Weekly Report SO242-1 DISCOL REVISITED

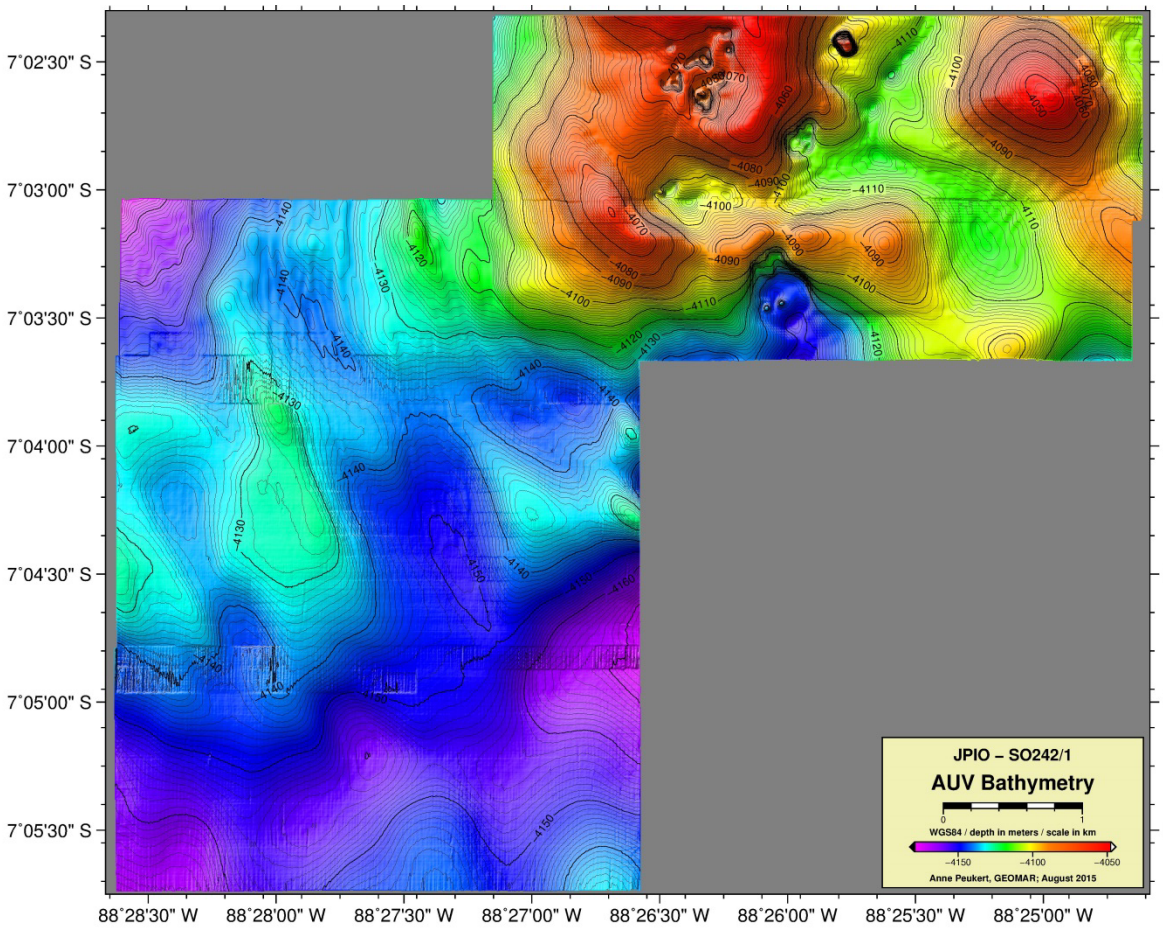
20th August – 25th August 2015

„Back home, time for a resume“

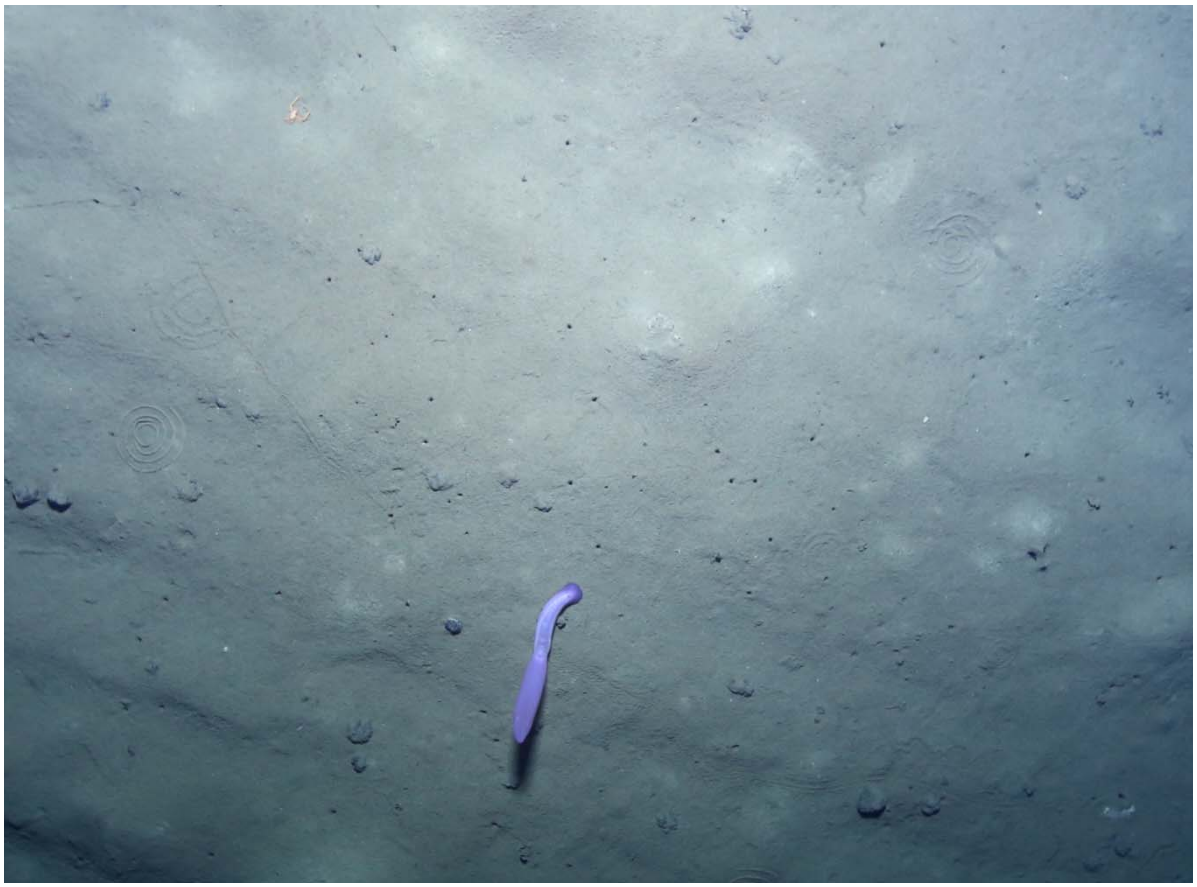
Now that we've returned home, there is time to write the last weekly report. The final days were packed with getting the last samples on board. Despite the day we lost in sampling water instead of sediment with the MUC over the stern (6 unsuccessful deployments) and the time we needed for the medical transit to Guayaquil and back into the work area, we succeeded in almost completing the entire work programme. During the last three sampling days we deployed another three EBS and MUCs, two more AUV surveys were undertaken and two more GCs deployed (again with more than 9m core recovery), six box corers were taken to increase the number of samples inside the plough tracks, and finally the two last stations were two rather long OFOS tracks.

Looking back at what we achieved in the time we had, we were very successful. We sampled five different areas as planned, all of them areas that were previously sampled as well. This makes it possible to assess if the deep sea environment has recovered from the earlier disturbances and if so, to which degree. We were able to recover all our gear except one LBL transponder, which hopefully will be 'rescued' using the ROV during SO242-2. All scientists where very happy with the samples they got and when asking half a day before we had to leave whether anybody needed additional samples (by shortening an OFOS track), everybody said (in a somewhat happy but tired voice) that they really had enough samples. In the following I will try to summarize first scientific results of the cruise:

AUV: The AUV once more proved to be a work horse that can be used almost 24/7 and only needs to be on deck for a quick (3h) pit stop to change batteries. Without the very precise hydroacoustic maps and images of the AUV we would not have been able to do what we did. AUVs will without doubt become the most important platform for monitoring deep sea mining activities with respect to immediate impact on and long-term recovery of the environment.



Plough marks: They are still clearly visible after 26 years, there is a slight sediment cover but first analyses of the fauna distributions clearly show sessile fauna did not recolonize the tracks. Stalked sponges, corals and anemones occur outside the tracks still within the DEA. There distribution pattern does not vary clearly from reference sites.



