

Cover sheet

Full name of state or organization:

Italian Republic

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Observer's website, if appropriate:

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Is your state or organization still interested in continuing as an Observer of the Arctic Council?

Yes No

Observer Report

Please describe in no more than 2 pages your state's or organization's contributions to the work of the Arctic Council's Working Groups, Task Forces, and/or Expert Groups since the time of your most recent report, or in the previous two years. Please highlight contributions to specific projects, such as through proposals, concept development, in-kind and financial support, and hosting of meetings. Please detail any collaboration with Permanent Participants, such as project proposal endorsement and support.

The guidelines of the Italian policy on Arctic issues are outlined in a National Strategy, available in the website of the Ministry of Foreign Affairs and International Cooperation. Italy considers the Arctic Council (AC) the cornerstone of international cooperation on Arctic issues, is proud to be Observer in this forum and reiterates its will to continue to contribute actively to reach the goals and objectives defined in the Ottawa declaration, recognizing the sovereignty of the Arctic States in the Arctic and respecting the values, culture and traditions of Arctic indigenous people and other Arctic inhabitants. In this perspective, Italy contributes to the works of the AC subsidiary bodies, following the prescribed rules for the Observers, and participates to the Ministerial and SAO meetings through a senior diplomat of the Ministry of Foreign Affairs and International Cooperation (MFAIC), who has been 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, the budget law has allocated, for the first time, specific resources for research activities in the Arctic, establishing a three-years period (2018-2020) Arctic Research Program (PRA). This Program, proposed by the CNR (National Research Council), is elaborated by the Arctic Scientific Committee (CSA). One of the main goals of PRA is "Italy's support as an Observer State to the Arctic Council" and the above-mentioned Italian senior representative to the AC chairs the newly created CSA, confirming the primary role of the Arctic Council in the Italian vision of the Arctic.

Italy's contribution to the work of the AC subsidiary bodies has been quite active and continuous in the past years and it will definitely benefit from PRA. We appointed experts for five working groups, some expert groups and task forces. In detail:

AMAP: Dr. Angelo Viola (CNR-ISAC) and Dr. Vito Vitale (CNR-ISAC) are contact points for Italy. In the last two years they participated to annual meetings (November 2016 and September 2017) as well as to AMAP Conference in Reston (April 2017), where they had the opportunity to present Italian research activities. They made also some proposals to contribute to the working plan of AMAP for the four-years period 2018-2021. Italy is also contributing to the SLCFs group and participated with experts to the meeting held in the end of January 2018. The Italian proposal of hosting the next meeting of SLCFs group in Bologna (Italy) next November has been accepted.

SDWG: Dr. Elisabetta Colaiacomo (Ministry of Environment and the Protection of Sea and Land) and Dr. Vito Vitale (CNR) gave their contribution to this WG. CNR, in particular, participated at AREA project (Arctic Renewable Energy Atlas) with the aim to provide contributions to the renewable energy atlas and elaborate a document on the state of the existing Italian off-grid systems for applications in remote areas. Regarding the first point, CNR and ENEA (National Agency for new technology, energy and economic sustainable development) focused in 2017 on solar and wind energy aspects. Data collected in the period 1983-2007 regarding solar radiation were elaborated in order to produce annual, monthly and hourly statistics concerning global horizontal irradiance (GHI) for clear sky and in all sky conditions.

EPPR: Representatives of the Italian Navy and the Italian Hydrographic Institute (Dr. Paolo Dei and Dr. Maurizio Demarte) participated to EPPR since 2016, contributing also to the activities of two subgroups - Marine Environmental Response Expert Group (MER EG) and Search and Rescue Expert Group (SAR EG).

PAME: Two Italian experts, Dr. Stefano Aliani (CNR-ISMAR) and Dr. Luca Fiorani (ENEA) have regularly participated at meetings of this WG and are engaged in several activities. Dr. Aliani, in particular, is involved in the preparation of a report on Marine Litter.

ACAP: Dr. Ian Hedgecock (CNR-IIA) has participated in past years to this WG and has been recently confirmed as Italian representative.

EGBCM: Dr. Antonello Pasini (CNR-IIA) actively contributed to the first released Pan-Arctic report on collective progress to reduce black carbon and methane emissions. He is now engaged in the work of the group started in autumn 2017 for the second Progress and Recommendations report to be submitted to the AC at the Ministerial in 2019. He participated to the meeting in Helsinki (October 2017) and will be at the next one in September 2018. Italian scientists that take part at the EGBCM and SLCFs will work together in order to strengthen the cooperation between the two expert groups.

