

## Bremen Summer School Report 2014 by Rui Zhao

The 2014 ECORD Summer School hosted by MARUM, University of Bremen, with the central theme “Subseafloor Biosphere: Current Advances and Future Challenges”, was an unparalleled experience for early career scientists like me engaged in deep biosphere exploration. A total of 29 young scientists from 14 different countries, with diverse backgrounds, including microbiologists, marine virologists, sedimentologists, geochemists, and petrologists, were attracted to gather in Bremen to participate in the twelve-day program (from September 22 to October 2) specially aiming to prepare the participants as scientists for future IODP expeditions.

The first week was an intensive lecture week. Many top researchers in this field gave us lectures covering almost all the basic aspects of the deep biosphere such as abundance, biodiversity, activity, energetics, lipids composition, biogeochemical processes of microorganisms in subseafloor sediments and oceanic crusts, as well as state-of-the-art techniques in cultivation, contamination control, DNA extraction, and isotope-based activity detection. All this has greatly improved my background knowledge and perspectives of the deep biosphere. The half-hour coffee breaks allowed us to discuss with the leading scientists, exchange ideas and seek for potential collaborations with our young colleagues from different disciplines. Each day just before the lunch break, 6 participants were given the opportunity to present their work to the audience, which was extremely helpful for me to find out the interesting connections between each other and also broaden my horizons given our diverse backgrounds.

The summer school did a very good job to foster scientists for future IODP expedition. First, as the closing speak of each day, one co-chief scientist of the recent IODP expeditions related to the deep biosphere, gave a comprehensive presentation about the main objectives and outcomes. Specifically, Dr. Fumio Inagaki presented Expedition 337 “*Deep Coalbed Biosphere off Shimokita*”, Dr. Steve D’Hondt gave a update lecture on Expedition 329 “*South Pacific Gyre Subseafloor Life*”, Dr. Bo Barker Jørgensen presented Expedition 347 “*Baltic Sea Basin Paleoenvironment*”, and finally Dr. Beth Orcutt introduced the ocean crust life focusing on Expeditions 327 and 336 through lecture titled “*Ridge Flank Microbiology Gleaned from Borehole Observatories*”. Second, the field trip to the German natural oil museum in Wietze gave us a direct contact with the drilling facilities and methods employed on the research vessels of IODP expeditions. Third, we had a practical exercise during the “*Virtual Ship*” section, which simulating the almost full-range of IODP-style work including pore water extraction and solutes measurements, microbiological sampling and contamination control, refined cell counting, microbial enrichment and isolation, and core description and physical properties measurements (following the time order). Fourth, on the last day, we were trained as chief scientist of IODP expedition through learning the essential components of an IODP proposal and trying to formulate great ideas through an enthusiastic group discussion. It turned out that fantastic ideas quickly emerged when multidisciplinary scientists were setting together, especially after the two-week of intensive interaction and training, as demonstrated by the representative’s presentation of each group after the discussion.

During the summer school we also had a visit to the famous Bremen Core Repository (BCR) and briefly got to know the policy and procedure of sample request from there, which probably are crucial for scientists before they get the opportunity to participate an IODP expedition.

The ECORD Summer School was successful in training young scientists engaged in subseafloor biosphere, and I will recommend it without reservation to anybody interested on this frontier.

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