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## NATIONAL REPORT OF ITALY

This report gives the summary of the main activities by the Istituto Idrografico della Marina (IIM) in the Arctic Region.

### 1. HYDROGRAPHIC OFFICE

The IIM is the Italian Hydrographic Service in charge of the official nautical documents relevant to over 550,000 square kilometers of national waters and more than 7,800 kilometers of coastline.

Our mission is to support and to contribute to the safety of navigation and to the National Defence, to promote the study of all sea related matters and the protection of the marine environment. Scientific research has always been crucial for the IIM and we cooperate with primary research centres and universities and take part in national and intergovernmental working groups in the fields of hydrography and oceanography. Among others, the IIM was tasked with the hydrographic surveys and publication of three ENC's and paper charts of the Western Ross Sea – Antarctica.

### 2. HYDROGRAPHIC SURVEYS IN ARCTIC REGION - 2017

The Italian Navy – acting as national marine focal point for Arctic research activities – with the scientific support of the Italian Hydrographic Institute, in 2017 has launched the Pluriannual Joint Research Program in the Arctic named «HIGH NORTH», to contribute to Oceans' knowledge, from a hydrographic point of view and, more generally, to the marine science.

The following six bullets represent the program's main messages:

- data sharing
- ocean knowledge
- exploration
- monitoring
- new technology
- education.

In the Arctic Marine Geophysics campaign HIGH NORTH 17 we collected Multibeam data using a Kongsberg EM 302 along the Barents Sea continental margin (Southwestern Svalbard) which had not been completely covered before, and improved the morphobathymetric charts of some key zones. All the hydrographic data were acquired and shared with the ancillary information and are compliance with IHO standards.

This HIGH NORTH 17 hydrographic surveys focused on three areas:



- I. The **INBIS channel system**, southwest Bear Island. This channel area has a strategic importance in the understanding of glacial, oceanographic and sedimentological dynamics along this margin.

The INBIS channel is a very peculiar structure in the Barents Sea; channel systems are in fact rare on the Northern Norwegian margin and confined to the INBIS and Lofoten Basin channels. The INBIS channel originates from a series of tributary canyons, converging in a trunk-type channel, leading to a deep sea lobe system. The INBIS channel is inferred to have been produced by turbidity flows, flowing from tributary canyons incising the upper part of the continental slope between Bear Island Trough Mouth Fan (TMF) and Kveithola TMF.

- II. The northern part of the **Storfjorden Trough**, South Sorkapp Banken. The Storfjorden is a conduit for the cold and dense water masses formed from brine-enriched shelf water flowing westward, South Sorkapp Banken, toward the shelf edge. A detailed morphobathymetry of this area will help define the flow paths of these dense water masses.
- III. The continental shelf edge in the southern part of the **Storfjorden**. Based on existing bathymetric and sub-bottom data collected in the previous CORIBAR cruise (2013), this portion of continental shelf shows a thin layer of soft sediments overlying a coarser layer formed by glacial till. Due to these characteristics, the area was chosen for a pilot experiment to evaluate if it possible to penetrate the superficial thin layer with a Multibeam and obtain a “3D bathymetric model” of the underlying coarser till layer.

Two further areas were Multibeam investigated during the HIGH NORTH17 Arctic marine geophysical campaign:

The area where the **S1 mooring** is currently deployed, was surveyed in order to collect high resolution bathymetric data and seabed information and find the best location for the mooring.

A limited area in the **Kveithola Trough**, to map some structures linked to the presence of authigenic carbonates and/or chemosynthetic communities on the seafloor sampled during the BURSTER cruise in 2016. Acoustic surveys were used to locate the sediment sampling sites to investigate these seabed communities from an environmental point of view, highlighting several gas flares.

### 3. NEW CHARTS AND UPDATES

Not Applicable



**4. NAUTICAL PUBLICATIONS**

Not Applicable

**5. MSI**

Not Applicable

**6. C-55**

Not Applicable

**7. CAPACITY BUILDING**

Not Applicable

**8. OCEANOGRAPHIC ACTIVITIES**

The Arctic Marine Geophysics campaign HIGH NORTH 17 was the result of the ever-increasing Italian involvement in the Arctic sea and of the polar experience of qualified IIM personnel. It was coordinated by the Italian Hydrographic Institute in all scientific, technical and logistics aspects, and involved scientists from IIM, CMRE (Center for Maritime Research and Experimentation), CNR (National Research Council), ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) and OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale). The results of the activities carried out during the campaign have been disseminated in a number of scientific meetings, and widely appreciated for their integrated multidisciplinary nature.

