



## SO-250 KuramBio II 2. Weekly Report (22.08. – 28.08.2016)



FS. SONNE  
45°41'N / 152°49'E

Time flies by!

We are now two weeks aboard the RV Sonne, have finished the third station and started the fourth station in ca. 7000 m depth already. So far, we were very lucky! The weather is favourable, since we are steaming we have a swell of 2 m, maximum of 3 m, and can therefore work without interruption day and night. In addition, so far all gear deployments have worked, even in 8250 m, thus so we already have extensive and extremely interesting samples in our sampling jars or frozen ice cooling chambers (or freezers) at -20 °C or -80 °Celsius. In the last report we briefly outlined our questions. In order to answer these we deploy a , we use a number of various gear according to a standardized operating protocol in order to compare our data with those of the earlier KuramBio I expedition, but also with the other expeditions in the northwest Pacific like the last-week mentioned SoJaBio and SokhoBio expeditions or even the expeditions to the manganese nodule region of Clarion Clipperton Zone et al was examined under the JPI Oceans project as well as those projects performed under the umbrella of the Census of Marine Life in various deep-sea regions of the Atlantic, from the Arctic, Iceland (IceAGE), through the Southern Ocean (ANDEEP and SYSTCO).



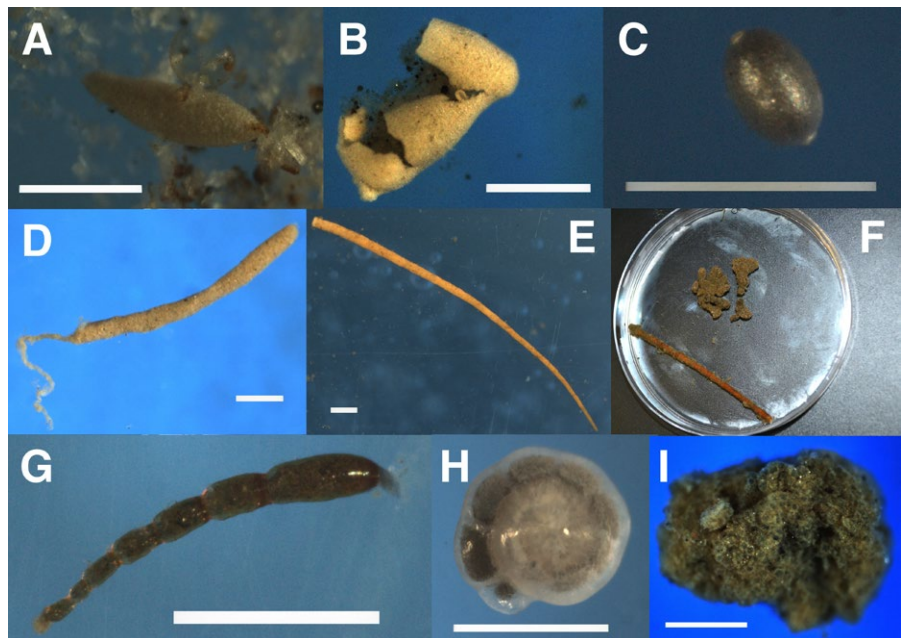
Researchers and crew can't wait to see the latest catch brought on deck with the Agassiz Trawl. (c) Oliver Meyer

According to our work plan we start with the deployment of a CTD down to 1000 m depth, because we need water from different surface layers for biochemical analysis of the productivity in the area. Furthermore, Melanie Steffen needs the data for the calibration of the bathymetric mapping by means of the multibeam echosounder. In a trench system like the Kuril-Kamchatka Trench, the topography is very rough; we can find seamounts, steep slopes, ridges or troughs which might not allow us to deploy towed gear like the epibenthic sledge or the Agassiz trawl in some areas. We therefore need to map the seabed

precisely and then – depending on the wind direction– define the spot from which we will start to tow these collection gears. Sometimes we have to slightly deviate from our planned stations because the sampling depths were selected on the basis of the previous superficial knowledge of the hadal ocean floor. For example, in area A6 we planned to sample at a depth of approximately 5100 m.

In fact, we had to work in about 6000 m, since in the vicinity of the planned coordinates we could not find a site that was flat enough for the towed equipment to be deployed. Thus this station took little longer than planned and we need to compensate for this additional shiptime at later stations. After mapping we deploy a multinet in order to sample plankton from different depth horizons in the water column, which is also partially used for biochemical analysis, but also for systematics and evolutionary biology, studies on biogeography and distribution of planktonic organisms or anatomic studies. After completing our work in the water column

we then focus on the seafloor and deploy two corer systems, the multiple corer and the giant box corer. Using these devices we can answer questions about the nature and composition of the sediments, or the occurrence of micro-plastics at these depths. We use the organisms from these corers for systematics of meiofauna and macrofauna and for solving evolutionary and ecological questions within these size classes. In addition, samples for biochemical analyzes are selected from all different gears, then these organisms are photographed and frozen for later analyses of fatty-acid patterns or the composition or



Examples of living Foraminifera (Protista). M = 0.6 mm). (c) Franck Lejzerowicz.

of the stable isotopes of nitrogen and carbon in order to detect the diets and trophic position of the animals. The multicorer offers us excellent and undisturbed samples for the analysis of single-cell organisms such as foraminifera, but also meiofauna, mainly from the dominating Nematoda (roundworms) and Copepoda (copepods). Sometimes we find in the surface of the box-corer samples very well preserved macrofauna organisms such as molluscs (snails, clams), polychaetes or small crustaceans, especially from the group of Peracarida (mostly isopods, amphipods, tanaidaceans and cumaceans). The epibenthic sledge collects very well preserved macrofauna (animals of 1 mm up to 1 cm in size) and usually brings hundreds to thousands of small invertebrates on deck of the RV Sonne with each deployment. Thus sorting of this material is extremely tedious and time-consuming, but well worth the effort, because the animals from this gear are perfectly suitable for further analyzes, from taxonomy to genetics.

