

Forty scientists from of nine nationalities (17 Germans, twelve Russians, three Japanese, each two French and Polish, and each one South Korean, Czech, Mexican, and Spaniard) embarked the research vessel *Sonne* for the deep-sea expedition KuramBio II (SO 250) in Tomakomai (Japan, Hokkaido) on August 15. In the afternoon of the same day we started unpacking our cargo as well as assembling gears and setting up the labs. All instruments, computers and other devices that we would need later had to be installed and well secured to withstand the movements of the ship exposed to the swell of the open Pacific Ocean, especially because it is Taifun season.

On August 16. at 9 am sharp RV *Sonne* left port in foggy Tomakomai. Already three hours later, the scientists were happy to spot a pod of sperm whales by their blows are repeatedly surfacing heads and backs. The same day, obligatory safety drills were held in order to introduce everybody on board with safety and emergency procedures. Also, the labs were brought to a usable state and then there was only one more day to get accustomed with the movements of the ship until we would arrive at the first study site.

KuramBio II is already the fourth expedition to the Northwest Pacific that was conducted as a German-Russian collaborative enterprise. Initially, the fauna of the Sea of Japan (East Sea) was investigated during the Russian-German SoJaBio (Sea of Japan Biodiversity study) campaign in summer 2010 onboard the Russian vessel *Akademik M.A. Lavrentjev*. In 2012 the Northwest Pacific Abyssal Plain was investigated in the Kuril-Kamchatka region sailing onboard the previous RV *Sonne* in order to compare the open ocean with the semi-enclosed marginal sea. During this first KuramBio campaign, depths between 4700–5700 m were studied. The follow-up project SochoBio (Sea of Okhotsk Biodiversity study) took place in summer 2015, again with RV *Akademik M.A. Lavrentjev*. This marginal sea is characterized by a depth similar to that of the Sea of Japan (ca. 3500–3700 m), however, it has stronger exchange with the open Pacific through rather deep sills such as the Krusenstern Strait (1920 m) und Bussol Strait (ca. 2500 m). The Sea of Okhotsk is not only isolated from the open Pacific by the Kuril Islands but from the perspective of the benthos the Kuril-Kamchatka Trench (KKT) may represent another obstacle that may hinder migration and dispersal. It is up to 9500 m deep.

One of the major research questions in the KuramBio II project is therefore whether the KKT has a restrictive effect on the distribution of abyssal organisms inhabiting either the Sea of Okhotsk and Kuril Islands side or the Pacific side of the trench. We are testing this hypothesis on various taxonomic groups and size classes of organisms that cover various modes of reproduction and dispersal, from taxa with brood care to those with free-swimming larvae. To study the depth limits of their distribution, we will take samples at various depths, allowing us to draw conclusions about the biogeography of the whole region.

In our studies we are considering environmental aspects, such as sedimentological parameters, and investigate morphological as well as genetic data of all size classes of eukaryotes (Protists, Meio-, Macro-, and Megafauna) from the trench and neighboring abyssal and bathyal samples. Furthermore, the biodiversity estimates that we estimate based on our modern sampling techniques are to be compared to the biodiversity described by Russian scientists that studied the region extensively throughout the 20<sup>th</sup> century with the RV *Vitjaz*. So far, our results indicate a much higher diversity than known from the *Vitjaz* expeditions which could be partly due to the smaller mesh sizes that we use today. Additionally we are able today to differentiate between morphologically cryptic species using DNA based species delimitation methods.

The mechanisms that contribute to the generation of this diversity are another focus of our studies. Drivers limiting gene flow thus leading to divergence and eventually speciation are poorly understood, especially for the deep-sea fauna as well as the most important selection factors. This pioneering character makes studying diversity in these great depths so fascinating and with every sample we gain new insights and understanding about the organisms of the deep-sea floor.

The first study area A8 and first station were reached already on Thursday the 18. of August at midnight. It was located at 43°82'N 151°76'E in 5130 m depth. We decided to begin our

sampling at a “shallow” site, and not the deep A1 area with 8200 m in order to accelerate the initiation of our work flow on board which includes time-consuming sample sorting etc., as well as to establish routine in the deployment of the gears on an „easy“ site before operating them in over 8000 m depth.

Following the deployment of the CTD (a device measuring physical parameters of the water column) with a rosette of Niskin bottles (a water sampler) in 2000 m depth as well as a Multi-closing plankton net, specifically catching planktonic organisms at certain depths, the sea floor was scanned with an echo sounder to study the topography of the sea floor. Based in these maps, the benthos sampling stations were planned. The benthos gear included a Multiple Corer, A Giant Box Corer, a Camera-Epibenthos Sledge, as well as an Agassiz Trawl. The complete set of instruments was successfully operated and the scientists on board RV *Sonne* could be satisfied. Already, new species could be identified and DNA extractions were conducted. It is nice to look into happy faces after the first days were dominated by anxiety facing the first station. Besides a number of interesting organisms and new species we also already discovered interesting parasite-host relationships, and new records of species occurrences expanding the previous knowledge of species distributions. These include for instance wood-boring isopod crustaceans of the genus *Limnoria*, which are typically occurring in coastal waters, and the rediscovery of a Ostracod crustacean family which was described based on KuramBio I material. The second catch of the Agassiz Trawl included a 85 cm long fish of the family Macrouridae (Grenadier) from more than 5000 m depth., *Coryphaenoides acrolepis*. We were informed by our Japanese colleagues on board that this species previously had been known only from 300-3700 m depth. Besides, they mentioned that this particular species is the most delicious of the family, however, we decided to keep the specimen for research purposes 😊!