TFICA: Dr. Ingrid Hunstadt, a researcher from INGV (National Institute of Geophysics and Volcanology), has been appointed as the Italian representative in this Task Force, after taking part previously at TFTA, contributing to its final report presented in Fairbanks, in May 2017.

Italy is also engaged in rising the interest and attention on Arctic issues and AC's activities at various levels. For instance, in 2016 the Italian MFAIC organized an event to celebrate the twenty years of the Ottawa Declaration. The MFAIC has also hosted in 2017 OneArctic, a simulation of the work of the Arctic Council, organized by the Italian Society for International Organization (SIOI). SIOI has also submitted in April 2018 its candidacy to become the first Italian member of UArctic, that should be confirmed at the UArctic Congress in September (SIOI has received an official invitation).

Finally, Italy considers of utmost importance to engage economic operators on Arctic issues. In this respect, the technological expertise of the Italian Industry is a significant asset to support the sustainable development of the Arctic, through comprehensive innovative solutions allowing to minimize effects on the marine habitat and biodiversity, enhance the wellbeing of indigenous people, improve operations' safety, oil spill preparedness and response capabilities, monitor infrastructures' and environment integrity and secure route navigability. In a good example of public-private partnership, ENI and CNR (Research National Council) have just signed a memorandum to create four research centres in the South of Italy, one of them devoted to studies on the Arctic.

If applicable, please describe in no more than 1 page your state's or organization's future plans for contributing to the work of the Arctic Council's Working Groups, Task Forces, and/or Expert Groups. Please highlight intentions to contribute to specific projects and to collaborate with Permanent Participants.

Italy intends to strengthen its presence in the WGs, EGs and TFs of the AC, using also the resources provided by the recently approved Arctic Research Program (PRA). In detail, Italy will contribute to the work of the Arctic Council's subsidiaries bodies as follows:

AMAP: Italy is determined to continue its participation to the works of AMAP. CNR will also guarantee the presence of Italian contributions to the Expert Groups: SLCFs, POPs and Mercury, SWIPA. Thanks to the long-term activities of research at the Italian scientific station "Dirigibile Italia" (Svalbard) and at the Italian Lab in Thule (Greenland), as well as the active participation in several European projects (iCUPE, Nunaturayuk), Italy will be able to provide useful data for the realization of assessment reports and other AMAP activities. CNR will organize the next meeting of the EG on SLCFs, which will be hosted in Bologna (Italy) next November.

SDWG: Dr. Giovanni Brunelli (Ministry of the Environment and of the protection of Sea and Land) will guarantee Italy's contribution to the WG. With regards to the project AREA, it has been planned to start the transfer of the data on solar radiation and wind on the Atlas web platform.

EPPR: In partnership with e-GEOS, the Italian Hydrographic Institute (IIM) is developing ARNACOSKY, a project conceived to support the search and rescue activity in the Arctic. The project, which is based on the COSMO-SkyMed satellite constellation, will support the Search and Rescue Expert Group in the following areas: vessel route monitoring, oil spills and sea-ice dynamics. ARNACOSKY will also provide numerical modelling activity, highly necessary in case of environmental emergency events. It will be tested in July 2018 during HIGH NORTH 18, the geophysics marine campaign in the Arctic Ocean organized by the IIM.

PAME: Italy will continue to take part to the activities of PAME. In addition, Dr. Salvatore Mauro (CNR-INSEAN) has been recently appointed as Italian representative at the Expert Group on Shipping.

ACAP: Italy intends to assure the presence of experts to the future activities of ACAP and to contribute to its work.

TFICA: Italian experts will continue to participate and give their contribution to this task force.

CAFF: Italy has decided to participate to the work of CAFF too. An Italian referent for the WG will soon be appointed.

The Italian company ENI will contribute to the 2nd Arctic Biodiversity Congress that will take place in Rovaniemi next October 2018, presenting in collaboration with the Norwegian Institute Akvaplan-niva a scientific document entitled "Environmental impacts of drill cuttings deposition on sea floor biodiversity in the south-western Barents Sea – a contribution to ecosystem-based management".

PPs: In line with the visit to Italy of a Sami delegation in 2015, Italy intends to follow up on the initiative strengthening and tightening new relations with the Permanent Participants also in the scientific and technological fields.

