



## BaySys Newsletter

Issue 4 - Fall 2018

### Project Update

Year 4 of the BaySys project is off to a busy start. Teams presented at the annual ArcticNet meeting in Ottawa. Samples continue to be processed and analyzed in both in-house and off-campus labs. All BaySys members continue working towards providing a scientific basis to separate climate change effects from those of regulation of freshwater on physical, biological and biogeochemical conditions in Hudson Bay. Read more about the project here: <http://umanitoba.ca/faculties/environment/departments/ceos/research/BaySys.html>

### Meetings

Research Advisory Committee Meeting was held on October 26th, 2018.

BaySys All-Hands Workshop and Science Steering Committee Meeting was held over two days from November 15th to 16th, 2018.

ArcticNet Annual Scientific Meetings held from December 10th to 14th, 2018.

### Outreach and Programs

Expedition Churchill: A Gateway to Arctic Research Celebration and Launch Event - Friday Nov. 30th 2018. This endeavour includes a new Arctic research-themed dining car that will travel the rail line between Winnipeg and Churchill, along with the launch of a multimedia e-book focused on research in Canada's Hudson Bay area, and its wider connection to the Arctic, has been released in an effort to make climate science more accessible to the general population. <http://www.rcinet.ca/eye-on-the-arctic/2018/12/03/interactive-canadian-ebook-seeks-to-make-arctic-climate-science-accessible/>

### Recent Publications

Déry, S. et al. 2018. Flow alteration impacts on Hudson Bay river discharge. *Special Issue Canadian Geophysical Union 2018*. DOI: 10.1002/hyp.13285

Find more BaySys Newsletters here: <http://umanitoba.ca/faculties/environment/departments/ceos/>

### BaySys All-Hands Workshop Recap

The BaySys Project All-Hands Workshop was a two-day academic event held at the University of Manitoba on November 15th and 16th. The workshop was well represented by attendees from across Canada, including researchers from the Université Laval, Université Québec à Rimouski, Trent University, University of Calgary, University of Alberta, and the University of Northern British Columbia, along with partners and collaborators from Manitoba Hydro, Ouranos, and DFO. Overall, the extremely successful workshop was used to discuss and develop plans for data analysis and publication over the next 18 months of the BaySys project. In this issue, we recap each day of the workshop and highlight some of the exciting topics discussed.

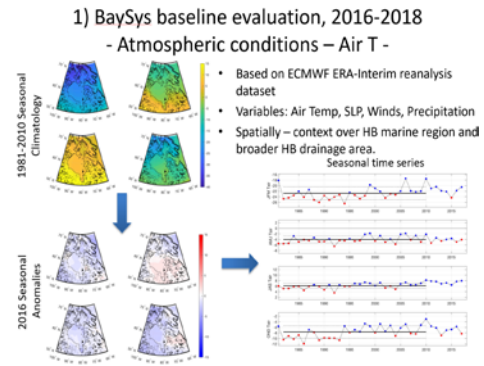


Zou Zou Kuzyk and Natasha Ridenour presenting proposed cross-team research goals for BaySys publications



## Day 1

On day 1 of the BaySys All-Hands workshop, we gathered in a lecture hall in the University of Manitoba's Wallace Building to begin discussions about publication goals and future achievements of the BaySys Project. The day opened with a brief introduction and update of the project by the project managers, Dr. David Barber (UM) and Kevin Sydor (Manitoba Hydro). This was followed by a presentation and discussion from the BaySys subgroup. This newly developed subgroup aims to develop two 'book-end' research manuscripts for the BaySys special issue in *Elementa: Science of the Anthropocene*. The first will provide a baseline for observational datasets from 2016-2018, including atmospheric and sea ice conditions, and the second manuscript will quantify the relative impacts of climate change and regulation on freshwater-marine coupling in the HBC, with contributions from each team, to specifically address BaySys objectives.



Slide from SubGroup presentation showing the atmospheric conditions baseline evaluations



Image of *Melosira arctica* from the in-prep. manuscript by Lisa Matthes et al.

Following the subgroup discussion, a representative from each team presented on their teams current and future publications goals, providing a brief description of each research paper in development, the proposed authors list, and current status of the analysis and/or writing. This extensive process provided the audience a sense of the scope of work being done throughout BaySys as a whole, and provided opportunity to discuss potential gaps or new insight into the plans for publication moving forward. Teams 2 and 6 began by outlining their current modeling studies and evaluations already underway, while Teams 1, 3, 4, and 5 each covered their respective BaySys research objectives through numerous concurrent and proposed publications over the next two years. Overall, 81 team publications were presented during this session. This portion of the workshop was essential as it provided the foundation for the remaining days of the workshop.

The second half of day 1 included insightful presentations and discussions concerning BaySys data management and the BaySys Special Issue by Claire Herbert and David Barber, respectively. Following these two presentations, teams broke out into two major sessions designed to discuss and highlight topics for 'cross-team' integration and research manuscript collaboration. These two sessions were separated based on two Hudson Bay regional themes, 1) Rivers & Estuaries, 2) Bay-Wide Studies. During these breakout sessions, nearly 20 conceptual papers were developed involving the collaboration and integration of datasets overlapping multiple BaySys teams. These proposed manuscripts spanned topics from physical properties and biogeochemical processes in the Nelson estuary, and coastal and freshwater ice distribution in the Hudson Bay system, to large scale transport fluxes in and out of Hudson Bay, and seasonal water mass characteristics, among others.

