NATIONAL REPORT OF ITALY

This report summarizes of the main activities carried out by the Istituto Idrografico della Marina (IIM) in the Arctic Region.

1. HYDROGRAPHIC OFFICE

Rear Admiral Massimiliano (Max) NANNINI is the new appointed Italian National Hydrographer who took over the Direction of the Italian Hydrographic Office on July 20th 2020.

The IIM is in charge of all the official nautical documentation published in Italy and supports the Ministry of Defence.for all the related matters.

The IIM has an active role in the study and protection of the sea, from a scientific, technological and environmental point of view. Scientific research has always been crucial for the IIM cooperating with primary research centers 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 charting of three ENCs and paper charts of the Western Ross Sea – Antarctica.

IIM embraced the UN General Assembly invitation to the global ocean community "to plan for the next ten years in ocean science and technology to deliver, together, the ocean we need for the future we want!" with own research activities.

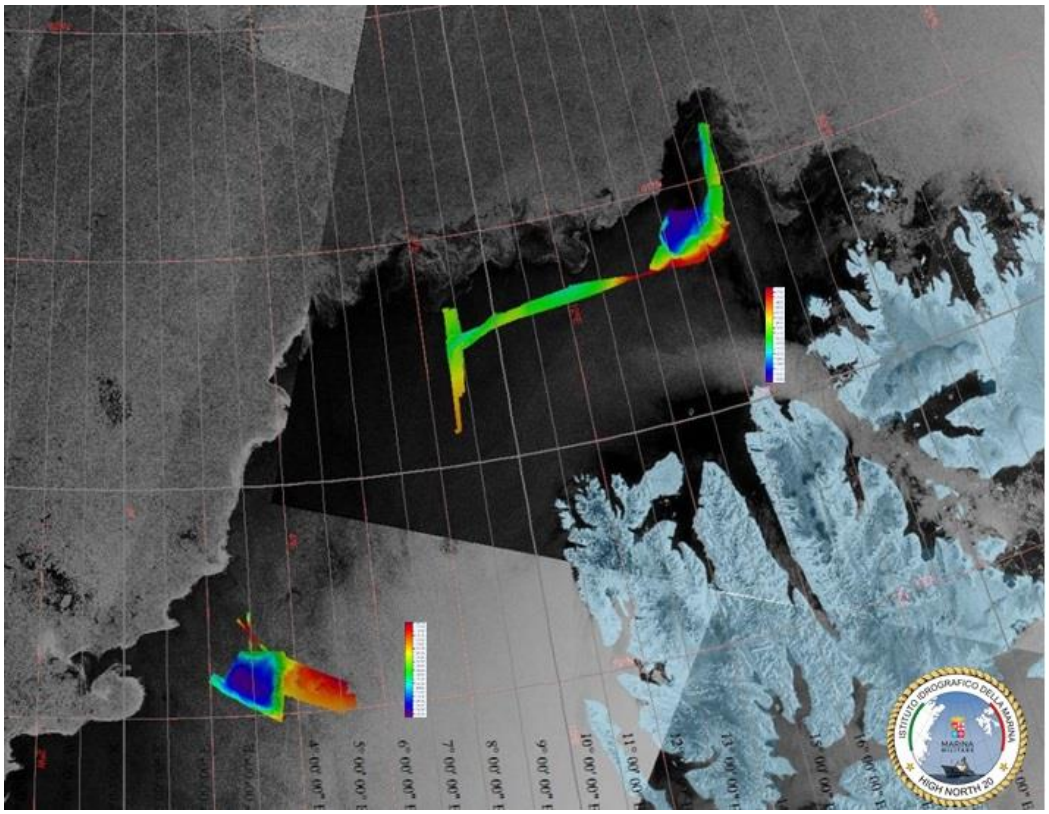
2. HYDROGRAPHIC SURVEYS IN THE ARCTIC REGION – 2019 & 2020

