



Metadata Citation Information

Title: Mallik Gas Hydrate Production Research Program
Weekly Science Report #2
January 29 - February 4, 2008

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Status: Final report

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Prepared for: General distribution

Submission date: February 4, 2008

Review status: R. Bowen/S. Dallimore
Unedited technical report as provided by lead NRCan
scientist. It is included here as background program
documentation only.

Distribution: Public

MALLIK GAS HYDRATE PRODUCTION RESEARCH PROGRAM

WEEKLY SCIENCE REPORT #2

JANUARY 29-FEBRUARY 4, 2008


AURORA RESEARCH INSTITUTE

PROJECT STAFF ON SITE

INUVIK

NRCAN- F. Wright, S. Dallimore (until mid-week)

AURORA - A. Applejohn, A. Taylor, A. Jenks

D. Ashford, K. Martin, G. Serrano

MALLIK SITE

AURORA- J. McEachern

+25 hearty souls at weeks end building our lease.

WEEKLY WEATHER

Thankfully, the weather has stabilized after a stormy period last week. Temperatures however have been in the -37 to -42 °C range, with wind chills to -50°C at times. Operating heavy equipment and personnel at these temperatures can be challenging. Safety of course is paramount, so as depicted below, all contractors and scientists must be alert for frost bite!

Canada QHSE – Frost Bite Alert
 January 31, 2008 – David Clark - CAN Injury Prevention Champion

With the cold spell currently around, Frost bites become a real danger. A Frost bite occurs when the blood circulation slows in areas of the body exposed to cold temperatures causing the skin tissues to freeze stopping circulation. The skin cells are damaged and in severe cases can not be rejuvenated. In some cases amputation is required.

Warning Indicators of possible frostbite:

- Extreme coldness on affected area causing burning sensation
- Numbness (loss of feeling) in affected area
- Change in skin color (ie. Purple, white, extreme redness, dark grey and possible black)

Frost bite may look like the following:




Blackening of the Skin



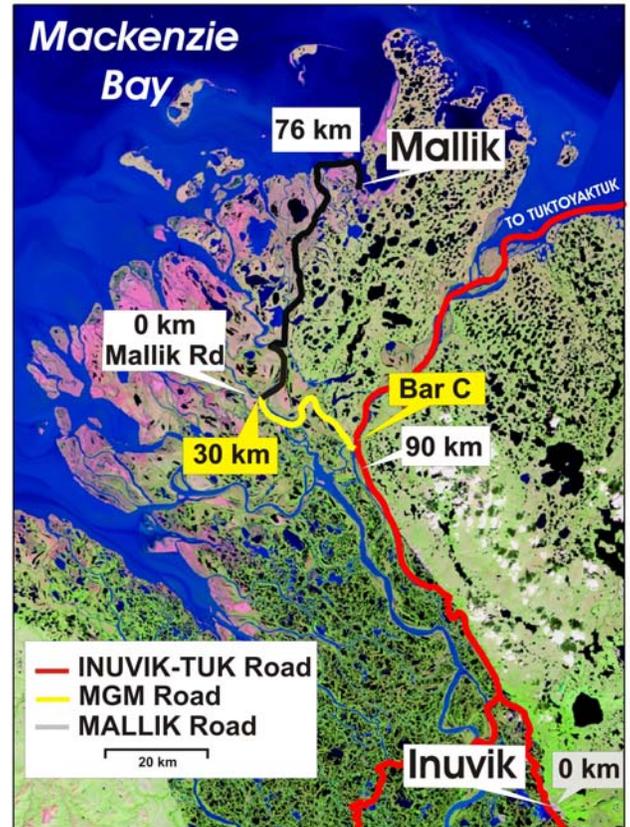

Blistering

Frostbite prevention:

- Proper Hydration (drink water & juices) and proper food intake
- Pocket warmers
- Dry clothing and dressing in layers
- Rotation out of the cold regularly
- Movement of body
- Caution in handling Metal objects

Schlumberger

FIELD OPERATIONS



Yes it is still all about logistics this week, with very good progress on all fronts on our ice road, sleigh camp and lease construction. Early in the week Doug and Scott drove out to Mallik and measured our road at 76 km. This is slightly longer than previous years as the route has been adjusted over the Beaufort Sea to stay on floating rather than grounded ice. Floating ice is our friend as a metre of strong sea ice is generally stable and able to handle heavy road traffic. Grounded sea ice however often requires considerable maintenance as it is easily broken up and potholed. As experienced last week, the boundary between the floating and grounded ice is also prone to overflows during storm surges which can be very problematic. So why is the Mallik route over the sea ice different this year??... **read on for the science behind the change!**

SNAP SHOTS OF THE WEEK AT MALLIK

FIRST THE ROAD...



Scott desperately tries to remember how to use his GPS upon first arrival at Mallik on Day 1.



Ground probing radar is towed behind a Grubens truck to profile ice thickness before moving heavy loads to Mallik. While the ice was generally >1 m for most of the channel and sea ice areas, there was a short section with only 70 cm of ice.

