Spatial and Temporal Changes in the Morphology of an Alpine Braidplain Characterised by High Resolution Digital Survey

Jonathan L. Carrivick[1], Jeff Warburton[2], Neil E. Dickson[1], Lee E. Brown[1]

[1] School of Geography, University of Leeds, Leeds, West Yorkshire, LS2 9JT. UK
[2] Department of Geography, Durham University, South Road, Durham, DH1 3LE, UK

Abstract

Alpine meltwater streams are characterised by highly variable river flows (both seasonal and diurnal) and large rates of sediment movement. This results in a highly dynamic river environment where channels are constantly shifting position and sediment erosion and deposition are spatially very variable. These characteristiocs have important implications for the management of Alpine river systems which are harnessed for hydro electric power production due to the need for sediment management structures and potentail danage to infrastructure. It is therefore important to characterise the timescales over which these processes operate in order to assess overall rates of sediment transfer and the stability of the channel network. However, the rapid and highly variable nature of Alpine rivers requires frequent, high resolution topographic data to capture this information. In this paper we describe preliminary results from measurements of the changing structure of the Odenwinkelkees Glacier braidplain (Austria). We use a combination of techniques including catchment-scale LiDAR survey; reach-based terrestrial laser scanning (TLS) and local differential GPS topographic survey to capture the variability in alpine channel morphology. In 2008 detailed surveys of the braidplain were undertaken at the start of July and in late August. Results are used to illustrate changes in the pattern of the channel network; the characteristic styles of sedimentation and rates of sediment transfer. Together they form baseline data for use in runoff and sediment routing models which can be used to predict the future impacts of changes in runoff and sediment supply on the river systems.

Contact

Dr. J. L. Carrivick
j.l.carrivick@leeds.ac.uk

School of Geography / Earth and Biosphere Institute
University of Leeds
West Yorkshire
LS2 9JT
United Kingdom

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