IICWG Iceberg Model Modernization Task Team
Teleconference Meeting Notes – 21 March 2019

The IICWG Iceberg Model Modernization Task Team met by telephone conference on 21 March 2019. The following people participated in the call:

- Dean Flett – Canadian Ice Service (CIS)
- Philippe Lamontagne – Canadian National Research Council (NRC)
- Keld Qvistgard, Kristine Skovgaard Madsen – Danish Meteorological Institute (DMI)
- Alvaro Scardilli – Argentine Naval Hydrographic Service (SHN)
- John Woods – US National Ice Center (US NIC)
- David Hebert – US Naval Research Laboratory (US NRL)
- Mike Hicks - IIP

Intro/Task Team Overview:

- Mike reviewed the agenda and as the first call on this topic within the IICWG Task Team, provided an introduction and overview of IICWG’s new task team structure.
- The goal of the Iceberg Model Modernization Task Team is to advance the implementation of iceberg drift and deterioration modeling and share an updated version of the North American Ice Service model (NAIS 2.0) with Task Team members to begin use operationally and to evaluate the impact of different ocean current and other environmental forces.
- Mike emphasized that the operational, shared version of the NAIS model will remain in Fortran while efforts to convert existing code to Python happen in parallel. Other organizations will have access to the NAIS 2.0 model.

Update on Installation and Use of Present Version of NAIS Model: Each organization that currently has the existing version of the NAIS model provided a brief summary.

- **IIP** – uses NAIS model through the iceBerg Analysis and Prediction System (BAPS). Model is used for flight planning and comparison with older “IIP” drift and deterioration model. It is difficult to make changes in the model since it is integrated within BAPS
- **SHN** – Fortran version of the NAIS model is installed and running. SHN is experiencing issues with properly representing the Antarctic. The group agreed that this problem would not be corrected with NAIS 2.0 and raised the question. Alvaro has sent code to CIS to check.
- **DMI** - Has code but does not presently have the resources to test it. Kristine noted DMI’s involvement in the Polar TEP and that the installed trajectory processor is based on the NAIS model. Philippe added that the Polar TEP trajectory processor is a very simplified version of the full NAIS model, particularly as an explicit (TEP) vs. implicit numerical scheme (NAIS).
- **NRC** – Has provided NAIS model capability to PAL Aerospace (St. John’s commercial iceberg management company) as “wrapper” for PAL to model the drift of icebergs for oil and gas facilities on the Grand Banks.
- **CIS** – Operationally, same as IIP. CIS Science also runs a stand-alone version of the model to facilitate model improvements (e.g., NAIS 2.0).
Status of NAIS 2.0 Model:

Dean presented a few slides as an overview on the status of the NAIS 2.0 model. Version name is somewhat arbitrary but is an effective way to identify the most recent version from earlier ones. This version has been revised to correct an observed issue with unrealistic drift for small icebergs. The GANT chart below provides an excellent summary of the work that has been accomplished at CIS and future steps. Highlights:

- NAIS 2.0 has been compiled and installed on new servers at CIS. Currently undergoing CIS Ops validation.
- Installation at IIP still needs to be scheduled; tentatively April, 2019. CIS and IIP will conduct model validations through the remainder of the ice season.
- NAIS 2.0 is ready to be shared with the larger community through NRC’s Wiki sharing system.

Wiki Sharing Overview:

- Philippe described the Wiki sharing system that he has established. Basically, the official release version of the NAIS 2.0 model will form the “trunk” of the system.
- Each organization that currently has an earlier version of the NAIS model becomes a “branch” of the system with their own user name and password. The Fortran code can be downloaded from here.
- Each organization can use the “branch” as their “sandbox” without affecting the trunk version. The trunk can be modified with any branch improvements only if the group agrees.
- All agreed that we should populate the trunk with CIS’ NAIS 2.0 version as soon as resources are available.
Action(s):
- Deploy NAIS 2.0 version onto the Wiki system. (CIS/NRC)
- Schedule installation visit to IIP. (CIS/IIP)

Status of Python Coding:

- Philippe began converting NAIS model code from Fortran to Python to create a more modular, higher level language.
- He estimated that this conversion is 90% complete and again emphasized that this version of the code would be used for research purposes only. Timeline for completion: a few months.

Action(s):
- Deploy Python version as a separate research branch in the Wiki system. (Philippe)

Overview of DHS/IIP Iceberg Tagging Campaign:

- Mike provided an intro and overview on background.
- US Dept. of Homeland Security Science and Technology (USDHS S&T) is managing a project to tag 4-5 icebergs per day over the next several months.
- The primary purpose for this project is to gather sufficient iceberg ground truth to support the development of a machine learning tool for automated SAR detection and identification of icebergs.
- A secondary outcome will be to develop numerous drift tracks that can be used to validate and improve iceberg drift and deterioration models e.g., the NAIS 2.0.
- There is a need to ensure that forecasted environmental data surrounding the period of tagging will be available for future validation efforts. We should be validating with the data that would have been available to the analyst operationally.
- Tagging will be accomplished over at least 4 vessel voyages equipped with a heavy lift drone to deploy GPS beacons onto select icebergs. Voyages will be scheduled once per month during April-July.
- One of the voyages will be from an ice strengthened US Coast Guard Cutter. This voyage will target icebergs in sea ice to provide some valuable detection and drift data in this environment.
- The group emphasized the importance of accurately documenting the sea ice environment surrounding each tagged iceberg.
- **** Addendum – this was not discussed on call but developed in a later telecom. If a sufficient number of tags are completed, the vessel will be outfitted with an underwater iceberg profiling and above water Lidar capability to profile select icebergs.

Action(s):
- Coordinate a meeting by phone to discuss necessary steps to archive the correct environmental data – both CMC/CECOM and GOFS/HYCOM. This should happen ASAP. (Mike)
- Discuss the value and specific data necessary via the underwater and above water profiling system. (Mike)

NEXT Meeting: During the week of April 9th to maintain progress and get early feedback on tagging project.