Geophysical Research Abstracts, Vol. 9, 02598, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-02598

Denudation and landscape preservation in Taiwan: the cosmic ray exposure perspective

L. Siame (1), H.-T. Chu (2), J.-C. Lee (3), J. Angelier (4), D. Bourlès (1), R. Braucher (1), J. Carcaillet (5), L. Watremez (4), R. Gamerre (1)

(1) Université Paul Cézanne (Aix-Marseille III) - CEREGE, Europôle Méditerranéen de l'Arbois, BP 80, 13545 Aix-en-Provence cedex 04, FRANCE, (2) Central Geological Survey, 2, Lane 109, Hua-Hsin Street, Chung-Ho, 235, Taipei, TAIWAN R.O.C., (3) Institute of Earth Sciences, Academia Sinica, 128 Academia Road, Sec. 2, Taipei 115, TAIWAN R.O.C., (4) Géosciences Azur, Observatoire Océanologique, La Darse, BP 48, 06235 Villefranche-sur-Mer cedex, FRANCE, (5) LGCA, Université J. Fourier, Maison des Géosciences, 1381, rue de la Piscine, 38400 St-Martin d'Hères, FRANCE (siame@cerege.fr)

The direct and feedback relationships between tectonics, climate and denudation are a matter of debate. Long-term averaged denudation rates are needed to validate and calibrate the parameters used in landscape evolution models or to determine the isostatic response to erosional unloading in connection with tectonic modeling. However, a better understanding of these relationships requires quantifying rates of denudation in a wide range of climate and tectonic settings, as well as at various time and space scales. Because of active collision and climatic setting, the Taiwan environment is highly dynamic with high uplift and denudation rates, as well as frequent tropical typhoons facilitating strong erosion dominated by mass movement and high degree of fluvial transport. Nevertheless, at elevations higher than 3,000 meters, glacial geomorphic features inherited from the last glacial period have been preserved in several areas. This is the case in the Nanhuta Shan range (NE Taiwan) where glacial relicts and landforms are best preserved. When combined with the geomorphic characteristics of the sampled areas, the obtained minimum cosmic ray exposure ages suggest that the glacial retreat in the Nanhuta Shan is consistent with the Holocene warming trend. Estimations of local denudation rates from in situ produced ^{10}Be measurements (steady-state surfaces) are compared to those obtained at lower elevations within the Lanyangchi River (also in NE Taiwan) from statistical analysis of short-term sediment load data and in situ produce ^{10}Be measured in river born quartz minerals.

This comparison allows evaluation of denudation rates in NE Taiwan over a variety of time scales (100-10,000 yr) and space scales (local site to basin size). It consequently allows discussing how such glacial features have been preserved despite the highly-dynamic environment of Taiwan.