Cooling history of the Higher Himalayan Crystalline nappe and underlying the Lesser Himalayan Sediments in eastern Nepal revealed by fission-track dating of detrital zircons.

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Fission-track (FT) dating of detrital zircon has been applied to the Higher Himalayan Crystalline nappe and the underlying Lesser Himalayan sediments (LHS) distributed along a 120 km long section from Mt. Everest to the Main Boundary Thrust (MBT) in eastern Nepal. In this paper, we report the results of 70 km long southern section between the Main Central Thrust (MCT) and the MBT. We collected rock samples from the Higher Himalayan Crystalline nappe of eastern continuation of the Kathmandu nappe and underlying autochthonous middle Proterozoic sequence of the LHS. Zircon FT ages show younging toward the north from 12.1 Ma just behind the MBT to 3.0 Ma just below the MCT in the root zone at southern slope of the Everest massif. It suggests that the LHS was covered by hot crystalline nappe comprising of metamorphic rocks, and fission-tracks of the detrital zircons have been annealing since 12 Ma. On the basis of retreating rate of isotherm line of closure temperature of ZFT, we estimated average cooling rate of the nappe and underlying LHS as about 7 mm/y, which is as same as 8-7mm/y, reported from the Katmandu nappe in central Nepal (Hirabayashi, MS, 2017). If we applied this rate to the HHS to the north of the MCT in the Everest massif, the location of ZFT age of 0 Ma would be located at 23 km to the north of the MCT, beneath Mt. Kantega (6685 m). It suggests that the underground of Mt. Everest is even now under hot condition higher than 220-350℃ Thus, heat source of hot HHC is ascribed to partially melted middle crust of Tibet, which southern front is located at about 100 km to the north of Himalayan giants.

キーワード：フィッション・トラック年代、ヒマラヤ、ナップ、ジルコン
Keywords: fission-Track age, Himalaya, nappe, zircon

