Geophysical Research Abstracts
Vol. 14, EGU2012-5573, 2012
EGU General Assembly 2012

An approximate fluvial equilibrium topography for the Alps

K. Stüwe and S. Hergarten
University of Graz, Earth Science, Graz, Austria (kurt.stuewe@uni-graz.at)

This contribution addresses the question whether the present topography of the Alps can be approximated by a fluvial equilibrium topography and whether this can be used to determine uplift rates. Based on a statistical analysis of the present topography we use a stream-power approach for erosion where the erosion rate is proportional to the square root of the catchment size for catchment sizes larger than 12 square kilometers and a logarithmic dependence to mimic slope processes at smaller catchment sizes. If we assume a homogeneous uplift rate over the entire region (block uplift), the best-fit fluvial equilibrium topography differs from the real topography by about 500 m RMS (root mean square) with a strong systematic deviation. Regions of low elevation are too high in the equilibrium topography, while high-mountain regions are too low. The RMS difference significantly decreases if a spatially variable uplift function is allowed. If a strong variation of the uplift rate on a scale of 5 km is allowed, the systematic deviation becomes rather small, and the RMS difference decreases to about 150 m. A significant part of the remaining deviation apparently arises from glacially-shaped valleys, while another part may result from prematurity of the relief (Hergarten, Wagner & Stüwe, EPSL 297:453, 2010). The best-fit uplift function can probably be used for forward or backward simulation of the landform evolution.