R/V MARIA S. MERIAN Cruise MSM 15/2

First Weekly Report: 9 – 16 May 2010

On 10 May 2010, R/V MARIA S. MERIAN cast off from the port of Haydapasar (Istanbul), at 8:42 local time, heading for the Black Sea. Investigations of natural gas emission sites and gas hydrates within sediment deposits were the scientific mission. This expedition was based on former results of earlier cruises and on the experiences of our cooperating partners in Russia and Ukraine. Methane emission sites from the seabed are well known from sediments in the Black Sea, and we intended to define the emission rates of the methane using different methods. Methane emissions in the water column are connected to the presence of near-surface gas hydrate deposits. The quantification and the dynamics of gas hydrates are very important for geoscientists because methane as a greenhouse gas reaching the atmosphere can also be relevant for climate change. From sediments of the Black Sea the first gas hydrates ever had been recovered.

Before leaving the harbour of Istanbul, R/V MARIA S. MERIAN stayed for two days in the port for exchange of the scientific crews and equipment between its first and second leg of cruise no. 15. During the second leg, the autonomous underwater vehicle AUV SEAL 5000 and the remotely operating vehicle ROV QUEST 4000 as well as our autoclave piston corer was planned to deploy and were installed on board. In total 7 containers were transported from Germany to Istanbul and unloaded on board, containing our entire scientific equipment.

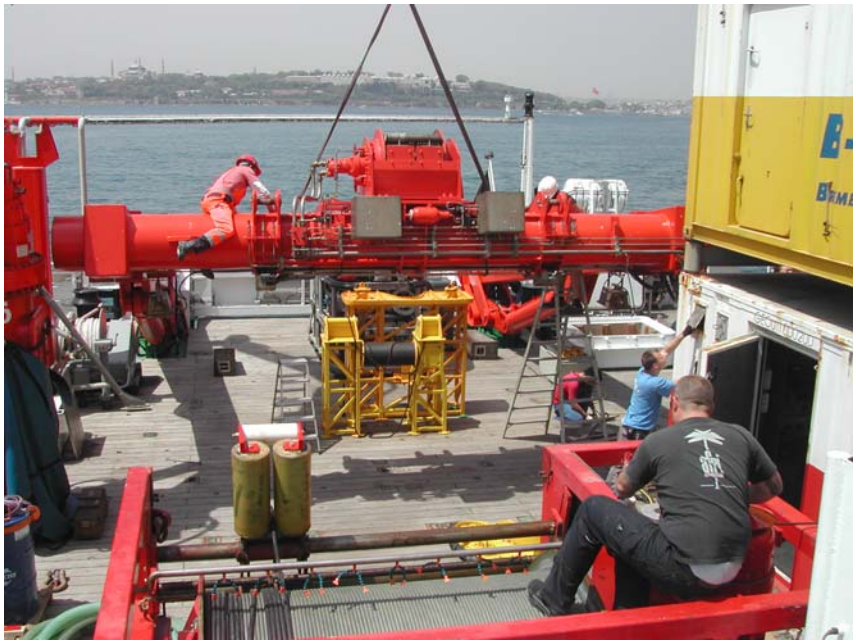

Fig. 1:
On Sunday, 9 May, we could take the opportunity of installing most of the scientific equipment on the research vessel. Especially on the working deck of the M.S. MERIAN we installed our deep sea devices. At the ship's stern we prepared the A-frame with the cable routing and for launching the Bremen ROV QUEST 4000.

