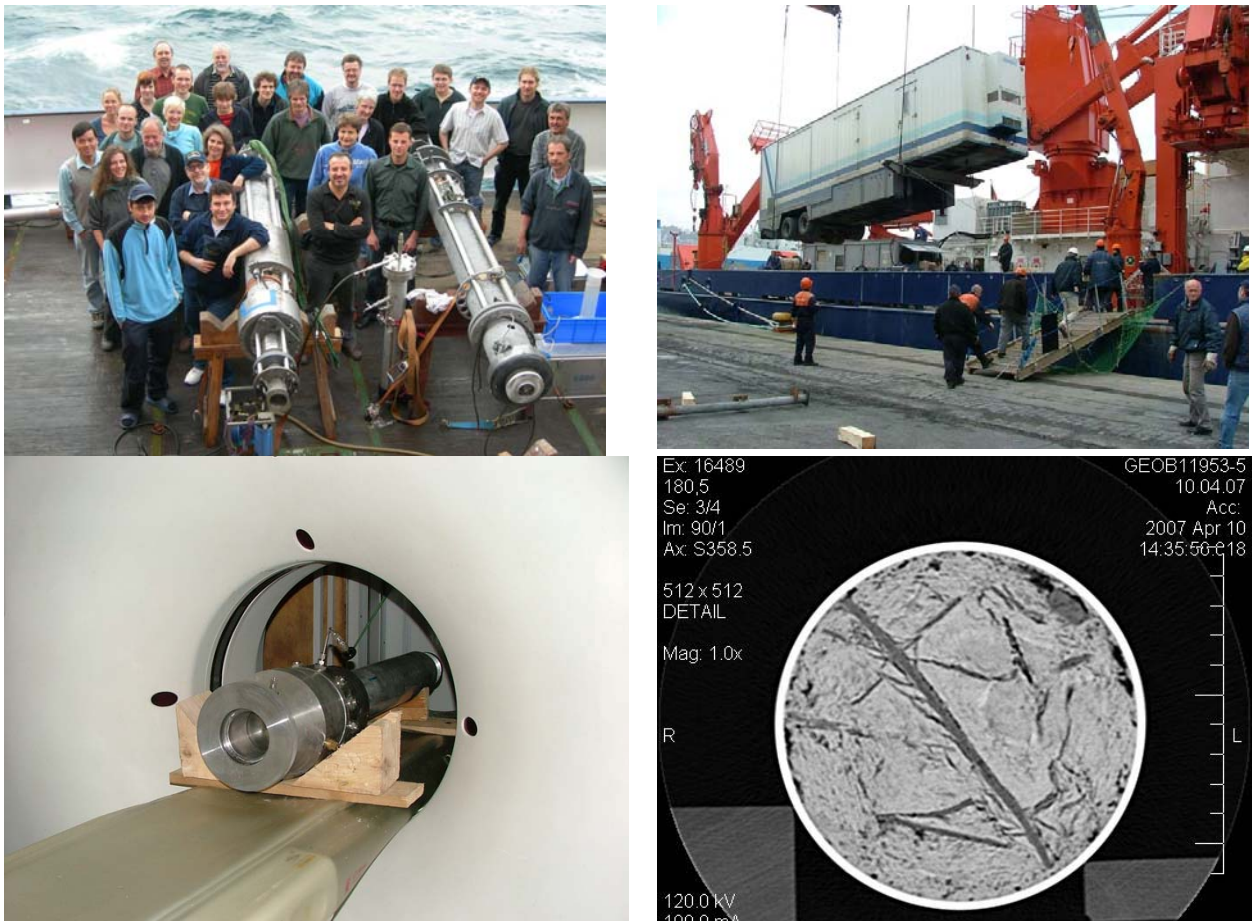


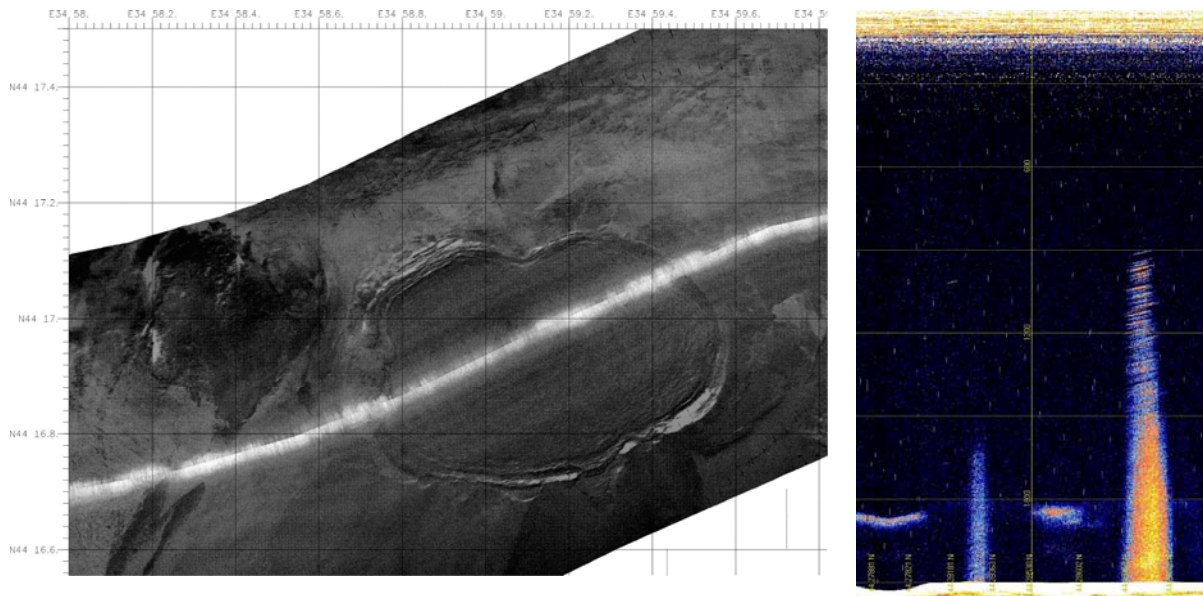
## M72/3 – last weekly report: 20 - 25 April 2007

