Geophysical Research Abstracts, Vol. 8, 10116, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10116

Identifying reach scale morphological variability in river channels for adaptation to future climate change

H. G. Orr (1,2), C. L. Walsh, (3), A. R. G. Large, (4) M. D. Newson, (4) and C. G. Kilsby (3)

(1) Climate Change Unit, Environment Agency of England and Wales, (2) Geography Department, Lancaster University, UK (h.g.orr@lancaster.ac.uk), (3) School of Civil Engineering and Geosciences, University of Newcastle upon Tyne, UK, (4) School of Geography Politics and Sociology, University of Newcastle upon Tyne

Climate change could have significant consequences for river management and the ecology of freshwater environments. Attempts to characterize the hydromorphology of rivers required by the EU Water Framework Directive are likely to use a range of typologies to describe physical habitats. In order to determine robust definitions of hydromorphological status these should be capable of detecting climate driven changes at a range of temporal and spatial scales.

This paper describes the development of process-based typologies to a case study in the River Eden North West England. Broad channel types are defined using, stream power, geology, valley width and land use. Field reconnaissance is then used to validate channel types and boundaries and determine within type reach variability. Using this approach at the catchment scale enables identification of sites that may be geomorphological active at a range of timescales, sediment sinks, sources and modified channels. This gives an indication of dominant processes and likely sites of geomorphological change and connectivity of reaches in terms of sediment transport. The typology can also help guide monitoring and detection of future change. In addition, the types can be used to explore the impacts of climate change scenarios on the available hydraulic habitats to explore the hydro-ecological relevance.

Initial results suggest that steep channels at the upland lowland transition are responding to climate signals by becoming more dynamic and enlarging in response to increased sediment delivery. Lowland active sites may be experiencing more rapid bank

erosion but are not necessarily changing in character, it is clear that active and responsive reaches are separately by long transfer or relatively inactive channel reaches such that appropriate climate change adaptation strategies e.g. restoration can be targeted at key reaches.