Following the fruitful 2017 campaign, a second marine geophysics campaign in the Arctic seas took place last summer – HIGH NORTH 18, again on board R/V ALLIANCE.

The key words of our HIGH NORTH campaigns are synergy and integration with a holistic approach. A number of scientists from different disciplines cooperate to achieve the same goal - explore the oceans, monitor the sea and protect a complex and fragile environment, which is becoming more and more important from a natural, economic and social point of view. Now more than ever it is crucial to coordinate multidisciplinary research in Arctic and Subarctic regions and the Italian Hydrographic Institute is contributing to the Arctic Subarctic Ocean Fluxes (ASOF).

**9. OTHER ACTIVITIES**

**9.1. DATA POLICY**

All the hydro-oceanographic data collected during HIGH NORTH 17 were made available to the Norwegian Hydrographic Service and shared for contribution to the International Bathymetric Chart of Arctic Ocean (IBCAO), with the University Centre in Svalbard.

All the hydrographic data were acquired and shared with the ancillary information and are in compliance with the IHO standards.



## **9.2. ARCTIC COUNCIL**

Italy contributes to the works of the Arctic Council subsidiary bodies, following the prescribed rules for the observers, and participates in the Ministerial and SAO meetings through a senior diplomat of the Ministry of Foreign Affairs and International Cooperation (MFAIC), who was recently appointed as MFAIC Special Envoy for the Arctic and chairs the "Arctic Table", a national coordination forum on Arctic issues, that gathers research agencies, ministries and companies interested to the Arctic.

Due to the growing attention towards the Arctic experienced in Italy in recent years, the Foreign Affairs Committee of the Chamber of Deputies conducted throughout 2017 a fact-finding investigation on the Arctic and the National Arctic Strategy. Consequently, for the first time, the budget law has allocated specific resources for research activities in the Arctic, establishing a three-year Arctic Research Program (2018-2020). Wherever necessary, Italy may provide the technological expertise of Italian industry to support the sustainable development of the Arctic, through comprehensive innovative solutions allowing to minimize effects on the marine habitat and biodiversity. The Italian Navy has been representing Italy as Observer in the Arctic Council WG Environmental Preparedness Prevention and Response (EPPR) since 2016, contributing to the coordination of the activities by the two subgroups - Marine Environmental Response Expert Group (MER EG) and Search and Rescue Expert Group (SAR-EG). In the aim of the SAR-EG, the Italian Hydrographic Institute and of e-GEOS are developing the ARNACOSKY (Arctic Navigation with COSMO-SkyMed) project, in order to support Search and Rescue activities in the Arctic region.

## **9.3. ITALIAN SOCIETY FOR INTERNATIONAL ORGANIZATION**

Some of the teachers in the Master Course in Sustainable Development, Geopolitics of Resources and Arctic Studies, with particular attention to the global warming, the climate change and the impact on the Arctic ecosystem, are from the Italian Hydrographic Institute.

On 18<sup>th</sup> September 2018, the Italian Society for International Organization (SIOI) in collaboration with the North University (Bodø–Norway) and the Royal Norwegian Embassy in Italy, will hold a Conference titled "Arctic Connections: Italy and Norway in the Arctic between Cooperation and Future Challenges", about the geopolitics of resources and transport, Arctic governance and sustainable economic development to strengthen the collaboration between Italy and Norway.



#### 9.4. OTHER SCIENTIFIC CONTEXT

The Italian Hydrographic Institute is actively involved in:

- Arctic research activities with NATO/CMRE;
- European Geoscience Union;
- Arctic and Subarctic Ocean Fluxes;
- Arctic Science Summit Week – POLAR;
- Arctic Circle;
- Arctic Frontiers.

#### 9.5. ARNACOSKY PROJECT

Thanks to an agreement between Italian Hydrographic Institute and e-GEOS, Italian Company leader in geoinformation, application and services, last summer we started the ArNaCoSky project (Arctic Navigation with COSMO-SkyMed) to distribute information on the state of the ice ahead of the route, and maritime traffic of cooperative and non-cooperative vessels.

E-GEOS acquired and made available COSMO-SkyMed radar images, a system owned by the Italian Space Agency (ASI), also integrating AIS data. ESA Sentinel-1 was also used; data were used to test and develop innovative services supporting the R/V Alliance safety of navigation in the Arctic. Satellite monitoring proved that our mission was respectful towards the Arctic environment. Thanks to the unique characteristics of the COSMO-SkyMed Radar Constellation technology and its polar orbit, offering global coverage (including the Poles), it was possible for e-GEOS to monitor the route every day, both day and night.