



ARHC 14th meeting
03-05 September 2024
TROMSØ (NO)



Agenda item B9

NATIONAL REPORT OF ITALY

This Report highlights the main activities and achievements of the Istituto Idrografico della Marina (IIM) since ARHC13 Meeting in September 2023

1. HYDROGRAPHIC OFFICE

The Istituto Idrografico della Marina (IIM) is the authoritative body responsible for all official nautical documentation published in Italy. It operates under the auspices of the Ministry of Defence, providing critical support for a wide range of maritime and defense-related activities. Our mission encompasses several key objectives:

Safety of Navigation: Ensuring the safety of navigation by producing and maintaining nautical charts, publications, and related maritime information. This includes updating and distributing Notices to Mariners.

National Defence Support: The IIM plays a vital role in supporting the Italian Navy and other branches of the Italian Defence by providing accurate hydrographic and oceanographic data. This information is essential for strategic planning, operational readiness, and the execution of naval missions.

Research and Study: We actively promote and contribute to the study of all sea-related matters, with a significant focus on Arctic research through our HIGH NORTH program. This program encompasses hydrographic surveys, oceanographic studies, and environmental monitoring in the Arctic region. We collaborate with national and international research institutes and institutions to advance our understanding of polar marine environments, the impacts of climate change, and the unique challenges of navigation in ice-covered waters. Our Arctic research efforts under the HIGH NORTH program aim to enhance safety, support sustainable development, and contribute valuable data to global scientific communities.

Technological Innovation: The IIM is committed to embracing and developing new technologies to enhance the accuracy and efficiency of our hydrographic surveys and nautical charting processes. We are currently focusing on remote sensing technologies, particularly in studying ice dynamics and their evolution. Additionally, we are advancing the use of Unmanned Survey Vessels (USVs) to conduct surveys in challenging and remote environments. These innovations enable us to monitor and analyze changes in ice conditions, provide critical data for safe navigation, and support strategic planning in Polar Regions. Our commitment to technological innovation ensures that we remain at the forefront of hydrographic science and maritime safety.

2. HYDROGRAPHIC SURVEYS IN THE ARCTIC REGION – 2024

The Italian Navy, continuing as the national marine focal point for Arctic research activities, and with scientific support from the IIM, has advanced the HIGH NORTH program into its new phase, HIGH NORTH24. This program remains a key initiative within the framework of the UN Decade of Ocean Science for Sustainable Development, recognized as Action 35 by IOC UNESCO.

Recent Achievements in HIGH NORTH24 - completion of key surveys:

During the recent HIGH NORTH24 campaign, we successfully completed detailed hydrographic surveys of the ATLA Seamount and the Molloy Transform Fault. These surveys have provided critical data, significantly enhancing our understanding of these important Arctic features. The insights gained from these surveys contribute to the broader scientific knowledge of the underwater geology and oceanographic dynamics of these regions. During the campaign, approximately 70 hours of surveying were conducted in the area northeast of the Svalbard Islands, a region where public data availability was notably scarce. This area is particularly underserved in terms of data within the context of the SEABED 2030 and IBCAO (International Bathymetric Chart of the Arctic Ocean) projects, which both aim to enhance global understanding of the seafloor but currently have limited information for this region.

