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A short preliminary report on the Arctic sea ice research survey

Melting of Arctic Ocean sea ice in Fram Strait
12 September to 30 September 2009

Vessel: MV Arctic Sunrise
Captain: Peter Henry Willcox
Cruise leaders: Melanie Duchin and Peter Wadhams

SUMMARY FOR ARCTIC SUNRISE CRUISE TO FRAM STRAIT , SEPT 13 –Sep 28 - 2009.

Overall aim was to track the nature and melt rate of ridged ice as it passes through the Fram Strait. Ridged ice is becoming an increasingly rare part of the Arctic ice cover as it thins under global warming. The second aim was to investigate two unstable ocean features of the northern Greenland Sea (Molloy Deep eddy) which may have been affected by global warming. Any change in the chimney field, in particular, could have an impact on the thermohaline circulation, thus the temperature of Western Europe.

The program was carried out within the range 79 – 81.5N mainly in the western half of Fram Strait.

MEASUREMENTS OF ATTENUATION RATES OF ICE FLOES IN FRAM STRAIT USING ICE MASS BALANCE BUOYS

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During September 2009 the research vessel “Arctic Sunrise” carried out a research programme in Fram Strait, organized and funded by Greenpeace. Ocean studies during the voyage included CTD sections across the ice edge.

Ice studies were carried out through the deployment of four Ice Mass Balance (IMB) buoys to measure the rate of attenuation of the ice. Each buoy consists of a thermistor chain frozen into the ice, with sensors at 2 cm intervals reaching from the air down into the water column and transmitting data by Iridium satellite system. The position of the air-ice and ice-water interfaces are given by temperature gradient changes, but where isothermal conditions prevailed the sensors could be heated and the maximum rise in temperature of each sensor recorded – with air, ice and water showing different rates of warming.

Four IMBs were deployed on first-year and multi-year floes. Three drifted quickly through Fram Strait in 2-3 weeks. The fourth, launched further upstream over the Yermak Plateau, lasted for a month before advecting to the ice edge. In each case ablation was slow while the buoys were inside the ice, but as soon as they approached the polar front, which generally coincided with the ice edge, the buoys melted rapidly in the warmer water and were destroyed as the floes broke up. The last 3 days of attenuation in warmer water gave melt rates of typically 0.8 m / day, which can be correlated with the near-surface water temperature.

Further work is in progress on the results. It is clear that this novel type of instrumentation works well, that the self-heating facility provides thickness data in isothermal conditions, but that the melt rates in this region are determined by nearness to the ice edge rather than by other climatic factors.

For further information on the progress of the scientific work contact Peter Wadhams. Greenpeace only provided logistics and in-kind support for the science program and did not conduct any scientific experiments.

Regards,

A handwritten signature in black ink, appearing to read 'Truls Gulowsen', written in a cursive style.

Truls Gulowsen – Program manager for Greenpeace in Norway