The Italian Navy – acting as national marine focal point for the Arctic research activities – with the scientific support of the IIM, at the begin of the 2020, confirm the Pluriannual Joint Research Program in the Arctic named HIGH NORTH for a new three years, to contribute to oceans knowledge, from a hydrographic point of view and, more generally, to the ocean science. The IIM, through HIGH NORTH program, is developing a common framework in order to ensure ocean science improving conditions for sustainable development of the Ocean in the aim of United Nations Decade of Ocean Science for Sustainable development coordinated by the Intergovernmental Oceanographic Commission (IOC) of UNESCO. In this context HIGH NORTH program guarantees integrated mapping activities and time series of ocean observations to sustain international scientific community, research and actions to predict the consequences of change, design mitigation and guide adaptation. A specific role in the HIGH NORTH program is played by the high education courses with a new generation of young researchers and hydrographers on field. In particular, IIM is involved in the activities of GEBCO-IBCAO and SEABED2030 project with HIGH NORTH data and results in coordination with international community.

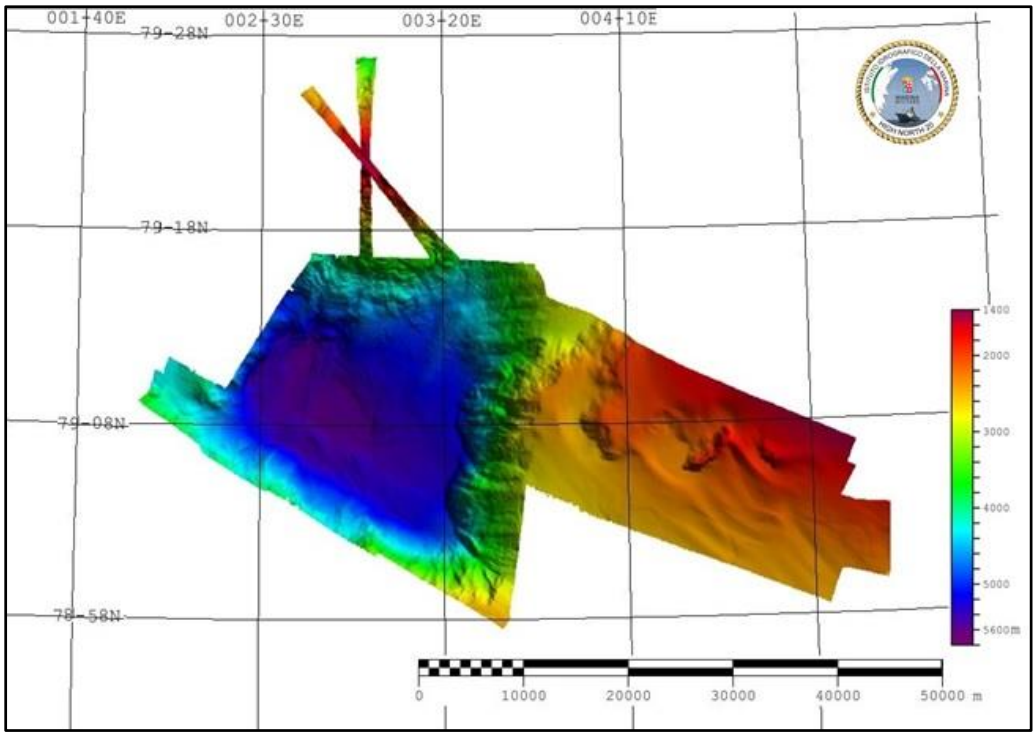
Six bullets represent the HIGH NORTH main pillars: data sharing, ocean knowledge, exploration, monitoring, new technology, education.

In order to contribute in exploration and high-resolution seabed mapping, during HIGH NORTH19 and HIGH NORTH20 campaigns, hydro-oceanographic data was collected using a multibeam echosounder (Kongsberg EM 302 - 30 kHz) installed onboard Italian Navy R/V Alliance.

