

Updates on Italian Arctic Activities

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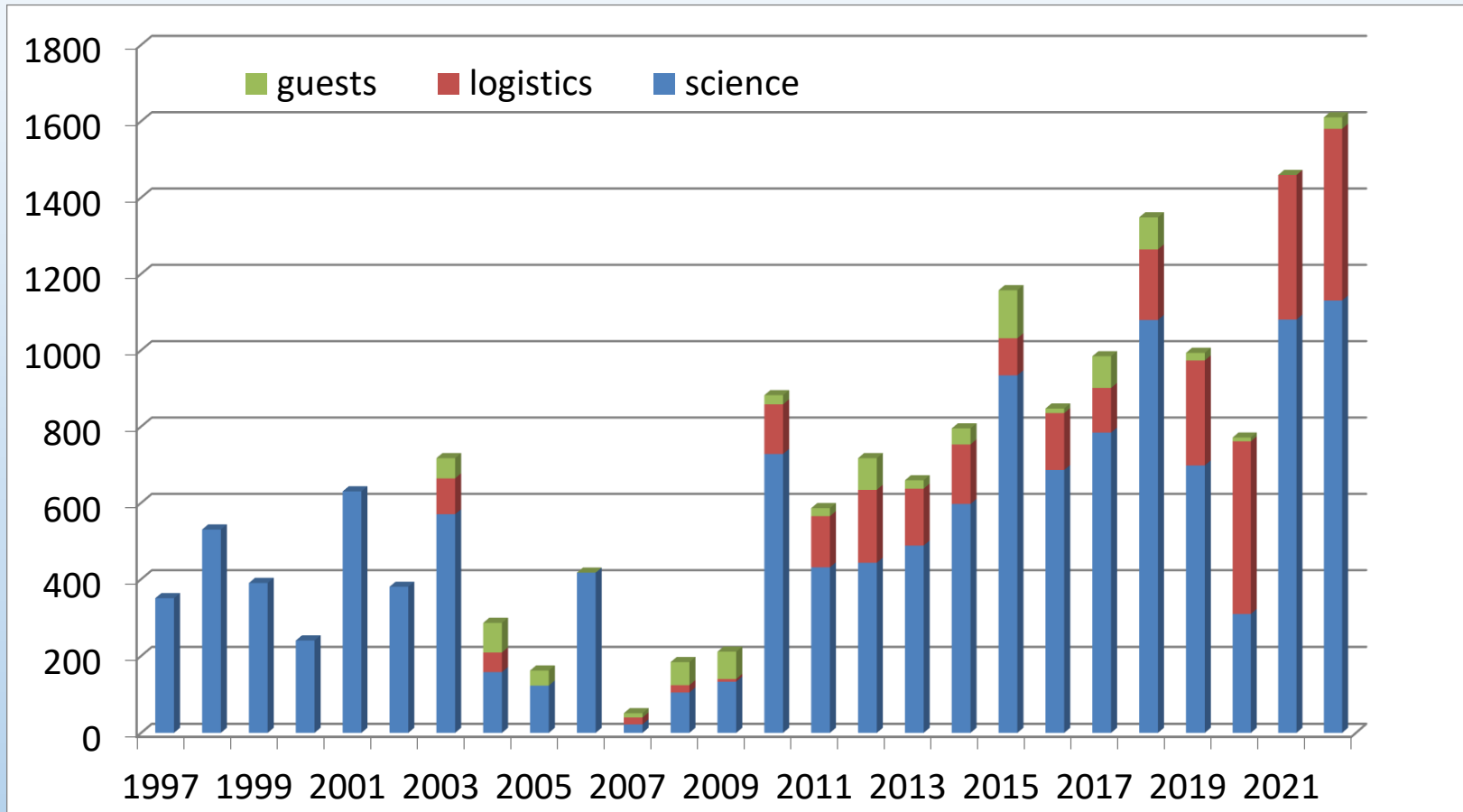
FARO annual meeting, February 17, 2023

Arctic Station “Dirigibile Italia”, Ny-Ålesund Research Station (Svalbard)



- Opened in **1997**
- Managed by **CNR-ISP**, but hosts researchers from other institutions and universities
- Surface 330 m² with sleeping rooms, offices and laboratories
- Can host up to 7 researchers
- Since 2018 runs **all year round**
- Access through a national call and a peer-review process.
- Participates to **INTERACT** and **SIOS** access programs

Man-days at Dirigibile Italia



More than 30 projects submitted for 2023, including **INTERACT** and **SIOS access projects**. We expect a similar number of attendances as in 2022.

Large future projects and investments

PRA (Arctic Research Programme) funded by Italian Ministry for University and Research for studies over the Arctic (3 calls for projects up to now), has been renewed for two more years (1 M€/y).

A screenshot of the PRA website's project page. The page has a dark blue header with the PRA logo and navigation links. Below the header are six project cards arranged in a 2x3 grid. Each card has a white background and contains the project title, acronym, research institution, and a brief description. A red arrow icon with the text 'SCOPRI IL PROGETTO' is at the bottom of each card.