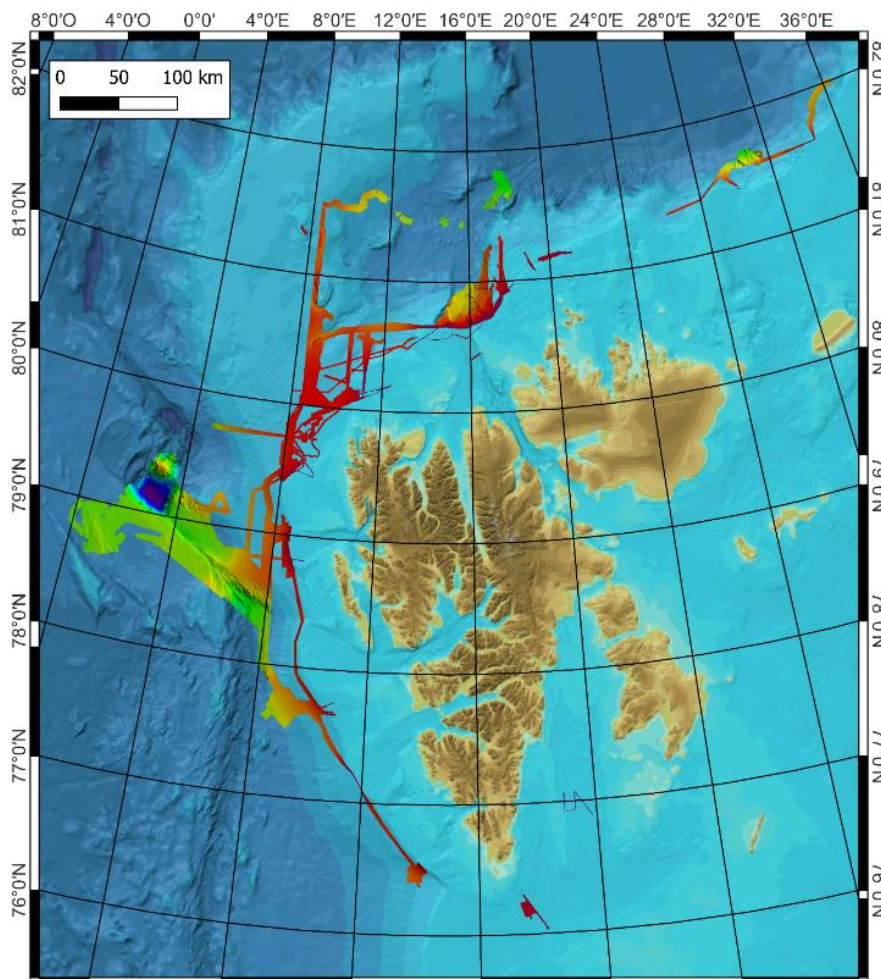


FIG. 1 HIGH NORTH surveyed areas - 2017/2024



The data collected, 5 hydrographic surveys were completed, covering an area of over 5200 km², during our activities have helped to address these deficiencies, contributing to a more comprehensive and accurate mapping of this remote and strategically important area. These efforts will play a crucial role in improving navigation safety and supporting future scientific research activities in the Arctic.

These achievements represent a significant step toward a deeper understanding of the Arctic and lay the groundwork for even more effective hydrographic survey work in the coming years. Continued collaboration with local and international authorities will be crucial to addressing future challenges and making the most of the opportunities presented by this ever-changing region.

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

HIGH NORTH24 was conducted from July 13th to August 10th. The primary goal was to expand our understanding of the Arctic environment by conducting comprehensive surveys and collecting critical data in previously under-explored areas. The campaign has yielded significant achievements across various research activities:

Seabed Sampling: A total of 9 seabed samples were collected, including 7 samples using a grab sampler and 2 with a box corer. These samples are crucial for analyzing sediment composition and seabed characteristics.

Water Column Measurements: We conducted 45 measurements of the water's chemical-physical parameters throughout the water column. This included 27 measurements in open ocean areas, 9 measurements in areas with ice, and 9 using an XBT.

Two dedicated activities were carried out to measure CTD along specific routes: one covering 27 nautical miles and another covering 52 nautical miles. These routes were strategically chosen to cross the current systems in the Fram streit. Measurements were taken both east-to-west and west-to-east, effectively

intersecting the currents to capture comprehensive data on water properties and their spatial variability over extended distances.

Photogrammetric: Six aerial photogrammetric missions were performed using Unmanned Autonomous Vehicles (UAVs). These missions provided high-resolution imagery for mapping and analyzing the Arctic terrain and ice conditions.

Sound Velocity: We conducted 8 measurements of sound velocity in open seas to gain a better understanding of its variation in the Arctic environment. This data is crucial for refining acoustic modeling and performing accurate ray tracing.

HIGH NORTH24 has significantly advanced our knowledge of the Arctic region through detailed seabed mapping, comprehensive water column profiling, and enhanced remote sensing techniques. The data collected contributes to a deeper understanding of Arctic dynamics, the impact of climate change, and the environmental variability of this critical region.