Mn-nodules distribution: There are areas inside the DEA that do not show nodules at the seafloor surface. These areas are found in small depressions; their shape is determined by the intersection of a hypothetical horizontal plane in a certain distance above the deepest point. The backscatter response in those depressions is low, indicating a sediment cover with less dense sediment. In addition, gravity corers recovered nodules even in 9m sediment depth. Several more or less intact nodules were found throughout the entire sampled sediment column.

Water currents: Currents have been slow during the time of our observations with a strong tidal signal. Current directions change and no general direction could be observed. Additional data from SO242-2 will provide better insight into longer-term variations.

Sediment plume: Our two ‘disturbance experiment’ showed that sediment plumes can be monitored using high frequency ADCPs (1200kHz). At least the disturbance by the EBS only created a sediment plume that stayed close to the seafloor (it could not be detected by the upward looking 300kHz ADCP). First analyses of current trajectories showed that the sediment resettled rather quickly; during one EBS tow, the water mass along the EBS track passed the lander position five hours after the tow and no increased backscatter signal could be determined.

Was it worth going back to the DISCOL area?
It was certainly worth going back to the DISCOL area 26 years after the impact and 19 years after the last studies in 1996. Using the latest technology allowed a much more detailed insight in the spatial heterogeneity of the deep sea and the disturbance. The remaining period of the project will show how the environment changed. It is clear that it did not revert to exactly the same state as before the impact. The studies performed and the technology used will be very helpful for providing advice for best practise guidelines of how the deep sea could and to a certain extent should be monitored prior, during and after deep sea mining activities. All scientists agreed that DISCOL should become a long-term monitoring station that is revisited again!

These are only a few first general results and I am sure the groups of the different scientific disciplines could add much more. We will hear more about results during at the annual JPI Oceans meeting in Ghent at the end of January 2016.

Jens Greinert, former chief scientist SO242-1