If applicable, please describe in no more than 1 page your state's or organization's contributions to other aspects of the Arctic Council and its goals not covered by the previous sections since the time of your most recent report, or in the previous two years.

Since the beginning Italy has participated actively at SAON, contributing to its committees for Arctic Data (ADC) and Observation and Networks (CON). It is also evaluating to offer a concrete support to SAON's secretariat. CNR, thanks to its long time observation activities of the Arctic in Ny-Ålesund (Svalbard) and after the implementation of the Italian Arctic Data Center (IADC), supports SAON effectively in the achievement of its goals. CNR will take part at the next conference of SAON-ADC (Polar Data 2018) and will contribute to the Arctic Observing Summit in Davos (June 2018). It took also part to FMI Arctic Science Networking Workshop in Helsinki (Aug-Sep 2017) as well as to Meteorology Summit in Levi (March 2018). CNR also participates in 5 of the 8 projects funded by Horizon 2020 dedicated to the Arctic, that are currently included in the so-called European Arctic Cluster: the research projects ICE-ARC and NUNATARYUK, the INTERACT network, the infrastructure for icebreakers of research ARICE and the EU-Polarnet coordination action.

The Italian Institute of Oceanography and Experimental Geophysics (OGS) organized in March 2018 a workshop with the scope of writing the contribution of the project SOA (Spitzbergen Oceanic and Atmospheric Interaction) to the report of SIOS (Svalbard Integrated Earth Observing System). Furthermore, OGS is acquiring a new ship to carry on scientific research activities in polar areas.

In March 2018 Space Earth Technology (a spin-off of the Italian Institute of Geophysics and Volcanology) launched NARWHALS, a project funded by ESA, whose objective is to elaborate a feasibility study of a service capable to provide high accuracy positioning by monitoring and mitigating the ionospheric impact of GNSS navigation.

In July 2017 the Italian Navy and IIM organized with CMRE (NATO), and with the participation of some Italian research agencies (CNR, ENEA, OGS, INGV), HIGH NORTH 17, a marine geophysics campaign carried out in the south-west waters of Svalbard on board of RV Alliance, a research vessel properly equipped to operate in extreme conditions. A press conference, with the participation of the Director of the AC's Secretariat, was held in Tromsø, on board of RV Alliance, to illustrate the preliminary results. A second marine geophysics campaign in the Arctic is ready to start next July 2018 and will take place in the waters surrounding Svalbard and in the Fram Strait.

E-GEOS, a company operating in the area of Earth Observation and Geo-Spatial Information using COSMO-SkyMed's constellation of the Italian Space Agency (ASI), carries on monitoring activities based on SAR (Synthetic Aperture Radar) images, providing information about the status of cryosphere and the consequences of climate change. E-GEOS is also partner of H2020 project ARCSAR (Arctic and North Security and Emergency Preparedness Network) and intends to launch in 2018 IceWatch, a new content platform dedicated to the Arctic and the Antarctic regions.

SIOI organizes a Master Course in Sustainable Development, Geopolitics of Resources and Arctic Studies, which has reached its third edition. On 18th September 2018, SIOI will organize, in collaboration with the Nord University (Bodø–Norway) and the Royal Norwegian Embassy in Italy, a Conference entitled "Arctic Connections: Italy and Norway in the Arctic between Cooperation and Future Challenges".

Finally, Italy has actively contributed to the First Arctic Science Ministerial (ASM1) in 2016 and will also participate to the ASM2 in 2018.



Italy

Points of Contact:

Consiglio Nazionale delle Ricerche (CNR), Department of Earth System Science and Environmental Technologies (<http://dta.cnr.it>)

Arctic Research Policy and Goals

Italy's Arctic policy aims to increase the knowledge of Arctic change, its impacts and feedbacks, through scientific monitoring, multidisciplinary research, and by enhancing international scientific cooperation. This policy is stated in the Italian Arctic Strategic agenda and is implemented by Consiglio Nazionale delle Ricerche (Italian National Research Council, CNR), in collaboration with universities and research organizations, including the Italian Space Agency (ASI), Istituto Nazionale di Oceanografia e Geofisica Sperimentale (OGS), Istituto

Nazionale di Geofisica e Vulcanologia (INGV) and the National Agency of natural resources for New technologies, Energy and Sustainable Economic Development (ENEA). Italy's overarching Arctic research goal is to gain the knowledge needed for understanding climate change in order to mitigate its impacts, to increase the resilience of natural systems and society, and enable a sustainable ecosystem-based management in the region.

