MSM 95 (GPF 19-2_05)

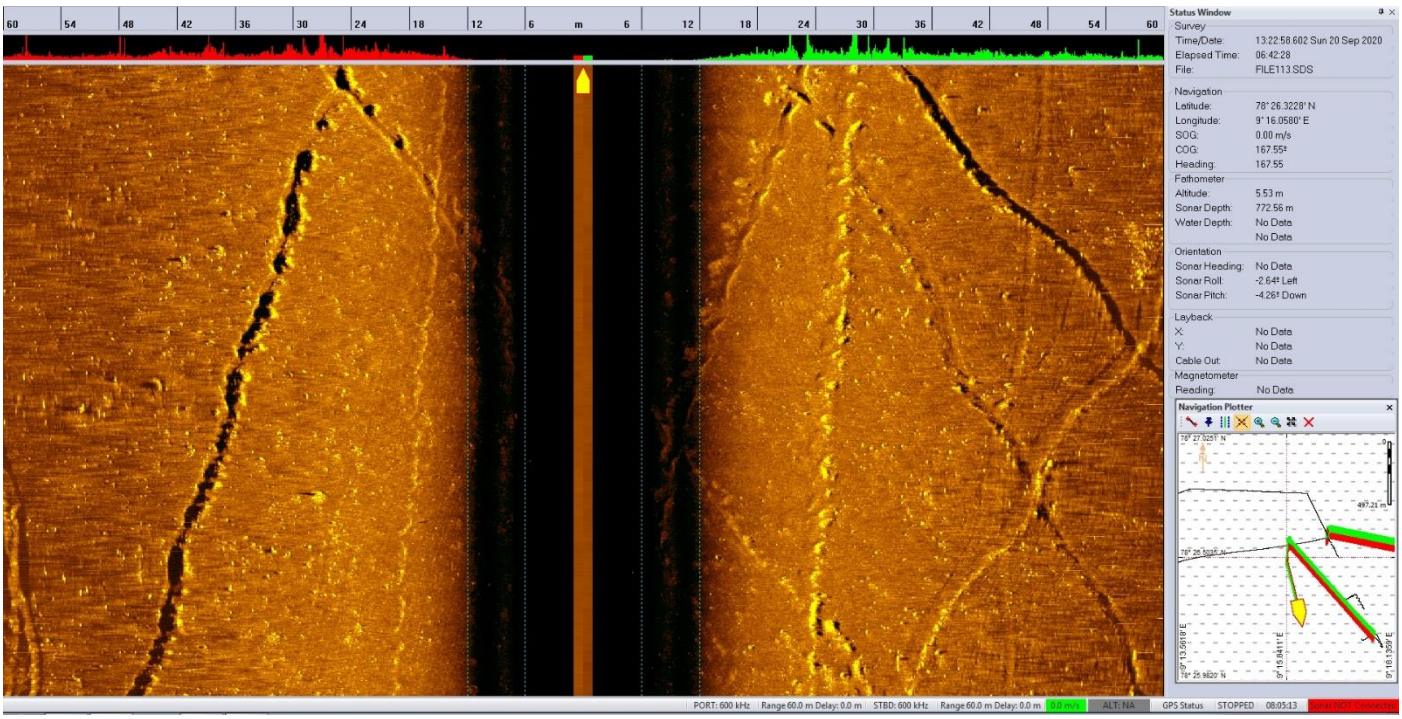
09.09.- 07.10.2020, Emden - Emden

4th weekly report, 28.09. - 04.10.2020

Our fourth week of expedition aboard the R/V MARIA S. MERIAN was very dramatic. We raced between various locations in the Fram strait, a narrow region through which the majority of water entering the Arctic ocean passes. The FRAM project currently continues the monitoring of this area as a ‚time series' data set, with many parameters measured throughout the year by sensors placed on ropes or lander platforms workign continuously, day and night. During our cruise we revisited three locations with our Ocean Floor Observation and Bathymetry System (OFOBS), to take photographs of the same stretches of seafloor as previously visited by colleagues over the last ~20 years. By repeatedly visiting these locations and photographing the seafloor, we can identify changes relating to the ongoing ice retreat, or changes in global ocean circulation.

