

M67/2A - 2nd Weekly report March 20-26, 2006

Since most of the time of the M67/2a cruise was spent in activities on the harbor, transit and preparation to collect and analyze samples on the first week, the second week should have been characterized by a dense program that included the geophysical survey with multichannel seismic, sidescan sonar, bathymetry and sediment, followed by the sampling of the water column and the seafloor.

The CTD with a 22 bottle Rossette was the first equipment used to support nanoplankton studies in the top 250 m depth in the water column and to determine the Barium tracer and the dissolved methane concentration in the deeper layers, its descent was used to calibrate the swath mapping echosounder with a sound profile characteristic for the Campeche Bay as well. This first equipment, that started to operate on Sunday noon, was the only successful action of the cruise for a while. The fate of the days onboard not only seemed to be bewitched by technical difficulties and mishaps but it seemed problem-bearing for the gadget's first action. An intensive search for problems included the contacts, the cables and the software of all, the multichannel seismic, the sidescan sonar and the new echosounder as well, the new navigation sensors or the proficiency of the upgraded Parasound system.

Several short circuits were recognized in the connectors of the side scan sonar and the housing that had equal level of importance as the ongoing strong noise in the imaging of the seismic and that made it impossible to initiate the measurements. Over two days were devoted to find the errors, change the cables and connectors of the sidescan sonar and the cleaning of the seismic streamer connecting plugs was added on Thursday, after being exposed to saltwater, until the two equipments were considered fit to perform the tasks.

We were able to extend the bathymetry accomplished in the study area of the Sonne cruise SO 174 at sites with recorded asphalt and seepage by carrying out profiles successfully with the Parasound, the in the mean time once again working echosounder.

The first measurements with the updated Parasound revealed several limitations that were overcome by the new capabilities and functions added and will provide an important tool with time in this study. Measurements and survey within the water column, imaging of gas bubbles or optimal diagrams and form of signals are only a small glance of the required capabilities that this cruise will slowly require available for us to work in the upcoming days.

The bathymetric data of the new Simrad EM120 Echosounder gave us several things to wish among which a broader swath band is available through the availability of the box located in the keel that allows to record high quality data while sailing at more than 10 knots and allows to search in station and measure systematically with more comfort. In this way we concentrated in the area

studied during SO 174 and accompanied the geophysical repairs with activities on station such as the sampling of the water column with the CTD/Rosette. It is in this way that we retrieved the first 5 m long gravity core sample with pelagic deep sea mud from the upper crater rim of the deep sea knoll „Chapopote“, sampling that took on this occasion from the stern (see enclosed images below).

An important contribution to the understanding of the seep processes in the Gulf of Mexico should be the enlargement of the area of study to the South where numerous natural oil slicks have been recorded, based on satellite observations of the water surface. These natural oil slicks are fed by the oil drops that originate in the seafloor and reach the sea surface and that helped us to determine the location of active cold seeps in this study. While sailing in the area we could directly confirm the presence of oil drops and oil slicks in the surface.

The surface mapping with Parasound/Echosounder should at the same time help to provide additional profiles to establish a basis and optimize the upcoming measurements and help to overcome the forecasted storm-phase of winds of strength of 10 while the sidescan sonar and seismic equipments are being repaired. This allowed us to recognize the infallible characteristics of the equipments that carry out hydrographic measurements under rough sea conditions that have greatly improved as in contrast with the past. With the right speed these measurements could be accomplished successfully even during the storm forecasted to reach wave heights of 4m, which is a great step for future work onboard the R/V Meteor.

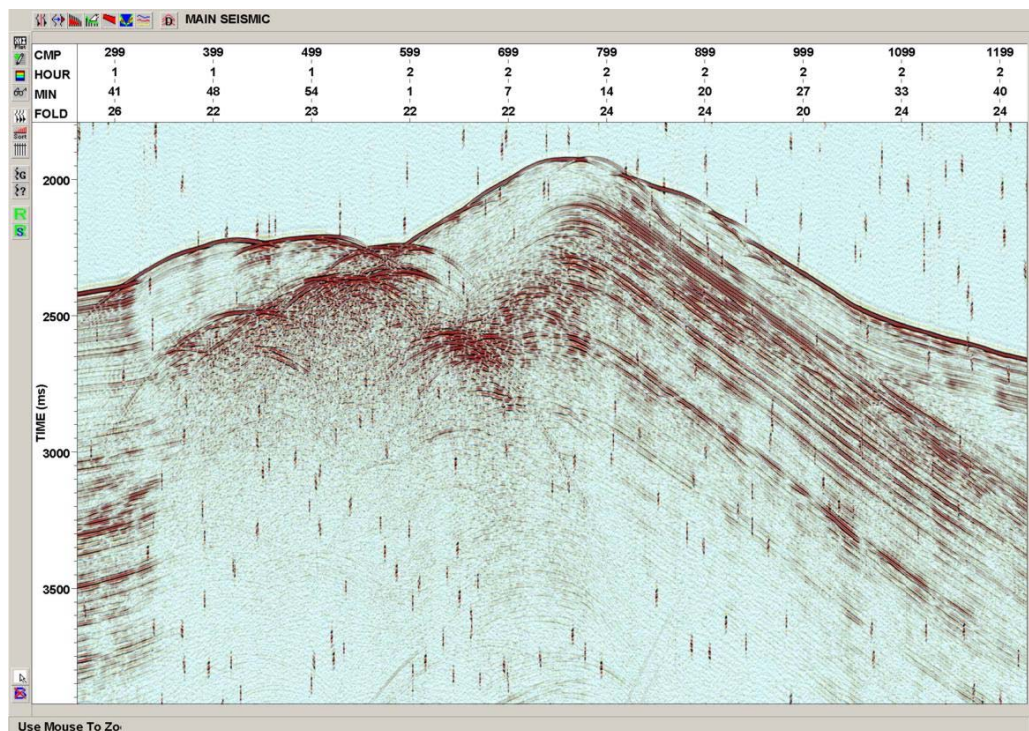
It was over Friday to Saturday night that the weather conditions improved and that the diminishing strength of winds throughout the day that we could get the seismic equipment back in water on Saturday evening. We could then accomplish diverse profiles over seep locations in order to understand the complex geological conditions on the seafloor represented by the salt diapirism, sliding and strong deformation to interpret jointly with the oil and gas outflow to the superficial sediment layers. The few, but long promised data (see image below) allow expect that we will still be able to accomplish sidescan measurements on Monday morning and will then be able to trace the path of fluids, gas and asphalt out of greater depths into the seafloor.

The optimism gained throughout this though week will remain with the good weather forecast for the Gulf of Mexico in such a way that we can send a warm tropical greeting home. All cruise participants are doing well and look forward to the last work week onboard.

In representation of the cruise participants Volkhard Spiess, 26.03.2006



Gravity core sampling on stern: although uncommon for the R/V *Meteor* however quite effective for the M67/2 cruise to save time in changing wire.



The image shows a seismic profile of an underwater hill in the area of a salt diapir. Elevated layers (right) and high reflection amplitudes (middle) indicate an active tectonic zone with seep activity near the surface and the presence of shallow gas concentrations.