth and planetary materials. We particularly focus on: (1) radiometric dating, bio-stratigraphy, magneto-stratigraphy and stable isotopic time series that provide the age information, (2) radioisotopes and stable isotopes widely employed for analyzing the Earth and planetary systems and (3) hypothesis and numerical modeling that utilize / assimilate the age and isotopic data. We also welcome contributions that integrate a variety of relevant disciplines.

[SGL30-P04]Cooling profile of the southern slope of Mount Everest since 15 Ma based on zircon and apatite fission-track and muscovite Ar/Ar analyses of the Higher Himalayan Crystallines

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Keywords:Cooling profile, Mount Everest massif, fission track, Ar/Ar

We performed zircon and apatite fission-track (FT) and muscovite Ar/Ar analyses of the Higher Himalayan Crystallines (HHC) including leucogranite along the southern slope of Mount Everest, E. Nepal. Seventeen samples are from the metamorphosed Yellow Band under the Qomolangma Detachment (QD; 8,300 m a.s.l.) down to the Main Central Thrust (MCT; 2000 m a.s.l.) near Jubing. In 17 km of the structural distance between QD and MCT, we found three stages of cooling history based on the relationship between zircon and apatite FT ages. First, rapid cooling zone at the topmost (QD to ~1.5 km below) of HHC has a simultaneity of zircon and apatite FT ages (15~14 Ma) indicating a cooling rate of >>100 °C /m.y. This is supported by unimodal distributions of confined-track length in zircon. Second, slow cooling zone (1.5 to 7 km below from QD) has a significant difference of FT ages up to 10 million years among the two minerals from the same rock sample. A cooling rate of 12 °C / m.y. is given in this zone. The resulting broad and skewed track-length distributions in zircon support the slow cooling history. Third, relatively fast cooling zone (40-50 °C/ m.y.) corresponds to the lower half of HHC in which the 10 km-thick massif has constant zircon and apatite FT ages being 5-3 Ma and 1.5-0.8 Ma, respectively. The cooling pattern of the third zone cannot be explained by uplift. In other words, the exhumation of Mount Everest massif has occurred earlier at least than 5 Ma. From interpolation between muscovite Ar/Ar ages and apatite FT ages, ~250°C is estimated as the closure temperature for the retention of fission tracks in zircon at the cooling rate of 50 °C/m.y. In this presentation, we will show temporal changes of cooling profile since 15 Ma and discuss exhumation history of HHC in the Mount Everest massif.