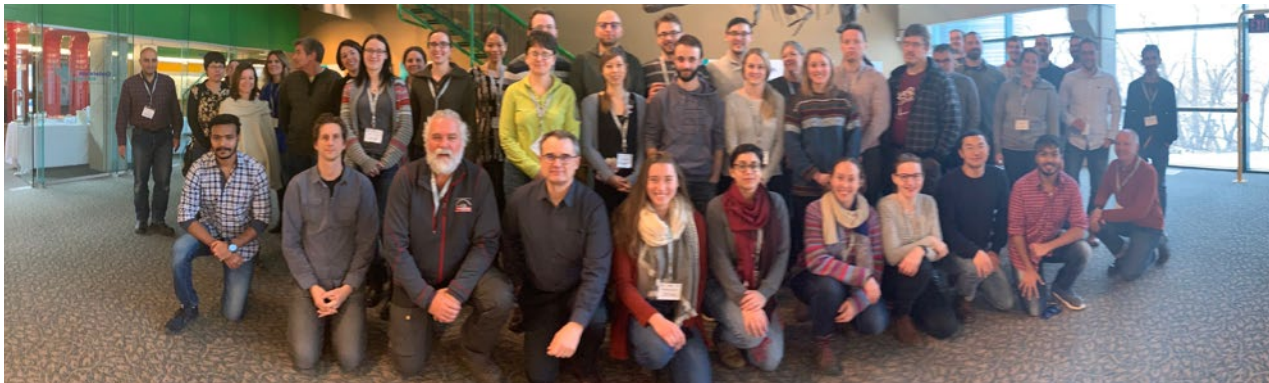


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## Day 2

Breakout sessions continued into day 2 of the BaySys All-Hands workshop. Participants traversed the two sessions as details of suggested day 1 topics emerged through discussions. For instance, lead contacts for each proposed manuscript were suggested, general titles were developed, a brief description of the goals and objectives of each paper were prepared, and datasets and proposed timeline details were discussed. This second day of extended breakout session discussion proved to be very useful as a workable list of suggested research manuscripts intended for the BaySys special issue was developed.

Following the conclusion of the breakout sessions, the group reconvened to provide an overview of the work moving towards the end of the project, and opened the room to further questions or insights. The two-day BaySys all-hands workshop was ultimately very successful, and we were incredibly happy to host it here at the University of Manitoba. We are looking forward to the next time we meet in such a large group, and strive to plan for such a meeting prior to the International Glaciological Society conference in August, 2019. Hope to see you all there!



*BaySys All-Hands Workshop group photo*

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## Elementa Special Issue

A primary focus of this workshop was to develop a plan for BaySys project publication structure and submission into a proposed special issue in the journal *Elementa: The Science of the Anthropocene*. This journal is a relatively new open access digital peer-review medium dedicated to studies of the anthropocene, the human impacts on the environment. We are expecting to submit approximately 20-30 papers in this special issue by the end of the BaySys project. An additional synthesis document based on all BaySys publications will be sent to all our partners, collaborators, and interested shareholders. For the synthesis, each BaySys publication, including those published in *Elementa*, will be summarized within a standardized 1-2 pages document written with perspective on and relationship to the overall project objective. The introduction of this synthesis will be translated into several Inuit and Cree dialects and distributed among Hudson Bay communities.



## Stories from BaySys - Team 3/4 - Inge Deschepper



From when I was young the one thing that stuck with me when someone asked “What do you want to do when you grow up?” was study the sea, which is an odd reply from a kid from Johannesburg where the closest sea was 500 km away. My interest in physics and biology drives my passion on how the physical environment impacts and drives the biological environment. It was always difficult to find a field that combined my passion until I was introduced to modelling in my bachelors and again in my masters. Which then lead me to choose a country that experiences more months of winter than summer per year for my Ph.D. For the BaySys project I have been coupling the Sibert et al. 2010 & 2011 pelagic and sympagic biogeochemical model to the NEMO v3.6 general ocean circulation model and the LIM2 sea ice model. I will be implementing some improvements into the biogeochemical model and then use this tool to try and see how the nutrients (nitrogen and carbon) cycle through the Hudson Bay and how it will be affected by climate change and how it has been impacted by river runoff regulation.

## Stories from BaySys - Team 4/5 - Tassia Stainton



My Masters research used both qualitative and quantitative methods to investigate particulate organic matter sources in the Nelson River system in northern Manitoba. The Nelson River is the largest river discharging to Hudson Bay, and its watershed has seen extensive land-modification in the upper reaches, permafrost thaw in the lower reaches, and hydroelectric development throughout. The aim of this research was to characterize particulate organic matter sources in the Nelson River watershed and identify processes influencing its transport downstream. With this work, we hope to contribute to the understanding of terrestrial organic carbon cycling in the coastal environment of Hudson Bay. To meet our research goals, water, soil, and sediment samples were collected from the lower Nelson River and its two subcatchments (upper Nelson River and Rat-Burntwood River) during two summer field seasons. Water quality parameters, Compound-Specific Stable Isotope (CSSI) fingerprinting, and Bayesian unmixing models were employed on terrestrial and in-stream samples. Distinct regional, longitudinal, and temporal differences in water quality parameters and particulate organic matter sources were observed among all three regions of the Nelson River system. The application of CSSI fingerprinting and unmixing models showed that the dominant sources of organic matter to suspended sediment in the lower reaches of the Nelson River are proximally derived and comprise soils, upstream suspended sediment, river bed sediment, and tributary suspended sediment.