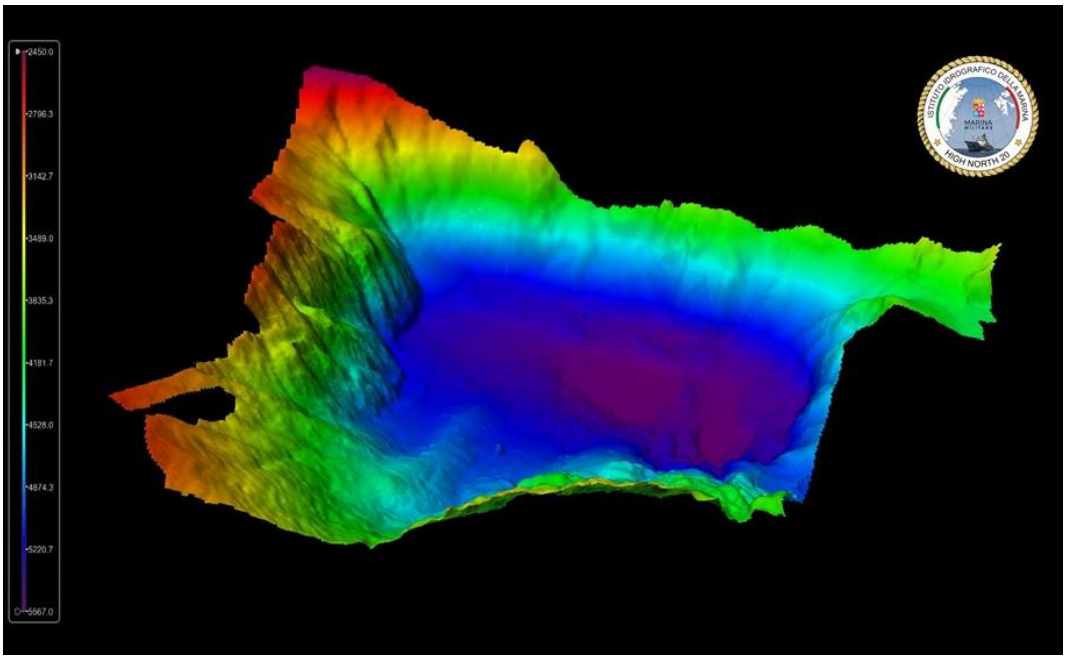
HIGH NORTH20 hydrographic survey focused on three main areas closed to the sea-ice edge: Molloy Hole, Yermak Plateau and Norske Banken.



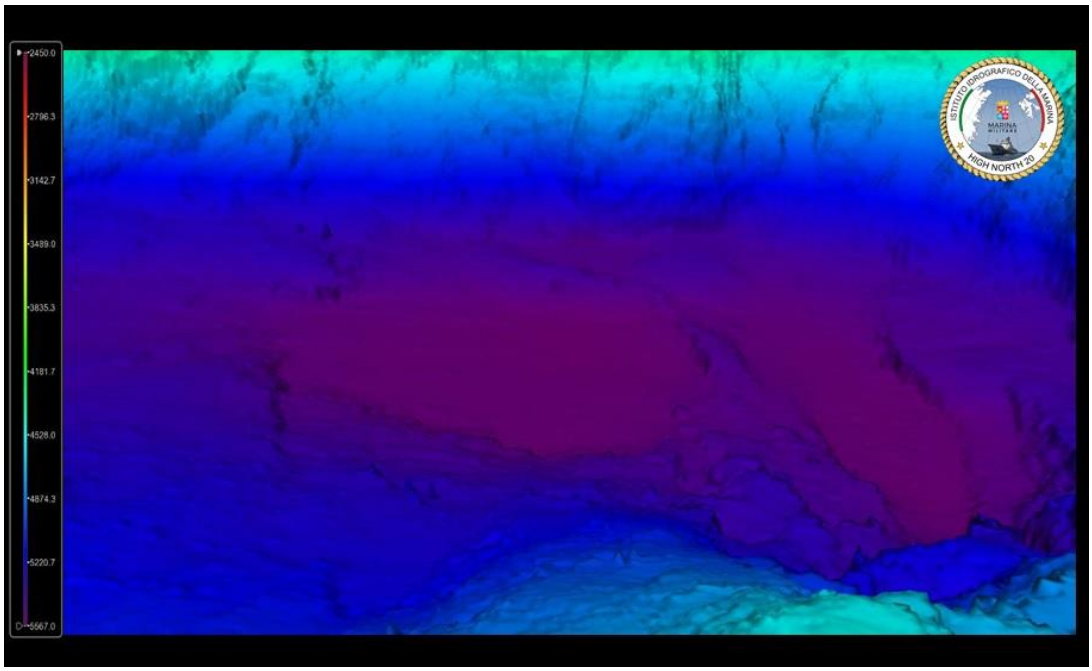
HIGH NORTH20 survey areas: HN20 MBES surfaces and Satellite mosaic with Sentinel1 images



