

## RV MARIA S. MERIAN - MSM108

06.06. - 02.07.2022, Tromsø - Tromsø

### 1<sup>st</sup> Weekly Report

06. - 12.06.2022



### Same procedure as last year: "Gardening" in the deep Fram Strait

After a latecomer from the group of cruise participants as well as (once again) luggage lost on the journey were taken on board in the early afternoon of 7<sup>th</sup> June, we could finally start this year's expedition to our LTER (Long-Term Ecological Research) observatory HAUSGARTEN. We have been regularly visiting this network of stations in the Fram Strait between Greenland and Spitsbergen for over 20 years to investigate the influence of global climatic changes on a polar marine ecosystem in a multidisciplinary approach.

Shortly after leaving the Tromsø Fjord, we were hit by the first (and hopefully last) storm with gusts of up to 9 Bft, which made a number of participants feel quite unwell. In the late afternoon of 8<sup>th</sup> June, the storm was over and since then we have been enjoying ideal weather conditions - which according to the weather forecast will continue for at least another week.

On 10<sup>th</sup> June we reached the southernmost HAUSGARTEN station and started our "gardening". The HAUSGARTEN stations are sampled annually in the summer months both in the water column and on the seabed. Water samples are obtained with a so-called CTD / "Rosette Water Sampler". The device also has a number of sensors that give us information about water temperature, salinity and chlorophyll concentrations in the water, a measure of the phytoplankton content in the water column.

Sampling on the seabed is done with cable-connected bottom grabs, the so-called multiple corer and the box grab, which cut out certain sediment volumes on the deep-sea floor and bring them on board. Some of the sediment samples are processed on board, however, most of them are analysed in the home lab after the expedition for certain biogeochemical parameters and sediment-dwelling fauna. A towed photo/video system gives us information about the large-scale distribution of larger animals on the bottom of the HAUSGARTEN area. Our Autonomous Underwater Vehicle "PAUL" (Fig. 1) has repeatedly been sent on lonely voyages through the cold Arctic Ocean to map the deep-sea floor and to complement our efforts to record the distribution patterns of larger organisms also on a large scale. Comparison with data from previous decades provides us with information about temporal changes in environmental parameters and in the density and composition of the bottom-dwelling community.

Free-falling systems, so-called "Bottom Landers" (Fig. 2), are used to carry out various measurements and experiments on the seafloor. Bottom landers consist of a steel frame, weight plates that pull the system down to the seafloor and buoyancy bodies that ensure that the frame rises to the sea surface again after the weights have been dropped. The landers can be equipped with a variety of measuring and recording devices, depending on the scientific question. During this year's voyage, we will deploy an experimental system in short-term missions to study the impact of ongoing ocean acidification on small bottom-dwelling deep-sea organisms. Provided the system works properly, it will be installed on the bottom of the Fram Strait for 12 months in a long-term experiment.

In addition to these stationary free-fall devices, we also operate various mobile platforms on the seafloor (so-called "Benthic Crawlers"). During the current expedition, a newly developed caterpillar will be used (Fig. 3), which is equipped with oxygen microsensors and incubation chambers to quantify the decomposition of organic material on the deep-sea floor. The crawler will be programmed to measure oxygen penetration depths and oxygen consumption rates on the seafloor, then travel a short distance before taking another measurement. Autonomous devices like this crawler allow us to obtain seasonal data from the Arctic deep sea, which is very difficult to access in the winter months.

Thanks to the good weather and ice conditions, we are making rapid progress with our work. The southernmost HAUSGARTEN station with 2300 m water depth as well as three stations with water depths between 2500 and 4000 m along a depth-transect off Spitsbergen have already been successfully completed. We hope things will continue like this...

Everyone on board is well and in good spirits!

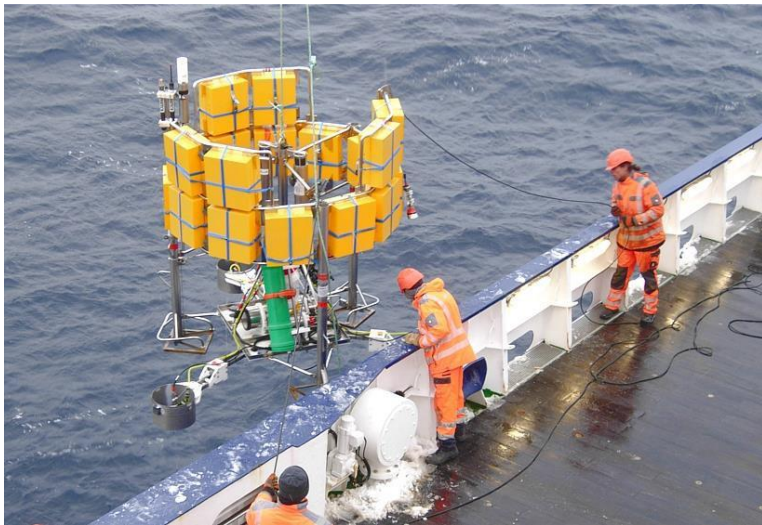
With best regards to the loved ones at home,

Thomas Soltwedel

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*Fig. 1: Recovery of the Autonomous Underwater Vehicle (AUV) „PAUL“ after mapping the seafloor at the LTER Observatory HAUSGARTEN.*



*Fig. 2: Recovery of a freefalling device (Bottom Lander) to assess effects of ocean acidification on small deep-sea organisms.*



*Fig. 3: First test trials of the new Benthic Crawler of the AWI deep-sea group to assess remineralisation rates at the deep seafloor.*