



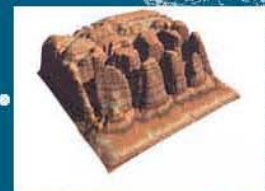
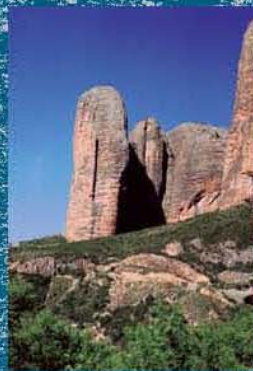
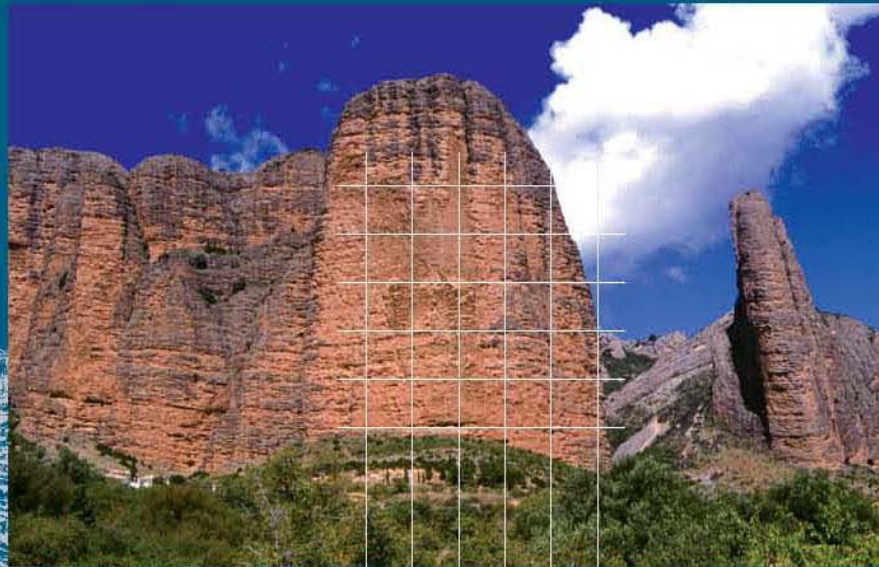
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## Abstracts Volume



## Response of fluvial environments in the Swiss Alps to Late Holocene climate changes

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The Late Holocene depositional history of the Lütshine alluvial fan was reconstructed from morphological mapping, sedimentology, geochemistry, palynology, historical maps, building inventories and <sup>14</sup>C-dating techniques. The independent variables CaO and mesic pollen percentages show a similar pattern from 2400 to 1000 yr cal BP and could be interpreted as natural response to climate forcing. Therefore, correlation between the alluvial fan proxy data and the radiocarbon anomalies are established. The peat horizons correspond to the climate optimums indicated by the negative radiocarbon anomalies. Other climate optimums are represented by the maximum values of mesic trees and by organic rich horizons. Gravel layers, deposited during palaeo-floods, correlate with positive radiocarbon anomalies. By contrast, the continuous anthropogenic impact after the 11<sup>th</sup> century masks the climate signal during the second Millennium. Regarding the period from 1550 to 1880 AD the building inventory of the Lütshine flood plain and the radiocarbon anomalies shows similar tendencies. Periods of enhanced house building coincides with periods of increased solar activity and vice versa. However, mayor sedimentation processes of the Lütshine river system occurred during the cooler Holocene climate events such as the Early Subatlantic Ice Advance (Göschén I period), Early Medieval Ice Advance (Göschén II period) and the Little Ice Age.

**Keywords:** *Fluvial environments; Late Holocene; climate variability; <sup>14</sup>C anomalies; Swiss Alps*

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## The cryosphere and global environmental change: some geomorphic perspectives

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On the basis of IPCC scenarios of doubling of CO<sub>2</sub> concentrations in the atmosphere, the West Antarctic or the Greenland ice sheets are said to have a very low probability of catastrophic collapse within the next century. The possibility can not be ruled out, but it would seem most appropriate to emphasize the long-term probability of such collapse. On the other hand, there is a high probability that changing arctic, sub-arctic and alpine hydrology may generate changes in the oceanic thermohaline circulation which, in turn, may cause abrupt climatic change within the medium-term. In the latter scenario, changing snow, glacier, permafrost and river and lake ice regimes will probably enhance freshwater input into the Arctic Ocean. Mass wasting, fluvial and permafrost degradation processes will have high priority in the interpretation of global environmental change and the cryosphere under this latter scenario. Firstly, questions of threshold exceedance and abrupt changes in geomorphic behaviour are urgent and, secondly, the contribution of geomorphic processes to permafrost degradation, thereby releasing new sources of methane and carbon dioxide, raises questions of feed-back effects in biogeomorphic systems and carbon sequestration. The 'panarchy' framework, borrowed and modified from ecology, is helpful in exploring these questions. More effort continues to be needed in staking out the most important medium-term and long-term niches for geomorphology in this high visibility problematique.

**Keywords:** *Global environmental change; Cryosphere; Feed-back; Threshold exceedance; Panarchy*