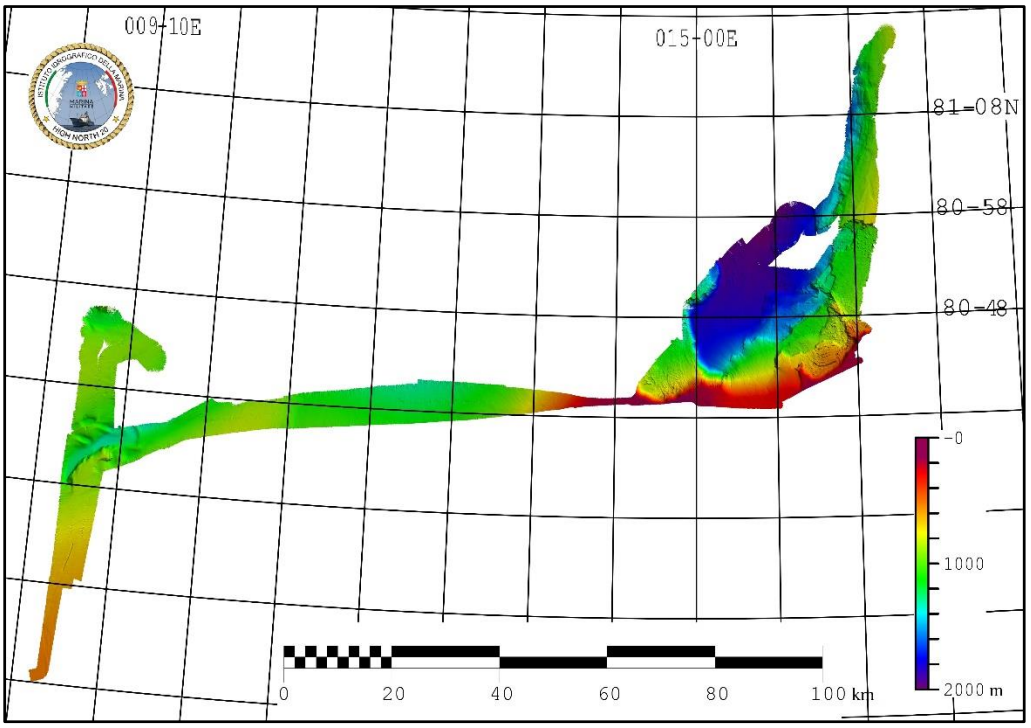
HN20 Molloy Hole morpho-bathymetric map



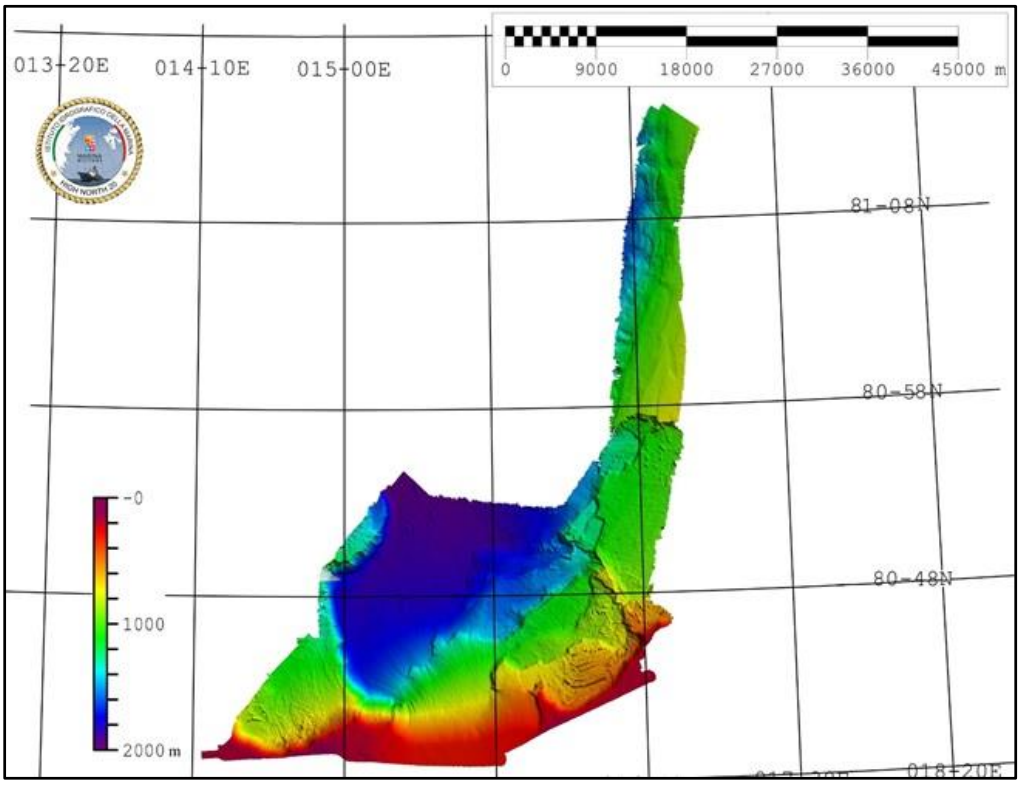
3D model of Molloy Hole (scene from north)



