Geophysical Research Abstracts
Vol. 20, EGU2018-1219, 2018
EGU General Assembly 2018

Biogeomorphic effects of caddisflies in gravel-bed rivers: What sizes and amounts of sediment do caddisflies use to build cases?

Richard Mason (1), Stephen Rice (1), Paul Wood (1), and Matthew Johnson (2)

(1) Centre for Hydrological and Ecosystem Science, Department of Geography, Loughborough University, United Kingdom (r.j.mason@lboro.ac.uk), (2) Department of Geography, University of Nottingham

There is growing recognition that manipulation of sediments by animals can have significant consequences for river geomorphology and ecosystem functioning, but the biogeomorphic effects of aquatic invertebrates remain poorly understood. Caddisfly (Trichoptera) are a widespread, abundant and diverse group of aquatic insects, many of which construct distinctive intricate cases from sediment. The quantity and size of the sediment used by caddisfly is a key factor determining the effect of their case and construction activity on the geomorphology and ecology of river systems. This study aims to determine the spatial variability in the quantity and sizes of mineral sediment used by the caddisfly species present. Caddisfly samples were collected from riffle habitats in two small streams, at nested scales to enable analysis of micro to meso-scale spatial variability. Environmental measurements and bulk samples of the available sediment were also collected to help explain any variability in sediment use. For each species, in each sample, a detailed grain size distribution of the caddisfly cases was determined by sieving. This enabled comparison of intra-species, inter-species and inter-site case architecture and resource use by caddisfly.

Caddisflies were found to use a broad range of grain sizes from gravel to clay, with a dominance of grains between 180 microns and 1.4 millimetres. The taxa that used the greatest mass of sediment were Glossosomatidae, important geomorphologically because they typically attach their cases to the surface of larger particles and therefore may influence local hydraulics as well as sediment transport processes. The environmental variables allow cautious interpretation of the conditions that control sediment use, and the work provides an entirely novel view of the sizes and quantities of fine sediment manipulated by different caddisfly species in these UK Gravel-bed rivers. These results, coupled with ongoing in situ and ex situ flume experiments, provide an important preliminary step in developing a fuller understanding of the geomorphic impacts of these widespread and abundant ecosystem engineers.