Geophysical Research Abstracts
Vol. 18, EGU2016-7797-1, 2016
EGU General Assembly 2016

Investigating the effects of transport on the preservation of soft-bodied organisms using an annular flume tank.

Orla Bath Enright (1), Nicholas Minter (1), Esther Sumner (2), Gabriela Mángano (3), and Luis Buatois (3)

(1) School of Earth and Environmental Sciences, University of Portsmouth, United Kingdom. (orla.bath-enright@port.ac.uk, nic.minter@port.ac.uk), (2) Ocean and Earth Sciences, University of Southampton, National Oceanography Centre, Southampton, United Kingdom. (E.J.Sumner@soton.ac.uk), (3) Department of Geological Sciences, University of Saskatchewan, Saskatoon, Canada. (gabriela.mangano@usask.ca, luis.buatois@usask.ca)

Annular flume tank experiments offer unique opportunities to be able to investigate the effect of transport on a range of organisms; being able to create slow to fast sediment-laden flows that can be laminar to fully turbulent, and lasting over durations of minutes to hours. Understanding the effects of transport on the preservation potential of different organisms is fundamental to the study of palaeoecology. Despite this, the sedimentological processes leading up to fossil entombment remain largely overlooked. This is especially significant for fossil lagerstätte such as the Burgess Shale, whose exquisite fossil preservation has enabled insights into the anatomy of early soft-bodied organisms and their evolution during the Cambrian explosion. However there is still a fundamental debate with regards to the transport these organisms have undergone. Namely, whether they were living within or close to the environment of deposition, or could they have been transported from one environment to another? As such, does the Burgess Shale biota represent a palaeocommunity or not?

To explore the limits of the effect of transport, initial experiments have been designed using an annular flume tank in order to test the influence of fully turbulent sandy suspensions (75-250μm) on organism preservation. This is a three factorial design where the three independent variables are transport duration, sediment concentration and grain angularity. In all experiments, flow velocity was kept constant along with controls on pH and salinity. The dependent variable, an index of "increasing state of damage" has been devised to classify the amount of destruction each organism exhibits after the experimental procedure. Results are presented here. From observations such as these, we can begin to set constraints on the amount of transport, if any, that these fossil organisms could have endured.