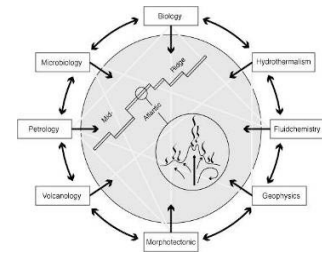




MSM 10/3

Jan. 11th – Feb. 13th, 2009

4th and last weekly report



Our last week in the Logatchev working area began as all our previous weeks with winds too strong and seas too high for using the ROV. And as during the previous weeks, we kept ourselves busy deploying the CTD for casts, tow-yos and jojos. We have not yet been able to find evidence for a new active vent site. Instead, we regularly found methane and hydrogen in the water column at 50 – 100 m above the seafloor, even in the rift valley at depths of 4000 m. We are now trying to figure out if diffuse venting, possibly throughout large parts of the rift valley could explain the presence of methane and hydrogen just above the seafloor.

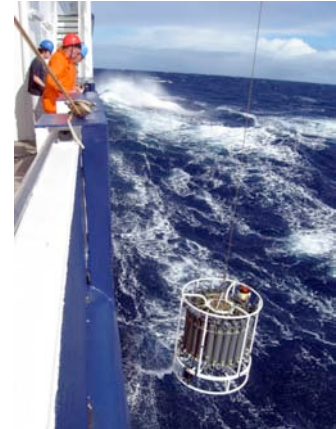


Fig. 1: CTD deployment

We spent February 2nd recovering Ocean Bottom Seismometers (OBS) that were



Fig. 2: Recovery of an OBS

deployed during the SPP 1144 cruise to Logatchev in December 2007 with the RV L'Atalante. These were placed in a grid on the seafloor to detect seismic activity. The working hypothesis for Logatchev is that a major fault zone connects the vent field to serpentinized host rock and the OBS data will be used to see if this hypothesis is correct.

On Wednesday, February 4th we were up to Station Number 300 (each instrument or piece of equipment that is deployed or recovered during a cruise is given a station number) and this was apparently our lucky number! The seas calmed down enough for us to deploy the ROV and we were able to collect bacterial mats using push cores, retrieve loggers placed in a mussel bed at the Irina II structure one year ago to record temperature over long time periods, and collect samples for chemical, microbiological and biological analyses. We also recovered an Ocean Bottom Tiltmeter (OBT) that had been deployed for over a year to measure seafloor movements. By the time we were

ready to bring the ROV back to the ship, the wind had become stronger again, and the relatively high waves together with the added weight of the heavy OBT made the recovery of our ROV quite a challenge!



Fig. 3: Vent shrimp (*Rimicaris exoculata* and *Chorocaris chacei*) near vent fluids as hot as 110°C. The nozzle (held by the ROV arm) is taking up fluids for online analyses of methane, hydrogen, sulfide, oxygen and other gases using the in situ mass spectrometer. Copyright: IFM-Geomar

Thursday, Friday, and Saturday were back to the weather we came to know so well during this cruise, hot and sunny but very windy and waves too high for using the ROV. And as on both previous Sundays since we have been at Logatchev, the seas once again calmed down enough for us to dive again, and even better, Monday, our last working day of the cruise was also calm enough for using the ROV. With two full days of diving, we were able to get quite a bit of work done. We recovered the second SMoni (Smoker Monitoring Device) placed near a black smoker at Site B over a year ago for monitoring the long-term temperatures of hot fluids, collected mussels and shrimp for analyses of their symbiotic bacteria, and sampled both diffuse warm fluids and more focused hot fluids for chemical and microbiological analyses. The in situ mass spectrometer measurements of diffuse and hot fluids showed that the relationship between hydrogen, methane and temperature varies considerably between sites, indicating the presence of different fluid sources within the Logatchev vent field.

As of Monday evening, we have begun our return transit to Fort de France in Martinique. We are finishing our last experiments, and packing up the ROV and our scientific equipment for transport to Port of Spain in Trinidad and Tobago, from which the next SPP 1144 cruise with the MS Meteor to the hydrothermal vents on the southern Mid-Atlantic Ridge will begin in April of this year. We will be happy to be returning home to our much missed families and friends but will be sad to be leaving the MS Merian crew that has done such an excellent job of supporting and helping us during this cruise.

Nicole Dubilier and the scientific crew of MSM10/3
February 10th, 2009

