



INTERNATIONAL ICE CHARTING WORKING GROUP (IICWG)

23rd Meeting of the International Ice Charting Working Group

Executive Summary Report

After two years of virtual meetings, the International Ice Charting Working Group (IICWG) convened its 23rd meeting in Buenos Aires during September 26-30, 2022. The meeting was hosted by the Argentine Naval Hydrographic Service. Fifty-five participants in the *Centro Naval* were joined by 97 remote participants in a very successful hybrid format. More than 50 organizations from 19 countries were represented. The meeting included a tour of Argentina's icebreaker *Almirante Irizar*.

The theme of the meeting was “*Re-Connecting*”, reflecting the need for the Ice Services to reconnect with one another, with their clients, and with their partners in the research and earth observing communities following the pandemic.

Significant Outcomes

Satellite Monitoring of Sea Ice and Icebergs

The ROSE-L Task Team led by Wolfgang Dierking presented its final report on the investigation into using combinations of C- and L-band Synthetic Aperture Radar images for operational ice charting. The bottom-line assessment of three dozen case studies by 4 operational ice services is that L-band is better for sea ice and iceberg charting in most cases, but not all. This work has helped pave the way for a European Space Agency plan to launch an L-band mission, in a synergistic orbit with Sentinel-1 C-band, within 8 years. As a follow-on task, Alvaro Scardilli is leading a team to further investigate the use of multi-spectral SAR data for ice charting with a focus on the Southern Ocean. The Argentine Space Agency's SAOCOM L-band satellite, COSMO-SkyMed-X, and Sentinel-1 C-band will all be used.

Ice Information for the Southern Ocean

Argentina and Chile have both implemented routine public ice information programs following international standards in the past few years. The meeting heard that the Australian Bureau of Meteorology is developing technical and human resources to increase its ice information capacity. An IICWG team led by Jan Lieser and Andrew Fleming took on the task in 2021 to look at the implementation of a Southern Ocean Limit of Known Ice (SOLOKI) as a maritime safety initiative in response to an increasing number of icebergs drifting northward into shipping lanes. The team is focusing its efforts on two essential components: automated detection of icebergs from satellite images and iceberg trajectory modelling. The loss of Sentinel-1B in December 2021 resulted in a major reduction in observing capacity, especially in the Southern Ocean. L-band data from SAOCOM was made available to partially mitigate the loss and the meeting was informed that ESA is advancing the launch of Sentinel-1C to the spring of 2023.

Development of Ice Hazard Products for Risk Assessment

To help vessels operating in or near ice, two IICWG task teams have been working on the development of ice hazard products - one for sea ice pressure led by the Canadian Ice Service and the other for iceberg density led by the International Ice Patrol. Both products underwent testing by select groups of users that provided feedback for improvement. The prototypes have matured



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to the stage where product standards must be developed that can be adopted by all ice services. The two task teams will be fine-tuning the products and working on the standards and implementation processes over the next year.

Enhanced Ice Information for Mariners

A task team led by Keld Qvistgaard and including representatives from several maritime training institutes, maritime users, and ice services conducted a survey on the use of, and need for, ice information by mariners. Twenty-six ships reported from over 40 voyages in ice-covered waters. All 26 ships reported using charts from the national ice services in addition to other information. The greatest need besides the ice charts was for high resolution satellite data and ice information on board. A significant result was that none of the survey respondents mentioned the Polar Code or the Polaris risk assessment tool. In response, the IICWG raised a new task team to look into the reasons for the lack of interest in Polaris and what can be done for ice information to figure more prominently in risk assessment.

Automated Processes in Ice Service Operations

An entire day was devoted to automated products and processes and the challenges of moving scientific results from research and applied science into the production environment. In the morning, there were eight presentations from the scientific community describing processes they feel are close to being ready for operations, with an emphasis on artificial intelligence and machine learning. After lunch, there were three presentations from the Ice Services describing what automated processes are actually in practice. This was followed by a panel of ice service leaders discussing the challenges of implementing new processes into operations. The consensus opinion of the panel was that human ice analysts will remain an essential component of the ice information production chain for quality control of automated products and to provide personalized tactical information on demand in difficult situations.

IICWG Linkage with the World Meteorological Organization

When the Joint Commission on Oceanography and Marine Meteorology (JCOMM) was disbanded in 2020, a number of Expert Team on Sea Ice (ETSI) action items were left incomplete. John Parker, Chair of the WMO Standing Committee on Marine Meteorological and Oceanographic Services (SC-MMO), assured the meeting that most actions were already underway or on the SC-MMO Expert Teams workplans. Chief among these are updates to the WMO documents Sea Ice Information and Services, Sea Ice Nomenclature, and the Ice Chart Colour Code Standard; revision of the S-411 Product Specification for electronic navigation charts; adoption of the Ice Analyst and Ice Forecaster Competency Framework; and support to the implementation of the Polar Code. One omission identified is the approval of the SIGRID-3 format documentation which will need to find its home in the Expert Team on Maritime Safety (ET-MS). Some former members of ETSI sit on the ET-MS as well as the Expert Team on Sea Ice Watch and can provide continuity.

IICWG-XXIV

The 24th meeting of the IICWG will be held in Cambridge, U.K. during September 24-29, 2023 at the invitation of the British Antarctic Survey.

IICWG Secretariat – October 6, 2022