Geophysical Research Abstracts, Vol. 8, 09624, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09624


# Modelling fluvial geomorphological response to climate change

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Over the last two decades numerical models have been developed that attempt to understand and predict how climate change impacts on fluvial geomorphology. These models have simulated system response to climate change over time scales of tens of years to millennia, and over spatial scales of a few kilometers to entire drainage basins.

Using recent examples from numerical simulations of river development, this paper discusses some of the key questions posed in this session in terms of fluvial geomorphology; Can we interpret fluvial landscapes in terms of climate change? and what governs the timing and response of geomorphic changes due to climate? Results from modelling studies using the CAESAR landscape evolution model show that simulated fluvial responses are often highly non-linear, which severely hampers establishing a link between climate and land-form development. Furthermore, when examining the timing and magnitude of climatically forced changes, model results often illustrate a high level of historical contingency - that is the response of a catchment is heavily conditioned by its previous state and the previous climate. In addition, climate change may shift the relationship between sediment yield (Qs) and water discharge (Qw), so in different climatic periods the same size flood may erode or deposit significantly different volumes of sediment.

Finally, the paper discusses how information gleaned from numerical models can be used to predict the impact of future climate changes on fluvial geomorphology as well as future issues and questions raised by these results.