

## **IODP Expedition 341: Southern Alaska Margin**

### **Week 8 Report (14–20 July 2013)**

#### **Operations**

Week 8 of Expedition 341 (Southern Alaska Margin) began while securing the vessel for transit at the end of Site U1419 (proposed site KB-2A). The drill floor was secured and the thrusters and hydrophones retracted at 0030 h on 14 July. After a 30 nmi transit, the vessel stabilized over Site U1420 (proposed site GOAL-15C) at 0345 h on 14 July. The top drive was picked up and the camera system was deployed for a sea floor survey. Following the survey, at 0850 h the seafloor was tagged with the bit at 248.2 mbsl and the camera system was pulled back to surface. Hole U1420A was spudded at 1045 h on 14 July. Coring with the RCB system continued from Core U1420A-1R through -78R (0–749.2 mbsf). Because of increasing torque on the drill string, a ~200 m wiper trip was completed followed by a 50-barrel mud sweep. Coring continued from Core U1420A-79R through -106R (749.2–1020.8 mbsf). Recovery over the entire hole was problematic because of the presence of numerous rock clasts that continually jammed the core catchers and prevented core recovery. Coring in Hole U1420A reached 1020.8 m and recovered 139.91 m (14%). At the completion of coring, the hole was cleaned by circulating a 50-barrels of high-viscosity mud. The Rotary Shifting Tool (RST) tool was run in the hole (RIH) on wireline to release the bit for logging. While running in the RST tool, the torque on the rotating drill string increased to 500 amps. The RST tool was pulled back and removed. After some hole remediation, another 75-barrel sweep was pumped and the end of pipe was pulled back to 981.2 mbsf. The RST tool was RIH again and the bit was released in the hole. After another run of the RST to shift the MBR sleeve back into the logging position, the hole was displaced with 450 barrels of 10.5 ppg mud for logging. After displacing the hole with the mud, the end of the pipe was raised up to logging depth. High torque was observed up to 640.9 mbsf. Week 8 of Expedition 341 ended while still raising the end of the pipe up to logging depth.

#### **Science Results**

At Site U1419, two Lithostratigraphic Units were described from 0–190 m CCSF-B based on the five holes drilled. Unit I includes an olive gray (5Y 4/2) diatom ooze with foraminifera from 0–5.5 m CCSF-B that is underlain by a dark greenish gray (10Y 4/1) foraminifera bearing sand. Dark gray (N 4) mud with dispersed to abundant clasts occurs immediately below this sand and is interbedded with several 30–50 cm thick ooze or diatom-rich mud beds. Interbedded sand and mud, as well as mud and diamict, and clast-rich diamict also occur in Unit I and are interpreted to record glacial influence at this site. Unit II begins at 90 m CCSF-B and is marked by a transition to clast-rich diamict. Two intervals of diatom ooze are interbedded with the diamict suggesting periods of higher productivity and/or reduced glacial sediment supply. However, low core recovery below 118 m CCSF-B limits the interpretation of Unit II. Core recovery of the 789 m CSF-A (to Core U1420A-2R-83R) drilled thus far at Site U1420 has been poor, consisting primarily of washed clasts, drilled rocks, diamict, and very dark gray (N 3) to dark gray (N 4) silty or sandy mud with dispersed clasts. The muddy diamict is commonly massive and clast-rich, occasionally containing shell fragments. Common clast types include sandstone, siltstone,

basalt, granite, rhyolite, and argillite. Dark greenish gray (10Y 4/1, 5GY 4/1, 5G 4/1), highly bioturbated mud without clasts is observed in cores with higher recovery.

The micropaleontologist group finished analyzing samples from Site U1419 and began studying samples from Hole U1420A. Around 80 cores were collected from Hole U1420A and generally contain lithic clasts and a high proportion of silt and sand. Microfossils are poorly preserved and their abundances are very low. Siliceous microfossils are barren in most samples. Calcareous microfossil abundances are higher and are more consistently preserved. Nearly all samples contain benthic foraminifera, although abundances are low; planktic foraminifera are more rare. In only two samples were all microfossil groups persevered.