Molloy Hole 3D model of the Arctic Ocean deepest sector (scene from north)



HN20 Yermak Plateau (west) and Norske Banken (east) morpho-bathymetric map



HN20 2D Surface of Norske Banken area

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

Two campaign was carried out since last ARHC 9 meeting in the Arctic Ocean Western and Northern Svalbard area. The dedicated period at sea was HIGH NORTH19 from 27 October to 08 of November 2019 and HIGH NORTH20 from the 08 and the 28 of July 2020. The main goal of the cruises was to investigate the marine geophysical, oceanographic, and geological conditions in the Arctic area. In the HIGH NORTH19 particular attention was paid to the maintenance of the two one-yearly mooring, S1 and ID2, monitoring the water column environment with a series of oceanographic instruments such as ADCP, CTD and sediment traps, observatories monitories the water masses and the seabed since 2014. These sites are part of the Svalbard Integrated Arctic Earth Observing System (SIOS), the international observation network of the Svalbard Islands. In the campaign, atmospheric and marine weather data were also acquired (wind, wave, current, atmospheric pressure, precipitation, air and superficial water temperature and humidity) for the refinement of forecasting weather and oceanographic models and for the development of a tool to supports the polar navigation from the satellite to the seabed and the joint project IIM e-Geos ARNACOSKY (ARctic NAvigation with COsmo SKYmed).

HIGH NORTH20 was characterized by 100 measurement stations and 4212 km^2 area surveyed by MBES (MultiBeam Echo Sounder), collecting Arctic marine geophysical, oceanographic, and geological data mapping three main areas closed to the sea-ice edge: Molloy Hole, Yermak Plateau and Norske Banken. The ship moved northwards up to 81° 16.093' N close to the sea-ice to investigate the characteristics of the sea ice, geomorphic and seabed nature and features, water physical and biogeochemical contents and sediment dynamics. A visual survey for floating marine litter was carried out in the regular daylight navigation of the vessel and a specific activity to observe and to sample plankton and plastic fragments at sea surface.

9. OTHER ACTIVITIES

9.1. DATA POLICY

All the collected hydrographic data were made available to the Norwegian Hydrographic Service, to the IHO DCDB, to the International Bathymetric Chart of Arctic Ocean (IBCAO) Vers.4.0 and GEBCO Seabed2030 project.

All the hydrographic data were collected and shared with the ancillary information 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).

The Italian Navy has been representing Italy 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).

9.3. OTHER SCIENTIFIC CONTEXT

The Italian Hydrographic Institute has been actively involved in:

- GEBCO-IBCAO and SEABED2030;
- Svalbard International Observation System (SIOS);
- International scientific context (EGU, AGU, Arctic Circle, …)
- Arctic research activities with NATO - Science and Technology Organization - Centre for Maritime Research and Experimentation (STO CMRE).