On 9 May the scientists from Germany, Japan, Russia and Ukraine embarked and used the Sunday for the necessary decks work together with the ship's crew and also to install the laboratories. After leaving its berth in the port, R/V M. S. MERIAN soon passed on Monday the Bosporus and reached the Black Sea already after just one hour. Many colleagues enjoyed the passage with sunny weather and a magnificent view on the scenery at the rising landscape left and right. The pilot left the vessel at 10:05 and we could steam forward into the Black Sea towards the Crimean Peninsula. After a 12-hour transit through Turkish territory we reached the Ukrainian border where our research could start. First profile

measurements on the water's acoustic velocity were started for calibration of some acoustic systems. At the same time we started the recording of Parasound and multibeam echosounder data in the area of the central province of mud volcanoes. By means of Parasound we verified the activities of some mud volcanoes, searching for gas emissions indicated by acoustic anomalies. In the western Sorokin Trough for the first time ever we found signs of gas emissions on the Dvurechenskii mud volcano (DSV) as well as above some other mud volcanoes in its neighbourhood. In 2007 the DSV showed no gas seepage during all for 4 weeks. A temperature chain had been anchored then in the mud of DSV, in order to document possible eruptions of the mud volcano by temperature measurements. The ROV QUEST dive on Thursday, 13 May, thus showed that the temperature anchoring had disappeared and that the seafloor in this area is characterised by fresh mud flow.

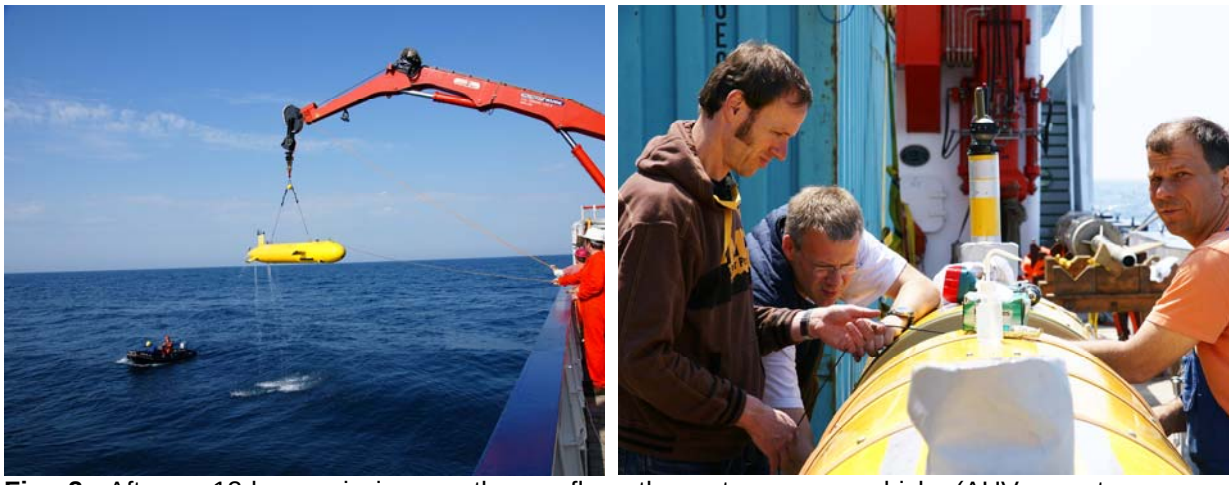

Fig. 2: After a 12-hour mission on the seafloor the autonomous vehicle (AUV = autonomous underwater vehicle) is retrieved safely to the ship by means of the starboard working crane at the stern, supported by a rubber boat. The AUV team (Gerrit Meinecke, Eberhard Kopiske and Jens Renken from MARUM) first check the data recording after every AUV dive.

In the meantime probably a heavy volcanic mud eruption has plunged our mooring station to the deep mud. Contrary to the situation three years ago now free gas escapes in small quantities at several places which we interpreted as a last sign of a mud volcano eruption dying away. Further work concentrated mainly on a prominent gas emission in 900m water depth on the slope south of the Kerch Peninsula. There we could for the first time create a complete micro-bathymetric map during a 24-hour measurement with the AUV SEAL 5000 disclosing completely new possibilities of processing and interpretation of gas seeps. We are very happy about this and also about the two successful ROV dives with a detailed inspection of gas emissions in the Kerch flare area. Due to this scientific success we are quite confident with this first week of the expedition.

Greetings on behalf of all cruise participants,

Gerhard Bohrmann R/V MARIA S. MERIAN, 16 May 2010

Further information on the cruise (in German): http://www.marum.de/Expeditions-Logbuch.html