

MICRO-fate
MORE-2
SO 268/3



3. weekly report (6/10 – 6/16)

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 for the northern Pacific near 30N the longitudinal and vertical distributions in the northern Pacific, including the sampling of sediments on the ocean floor. MORE-2 samples reference data over oceans in support of satellite remote sensing and global modeling and deploys 21 US ARGO floats along the way.

This week our vessel travelled near a latitude of 30N from the garbage patch region westwards to the dateline. Even though the number of floating elements in surface waters had decreased, there was still significant debris floating by. Thus, it was relatively easy to catch material with cashers (or our large net) during the long-lasting profiling stations #5 and #6 at 162W and 175W. As illustrated in Figure 1, the collected debris usually offered a home for marine life. For instance, as we emptied a big plastic barrel we were surprised by the release of many small fishes, which suddenly were jumping on the deck.



Figure 1. Sampled ocean litter, which often offered a home to marine life, as the surface of a big plastic ball for muscles and crabs (left) or a plastic barrel with many small fishes inside (center and right)

On both MICRO-FATE profiling stations this week, which lasted about almost an entire day each, regular probing was conducted. It included CTD profiles (of temperature, salinity, oxygen and chlorophyll), movie images of the ocean floor, the probing of ocean floor sediments and the filtering of smaller particles at the surface (with the Neuston-Katamaran und a snowsampler) and in different depth (mit McLane-pumps attached to the CTD cable).

The second station of this week was located at the northern region of the „Papahānaumokuākea Marine National Monument“ (PMNM), one of the largest marine sanctuaries worldwide. This region also became famous by a high frequency of dying marine birds, which had swallowed small plastic pieces. Figure 2 also shows a high density of probably organic particles in surface waters at our profiling station.



Figure 2. map of the PMNM marine sanctuary, where we conducted a profiling stop at 29.5N/175W. That region reports about dying marine birds, where often small plastic elements were found in their stomach (www.chrisjordan.com). The quiet sea at our profiling stop offered deep views into the ocean and revealed in surface waters the presence of many small floating elements, mainly organic in nature.

Many examinations will be conducted with the sampled and filtered probes over the next years back in Germany, to determine polymers and their concentrations, as well as toxic and organic material content, including the growth of organics at the surface of (collected) litter and plastic particles.

As part of the MORE-2 projects 6 ARGO floats were deployed this week. These batterie-operated at in ca. 1000m depth free floating robots sample about every 10 days profiles of temperature and density from 2000m up to the surface. There the sampled data are transmitted via satellite to a data-bank before the floats return to the 1000m depth. In order to maintain an evenly distributed sampling distribution by about 4000 robots worldwide, all (after ca 5 years) failing robots need to be continuously replaced by new floats. On our research cruise newly developed floats by Scripps were deployed, as illustrated in Figure 3. These floats are packed for extra protection in a cartons which are kept together by in water dissolving tape. Particularly unique is a release of the green carrying ribbons once contact with the water is made.

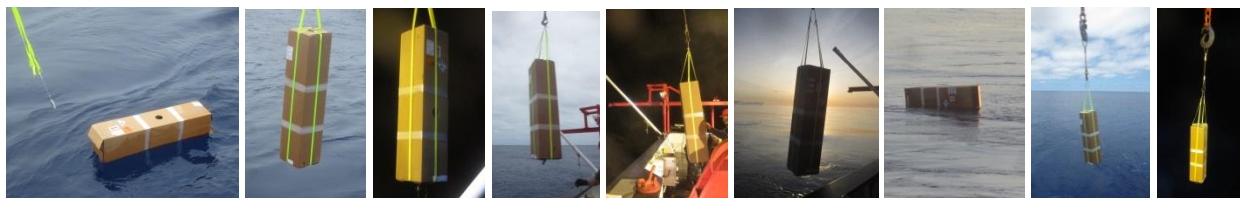


Figure 3. Scripps type ARGO float deployments in the Pacific during the SO268-3 research cruise