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HGM22-02 会場:101B 時間:5 月 26 日 15:30-15:45

宇宙線照射生成核種に基づく木曽山脈の隆起・侵食史
Relation between tectonic uplift rates and erosion rates in the Kiso Range from in situ cosmogenic nuclides

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Tectonic uplift enhances the elevation and local relief of mountain ranges (Willett and Brandon, 2002). High relief leads to intensified erosion process through the slope dependent surface processes namely as relief becoming steeper larger erosion process is resulted (Ahnert, 1970). Therefore, documenting rates of uplift and erosion is critical for understating how topography of the mountains is maintained by such a negative feedback. In case of continuous rock uplift, numerical models of landscape evolution suggest that mountain ranges may reach steady states in which uplift rates and erosion rates are balanced, and hence elevation and topography may be maintained (Molnar and England, 1990). In this study, we present erosion rates reconstruction from the drainages of the Tenryu River using terrestrial cosmogenic nuclides (TCN) in order to document their relations to the topographic evolution of the Kiso Range (central Japanese Alps). Measurement of TCN allowed us to determine the erosion rates over the timescale of 10^3 year. We sampled river sediments from the tributaries and the main stream of the Tenryu River. Basin-averaged erosion rates of the tributaries near the main ridgeline of the Kiso Range are 1000-2000 mm/kyr, whereas the southern tributaries have lower erosion rates between 600 and 1000 mm/kyr. In addition to the samples from the modern riverbed, sediment samples were also collected from the drilling cores excavated near the mouth of the Tenryu River in order to reconstruct paleo-erosion rates. Erosion rates using TCN from the core samples show relatively constant erosion rates through the Holocene. Furthermore, previously reported erosion rates using sediment yields (Kawata and Uemoto, 1998) and apatite fission track ages (Sueoka et al., 2012) suggest constant erosion rates of the Kiso Range over 50 yr, 1 kyr, and 1 Myr time scales. These values are comparable with the uplift rate of the Kiso Range (Ikeda et al., 2002), and hence the topography of the range in the central Japan is maintained in a steady state.