Proposal for the improvement of observations of sea ice and icebergs in polar and subpolar waters for the development of nautical safety products by Ice Services

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Summary

It is possible for ships navigating in Antarctic Treaty waters to share the information they collect through ice observations under standard conditions, and this information can be used as field information for the interpretation and validation of satellite images. These images are used, among other purposes, to generate sea ice charts that provide updated and georeferenced information on the glaciological situation to the Ice Services of the countries that offer this service for the Antarctic Treaty area.

Introduction

The observation, recording and reporting in operational times of the characteristics of sea ice and icebergs by ships in waters with the presence of ice are of fundamental importance for the preparation of sea ice charts, iceberg risk charts and the validation of forecasts and sea ice concentration and iceberg drift models. These products are routinely generated on a daily, weekly and/or monthly basis by the Ice Services with the sole purpose of contributing to nautical safety, preventing environmental damage due to collisions or ice pressure and generating better tools for the planning of shipping routes, scientific and/or tourist activities. In addition, the observations of the floating ice contribute to validate the information obtained from satellites and allow subsequent climatological studies and gaining insights in the current context of climate change.

These observations can be made from a ship, from the coast, from an aircraft or from the interpretation of data from remote sensors on satellites.

Ice observations have multiple functionalities. An ice spotter aboard a polar-capable ship or icebreaker can provide direct advice to the commander, as can a spotter located at an Antarctic base when a ship is sailing nearby. In turn, the observations are used as field information for the interpretation and validation of satellite images, which are used, among other purposes, to generate ice charts that provide updated and georeferenced data on the glaciological situation (Scardilli *et al.*, 2022).

Glaciological observations are relevant for advice on decision-making in navigation. Any ice records made contribute to nourish the statistics of each area that are later made available to interested users.

Therefore, having information from observations from ships or bases is essential for the tasks of the Ice Services in their permanent challenge of generating products and services to help nautical safety in the least populated region of the world and, therefore, with a paucity of significant information.

As far as possible, these observations should be made as frequently as possible, routinely and periodically, following international terminology and standards (according to the publications of the World Meteorological Organization WMO 1215, 259 and 574), and shared with the Ice Services within operating times so that they can be useful in preparing ice charts and other products.

**Contributing actions**

Argentina, through its Naval Hydrography Service (NHS), is responsible for nautical safety in NAVAREA VI, a region that includes the Antarctic Peninsula, which is the most visited part of Antarctica by research, logistics and tourism vessels. For this reason, one of the major actions in terms of the provision of aids to navigation is the preparation of ice charts and the generation of models and forecasts of sea ice concentration and iceberg drift.

Other countries other than Argentina also generate ice charts for aids to navigation in the Antarctic region, so sharing ice observations would be beneficial to many Parties to the Antarctic Treaty.

To ensure the observation, recording and reporting of the characteristics of sea ice and icebergs, Argentina, through the NHS, makes available to the Parties a Sea Ice and Iceberg Observer’s Manual (free download available in Spanish at: <http://www.hidro.gov.ar/Download/Download.asp>), software developed for the simple recording and reporting of observations called SIGLAC-C (free download available in Spanish and English at: <http://www.hidro.gov.ar/Download/Download.asp>) and training for the role of ice observer through the UNESCO Intergovernmental Oceanographic Commission’s (IOC) Ocean Teacher Global Academy (OTGA) virtual platform.

Regarding training, it is important to highlight that at the moment two international courses have been taught in Spanish through the OTGA and for this academic year of 2023 one course will be taught in Spanish and one in English.

Argentina considers that access to material, software and training for the personnel of the ships navigating in the Antarctic Treaty area will contribute effectively to an increase in the observations of sea ice and icebergs and in their subsequent communication to the Ice Services, and therefore in the production of ice charts and forecasts that are used by seafarers in icy waters in Antarctica. These observations may also be useful for scientific organisations in the generation of knowledge regarding the climatic variability of floating ice.

Argentina recommends to the Parties that:

1. Any Parties that operate ships in the Antarctic Treaty area, routinely observe, record and report within operational times to the Ice Services that make charts and forecasts the characteristics of sea ice and icebergs when they are in polar waters, in order to improve the navigation safety.
2. They invite their non-governmental ship and sailboat operators to take up this practice.
3. They promote, to this effect, the training of ship personnel to carry out observations of sea ice and icebergs so that these are performed properly and in accordance with international standards through the OTGA virtual platform.

**References**

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*OceanTeacher Global Academy (OTGA)* [*https://classroom.oceanteacher.org/*](https://classroom.oceanteacher.org/) *Curso de Observador de Hielo Marino y Témpanos [Sea Ice and Iceberg Observer Course] – 2022 Edition:* [*https://oceanexpert.org/event/3542*](https://oceanexpert.org/event/3542)

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