NEXT THE SLIEGH CAMP...



Considerable excitement on the radios as our sleigh camp is moved to Mallik. The 34 man camp was moved from Tuk to Mallik in five sections with more than 20 personnel coordinating the 15hr move.

THEN THE CAMP SET UP...



Sleigh camp in place and operating at Mallik... reports are the food is great!

THEN THE WORK ON THE LEASE TO PREPARE FOR OUR MAIN PROGRAM BEGINS...



All terrain vehicle called a Gator working to spread water on lease.

PICTURESQUE ARCTIC SUNSET...



View from Mallik lease looking south towards small pingo.

THE STERIC EFFECT & OTHER INTERESTING REGIONAL FACTORS AFFECTING OUR ICE ROAD

As mentioned previously, the Mallik road this year has taken a somewhat longer route over the sea ice to stay on floating ice. Garfield Messner and Scott/Doug had quite a debate on this in the field as the longer route over the sea ice is not desirable as the open sea ice is prone to blowing snow and white-outs. Garfield however was adamant that we had to make some changes, explaining that in his opinion the water levels in the nearshore and at our water source, were 30 cm lower than last year. How can this be, one wonders (certainly Scott did)? Well it just so happens that Scott's lunch time running buddy is Humfrey Melling from the Department of Fisheries and Oceans, one of Canada's leading Arctic oceanographers. All runners know of course that the best strategy when running is to keep the other guy talking (this conserves your energy and stresses your running mate). So as the kilometers past during a recent lunch time run, Scott kept Humfrey talking and by gosh he confirmed that Garfield was right and that there is a scientific reason for the sea level fluctuations.

It is all explained (well part of the story at least) in the plot below which shows the results of two research cruises Humfrey led in 2006 and 2007. The top map shows the cruise tracks for the Coastguard vessel Laurier, and the lower plot is a record of salinity of the sea water measured en route. The Steric effect is caused by changes in density of the ocean water affecting sea level. In this case Humfrey has recorded a significant change in salinity of the deep waters of the Beaufort Sea in the vicinity of Mallik. Normally because of the influx of fresh water from the Mackenzie River, salinities in this area are quite low (20 ppt observed in 2006), however in 2007 highly saline waters were dominant. Humfrey suggests this change in salinity and therefore density of the water column would naturally result in lower sea level as we have observed. Humfrey continues to study the climate and oceanographic factors influencing this salinity change with early insights suggesting that prolonged easterly winds experienced in this part of the Arctic for much of 2007 were a contributing factor.

NEXT WEEK AT MALLIK

The report as of 20:00 hrs on February 4th was that field work was proceeding very smoothly with good progress on flooding of our lease area. As mentioned last week, given that we are working with both a fixed budget and schedule it is critical that things proceed according to plan or if at all possible, even slightly faster than the planned. At the moment crews are working very well at Mallik and thankfully our sizable collection of equipment (plow truck, grader, cat, 3 water trucks, gator, 2 Deltas, loader, dump truck and camp

facilities) are all working well despite weather challenges... Lets hope things continue well this week as productivity will yield more testing!

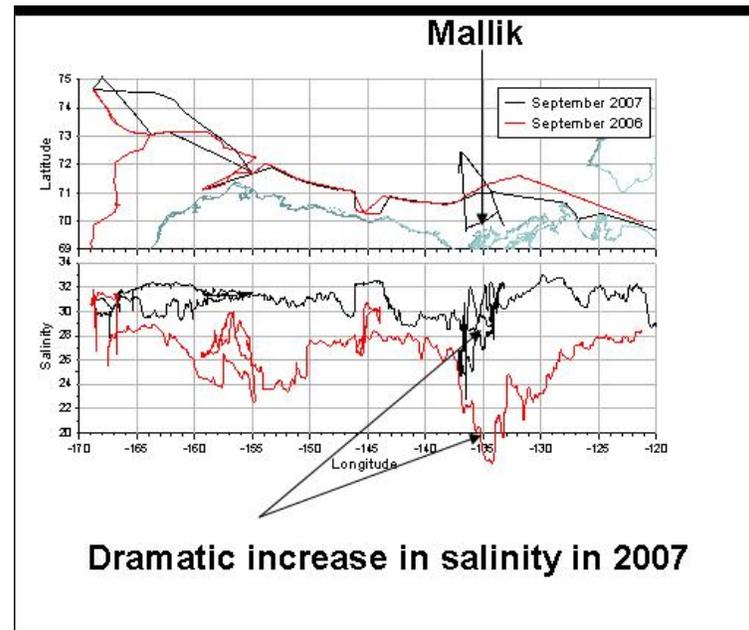


Figure courtesy of Humfrey Melling showing oceanographic data between Amundsen Gulf and the Chukchi Sea. Ship's latitude is plotted in the upper frame and near-surface salinity in the lower frame; the abscissa is longitude. Data are shown for both 2006 (red) and 2007 (black) along similar ship tracks at the same time of year. The ship followed the 1000-m isobath for much of the distance in both years.

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