

Hydrography of the eastern and southern Hudson Bay – preliminary results from the ArcticNet cruise in Sep/Oct 2005

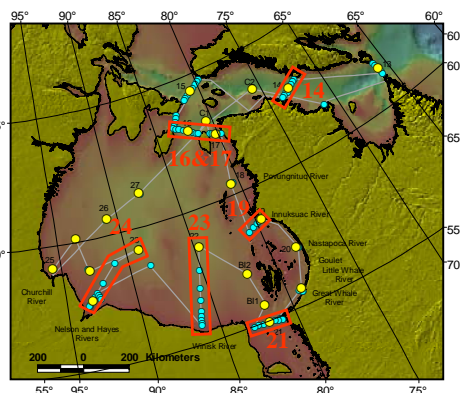


¹Granskog, M.A., ¹Mundy, C.J., ²Rail, M-E., ³Macdonald, R., ²Gratton, Y. and ¹Barber, D.G.

¹Centre for Earth Observation Science, Department of Environment and Geography, Wallace Bldg, University of Manitoba, Winnipeg, MB R3T 2N2
²Institut national de la recherche scientifique, Eau, terre et environnement, 490, de la Couronne Quebec, Quebec G1K 9A9
³Fisheries and Oceans, Institute of Ocean Sciences, PO Box 6000, Sidney BC, V8L 4B2

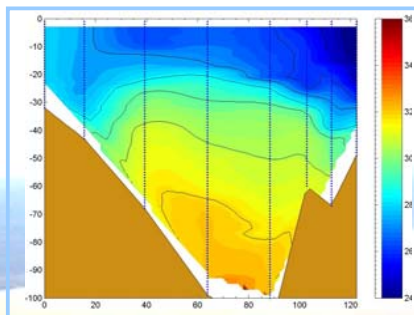
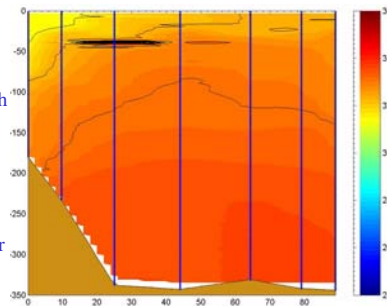


Introduction: Hudson Bay is a large inland sea that receives approximately 30% of the total freshwater drainage from Canadian rivers and an even greater input through sea ice melt. Nevertheless, little is known about the distribution of freshwater in the bay. Onboard the *CCGS Amundsen*, Leg 2 of the ArcticNet 2005 marine science expedition to Hudson Bay provided an opportunity to study these features of the bay in detail. Several CTD and hydrocasts were made, in order to assess the distribution of freshwater along major inshore-offshore transects, across the counterclockwise coastal current in the eastern and southern parts of the bay. During these hydrocasts CTD profiles and water samples for salinity, $\delta^{18}\text{O}$ and CDOM (colored dissolved organic matter) were collected. About 500 discrete water samples were collected in total, usually from 3-6 depths at each station. We present preliminary results of hydrographic sections made during the cruise and describe the distribution of freshwater based on these.

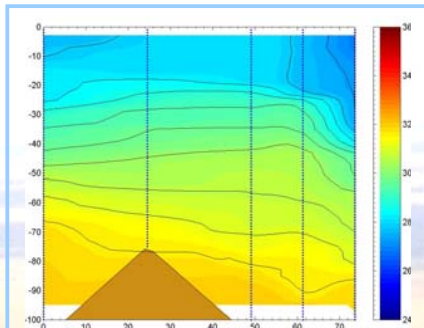


Map of the study area for leg 2 of the 2005 ArcticNet expedition. The transects described are indicated in red.

