

Gas Hydrate Instability in the Southeastern Bering Sea
Contract No. DE-FC26-05NT42665

Quarterly Progress Report

Date: 10 January 2007
Period: October to December, 2006
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Progress

Task # 3.0
Task **Paleomagnetic Analysis**

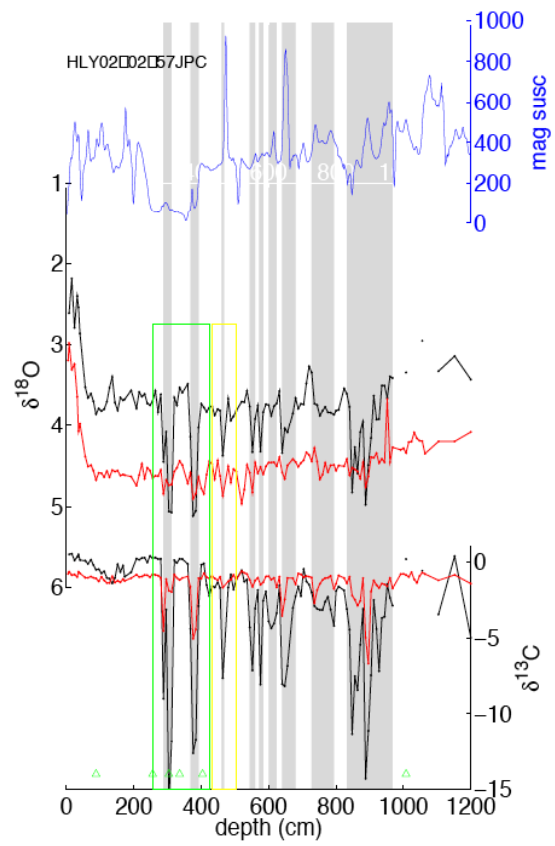
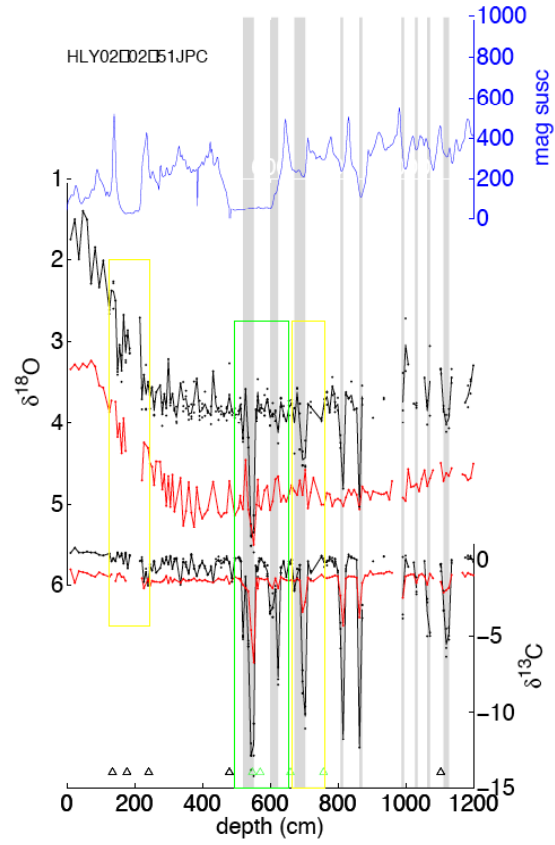
Steve Lund is currently analyzing the U-channel samples he collected in June from 57JPC and 55JPC in order to test the reproducibility of his data from the type section, 51JPC.

Task # 5.0
Task **Sample Preparation**

Mea Cook completed preparation of the high-resolution samples from 57JPC.

Task # 6.0
Task **Mass Spectrometer Work**

We completed analyzing the high-resolution samples from 57JPC. We are pleased to report that the pattern of isotopic events is very similar between this core and the type section, 51JPC (see figures on the next page).



Task # **7.0**
Task **AMS 14C Dating**

In green triangles in the figures on the previous page, we have marked the samples we will target for radiocarbon dating. We are targeting the youngest of the isotopic events because they are recent enough that we can obtain reliable ¹⁴C measurements that we can calibrate to calendar age. A standard calibration dataset to convert a ¹⁴C measurement to an age only exists for the time period 26,000 years ago to the present. The calibration of older events is tricky, and the amount of ¹⁴C in the sample approaches the detection limit. In order to demonstrate that the events in these two cores are contemporaneous, we need to target events that we have the greatest possibility of dating precisely.

Task # **8.0**
Task **Organic Geochemistry**

We identified events of interest for geochemical analysis (marked in green and yellow boxes on the previous page). Mea Cook prepared samples for analysis of abundance of organic carbon, and the δ¹³C of the bulk organic carbon and submitted them to the isotope facility at WHOI for analysis.

Schedule

During Dr. Cook's interaction with scientists at the Monterey Bay Research Institute (MBARI) in September, she learned that it was possible that authigenic carbonate layers can form well below the sea floor. This is problematic because we assume that the layers formed at the seafloor in order to determine when they were emplaced by radiocarbon dating the surrounding sediment. In order to test our hypothesis that the authigenic minerals were indeed forming very near the seafloor, as would be the case with a high vertical flux of methane, we will look at the assemblage of benthic foraminifera before, during, and after the isotopic events. We expect that there would be a significant change in the assemblage of benthic foraminifer species if the chemical environment changed dramatically, as it would have if there were active methane seeping at this site, and formation of authigenic carbonates at the seafloor. Mary Carman will perform this faunal analysis.

Mary Carman will also work with Dr. Cook to prepare samples for ¹⁴C analysis (Task 7.0).

Dr. Cook will spend January to March, 2007, in Bremen, Germany in the lab of Kai Hinrichs, to execute Task 8.0. She will extract and isolate organic compounds that are diagnostic of the presence of methanotrophs.

Other Activities

On October 24, 2006, Mea Cook gave a seminar at the annual WHOI Postdoc Symposium. The audience was comprised of WHOI Postdocs and the staff of the WHOI News Office.

A piece on Dr. Cook's work on this project appeared in NETL's "Fire in the Ice" newsletter in November.