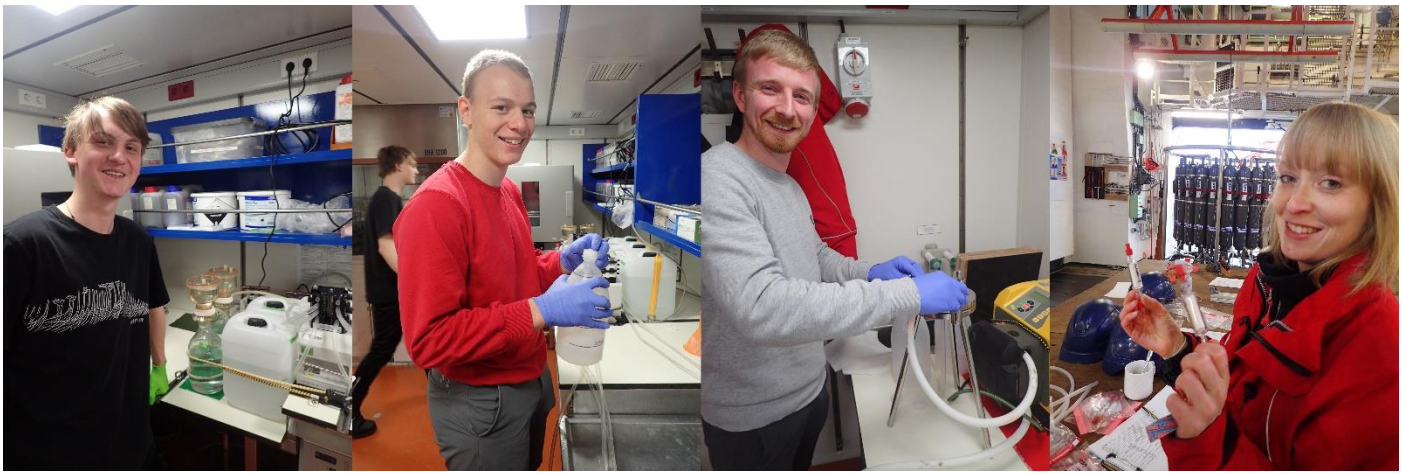
In addition to conducting these repeat surveys, we also used our acoustic systems to locate and visit several devices on the seafloor, including the AWI / MPI tracked vehicle NOMAD. This vehicle has been crawling across the seafloor for a year, taking photographs and measurements of biogeochemical processes in the sediments at different locations. Unfortunately the robot had got stuck on one of the very few rocks in the region – we have freed the robot from this obstruction so hopefully it will continue to take measurements until we return in August to pick it up.

We have also spent the last days investigating our data collected from the Svalbard area earlier in the expedition. We see from our sidescan data collected by Autonomous Underwater Vehicle (AUV) (see below) that the impacts of fishing action can be high on the seafloor, even at almost 800 m.



Raw sidescan data showing many trawl marks on the seafloor at 772 m depth, south west of Svalbard. Data collected by the PAUL 3000 Autonomous Underwater Vehicle.. RAW SIDESCAN PLOT: AWI AUV team

Also in the last week we continued sampling the waters across the Fram strait. As with the repeated visits to the seafloor to monitor animals abundances, the FRAM project also monitors how the small organisms within the water may change over the years. To do this we use the CTD rosette (introduced in the last report), which in addition to measuring the temperature, conductivity and chlorophyll within the waters also allows up to 24 bottles of water to be collected from whichever depths are of interest. The MicrObs team within the FRAM project sent Erik Dauer and Niklas Korfmann (AWI), two students about to start university, to collect the annual samples for microbial community analysis, with Taylor Priest (MPI) joining the expedition to take bacteria samples and Véronique Merten (GEOMAR) joining to continue the eDNA work she started last year; water sampling to see whether or not particular squid species live within the various depths of Fram Strait waters.



The CTD team. From left to right : Erik Dauer and Niklas Korfmann (MicrObs sampling), Taylor Priest (bacteria) and Véronique Merten (eDNA).

The CTD team finished our station work at noon on the 1st October, at which point the R/V MARIA S. MERIAN began her transit back home towards the port of Emden, Germany. We have had an extremely successful research expedition, with 6 long AUV dives collecting 170,000 images of iceberg and trawl impacted seafloors around the Svalbard archipelago, 20,000 images with our towed OFOBS camera system and high quality bathymetric maps were produced with the ship systems and also our marine systems. Many hours of video was also recorded by the various devices, including the new ‚Remora' class mini-ROV, which was built within AWI and deployed numerous times during the expedition.

The scientific party of MSM95 in front of our OFOBS system – 23 successful deployments and almost 200 hrs underwater during MSM95, the OFOBS records! PHOTO: Jonas Hagemann

We are looking forward to our return to shore and to our friends and families. We thank the fantastic captain, officers and crew of the R/V MARIA S. MERIAN for being so helpful in supporting us in getting the best science data out of our time onboard, despite the occasionally challenging weather conditions, and for generating a consistently pleasant working environment.

Next week our colleagues from GEOMAR and Jacobs University Bremen will join the vessel for MSM96 – we wish them all the success we had with our voyage!

Autun Purser - Alfred-Wegener-Institute