Main Arctic Research Funders

Ministry of Education, Universities and Research (MIUR, www.miur.gov.it) supports research and innovation in the polar regions. Starting from 2018, in addition to existing funding instruments, MIUR has a dedicated Programme for the Arctic (PRA), managed through CNR.

CNR (www.cnr.it/en) supports research activities in the Arctic, in particular those carried out at the CNR Arctic Station *Dirigibile Italia*, which include atmospheric and climate change studies, geology and geophysics, marine and terrestrial ecosystems, paleoclimate.

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

INGV (www.ingv.it/en/) supports Space Weather at polar latitudes as well as Marine Researches (EMSO ERIC), paleomagnetic and paleoclimate studies.

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

ENEA (<http://www.enea.it/en>) sustains activities of Thule observatory, contributing to atmospheric physics researches in the Arctic.

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

Major Arctic Research Initiatives

CCT-IP. *The Climate Change Tower Integrated Project* investigates Arctic 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 (permafrost and vegetation).

ReCAP and EastGRIP. These projects aim at collecting ice cores from the eastern and north-east sectors of Greenland to reconstruct atmospheric conditions (back to the Eemian and 50 ky BP, respectively), investigate ocean related process (sea ice extent, primary production), understand the ice flow dynamics and the changes in ice flow velocity that may be induced by the warming of the Greenland ice sheet.

MELT. Using an internationally cooperative approach, *Monitoring and Investigating Arctic Change along a Longitudinal Transect* aims to strengthen and integrate Arctic observations to better understand the interconnected processes involved in climate change.

DEFROST. This project investigates the temporal and spatial variability of the deep flow in the southwestern region of Svalbard, an area where water masses with different properties interact each other.

Side project SOA aims at valorising all oceanographic data collected in the area and combined with meteorological data to investigate correlations.

DRAFT (*Damping Role of Arctic Fjords in the climate change*) and **SNOW** (*Sensor Network for Oceanography in Shallow Water*). The major aim of these joint projects is to collect time series oceanographic data in *Kongsfiord* using permanent mooring arrays to understand how climate change is affecting fjord systems, and how the effects may be mitigated.

METROLOGY FOR THE ARCTIC. Metrology and environmental science communities cooperate to develop improved and dedicated calibration procedures, assess the response of instruments and sensors to polar conditions, evaluate uncertainty of field measurements, also implementing a metrology laboratory in Ny-Ålesund.

ACZ-DYNAMICS. Comparing Arctic sites, this initiative intends investigate changes in the Arctic Critical Zone (CZ), and related impacts on ecosystem functioning and associated biogeochemical fluxes, in particular the contribution of land ecosystems to the Carbon (C) budget.

C3. Italy takes part to this international, multi-disciplinary and multi-year program whose overarching goal is to constrain the linkages between Climate, Cryosphere (sea ice and coastal permafrost) and Carbon release from sediments up to the atmosphere in the East Siberian Arctic Ocean (ESAO).

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 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 expedition of 1928.



The CNR Arctic Station Dirigibile Italia – Ny-Ålesund, Svalbard (Photo: Giuseppe Pellegrino).

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, among others, surface radiation and energy budgets and PBL dynamics.



The Amundsen-Nobile Climate Change Tower during maintenance (Photo: Fabio Giardi).

Gruebadet Atmospheric Laboratory. It is a modern laboratory with atmospheric and aerosol instruments, connected to the Italian Arctic Station.

Thule Observatory. Inside THAAO Observatory, Italy (ENEA and INGV) operates an aerosol/temperature lidar, a water vapor emission spectrometer (VESPA-22), as well as radiation and aerosol measurements at surface.

ISACCO network. Since 2003 Italy (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 (SAR) operating in X-band.

Vessels

Italy (OGS) is in the process of acquiring a polar research vessel for geophysical and oceanographic research activities in Antarctica and in the Arctic.

Other infrastructures

SIOS (Svalbard Integrated Arctic Earth Observing System). Italy is Funding Member of SIOS, aiming to coordinate and develop existing and new research infrastructures in Svalbard, as a support to the pan-Arctic observing system. SIOS also coordinates open data, transnational access, logistics and training.

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