

IODP Expedition 371: Tasman Frontier Subduction Initiation and Paleogene Climate

Week 1 Report (27–29 July 2017)

Operations

The Tasman Frontier Subduction Initiation and Paleogene Climate Expedition 371 started at 0812 h on 27 July with the first line ashore at Wharf 10 in Townsville, Australia. The IODP technical staff and Co-Chief Scientists moved onto the ship and cleared immigration and customs. The Expedition 371T School of Rock participants moved off the ship. After ~4 h of crossover activities, the Expedition 371T IODP technical staff moved off the vessel as well.

The rest of the Expedition 371 scientists boarded the ship in the morning of 28 July and, after checking into their cabins, received various introductory presentations as well as laboratory safety tours. The Siem Offshore crew change was completed. Fresh food and other catering supplies were loaded on board. Three public ship tours were held. Toward the end of the day, we began loading 450 metric tons of marine gas oil, which was transported alongside by trucks and then pumped on board.

Fueling was finished at 0100 h on 29 July. We made progress on the subsea camera hydraulic system upgrade but were not able to complete it during this short port call. The Expedition 371 scientists received several presentations, including an introduction to the project science from the Co-Chief Scientists, an overview of the Education and Outreach (E&O) plans from the two E&O Officers aboard, and an introduction to the expedition work plan from the Expedition Project Manager (EPM). The Captain and other senior Siem Offshore personnel met with the scientists and provided ship safety information. The EPM then led the scientists on laboratory tours for an overview of scientific equipment, procedures, and work responsibilities. The passage plan for the expedition transits was completed and arrangements were made with the agent and immigration for a departure at 0700 h on 30 July.

Science Plan

We will core and log Paleogene and Neogene sediment sequences within the Tasman Sea. The cores will be analyzed for their sediment composition, microfossil components, mineral and water chemistry, and physical properties. The research will improve our understanding of how convergent plate boundaries form, how greenhouse climate systems work, and how and why global climate has evolved over the last 60 My. The most profound subduction initiation event and global plate-motion change since 80 Ma appears to have occurred in the Early Eocene, when Tonga-Kermadec and Izu-Bonin-Mariana subduction initiation corresponded with a change in direction of the Pacific plate (Emperor-Hawaii bend) at ~50 Ma. The primary goal of Expedition 371 is to date and quantify deformation and uplift/subsidence associated with Tonga-Kermadec

subduction initiation in order to test predictions of alternate geodynamic models. This tectonic change may coincide with the pinnacle of Cenozoic “greenhouse” climate. However, paleoclimate proxy data from lower Eocene strata in the southwest Pacific show particularly warm conditions, presenting a significant discrepancy with climate model simulations. A second goal is to determine if paleogeographic changes caused by subduction initiation may have led to anomalous regional warmth by altering ocean circulation. Late Neogene sediment cores will complement earlier drilling to investigate a third goal: tropical and polar climatic teleconnections. Expedition 371 will drill in a significant midlatitude transition zone influenced by both the Antarctic Circumpolar Current and Eastern Australian Current. The accumulation of relatively thick carbonate-rich Neogene bathyal strata make this a good location for generating detailed paleoceanographic records from the Miocene that can be linked to previous ocean drilling expeditions in the region (DSDP Legs 21, 29, and 90; ODP Leg 189) and elsewhere in the Pacific.

Education and Outreach

We have two Education and Outreach specialists sailing on this expedition: one is an educator from Australia and the other is a videographer from the USA. They both presented their planned E&O efforts for the expedition to the science party. The educator prepared for upcoming live outreach events such as scheduling videoconferences, setting up social media, initial planning for blogs, confirming contacts with schools for next week’s events, and compiling a list of media outlets that have recently published reports on the current expedition. The videographer began collecting images and video for social media and television media outlets, managing video and image files, scheduling interviews, and assisting in educational activities.

While in port, personnel from four television stations and one newspaper interviewed various individuals about IODP and Expedition 371. This direct media presence was accompanied by numerous phone and email requests from distal locations, such as the UK and USA. Within two days, the departure of Expedition 371 was presented in scores of media outlets. It may be worth assessing the total impact.

Technical Support and HSE Activities

Port Call Activities

- A scanning electron microscope (SEM) service call was completed.
- Technicians installed a new Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) in the Chemistry Laboratory.
- The staff was introduced to the new email program Outlook.

- Technical personnel started to resolve issues with laboratory instrumentation due to the newly installed PC hardware and Windows 10 operating system.
- Technicians helped with loading freight off and on the ship, including catering supplies.

HSE Activities

- Senior IODP staff provided presentations on life on board and laboratory safety, and conducted shipboard laboratory safety tours for scientists and new staff.
- Siem Offshore senior personnel provided ship safety information.
- Technical staff completed the audit of hazardous storage areas and the weekly check of safety showers and eyewash stations.