Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05674, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05674
EGU General Assembly 2008

Palaeodata/model comparison: testing a cellular based approach to modelling sediment transfer from a catchment to a lacustrine basin

K. E. Welsh (1), J. A. Dearing (2), R.C. Chiverrell (1), T. J. Coulthard (3), A. Lang (1)

(1) University of Liverpool, UK, (2) University of Southampton, UK, (3) University of Hull, UK

A cellular hydro-geomorphic model (CAESAR) is used to capture complexity, non-linearity and feedbacks within the hydrological system of the Petit lac d'Annecy catchment, Haute Savoie, France (48'N; long.6°8'E). The small lake catchment (251 km^2) has three main tributary rivers: Eau Morte, Ire and Bornette rivers, providing the context for applying and validating the model over decadal timescales since the 19^{th} century. The aim of the research is to unravel the role of key drivers, climate or land use, on water and sediment discharge. The model is driven using an hourly precipitation series for different time scales (1826-1995 and 1500-2000), along with independent historical forest records and pollen records to represent land use data.

Results from recent model outputs show that with the aid of a snowmelt sub model, observed water discharge and modelled water discharge match very well. Further model outputs show that modeled sediment discharge for these time scales are consistent with lake sediment accumulation rates for the Petit lac d'Annecy and this comparison is used to validate CAESAR over longer-term temporal scales. Sediment movement and delivery to the lake is largely restricted to high magnitude flood events and these are a function of storms and snow melt pulses. In addition land use change, as varied through the m parameter, also moderates flood magnitude. The modelled lake sediment record appears to respond strongly to land use change, with greater delivery of sediment during periods of lower forest cover and greater anthropogenic use. These

findings are consistent with interpretation of the lake sediment record.