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The submarine Congo Canyon as a conduit for microplastics to the deep sea

Florian Pohl[1], Lars Hildebrandt[2], Joey O'Dell[3], Peter Talling[4], Megan Baker[5], Fadi El Gareb[2,6], Jacopo La Nasa[7], Francesca De Falco[1], Marco Mattonai[7], Sean Ruffell[8], Joris Eggenhuisen[3], Francesca Modugno[7], Daniel Proefrock[2], Ed Pope[4], Ricardo Silva Jacinto[9], Maarten Heijnen[10,11], Sophie Hage[12,13], Stephen Simmons[14], Martin Hasenhündl[15], and Catharina Heerema[8]

[1]University of Plymouth, United Kingdom of Great Britain – England, Scotland, Wales (florian.pohl63@gmail.com)
[2]Department for Inorganic Environmental Chemistry, Helmholtz-Zentrum Hereon, Germany
[3]Faculty of Geosciences, Utrecht University, The Netherlands
[4]Departments of Geography and Earth Science, Durham University, United Kingdom
[5]Department of Geography, Durham University, United Kingdom
[6]Department of Geoscience, Universität Hamburg, Institute of Geology, Germany
[7]Department of Chemistry and Industrial Chemistry, University of Pisa, Italy
[8]Department of Earth Sciences, Durham University, United Kingdom
[9]Marine Geosciences Unit, IFREMER Centre de Brest, France
[10]National Oceanography Centre Southampton, United Kingdom
[11]School of Ocean and Earth Sciences, University of Southampton, United Kingdom
[12]University of Brest, CNRS, IFREMER, Geo-Ocean, France
[13]Department of Geosciences, University of Calgary, Canada
[14]Energy and Environment Institute, University of Hull, United Kingdom
[15]Institute of Hydraulic Engineering and Water Resources Management, TU Wien, Austria

The increasing plastic pollution of the world's oceans represents a serious threat to marine ecosystems and has become a well-known topic garnering growing public attention. The global input of plastic waste into the oceans is estimated to be approximately 10 million tons per year and predicted to rise by one order of magnitude by 2025. More than 90% of the plastic that enters the oceans is thought to end up on the seafloor, and seafloor sediment samples show that plastics are concentrated in confined morphologies and sedimentary environments such as submarine canyons. These canyons are occasionally flushed by powerful gravity-driven sediment flows called turbidity currents, which transport vast volumes of sediment to the deep sea and deposit sediment in deep-sea fans. As such, turbidity currents may also transport plastics present in the canyon and bury plastics in deep-sea fans. These fans may therefore act as sinks for seafloor plastics. Here we present a comprehensive dataset showing the spatial distribution of microplastics in seafloor sediments from the Congo Canyon, offshore West Africa. Multicores taken from 16 locations along the canyon, sampled different sedimentary sub-environments including the canyon thalweg, canyon terraces, and distal lobe. Microplastics were extracted from the sediments by density separation and the polymer type, size, and shape of all individual microplastic particles were analysed using laser-direct infrared-spectroscopy (LDIR). Microplastic

number concentrations in the sediments of the distal lobe are significantly higher than in the canyon, indicating that the Congo Canyon system is a highly efficient conduit for microplastic transport to the deep sea. Moreover, microplastic concentrations of >20,000 particles per kg of dry sediment were recorded in the lobe, which represent some of the highest ever recorded microplastic number concentrations in seafloor sediments. This shows that deep-sea fans can serve as hotspots and potential terminal sinks for seafloor microplastics.