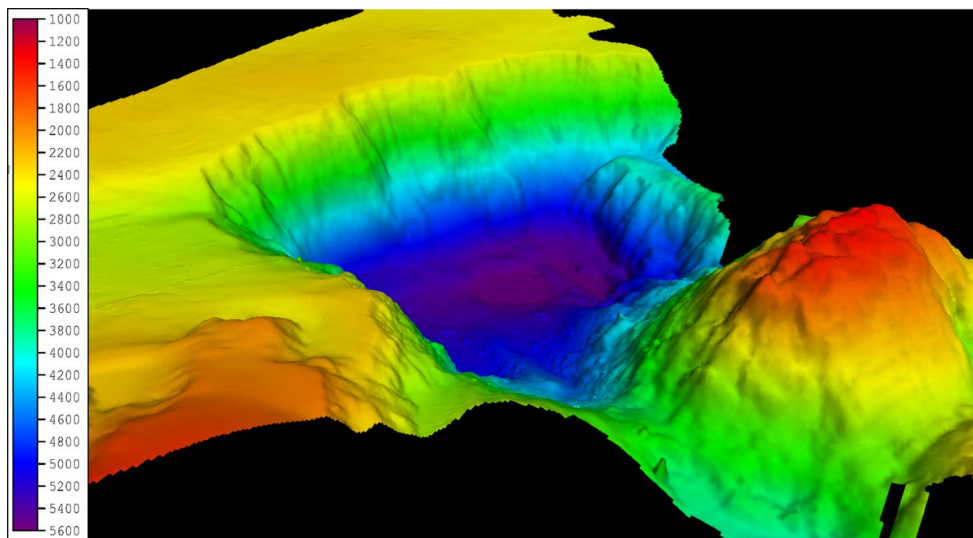


FIG. 2 Atla Seamount and Molloy Hole

9. OTHER ACTIVITIES:

9.1. ICE DYNAMICS MONITORING:

Our efforts in monitoring ice dynamics have been significantly enhanced through the use of advanced remote sensing technologies. We have utilized satellites such as COSMO-SkyMed and COSMO-SkyMed Second Generation, Sentinel-1A, and Sentinel-2 to study and track ice movement, thickness, and extent. As part of the collaboration with e-GEOS, the data from COSMO-SkyMed has been particularly valuable during the HIGH NORTH24 Arctic campaign. This collaboration has allowed us to leverage high-resolution radar images to monitor ice conditions in real-time, improving our understanding of ice dynamics in this challenging environment. This data is essential not only for ensuring safe navigation but also for deepening our understanding of the impacts of



climate change on Arctic ice conditions and for enhancing our hydrographic and cartographic capabilities in these critical regions.

9.2. EDUCATIONAL AND TRAINING CONTRIBUTIONS:

The HIGH NORTH24 campaign has been enriched by the involvement of new personnel in training. This includes two Petty Officers 3rd class, who are hydrographers in training, currently following the Hydrographic Surveyor Category B course in compliance with IHO standards. Additionally, the campaign featured two PhD researchers, fellows from the Prince Albert II Foundation of Monaco. The Istituto Idrografico della Marina has embarked on a collaboration with the Prince Albert II Foundation to broaden the horizons of marine research and enhance the dissemination of acquired knowledge. One researcher, from Stockholm University, is contributing to the SEABED 2030 project, while the other, from the University of Milano-Bicocca, is studying the application of remote sensing to glacier dynamics. This partnership aligns with the principles of the Prince Albert II Foundation, emphasizing environmental sustainability and scientific advancement. The participation of these trainees and researchers underscores our commitment to nurturing the next generation of hydrographers and scientists while advancing our shared goals for marine research and conservation.

9.3. DATA SHARING POLICY:

In alignment with global best practices and the principles of the UN Decade of Ocean Science for Sustainable Development, the Istituto Idrografico della Marina is committed to a policy of data sharing. This policy facilitates the exchange of hydrographic and environmental data with national and international organizations, enhancing collaborative efforts and promoting transparency. By sharing data with entities such as GEBCO-IBCAO, SEABED 2030, and other relevant bodies, we support global initiatives to improve advance scientific research, and foster international cooperation in Arctic and marine research.

9.4. UNITED NATIONS DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT:

In conclusion, the involvement of emerging professionals in projects such as HIGH NORTH24 reflects the Istituto Idrografico della Marina's alignment with the United Nations' Early Career Ocean Professional (ECOP) initiative. The Marina Militare is dedicated to supporting ECOP with concrete actions like these, fostering the development of early-career ocean professionals and promoting sustainable practices and innovations in marine science. This commitment ensures that the next generation is well-prepared to address the challenges and seize the opportunities in oceanography and marine science.