

PROJECT TITLE

Microplastic abundance and distribution around South Sandwich Islands (Southern Ocean)

PROJECT DESCRIPTION

The occurrence of plastic pollution in the Southern Ocean has been proven in almost all environmental compartments which highlights this region is not as isolated from the rest of the world as previously considered. Being well adapted to extreme but stable environmental conditions, with unique phenotype traits, Antarctic organisms are considered more vulnerable to environmental perturbations and pollutants compared to species from lower latitudes. Thus, microplastics may pose a significant threat to Antarctic marine biota. In the Southern Ocean zooplankton species are often keystone species, having an expedited path to top predators via short food chains. The uptake of microplastics by lower trophic organisms such as zooplankton has been hypothesized as a conduit for microplastics up the food chain. For this reason, it is crucial to investigate Southern Ocean regions characterized by high pelagic biomass to build up a picture of plastic pollution and its potential interaction with the Antarctic Ecosystem. Within the Southern Ocean the South Sandwich Islands (SSI) waters, are considered a hot spot of biological productivity compared to the surrounding open ocean; mainly because the micronutrients availability and the dynamic interactions between oceanic circulation and shelf topography. As results SSI are surrounded by oceans that are species-rich, have high levels of biodiversity and important endemism. Further, these regions support large aggregations of upper trophic level species including the largest population of chinstrap penguins in the world hosting almost 40% of the global population, alongside large populations of Adélie and macaroni penguins. The main object of this project is to quantify microplastic abundance, distribution and characteristics around South Sandwich Islands surface seawater and to determine microplastic potential availability to zooplankton. The samples have been collected during a BAS research cruise expedition using a neuston net comprising two microplastics nets, of 300 micron and 100 micron mesh. Samples have been stored in glass jars and frozen at -20 for analysis. This project will implement the UKRI –FLF funded project CUPIDO “Calculating the strength of the Plastic pump in counteracting the Deep export of Oceanic carbon” which has a focus on the potential impact of microplastic-zooplankon interaction on the marine carbon cycle.

SUGGESTED LENGTH – 4 months

JOB DESCRIPTION

The applicant will develop an understanding of main process dominating the Southern Ocean Pelagic Marine Ecosystem and gain knowledge on the potential interaction between zooplankton and microplastic pollution. The candidate will learn to use several lab techniques as well as using high tech instruments. The specific role will be to investigate the amount of microplastic in the seawater surface and explore the potential interaction between microplastic and key zooplankton species. The student will get involved in 3 main tasks: 1) Chemistry analysis (i.e. enzymatic digestion of organic matter) to isolate organic carbon from microplastic; 2) Microscope analyses (Optical Microscope and Scanning Electron Microscope) to identify degradation state of microplastics debris; 3) Fourier Transform Infrared Spectroscopy (FTIR) analyses to identify, quantify and characterize the microplastic polymers. The candidate will have the opportunity to compare microplastic results with archived data of zooplankton abundance in this region to explore the potential availability through the food web. The candidate will join the Ecosystems group at BAS

where they will get training in Southern Ocean microplastics and zooplankton ecology alongside extensive opportunities to expand a multi-disciplinary outlook through interactions with a wide network of scientists. They will actively participate in science meeting, informal team meeting and seminars. The supervisor will have weekly formal meeting with the candidate to follow the progress and to address the next step. A traineeship record will be prepared and incrementally updated during the meeting. Further, there will be support and mentoring from the PDRAs working in the microplastic group. The student will present a talk to the team meeting on the achieved results at the end of the internship period and will get involved as co-author in the publication of the data on a peer-review journal.

WHAT ARE WE LOOKING FOR?

Familiarity with marine ecosystem and/or micro plastic thematic; previous experience in the lab is not mandatory but will be considered an advantage.