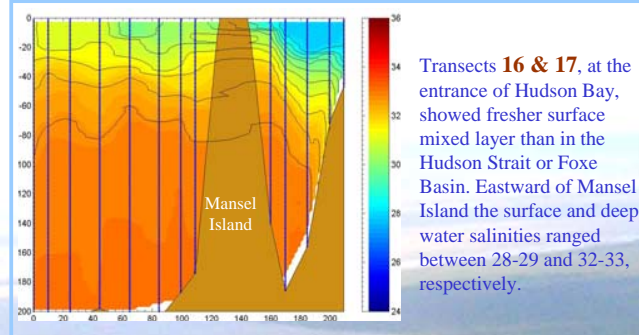
Transect **14** across Hudson Strait revealed a fresher surface layer, with salinities between 31-33. The surface mixed layer became fresher going southwards, where the eastward outflow of Hudson Bay waters occur (data Q and A still required).



Transect **21**, at the entrance of James Bay, had the lowest observed salinities. The eastern side demonstrated a deeper and fresher surface layer, with salinities of 24-25. This is the fresh outflow from James Bay into Hudson Bay, caused by high river runoff into the bay. On the western side there is a somewhat saltier surface inflow (salinities 27-29) from Hudson Bay.

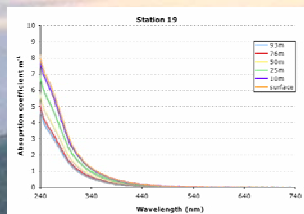
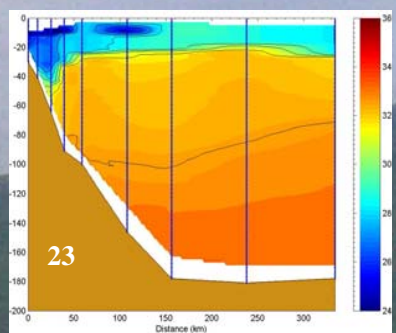
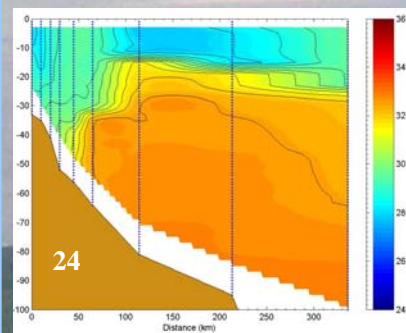


In transect **19**, the fresh (28-29) surface layer extended at least 80 km from the coast.



Transects **16 & 17**, at the entrance of Hudson Bay, showed fresher surface mixed layer than in the Hudson Strait or Foxe Basin. Eastward of Mansel Island the surface and deep water salinities ranged between 28-29 and 32-33, respectively.

In southwestern Hudson Bay, transects **23** (the Winisk Trough) and **24** (out from the Nelson River estuary) were sampled. In both transects, the surface layer was deeper closer to the coast. Salinities were higher near the Nelson River estuary. Nearshore CTD casts and water samples were collected via the Zodiac onboard showing a general freshening closer to the rivers. We note that along the southwestern coast the coastal current is as constrained and narrow as it appears to be on the eastern coast.



Above is an example of CDOM absorption at 19A. It shows that CDOM absorption decreases with depth, following the change in salinity. Rivers are typically rich in CDOM which mixes with the CDOM poor waters of Hudson Bay. These observations will provide insight towards the distribution of river runoff in Hudson Bay.



The preliminary results presented in this poster show a strong influence of freshwater in Hudson Bay along the coasts, influenced largely by the input from surrounding rivers. In the future our aim is to use the water samples collected for salinity, $\delta^{18}\text{O}$ and CDOM during the 2005 marine science expedition to characterize the waters and study the freshwater composition in more detail.

Acknowledgements: Our sincerest thanks goes to the captain and crew of CCGS Amundsen for their inexhaustible help and support. Many thanks to Brent Else, Pascal Guillot, Alex Hare, Zou Zou Kuzyk, Mary O'Brien and Monica Pazerniuk for help in sampling onboard the ship.