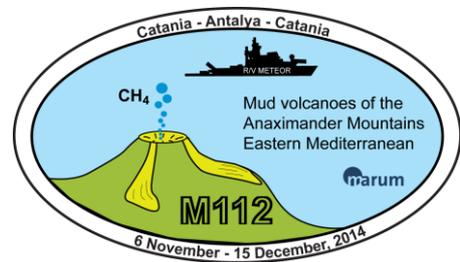


# Expedition METEOR 112

6th Weekly Report: 8 – 15 December 2014



The weather forecast for our 6th working week predicted considerably worse weather, so we used the reminder of week 5 and the weekend for more dives than originally planned. Wind and waves, however, were a bit milder than predicted so we could perform the last dive on this cruise with ROV QUEST 4000m – it was dive number 350 since the ROV was installed in 2003. On the occasion of this anniversary dive the bridge acknowledged the dive by flying the international flags for the numbers 3 5 0 (Fig. 2). ROV QUEST dived at gas emission site Flare 2, which was already visited during the first leg of the cruise. That dive was mainly used for exploration and mapping and a bit of geological and geochemical sampling.

During several flare mapping surveys using METEOR's sonar systems (Fig. 4) Flare 2 became stronger during the past few days, while Flare 1 decreased considerably in the water column records of the hydro-acoustic measurement. Our multiple surveys of the 5 flare locations clearly show that the seep activities around Venere mud volcano are highly variable and we can hardly describe this variability by known forcing mechanisms such as tides. Nevertheless the gas seepage is connected with the activity the mud volcano. After exploration of more than ~30 mud volcanoes at the Calabrian Arc, Venere mud volcano seems to be the only one currently active one in the surveyed part of the Calabrian accretionary wedge.



**Fig. 1:** On position of Flare 2 we left a very special marker for identification of the location (GeoB 19267-13).

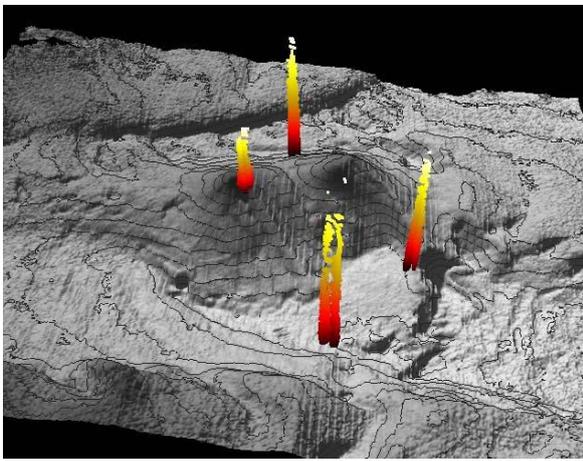


**Fig. 2:** Parade of flags on the occasion of MARUM ROV QUEST 4000m's 350th dive. (Photo: Christian Rohleder).



**Fig. 3:** Work on cores in the Geolab (Photo: Christian Rohleder).

During the dive we intensively sampled seeps, characterized by chemo-synthetic organisms like tubeworms and clams, as well as by authigenic carbonate precipitates, by means of push cores, gas bubble sampler and T-sticks. The sampling location was labeled on the seafloor by a very special marker. Normally our markers are composed of lifting bodies showing a number and bound with a weight as anchor, this time for the 350<sup>th</sup> dive the ROV-crew constructed a special marker whose appearance was a great surprise for all of us. According to the wintery time, they had constructed a snow-woman with a hat showing the M112 logo (Fig. 2).



**Fig. 4:** 3D-presentation of Venere mud volcano with 5 flare locations (presentation by Miriam Römer).



**Fig. 5:** Group picture showing the scientists of M112, Leg 2 on R/V METEOR (Photo Christian Rohleder).

Monday, Tuesday and Thursday were dedicated to gravity core sampling at Venere and Cetus mud volcanoes, and sediment cores were taken from different mud flows. We want to work out the age of mud flows by investigation of the pelagic sediments overlying the mud breccia in order to compile a time scale for the activity episodes in both mud volcanoes. We will be engaged in this task in the Bremen labs for a long time but we are sure having collected valuable samples.

Cetus mud volcano showed a further highlight as we could precisely determine the location of the main chimney of the mud volcano based on temperature measurements during a ROV dive. We followed these temperature indications by sampling it with a so-called plastic bag gravity corer. The difference to a normal gravity corer is that we do not use a plastic liner inside the corer for sampling but a big plastic bag. Sampling of pore water and sediment gas after taking cores can thus be executed faster and easier this way in our Geo-lab (Fig. 3). A pore water analysis of the mud breccia core showed that like in Venere mud volcano the bottom seawater salinity of 38.2 ‰ decreases with depth and reaches a constant salinity value of 10 ‰ at a depth of 50 cm. By means of the salinity profile, we can clearly document freshwater signal from the underground but also – by the curve progression – we can model the time of the latest mud volcano eruption via the rate of diffusion of salts from the overlying seawater.

On Friday last station work of this cruise was performed by sampling some mud flows of Satori mud volcano and since Friday night some mapping with Parasound and Multibeam in the deeper part of the Calabrian accretionary wedge was performed. We will continue with this program until Sunday night and on Monday morning we will arrive in Catania port as planned. Most of us will be engaged by usual work like cleaning up, packing, cleaning the labs and writing the cruise report until arriving in the port and beyond.

Despite the short-term change of the planned research area, the M112 cruise ends as a very successful METEOR expedition. All scientists thank Captain Rainer Hammacher and the entire crew for their huge support and helpfulness, which greatly contributed to our success. We thank the shipping company, the control station in Hamburg, the Department of Foreign Affairs in Berlin and the German Embassies in Turkey and Italy for their accompanying support. All cruise participants are well (Fig. 5).

A last time, on behalf of all cruise participants,  
Best regards,  
Gerhard Bohrmann

RV METEOR Sunday, 14 December 2014