



Italy

Points of Contact: National Research Council of Italy (CNR), Department of Earth System Science and Environmental Technologies (<http://dta.cnr.it>)

Arctic Research Policy and Goals

Italy's Arctic policy aims at increasing knowledge of change in the Arctic, its impacts and feedbacks, through scientific monitoring, multidisciplinary research, and by enhancing international scientific cooperation. This policy was stated in the Italian Arctic Strategic agenda and is implemented by the National Research Council of Italy (CNR), in collaboration with universities and research organizations, including the Italian Space Agency (ASI), National Institute for Oceanography and

Experimental Geophysics (OGS), National Institute for Geophysics and Volcanology (INGV), Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Italian Navy Hydrographic Institute. Italy's overarching Arctic research goal is to gain the knowledge needed to understand climate and mitigate its impacts, increase the resilience of natural systems and society, and enable sustainable ecosystem-based management.

Arctic Research Funders / Institutions

Ministry of Education - Ministry of Universities and Research (MIUR, www.miur.gov.it) supports research and innovation in the Polar regions. MIUR has a dedicated Programme for the Arctic (PRA), managed by the CNR.

CNR (www.cnr.it/en) supports research activities in the Arctic, such as atmospheric sciences and climate change, geology and geophysics, marine and terrestrial ecosystems, and paleoclimate studies.

ASI (www.asi.it/en) uses various satellite constellations, including the COSMO-SkyMed, to support observational research (sea-ice, permafrost and environmental monitoring as well as surveillance applications).

INGV (www.ingv.it/en/) supports space weather research as well as marine, paleomagnetic and paleoclimatic studies.

OGS (www.ogs.trieste.it/en) supports oceanographic research, particularly along the Fram Strait and in Spitzbergen.

ENEA (<http://www.enea.it/en>) sustains the activities of the Thule Observatory, contributing to atmospheric physics research and environmental studies at different Arctic sites.

Ministry of Foreign Affairs and International Cooperation (www.esteri.it/mae/en) supports international collaborative research projects in the Arctic.

Italian Navy Hydrographic Institute (<http://www.marina.difesa.it/en/Pagine/default.aspx>) supports oceanographic investigations.

Arctic Research and Education/Capacity Building Initiatives

CCT-IP. The Climate Change Tower Integrated Project investigates atmospheric boundary layer dynamics, surface energy budget and fluxes, and the roles played by complex coupling processes involving air, aerosols, clouds, snow, ice and land.

ReCAP and EastGRIP. By collecting ice cores from the eastern and north-east sectors of Greenland to reconstruct past atmospheric conditions, these projects investigate ocean related processes (sea ice extent, primary production) to understand changes in ice flow velocity that may be induced by the warming of the Greenland ice sheet.

MELT. The project aims at strengthening and integrating observations on the interconnected processes involved in climate change by monitoring and investigating Arctic changes along a longitudinal transect.

HIGH NORTH. The benchmarks of the programme are ocean knowledge, exploration, new technology, education and monitoring of unsurveyed areas up to the Arctic ice edge. Activities include bottom mapping, water column and seabed features, sub-bottom profiling, acoustic and optical imaging, and remote sensing.

METROLOGY FOR THE ARCTIC. Since 2016, based on a growing collaboration between metrology and

environmental sciences (promoted by EURAMET, WMO and National Institutes/Funding agencies), specific actions were developed to improve metrology in the Arctic region (in particular Ny-Ålesund and Svalbard).

ACZ-DYNAMICS. Changes in the Arctic Critical Zone, and their related impacts on ecosystem functions and associated biogeochemical fluxes, are investigated, focusing on the contribution of land ecosystems to the carbon budget.

CNR-ENI. The cryosphere in a changing Arctic project tackles the fundamental mechanisms driving carbon release from Arctic soils across the land-atmosphere-ocean system in three hotspots: Svalbard, Siberia and Alaska.

The **PhD Programme in Polar Sciences** aims at preparing students with in-depth scientific competences and original and innovative research activities to become experts on topics related to recent and past environmental and climate changes of the Polar regions.

Arctic Research Infrastructures

Field Stations

CNR Arctic Station “Dirigibile Italia”. The Arctic station (<http://arcticnode.dta.cnr.it/welcome>), located at Ny-Ålesund, Svalbard, is a multidisciplinary research station operated by the CNR that can host up to seven scientists in its laboratories and offices. Active since 1997, it is named after Umberto Nobile’s airship Italia, used in the 1928 expedition.



Figure 1. The CNR Arctic Station Dirigibile Italia – Ny-Ålesund, Svalbard (Photo: M. Mazzola).

The Amundsen-Nobile Climate Change Tower. This facility is connected to the Italian Arctic Station in Ny-Ålesund. The tower is 33 m high and is equipped with instruments to investigate surface radiation and energy budgets and PBL dynamics.

Gruebadet Atmospheric Laboratory. It is a modern laboratory equipped with atmospheric and aerosol instrumentation.

Thule Observatory. ENEA, INGV and Universities of Rome and Florence have been operating since 1990 various instruments at the Thule High Arctic Atmospheric Observatory in Greenland, to investigate climate processes and environmental changes.

ISACCO network. INGV manages a specially modified GNSS network at Svalbard to monitor and model the upper atmosphere and ionospheric scintillation.

Satellite Observations

COSMO-SkyMed is an ASI satellite constellation consisting of four medium-size satellites equipped with a microwave high-resolution synthetic aperture radar operating in the X-band.

Vessels

In 2019 a polar research vessel was acquired by Italy for the Italian Polar Community. The R/V "Laura Bassi" is managed by a Consortium of the OGS, CNR and ENEA and was operated in Antarctica during the 2019-2020 campaign. A first Arctic Campaign is foreseen for summer 2022.



Figure 2. The R/V Laura Bassi (Photo: @PNRA).

Other infrastructures

SIOS (Svalbard Integrated Arctic Earth Observing System). Italy is member of SIOS, whose goal is coordinating and developing existing and new research infrastructure in Svalbard, in support of the pan-Arctic observing system. SIOS also coordinates open data, transnational access, logistics and training activities.

IADC (Italian Arctic Data Center). This interoperable data center manages Arctic data and observations. The center is operated by the CNR in cooperation with all the other Italian research institutions. It is strongly connected with the SIOS Data Management System.