

IODP Expedition 349: South China Sea Tectonics

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Scientific Motivation

The South China Sea (SCS) is situated at the junction of the Eurasian, Pacific, and Indo-Australian plates (Fig.1). Although the SCS is relatively small in size and has a short evolutionary history, its opening will reveal complex histories of continental margin breakup and basin formation. However, previous studies did not accurately answer the questions in estimated opening ages and test various hypotheses regarding its opening mechanism and history. Due to a lack of samples of basement rocks and overlying sediments from the deep basin, our understanding of East Asian tectonic and paleoenvironmental evolution is limited.

The new International Ocean Discovery Program (IODP) started in October 2013 with the support of 26 nations. The first expedition of new IODP, formerly known as the Integrated Ocean Drilling Program, was designed to core basement bedrock at multiple sites around the SCS basin in order to determine the age of the South China Sea, and to resolve ongoing controversy over how it formed. In addition, another primary objective was to core the sedimentary sections above basement, in order to examine the sedimentary and paleoceanographic responses to basin opening. On January 26th 2014, 32 scientists from 12 countries, including two Swiss participants, set sail on the JOIDES Resolution from Hong Kong to the SCS to explore the opening history of this critical site (Fig. 1).

Shipboard Activities

All the scientists on board were divided into two classes for working in 12

hour shifts. We had to arrive in the meeting room 15 minutes in advance, in order to exchange ideas and discuss important scientific discoveries. Onboard, two scientists shared a room. While I worked, my roommate would be at rest.

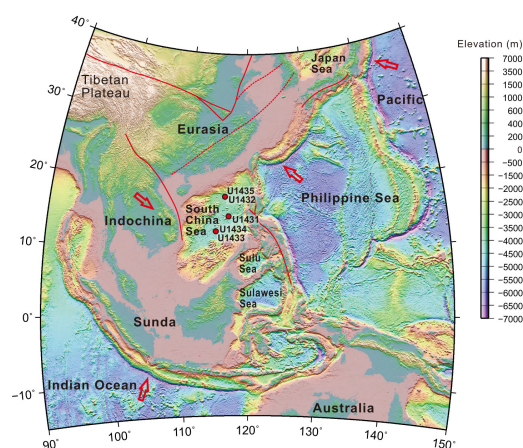


Figure 1. Regional topography and geodynamic framework of Southeast Asia. (Li et al., 2013)

In term of our work schedule, the scientists were also assigned to specific groups for sampling (Fig. 2). After “core on deck”, the scientists conducted a series of in-situ tests to obtain important physical and chemical parameters. The core would be split into two halves: working half and archive half after the core scanning and description. Working half would be collected and packed and put into some boxes with different scientists’ names. All scientists in this section were required the completion of sampling within 2 hours.

As an organic geochemist on board, I was responsible for the measurement and analysis of hydrocarbon concentrations and inorganic and organic carbon content. One of the primary responsibilities of the shipboard geochemistry team was to monitor cores for hydrocarbon content

and to advise when hydrocarbon levels in cores may constitute a potential safety or pollution hazard. Additionally, I assisted the inorganic geochemist to squeeze the pore water from sediments and took the remainder for inorganic and organic carbon content measurement.



Figure 2. Rui Bao (organic geochemist) is investigating a sediment core recovered from Site U1431.

Education and outreach has been a crucial component of the IODP. Expedition 349 had also been busy with a range of education and outreach activities taking place onboard. These had been led by Denise Kulhanek (expedition project manager). The outreach activities had included ship-to-shore broadcasts with schools, question and answer sessions with junior/high school students, and regular blogs on facebook made by shipboard scientists. In addition, we had both been able to participate in events with both Swiss and international audiences. We also had a very memorable ship-to-shore broadcast with the 1st Swissdriling conference attendees on February 14th 2014. Two Swiss sailors on board had a very fantastic exchange with the audience in Bern. Besides, we had some interesting events unrelated to science, for example, masque, barbecue on deck, drill, designing an expedition logo (Fig. 3).



Figure 3. Left: expedition logo, created by Rui Bao, that reflects some of our experiences we shared while at sea. It may take you much time to discover all the hidden details illustrating what happened during Expedition. Right: my design was voted as the final logo of this expedition and the logo was pasted permanently on the wall of corridor.

Finally, many thanks to the Swiss IODP and my colleagues on the JOIDES Resolution.

Reference

Li et al. (2013). International Ocean Discovery Program Expedition 349 Scientific Prospectus. doi:10.2204/iodp.sp.349.2013