The measuring and data processing of paleomagnetic data for Site U1419 was finalized and measurements began on material recovered at Site U1420. Data collected at Site U1419 revealed a dominantly normal polarity interval with a complex magnetization reflecting the site's variable lithologic and geochemical boundary conditions. Some intervals of reversed polarity have been observed, though the cause of these is at present indeterminate. At Site U1420, measurements have so far only revealed material of normal polarity from 0 to 900 m CSF-A.

The stratigraphic correlators completed work on the stratigraphic correlation and shipboard age models for Site U1419 and conducted tests on the *Correlator* software.

We completed physical properties measurements at Site U1419. We measured gamma ray attenuation bulk density, magnetic susceptibility and natural gamma radiation on the multi-instrument logging tracks. After coring began at Site U1420, we began taking both discrete and track measurements. Due to poor core recovery, very little material was passed through the tracks. There are few discrete samples for velocity, density and porosity above ~450 m CSF-A. Below ~450 m CSF-A, velocities vary between ~1600–~2100 m/s. Densities range between ~2.0–2.2 g/cm<sup>3</sup>.

Ion chromatograph (IC) analysis for cations and anions, ICP-AES analysis, and photometric analysis for ammonium and phosphate, have both been completed for interstitial water samples from Hole U1419A. Discrete samples from Hole U1419A were prepared and analyzed for total carbon, nitrogen, carbonate, and total organic carbon contents. All parameters indicate high organic matter degradation rates at Site U1419. Due to limited core recovery, only ten scattered interstitial water samples were taken in Hole U1420A so far, and directly analyzed for alkalinity, pH, chlorinity and salinity. While alkalinity was low in all samples, chlorinity and salinity were low as well, indicating interstitial water freshening. In addition, 27 headspace samples were taken in Hole U1420A, with methane concentrations up to 33,000 ppmv.

We have made a preliminary comparison between core, log, and seismic data for Site U1418, in order to examine the coherency between the different data sets. In general, there is good agreement between the physical properties measured on core in the CCSF-B depth scale and in the borehole through downhole logging (in the WMSF scale). Magnetic susceptibility (MS) data show similar variations in both data sets. High MS values are often observed to correspond to diamict and sand intervals, while low MS values are measured in intervals with diatom ooze and mud. Gamma ray data from both core and logs shows high variability in the upper ~220 m at this Site, corresponding to an interval of interbedded silt and mud described in core (Lithostratigraphic Unit I). The *P*-wave velocity log indicates higher formation velocity than

discrete core measurements. This may be due to gas expansion of cores, leading to low velocities, as well as to the fact that the log measurement averages between lower velocity mud matrix and higher velocity clasts. Using two-way travel times calculated from average *P*-wave velocities from cores and logs, we observe that several lithostratigraphic and log unit boundaries very likely coincide with significant seismic reflections.

## **Education and Outreach**

In addition to routine updates on the *JOIDES Resolution* website (<http://joidesresolution.org/>), Facebook (<https://www.facebook.com/joidesresolution>), and Twitter (<https://twitter.com/TheJR>), videoconferences were conducted via Skype. Participants were from the University of Otago (New Zealand); the National Aquarium of New Zealand; and Questacon-Science and Technology Centre (Australia). In total, E&O connected with 126 children and 86 adult participants via live video broadcasting. Other duties performed include Skype test calls for upcoming video broadcasts; video broadcast scheduling, curriculum development and assisting scientists in labs.

## **Technical Support and HSE Activities**

The following technical support activities took place:

- Cores were processed in the labs.
- The expedition group photo and science party photos were taken.
- The expedition t-shirts were made.

The following HSE activities took place:

- A fire and boat drill was held on Friday, 19 July.
- A security drill and bomb search was held on Saturday, 20 July.
- The eye wash stations were tested on Saturday, 20 July.