Origin, transport and burial of organic matter in the Whittard Canyon, North East Atlantic

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POSTER

Submarine canyons are often considered efficient conduits of material to the deep sea that can also harbour varied and well developed ecosystems. Recent work from canyons of the European and N. American margins has revealed highly heterogeneous environments that can also function as important depocentres and are homes to diverse habitats. However little is known about the drivers for such variability and a more comprehensive understanding of the processes within canyons is much needed. The Whittard submarine canyon (Celtic Sea, North East Atlantic) is one of the largest (~100 km across, down to 4500 m depth) and most complex underwater features in the North Western European Margin being home to an array of diverse benthic ecosystems and the focus of much recent research. This project is part of the effort to elucidate the biogeochemical processes that drive variability in the Whittard canyon and assess its significance in marine biogeochemical cycling and deep-sea benthic ecosystem functioning. This will be attempted by examining the provenance, transportation, burial potential and ecological function of sedimentary organic matter from targeted sites of this system. 40 sediment cores, down to ~50 cm, were collected during three surveys in 2013, 2014 and 2015 at depths up to 4210 mbsl across the four main branches and the main channel. Sedimentological (grain size) and geochemical (XRD, XRF, organic Carbon and Nitrogen, lipids) analyses are in progress. Initial grain size results from few cores of the upper western branches have provided a glimpse of the sharp energy changes of the system. Total organic carbon (TOC) concentrations were within already published ranges (0.2-0.6% TOC of dry sediment), but did not correlate well with grain size. At this point it is not clear whether these preliminary results reflect processes related to sediment transport and/or deposition within the canyon at different time scales, local benthic bioturbation, or anthropogenic activities. Future work will focus on the more detailed evaluation of the fluxes, origin, nutritional value and burial potential of the organic material (OM) within the specific sedimentological and geomorphic context of each sampling site.