Expedition Log for IODP Expedition 313
Week 1
New Jersey Shallow Shelf

8th May 2009

Welcome to IODP Expedition 313, a scientific drilling operation currently being conducted on the continental shelf about 30 miles off the New Jersey coast.

Over the coming weeks, this log will be updated with entries from on board the *L/B Kayd*, bringing you up to date information on how the operation is progressing, what scientific activities are being done on board and hopefully showing you what it is like to work offshore.

Allow me to introduce myself. My name is David McInroy, and I am the Staff Scientist for this Expedition. It is my job to co-ordinate and assist the scientists on board, and to help them document the results of their scientific analyses. I am part of a much larger team of drilling engineers, ship crew, scientists and technicians, who work together to recover, record, analyse and store sediment cores collected from below the sea bed. In the coming weeks, we will meet the various members on board the *L/B Kayd* and hear more about their work.

So what is this project all about? Our main aim is to drill below the sea bed and recover a series of sediment cores, each roughly 6 cm diameter and up to 3 m long, to 750 metres below the sea bed. So that's up to 250 cores at each site. We plan to do this at 3 sites, each one being farther from the coast than the last. The sediments and the fossils contained in these cores should provide a record of how sea level has changed in this region over the last 24 million years.

Our coring operation offshore New Jersey is the first step in a much longer scientific project. The cores we recover will undergo various types of scientific analyses, conducted by a multi-national team of scientists over the coming months and years.

On the 30th April, our drill ship set sail from Atlantic City, New Jersey, and headed for the first coring site. Technically, our drill ship is called a lift boat (*L/B Kayd* stands for *Lift Boat Kayd*) which is a self-propelling boat with the capability to jack-up out of the water on three legs (photo 1). The photograph shows the *L/B Kayd* docked at Atlantic City shortly before she left port. In this photograph, the boat is fully jacked down so the legs extend their full height into the air. At the coring site, the legs are jacked down to the sea bed, and the boat is jacked up out of the water. This gives us a stable platform from which to lower our coring equipment over the bow down to, and below, the sea bed.

Photo 1, Graham Tulloch. *L/B Kayd* docked at the US Coast Guard station, Atlantic City, New Jersey.

The drilling equipment and expertise are being provided to the expedition by the not-for-profit corporation DOSSEC (Drilling, Observation and Sampling of the Earths Continental Crust; www.dossec.org).Coring the layers of sediment below the sea bed involves drilling a hollow steel pipe (the drill pipe) into the sea bed, which allows a core of sediment to move up into a core barrel inside the drill pipe. A drill bit on the end of the

pipe, sometimes combined with a sharp cutting ‘shoe’, provides the mechanism for cutting out the sediment cores (photo 2).

Photo 2. Graham Tulloch. The extended nose corer, one of the drill bits used in this Expedition.

When the sediments are soft, the core is cut out using a hydraulic piston instead of a rotating drill. The drilling team load lengths of drill pipe into the drill rig which is mounted on the side of the *L/B Kayd* (photo 3), and the rig rotates and controls the weight of the drill string on the drill bit at the base of the hole.

Photo 3. Graham Tulloch. The DOSSEC drill rig in operation.

The drilling team work 24 hours a day deploying and operating the coring equipment that drills out the cores and brings them back to the platform (photo 4). The work is tiring, noisy, dirty, and often wet!


Photo 4, Graham Tulloch. DOSSEC driller Beau Marshall handling a length of drill pipe, while in the background, stacks of drill pipe are ready to be lowered down the hole.

Once the core barrel is full, it is brought back to the surface by a steel wire. A new core barrel is lowered down the drill pipe to the base of the hole, after which a new length of drill pipe is screwed onto the last one, and the whole process of drilling a new core starts again.

We are currently coring about 200 m (about 656 ft) below the sea bed, and are bringing some good cores of clay back to the surface. How well we can core depends on how soft or hard the sediments are, so clays are generally well recovered, but loose sands can be a lot trickier.

Once the cores arrive on deck, they are immediately given to the ESO curators, Alex Wülbers and Carl Peters, who record their length into the Expedition database (photo 5).

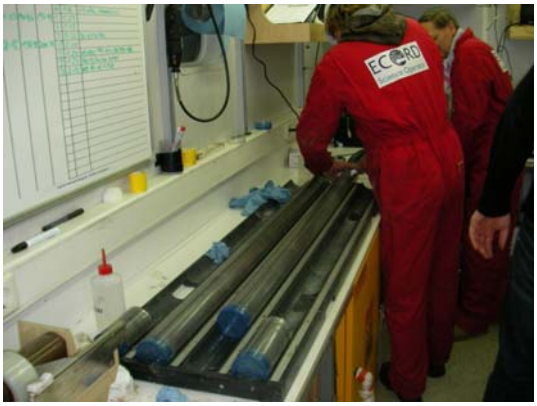
Photo 5. David McInroy. Cores of clay recovered from 200 m below the sea bed are being recorded by the curators.

Once they are properly recorded, they can be sampled and further analysed by the scientists on board. We will find out more about the scientists and their work in the coming weeks.

A selection of this week's photos

Dave Smith. 28th April. ESO staff join Captain Farrel Charpentier on the bridge of the *L/B Kayd*. From left to right: Farrel Charpentier (Captain), Sally Morgan (Petrophysicist), Jenny Inwood (Petrophysics Staff Scientist), Graham Tulloch (Drilling Coordinator), Colin Graham (Drilling Superintendent), Alex Wülbers (Curator), David McInroy (Staff Scientist).

David McInroy. 30th April. The working deck of the *L/B Kayd*. The drill rig mast is down in preparation for transit. Stacks of drill pipe are secured, and the various ESO container laboratories are arranged in a street-like formation.

David McInroy. 1st May. The supply vessel *Rana Miller* arrives at the *L/B Kayd* to drop off equipment and personnel. The transfer between the *Rana Miller* and *L/B Kayd* is done by hoisting a small platform (the 'Billy Pugh', foreground) between the two platforms.

Dave Wallis. 2nd May. One of the *L/B Kayd's* crew members, David Cook, shows off his catch of two dogfish.

Dave Smith. 4th May. The team take a moment to view a test of the BGS remotely operated vehicle (ROV), which can be used to check for problems around the top of the borehole on the sea bed. From top left to right: Linton Charpentier (1st Mate), Mike Mottle (Geochemist), Clem Darda (Captain), Dave Wallis (Electrical Engineer), David McInroy (Staff Scientist), Greg Mountain (Co-Chief Scientist), Susanne Stadler (Microbiologist), Jenny Inwood (Petrophysics Staff Scientist).

David Smith. 6th May. Three of the team observe the transfer of supplies from the *Rana Miller*.

David McInroy. 6th May. A Scarlet Tanager (or Scarlet Flycatcher) is one of many small birds that find their way onto the platform after being blown off course. They tend to hang around for a few days and feed on scraps from the kitchen.

Graham Tulloch. 8th May. Driller Shaun LaGrange with the DOSSEC team handling the drill pipe at the base of the rig.