On Friday, April 20 and the following Saturday we had a very busy program, because some scientific goals had not been reached yet, but needed to be reached before the return transit to Istanbul. Unfortunately gas hydrate sampling failed at the Kerch Flare site, and because of the short remaining time, we decided to sample hydrates on Vodyanitskii and Dvurechenskii (DMV) mud volcanoes. There, we immediately have been successful. Besides gravity core sampling of gas hydrate specimen that will be analyzed later in the lab, both autoclave piston corers DAPC-I and DAPC-II were used. These coring systems keep the samples under in-situ pressure conditions and no gas is lost and no gas hydrates decompose on their way up through the water column. Besides DAPC-I which has been already successfully used in the past as well as during the current cruise, the DAPC-II is a new development which allows to sub-sample the 2,30m long sediment core into several segments while maintaining the pressure. The advantage sub-sampling the core is that the sub-samples allow quantifying the gas and gas hydrates for segments of the core. We were able to cut the core under pressure for the first time, which represents a valuable achievement of project METRO during the cruise. In addition the sub-samples could be analyzed under pressure within the CT-lab (Fig. 1, lower left). The CT scanner which we loaded in the port of Trabzon (Fig. 1, upper right) used intensively during the cruise. More than 10.000 scans of gas hydrate samples have been made.



**Figure 1:** Scientific party of cruise M72/3b on the working deck around both autoclave coring systems DAPC-I and DAPC-II (upper left), mobile CT-lab during installation on RV METEOR in the port of Trabzon (upper right), sub-core that had been separated under pressure on the CT-scanner (lower left) CT-section from a gas hydrate core (lower right), in the image density is shown and platy gas hydrates (dark grey) are visible in the core.

Major goals for the CT-lab analyses were to review the internal fabric and the distribution of gas hydrates within natural marine sediments. In the past it was believed that gas hydrates are distributed more or less homogeneously. In recent times there are more and more indications for different fabrics in hydrates, which are not yet well documented. RV METEOR cruise M72/3 obtained many new results in this field. Among others we could show vertical gas hydrate alignments over longer depth levels. These alignments probably formed by the rise of free gas vertical to the bedding planes. The gas hydrates filling the pathway of the gas ascent appear as long plates cutting through the sediments (Fig. 1).



**Figure 2:** Sidescan Sonar record from the Dvurechenskii mud volcano, DMV (left). Gas flares on top of the DMV registered on April 21 after several weeks without a flare (right).

Furthermore in the night between Friday and Saturday we could use the sidescan sonar again, which had problems with one of its transducers after the first three deployments and was then in repair during the last couple of days. Thanks to the effort and experience of our sidescan sonar technician the instrument could be used again and we were able to map the DMV (Fig. 2). Surprisingly, two flares have been detected by sidescan sonar on DMV in areas that showed no gas flares a day before on Parasound recordings. A new Parasound profile run after the sidescan sonar survey confirmed the presence of two active flares. The flare on the centre of DMV reached a height of 1100 m above the seafloor (Fig.2). The flares have not been active within the last 8 weeks, when RV METEOR visited the mud volcano several times, but and a major change in activity apparently happened just a day before. This new finding provoked many discussions among the cruise participants about the activity of the mud volcano in general, such as the intensity of mud flows, the frequency of gas expulsions, and many other questions.

Since we had to start our way back to Istanbul around midnight there is no more chance to extend our investigations of DMV. On Monday we left the Black Sea around 13:00 when we entered the Bosphorus Strait under nice, sunny skies. We passed along the old city of Istanbul and entered the Sea of Marmara. Right now we are waiting in front of Ambarli for the pilot who will guide us into port. Cruise M72/3 will finish soon and we return from this successful cruise with a treasure of scientific samples and many new ideas about scientific questions regarding the Black Sea. This is due to the enthusiasm of all participants, especially Captain Jakobi and his crew of RV METEOR. Many thanks for their great support.

With best regards from all participants of Meteor M72/3