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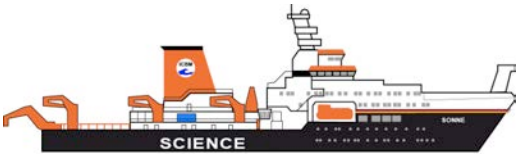
	SO-249 Leg 1 **BERING** **Weekly Report No. 1** **(5.06. – 12.06.2016)**	 **R/V SONNE** 50°30´ N / 179°45´ E

The Bering Project is a long-term international collaboration between German, Russian, and American scientists. The project encompasses two legs: (1) from Dutch Harbor, Alaska to Petropavlovsk-Kamchatsky, Russia (June 5 - July 15), and (2) from Petropavlovsk to Tomakomai, Japan (July 17 - August 14). The overall goal of the project is to study the geodynamic evolution of the southern and western margins of the Bering Sea, formed by the Aleutian Subduction Zone and Chukotka-Berginga continental margin respectively. Our research will contribute to improving our understanding of the origin of marginal seas, the initiation and geodynamic evolution of subduction zones, as well as the causes and effects of natural hazards, such as explosive volcanic eruptions. During the two cruise legs, we will carry out detailed bathymetric mapping of the seafloor, sediment profiling and sampling of volcanic and tectonic structures along the aforementioned margins of the Bering Sea.

At the Aleutian Subduction Zone, which forms the northern-most part of the Pacific "Ring of Fire", the Pacific Plate is being thrust beneath the North American Plate. As the plate subducts (sinks) into the mantle, it releases fluids (seawater taken up while the plate formed the seafloor) and melts from the down-going oceanic crust into the overlying mantle wedge. Addition of hydrous fluids and melts to the mantle causes a reduction of the melting temperature and melting of the mantle. These melts ascend to the surface and erupt, forming the Aleutian arc-like chain of volcanoes. The sliding of the two plates against each other during subduction causes the strongest earthquakes on Earth, such as the magnitude 9.0 Tohoku Earthquake on March 11, 2011, that generated the huge tsunami that devastated the coastline of Japan and caused the Fukushima disaster.

After a long, grueling journey from Germany halfway around the world to Dutch Harbor, Alaska, the German and Russian scientists met up with their American colleagues on June 4. The next day we boarded the R/V SONNE, unpacked the sampling equipment and set up the laboratories. At 9:00 a.m. on Monday June 6, the SONNE left Dutch Harbor, escorted not only by the pilot's tugboat, but also by leaping humpback whales and a young bald eagle that perched on our foredeck railing (see photos). After a day of transit, we reached our study area and began dredging on the Amlia Fault (Fracture) Zone that extends southward along the Pacific Plate south of the Central Aleutians. Here we recovered an interesting variety of rocks from a fault-bounded block in the fracture zone, which included surface sediments and bedded sedimentary rocks, clinopyroxene-, plagioclase-, and olivine-bearing basalts, as well as dioritic rocks and a sheared oceanic gabbro. On the third day of the cruise, we sampled fresh olivine-plagioclase phyric basaltic rocks from the Pacific Plate along a fault running parallel to the Aleutian deep-sea trench, caused by bending of the plate just before it is subducted. We then dredged Adams Seamount, a guyot, located directly outboard of the Aleutian Deep-sea Trench. Guyots are characterized by steep flanks and a flat top, representing former ocean island volcanoes. When the volcano becomes inactive, it is eroded to sea level and wave activity forms a plateau on its summit. When the crust below the volcano cools, it subsides deep beneath the sea surface. The full dredge from Adams Seamount contained pillow lavas with glassy rinds and hyaloclastites (a rock formed from pieces of volcanic glass), characteristic of submarine eruptions of lava, as well as subaerially-erupted oxidized soria, providing direct evidence that it once had indeed formed an ocean island volcano (see photos). Thereafter, we crossed the Aleutian trench once again and carried out several successful dredges on the lower slopes of the subduction-zone forearc and deepest parts of the walls of Adak and Amchitka Canyons. The samples included a wide variety of rocks typical for arc volcanoes. The petrologic sampling was very successful during the first week of the cruise.

The biology program of SO249 aims at collecting marine fauna from both hard rocks and sediments to determine the benthic biodiversity south of the Aleutian Islands and of the incoming Pacific Plate. Due to the nature of the sampling equipment (chain sack dredge, see photo), only a selected part of the benthic macrofauna can be obtained. However, numerous organisms such as sea cucumbers, brachiopods, bivalves, or bristle worms use rocks as their preferred substrate for dwelling. Hence, every single rock brought up during dredging is screened before geological processing. In addition, the chain sack dredge includes four metal tubes that sample the sediment while the dredge is moving across the seafloor. This sediment includes so-called meiofauna, i.e. organisms living in the seawater between the sand grains. Biological sampling during the first week was very successful, in particular on Adams seamount and at the base of Adak Canyon (see photos).

Everyone on board is doing well and sends their greetings.

Kaj Hoernle (chief scientist SO249) and the cruise participants

During departure, a curious, young bald eagle visited the R/V SONNE. (Alexander Ziegler).

One of the many humpback whales that escorted the R/V SONNE out of Dutch Harbor. (Gene Yogodzinski).

A piece of subaerial scoria from Adams seamount (ca. 3,600 m depth). (Kaj Hoernle).

Seamen of the R/V SONNE maneuver a full dredge from the base of Adak Canyon onto the ship's deck. (Kaj Hoernle).

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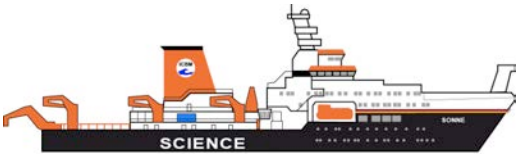

R/V SONNE
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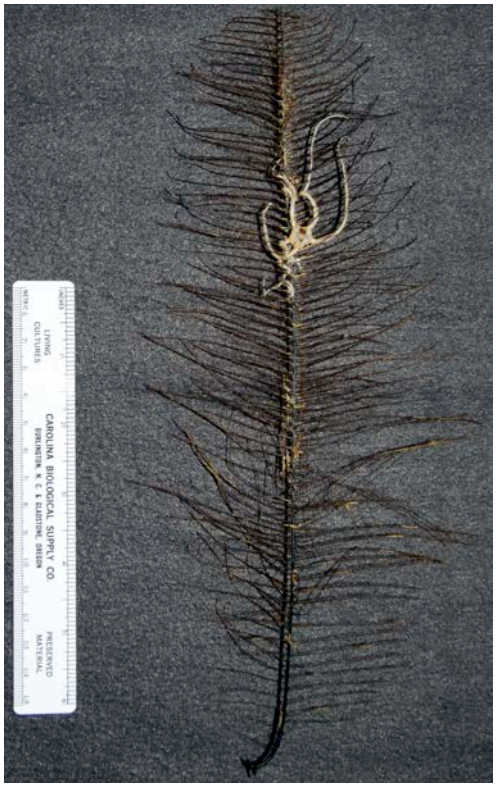

A deep-water coral associated with a brittle star found on a volcanic rock sampled on Adams seamount (ca. 3,700 m depth). (Alexander Ziegler).

A yet unidentified crustacean sample from within the sediment layer found at the base of Adak Canyon (ca. 4,000 m depth). (Alexander Ziegler).