CRUISE REPORT 1
CAGE17-1-Leg 1 Cruise

Water column observation from CTD and water samples west of Prins Karls Forland, Svalbard

on R/V Helmer Hanssen, May 15th – May 19th

2017

by Tine L. Rasmussen on behalf of Helge Niemann, Friederike Grundger, Pär Jansson, Fatih Sert, Pavel Serov, Vincent Carrier

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Acknowledgements:
Steinar Iversen and Bjørn Runar Olsen contributed with data processing and handling of acoustic CTD equipment connected with this cruise. All cruise participants contributed to the collection of the data. They are all warmly thanked for their great contribution to make this cruise a great success.

This report was finalised on July 30th 2017.
1. Summary

From the afternoon of May 15\textsuperscript{th} to the afternoon of May 19th, CAGE-Centre for Arctic Gas Hydrate, Climate and Environment, the Department of Geoscience UiT, the Arctic University of Norway, arranged a scientific cruise to survey offshore Prins Karls Forland, Svalbard to perform CTD measurements and water sampling on R/V “Helmer Hanssen”. The purpose is to study the variations in methane release and its dependence on oceanographic changes. The area has been continuously surveyed for the last three years for methane concentration, and methane consumption by bacteria and other related data. Because of the good weather conditions time allowed survey of the outer part of the shelf west of Prins Karls Forland – the so-called ‘Masox area’. Here three CTD’s were taken and the area surveyed by echosounding (EK60), chirp and multibeam for combined flare survey (EK60) and geological recording of sedimentary environments (chirp and multibeam).

A total of 69 CTD (conductivity-temperature-depth) casts were performed with 12 water bottles sampled for each CTD station.

2. Participants

\textit{Scientific crew:}

<table>
<thead>
<tr>
<th>Participants</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Rasmussen, Tine Lander (Professor; chief scientist)</td>
<td>UiT</td>
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<tr>
<td>Helge Niemann (Professor II; co-chief scientist)</td>
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<td>Bjørn Runar Olsen (Engineer)</td>
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<td>Steinar Iversen (Engineer)</td>
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<td>Friederike Grundger (Post doc)</td>
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<td>Fatih Sert (PhD student)</td>
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<td>Pavel Serov (PhD student)</td>
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<td>Pär Jansson (PhD student)</td>
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<td>Vincent Carrier (PhD student)</td>
<td>UiT</td>
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3. Equipment

\textit{Water properties:}
- CTD (Seabird 911 Plus) with compact rosette with water samplers

\textit{Acoustic equipment}
- Kongsberg Maritime EM 300 multibeam echo sounder
- EdgeTech 3300-HM hull-mounted sub-bottom profiler ("Chirp"); 4*4 arrays
- Kongsberg Maritime EK60 splitbeam echosounder (18, 38 and 120 kHz)
Methods

Water properties
The water properties – temperature, salinity – were measured off Prins Karls Forland, using a Seabird 911 Plus CTD. Data collection was performed during down casts at a speed of approx. 1.0 m/s. The data of selected CTD stations were used for records of modern water mass properties. Water samples (12 bottles per CTD cast) were taken for measurements of concentration of methane, methane consumption by bacteria and other parameters.

After the departure from the first survey area off PKF, soft starts of the Chirp system were performed outside of the 12 nm zone at 350 m water depth on the evening of the 17th of May, starting with 1% of the total effect, followed by a doubling of the effect every minute.