ISTITUTO NAZIONALE
DI GEOFISICA E VULCANOLOGIA

The Istituto Nazionale di Geofisica e Vulcanologia (INGV) has been dealing with polar sciences for over thirty years in the disciplinary fields of geophysics, geology, seismology, and volcanology through its three Departments: Environment, Earthquakes, and Volcanoes. INGV is member of the Scientific Committee for the Arctic (CSA) and of the National Research Program in Antarctica (PNRA).

INGV carries out several research activities in the Arctic regions, with particular regard to **Greenland, Svalbard Islands and Barents Sea**. Through international and national projects in the frame of ESFRI (European Strategy Forum on Research Infrastructures), ESA (European Space Agency), EU (European Union) Programs, SCAR (Scientific Committee for Antarctic Research), INGV established successfully scientific interactions with Arctic Countries, members of the Arctic Council, and Observers Countries, in particular Norway, Canada, USA, UK, Poland, Germany. INGV has taken part in the Task Force on Telecommunications Infrastructure in the Arctic (TFTIA) and the Task Force on Improved Connectivity in the Arctic (TFICA) due to the expertise of the ionosphere and GNSS research group. Moreover climate change topics in the last years has been the main interest within the ARCA project (*ARctic present Climate change and pAst extreme events*) carried out in collaboration with CNR as coordinator and OGS (www.arcaproject.it).

SVALBARD-Since 2003 INGV is involved in the monitoring and modeling of the upper atmosphere and **ionospheric scintillation**. Scintillation is of great interest for **Space Weather** as it can jeopardize satellite signals, like those of GNSS (Global Navigation Satellite System), with a crucial impact on the navigation and positioning technology (http://eswua.ingv.it/).

From the infrastructural point of view, INGV has coordinated the preparatory phase of **EMSO** (European Multidisciplinary Seafloor Observatory), an important European research infrastructure included in both **ESFRI** and Italian roadmaps. EMSO aims to realize, complete and manage a multidisciplinary sub marine network in European seas. The marine regions around Svalbard are part of the EMSO areas of interest**.** EMSO offers data and services to a large and diverse group of users, going from scientists and industries to institutions and policy makers. **EMSO** is now a European Research Infrastructure Consortium **(ERIC)** (http://emso.eu).

GREENLAND-INGV contributes to the **NDACC** (Network for Detection of Atmospheric Composition Change) in collaboration with ENEA, Sapienza University of Rome, and NCA (USA). In particular, in January 2009 INGV staff installed a Ground-based mm-wave spectrometer (GBMS) at Thule Air Base and started regular winter measurements of the stratospheric and mesospheric chemical composition. Since July 2016, a new spectrometer (VESPA-22), designed and built at INGV, is successfully operating at Thule for the continuous measurement of tropospheric and stratospheric water vapor (http://www.thuleatmos-it.it//).

INGV participates to the international project **GLISN** (Greenland Ice Sheet Monitoring Network; http://glisn.info/), in which framework a seismic network has been installed, operated and recently upgraded to 15 large band seismic stations and GPS along the island perimeter and on the ice sheet. The double purpose of this state-of-the-art network is to enhance the earthquake detection capability in the region and to provide high quality data for the study of the dynamics and evolution of glaciers**.**

BARENTS SEA-INGV is involved in studies of **tephrostratigraphy**, **paleo magnetic and environmental magnetic properties of sediment cores** collected from the northwestern Barents Sea. The studies are conducted in cooperation with the OGS and various other scientific institutions. The aim of the research is the detailed reconstruction of the geomagnetic field variability in the past and the use of the paleosecular variation as high-resolution correlation and dating tool for sedimentary sequences deposited during and after the last glacial maximum.

For what concerns the wide issue of "**critical infrastructures**" in the Arctic, INGV is strongly proactive in:

- actions within the PECASUS consortium (Pan-European Consortium for Aviation Space weather User Services) in support of ICAO (International Civil Aviation Organization), together with centres of excellence in Europe on Space Weather (Finland, Belgium, Poland, Germany, Austria, Holland, Italy, Cyprus);

- wildfire studies by using observation from space and airborne sensors campaign realized through a number of international collaboration which includes: JPL-NASA (National Aeronautics and Space Administration, USA), AIST (National Institute of Advanced Industrial Science and Technology, Japan) - The University of Manchester, the Kings College of London, the John Moore University Liverpool (UK);

- in sampling activities of products from eruptive phenomena (e.g., during the eruption of the Eyjafjallajökull volcano in Iceland in 2010) for the development of ash dispersion models.

Finally, INGV has a long lasting expertise in polar science communication, dissemination, and education hosting students of any school level, organizing open days and taking part to National Science Festivals and to the European Researchers' Night.

Link of interest:

- Istituto Nazionale di Geofisica e Vulcanologia www.ingv.it
- Blog INGVambiente https://ingvambiente.com/category/artideantartide/
- Web portal on the e-Space Weather for the Upper Atmosphere http://eswua.ingv.it/
- Web portal on GRAPE (GNSS Research and Application for Polar Environment) www.grape.scar.org
- Web portal on the atmospheric observatory at Thule (Greenland) http://www.thuleatmos-it.it/
- ARCA project http://www.arcaproject.it/index.php/en/
- PECASUS http://pecasus.eu/
- SVAIS project https://sites.google.com/site/ipynicestreams/svais
- EGLACOM project https://sites.google.com/site/ipynicestreams/eglacom
- CORIBAR project https://sites.google.com/site/ipynicestreams/coribar
- EUROFLEETS2 project https://www.eurofleets.eu/access/previous-calls/eurofleets2-polar-and-subpolar-call-results/