

MICRO-fate
MORE-2
SO 268/3



1. weekly report (5/30 – 6/2)

The RV Sonne science cruise from Vancouver, Canada to Singapore involves two projects: MICRO-FATE and MORE-2. MICRO-FATE investigates the distribution of plastic in oceans, from large accumulations down to decayed and degraded microstructures. Its goal is to capture spatial and vertical distributions including the sampling of sediments for ocean floor deposits. MORE-2 samples reference data over oceans in support of satellite remote sensing and global modeling. The research group on the SO 268/3 cruise involves 29 scientists of 7 different universities and 7 different research institutes. All scientists are shown in Figure 1 prior to the Vancouver departure.



Figure 1. The scientific team (left) and the research vessel (right) prior to the Vancouver departure

The ship departed from Vancouver at 5am on June 30. The earlier than scheduled departure was driven by the threat of delays due to an announced strike by the harbor staff. In Vancouver we had received 21 ARGO floats for deployment along the way (outside national EEZ zones). The newly designed (low weight) floats were built, delivered and prepared for deployment already on May 28 by the staff of the Scripps oceanic Institute near San Diego. The deployment of the first float at 40.5N und 135W was our Station 1. Figure 2 shows the float shortly after the deployment as well as images of initial MICRO-fate measurements. These samples at station 2 are expected to define a state with relatively low plastic content, as backdrop to future samples near 30N, where larger accumulations of garbage and plastic near the surface are expected.

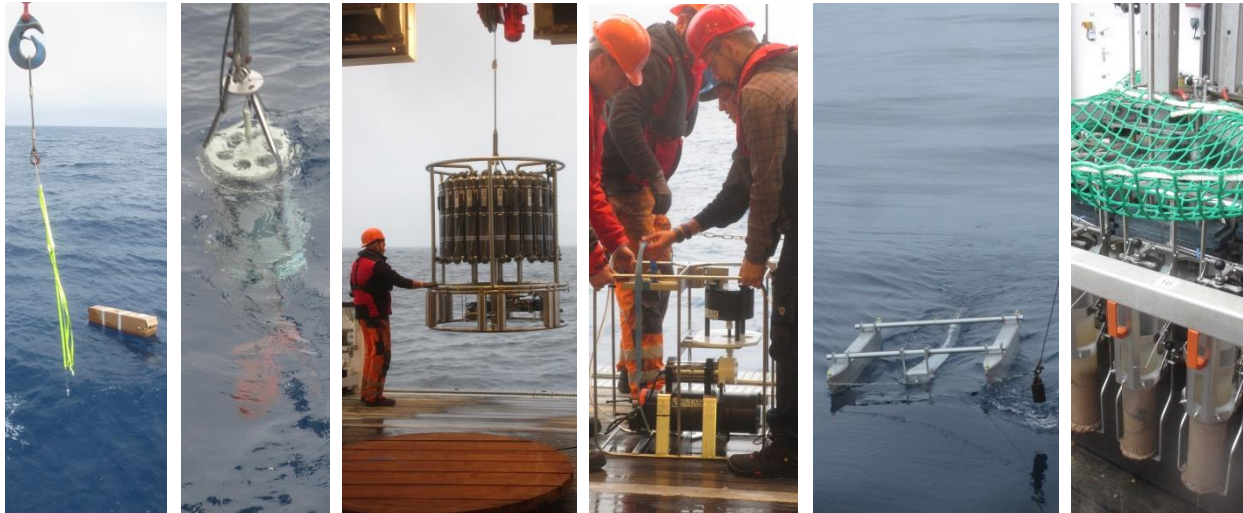


Figure 2. The deployment of the first ARGO float (A) near 40.5N/135W and first operations of an oceanic snow sampler (B), of the CTD with 28 water-samples (C) and 4 attached pumps (D), of a catamaran for surface water probes (E) and of a Multicorer (MUC) for 20 sediment samples (F) - near 39.5N/136W.

Each MICRO-FATE station lasts about an entire day, also due to 5km plus ocean depths. Ocean sampling will be done consecutively with different instruments and methods, that complement each other:

- concentrations of small plastic elements completely covered by organic material (marine snow) in the upper layers of the oceans with a (swedish-built) snow catcher
- profiles of temperature, oxygen, chlorophyll and seasalt-content by lowering (to the ocean-floor) a CTD, which - in addition - allows to collect (up to 24) water samples along the way
- oceanic particle size concentrations larger than 335 μ m in size at the surface with a starboard side pulled catamaran and oceanic particle size concentrations larger larger than 35 μ m in size with pumps (attached to the CTD steel-rope) at different ocean depths
- detection of larger objects in the ocean - especially at the oceans floor - with a camera (OFOS)
- composition of the upper sediment layers of the oceans with a multi-coarer (MUC)

Station sampling is also complemented by continuous aging experiments for plastic material in water tanks on the deck and initial analysis work in the vessel's laboratories.

Also continuous operating is the sampling of atmospheric reference data for the MORE-2 project. Due to continued cloudiness over the last days the number of samples for aerosol and trace-gases has remained sparse. This is expected to change with more intense solar irradiances during the next days, as we continue to lower latitudes.

We all are curious as to the amount of garbage and plastic that has accumulated at the surface in the central regions of the garbage patch, which we are expected to reach and probe during the next week.

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