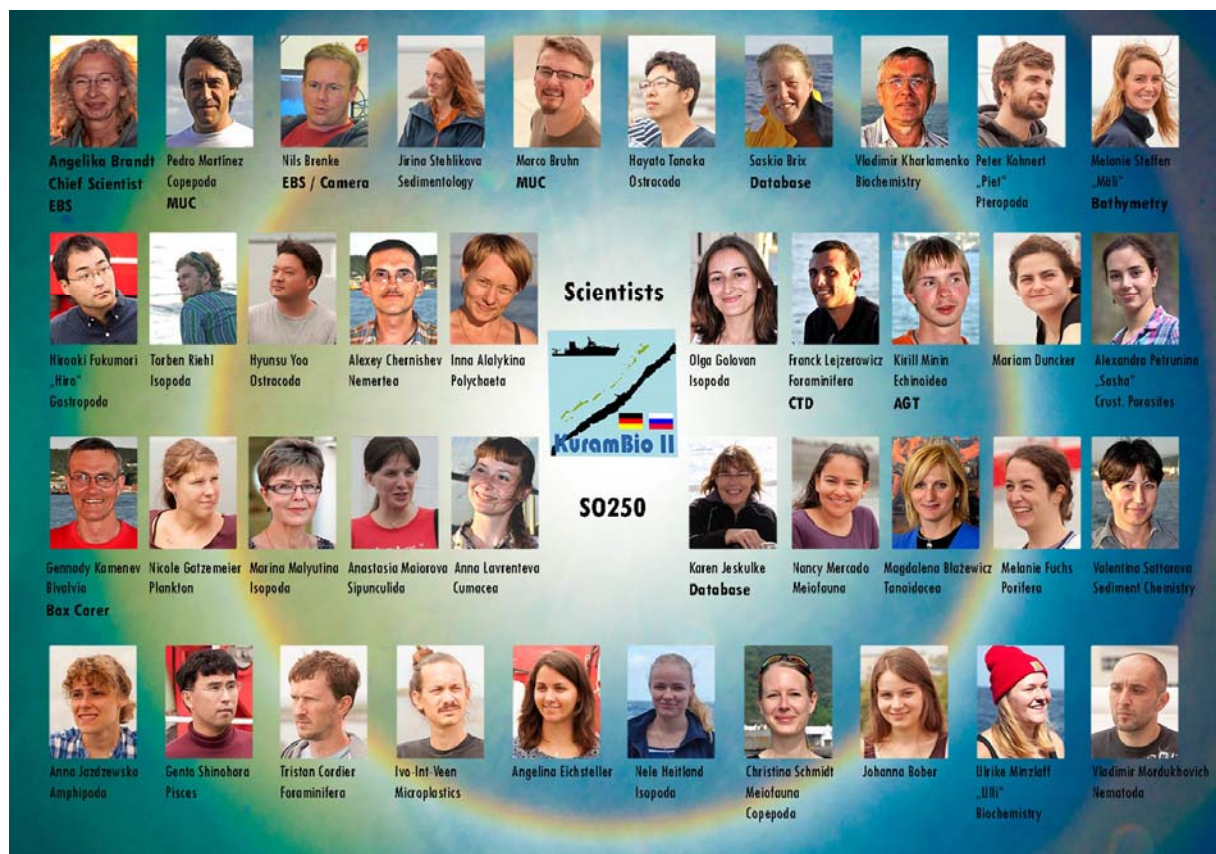
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Angelika Brandt, Centre of Natural History (CeNak), (Chief Scientist SO250) and the scientific party



Scientists of the KuramBio II ( SO-250) expedition with RV *Sonne*.



RV Sonne in the harbor of Tomakomai.



Unpacking the containers on RV Sonne.



The epibenthic sledge.



Invertebrates from the epibenthic sledge A, isopod, B, mysid; C, gastropod; D, polychaete; E, coral; F, scaphopod with the actinian *Anthosactis nomados* White, Wakefield, Pagels & Fautin, 1999, also known from the west coast of the United States of America.

Deepest record of wood boring isopod (*Limnoria* sp.).

Sea cucumber from the Agassiz.



Deepest record of *Coryphaenoides acrolepis* (T. H. Bean, 1884) a deep-sea macrourid.