The Agassiz trawl collects the largest size group of organisms, the megabenthos. It comprises organisms ranging from several centimeters to the size of big fish. With this device, as with the EBS, we bring a lot of animals on the deck, and sometimes it is very difficult to wash and sieve about a ton of deep-sea mud. When the work on deck is finally done, Saskia Brix-Elsig and Karen Jeskulke are already waiting for the station protocols. In addition to their extensive work, ranging from sorting and photography to preparation of selected animals for genetic studies, they enter every station plan and the number of samples in an Access database for sample management. Each jar gets its own number. If a sample is sorted, then each vial receives a number as well that can be traced back to the original container number. This database (about which we will report in a later weekly report) helps - back in our home laboratories - to keep track of each of our many (thousands) of samples while distributed to expert scientists all around the world, for example in Hamburg, Wilhelmshaven, Vladivostok, Tokyo, Lodz or anywhere else.

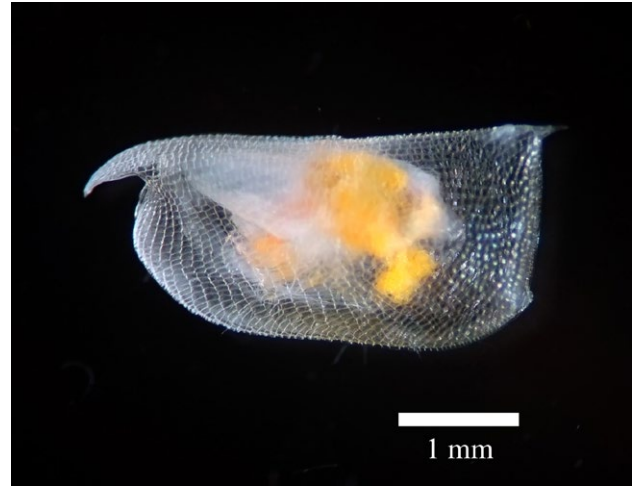


Sea Butterfly (Pteropoda) of the genus *Gymnosoma*. (c) Nastya Maiorova)

This week, pteropods (also called sea angels) caught by means of the multinet held several surprises. Besides the common species *Clione limacina* and *Limacina helicina* which are known to frequently occur in these regions, we were able to obtain two individuals of gymnosome pteropods from the mesopelagial from a depth between 200-2000 m. The specimens belong to different species, one of them



A monoplacophoran - a „living fossil“. Scale = 1 mm. (c) Torben Riehl



A planktonic Seed Shrimp (Ostracoda) *Conchoecissa* cf. *plinthina*. (c) Hayato Tanaka

being new to science. For this reason DNA vouchers of this species have been taken and their analysis will be complemented by a detailed microanatomical species description.

Furthermore, a mystery concerning an additional species was revealed and knowledge of its distribution was remarkably extended. Specimens of the species *Peracle* spec. have already been obtained during last year's SokhoBio expedition to the Sea of Ochotsk, but could (due to the severely damaged condition) only be identified through DNA-barcoding. Now we were able to obtain few undamaged specimens that could clearly be assigned to the genus *Peracle*, based on the more or less intact shells. Genetic analyses in the home laboratory will reveal whether these specimens belong to the known species *Peracle apicifulva* whether they are a new species.

A very interesting and rare find worth mentioning is a Monoplacophoran mollusk, a “living fossil”, sampled with the epibenthic sledge which pleased not only us on board, but also our colleagues back at home in Germany. The deep station revealed - as was to be expected - new records and interesting discoveries. We have sampled fish of the macrourid group (benthic deep-sea fish) again, this time in more than 8000 m depth with the Agassiz Trawl. Prity exciting when considering that this species had been known from a maximum of 3700 m depth previously. We have brought the deepest evidence of benthic ostracod crustaceans from 8250 m depth and found that many of the species are huge at these great depths. We thus support the theory of gigantism of species with increasing depth. Particularly noteworthy for the stations in the third region (Area 6) is that (in the extension of Bussol Strait), we sampled species which were already collected in the Sea of Okhotsk during SokhoBio, while they were not known from KuramBio I abyssal stations. Thus, already the first three stations deliver answers to our scientific questions that we presented to you in last week's report after meticulous washing, sorting, the first analyses and determination of the species. It remains exciting because with each station and haul we gain new knowledge.

All participants are well and greet you and their families! Please send us the sun and a few centigrade air temperature to the Kuril-Kamchatka trench so that the fog here can be slightly dissolved.

Angelika Brandt, Center for Natural History (CeNak), (chief scientist SO250) and the cruise participants



The deepest record of a Seed Shrimp (Ostracoda) *Krithe* sp. (c) Hayato Tanaka & Hyunsu Yoo