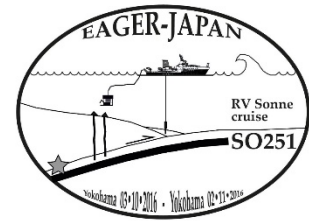




Expedition SO251

Weekly Report No.1



By September 30, all 29 scientists (11 from Germany, 7 x Japan, 2 x Switzerland, 2 x USA, and each 1x from Belgium, Brazil, UK, China, Netherland, Poland and Austria) from 10 different universities or research institutions safely arrived in Yokohama, Japan, and embarked research vessel *Sonne* on Oct 1st. Unfortunately, our scientific equipment, which was shipped from Bremen by a carrier that declared insolvency while the containers were on their way to Yokohama, did not arrive. Nevertheless, and thanks to the great support by our Japanese colleagues from JAMSTEC (Japan Agency for Marine Earth Science and Technology), the Geological Surveys of Japan, and the University of Tokyo, that kindly provided coring and laboratory equipment for our research cruise on very short notice, we could start our voyage with nearly complete infrastructure and a delay of 2 ½ days to leave the harbor on Tuesday Oct. 4 at 15:00. The additional time in port, we used for science meetings and discussions to optimize work flows on deck and in the laboratory using the various „new“ equipment and to prepare for our „EAGER-Japan“ expedition.

„EAGER-Japan“ stands for „ExtrEme events Archived in the GEological Record of Japan’s Subduction margins“. The focus of R/V Sonne voyage SO251 thus is the investigation of the geological archive off the coasts of Japan. Here, at the southeastern edge of the Eurasian Plate, Japan hosts two of the most interesting subduction systems, both prone to devastating megathrust earthquakes: The Japan Trench east of Honshu with subduction erosion/subsidence in the north, and the Nankai Trough with a huge accretionary prism in the southwest. In 2011 the Japan Trench area was struck by a Magnitude 9 earthquake that caused unusually large slip all the way to the trench, and a series of landslides which are believed to be partly responsible for amplification of the catastrophic tsunami following the event. At Nankai, frequent Magnitude 8+ earthquakes are also documented, and landslides and other sediment remobilization processes related to seismicity are attested.

The overarching goal of R/V Sonne cruise SO251 and subsequent post-cruise research is to investigate fluid- and sediment mobilization processes by mud volcanism, earthquake-triggered seafloor displacement, submarine landslide and related “paleoseismologic event deposits” and to compare inferred earthquake processes and rates along accretionary vs. erosive subduction margins of Japan (Nankai Trough and Japan Trench, respectively).

The working area of the first part of the SO251 expedition, the Japan Trench, was reached after a transit of 17h. After first short multibeam bathymetry and Parasound mapping survey, but still within the first day in the working area, we successfully retrieved a piston core from the deepest part of the Japan Trench in more than 8000m water depth and started our laboratory work flow (porewater-geochemistry, geotechnical and physical properties, core photography, visual core description and smear-slide microscopy). Since Wednesday Oct 5 we then conducted detailed mapping and coring along the trench axis from S-N to have arrived in

the northern part of the study area by today. So far we have retrieved three nearly 10m long cores from the very deep trench basins in the >7000m deep Japan Trench. Furthermore, we have sampled two sections from the lower slope of the upper plate that in the central part of the study area moved co-seismically more than 50m eastward during the large earthquake 5 ½ years ago. Shipboard core analyses are well underway and today first results by the various research groups were presented in our regular science meeting. We are discussing how the geological fingerprint of the Tohoku-oki earthquake is represented in the various datasets and are fascinated about the emerging potential of the acquired data and samples to be further analysed in post-cruise research to advance our fundamental understanding about cause and consequence of earthquakes in deep marine environments.

Further impressions and reports about our scientific mission can be accessed and followed in the following „ships logs“ and blogs.

http://www.marum.de/Logbuch_SONNE_251.html

<http://www.planeterde.de/logbuecher/fs-sonne-japan/logbuch-japan/>

<https://www.uibk.ac.at/newsroom/live-vom-forschungsschiff-sonne.html.de>

Michael Strasser (chiefscientist SO 251-A) representing onboard science party



Yokohama Bay Bridge on 4. Oktober when leaving for good to the Japan Trench working area (Foto Jess Hillmann)

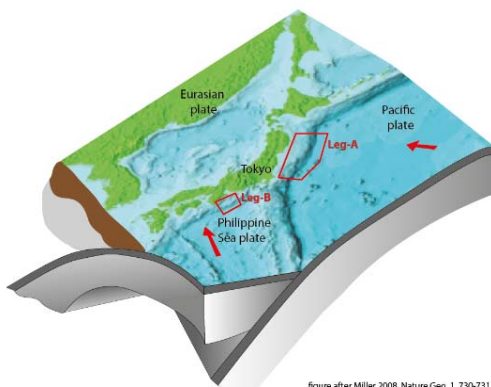


figure after Miller 2008, Nature Geo, 1, 730-731

Japan's subduction zones are the focus of the two legs of R/V Sonne voyage SO251 (A: Japan Graben, B: Nankai Trog).



The piston coring system kindly provided by JAMSTEC for our cruise is being prepared for coring in the deepest part of the Japan Trench at >8000m water depth. Photo by Kazuko Usami