PRA
PROGRAMMA DI RICERCHE IN ARTICO

ABOUT • AZIONI PRA • INFRASTRUTTURE • ATTIVITÀ INTERNAZIONALE • IADC • DIVULGAZIONE • NEWS • GALLERIE

A-PAW
AIR POLLUTION IN THE ARCTIC WINTER (A-PAW): AN ITALIAN CONTRIBUTION TO THE ALPACA FIELD EXPERIMENT
CNR-IRPAZ
Area di ricerca: Atmospheric sciences

L'esperienza ALPACA (Arctic Pollution And Chemical Analysis), coordinata dall'Università dell'Alaska in Fairbanks, è il primo grande esperimento internazionale sulla qualità dell'aria nelle città artiche. La campagna sperimentale, che ha avuto luogo tra gennaio e febbraio 2022 a Fairbanks, ha cercato di delineare le cause degli eventi critici di inquinamento da particolato atmosferico (PM) nelle città artiche nei periodi di alta pressione durante i mesi invernali. Sono state considerate le possibili sorgenti da combustione (dal riscaldamento domestico alle centrali termiche) e le variabili meteorologiche tipiche dei mesi freddi alle alte latitudini. Sono state inoltre caratterizzate le deposizioni nevose. Infine, il progetto ha coinvolto associazioni di cittadini interessate.

BETHA-NÅ
BOUNDARY LAYER EVOLUTION THROUGH HARMONIZATION OF AEROSOL MEASUREMENTS AT NY-ÅLESUND RESEARCH STATIONS
ISTITUTO DI SCIENZE POLARI - CNR
Area di ricerca: Atmospheric sciences

The Arctic is experiencing the most dramatic impact of the present climate change, amplifying and driving changes elsewhere in the Earth system. This "Arctic Amplification" is due to peculiar feedbacks between climate forcings and environmental responses, especially involving large changes in surface albedo, over land, sea and long-range transport patterns of air pollutants. A detailed knowledge of the atmospheric processes at different scales can help to define the main causes of "Arctic Amplification". In this scenario, vertical structure of the Arctic Boundary Layer (ABL) is a key element that can influence aerosol size distribution, chemical composition and its Svalbard in Norway's northernmost region, and the archipelago is one of the northernmost land-areas in the.

ECAPAC
EFFECTS OF CHANGING ALBEDO AND PRECIPITATION ON THE ARCTIC CLIMATE
INEA - DIPARTIMENTO SOSTENIBILITÀ DEI SISTEMI PRODUTTIVI E TERRITORIALI (DSPT)
Area di ricerca: Atmospheric sciences

The project aims at quantifying the impact of precipitation on the surface distribution of ice and snow and on the surface radiation budget. The goal will be achieved by means of an integrated approach based on ground-based, in situ, and satellite-based measurements in combination with a regional climate model. Observations will be used also to improve model representations of key physical processes. Field activities will take place at the Thule High Arctic Atmospheric Observatory, Greenland.

ICED EARTH
INTERACTIONS BETWEEN THE CRYOSPHERE AND DUST IN THE EARTH SYSTEM
DEPARTMENT OF ENVIRONMENTAL AND EARTH SCIENCES, UNIVERSITY OF MILANO-BICOCCA
Area di ricerca: Earth science

Could dust contribute to cause the observed abrupt changes in the Arctic? ICED EARTH aims to put the bases to tackle this question through simulations with a global Earth System Model of high complexity (IPSLCM4). Dust-cryosphere processes are only just starting to be fully implemented in global ESMs, often in a fragmented way. In ICED EARTH, deposition of mineral dust and carbonaceous aerosols will be coherently coupled to snow albedo on land. Simulations will be tested against available observations.

PASTHEAT
PERMAFROST THAWING: WHAT HAPPENED TO THE LARGEST TERRESTRIAL CARBON POOL DURING LAST DEGLACIATION?
ISTITUTO DI SCIENZE POLARI ISP-CNR
Area di ricerca: Earth science

L'ultima deglaciazione è una fase di riscaldamento che segue l'ultimo massimo glaciale (21k fa). I modelli suggeriscono che, durante questa transizione, la fusione del permafrost ha esercitato un feedback positivo sul cambiamento climatico rilasciando CO₂/CH₄ in atmosfera. Processi e tempi di rilascio del carbonio rimangono tuttavia ancora poco chiari. PASTHEAT esaminerà il comportamento del permafrost durante l'ultima deglaciazione per migliorare la nostra comprensione sul ciclo del carbonio post-glaciale e chiarire come i suoi artici risponderanno ai cambiamenti climatici in un futuro scenario di amplificazione polare.

SIMTNEL
THE IMPACT OF SEA ICE DISAPPEARANCE ON HIGHER NORTH ATLANTIC CLIMATE AND ATMOSPHERIC BROMINE AND MERCURY CYCLES
ISP-CNR
Area di ricerca: Earth science

The Higher North Atlantic (HNA), Svalbard and Greenland east coastal regions are experiencing rapid climate change with sustained temperature increases and loss of sea ice. This disappearance of old ice is cited as one of the causes of the recent exceptional warming of the Arctic (HNA1), together with increasing inflow into the Fram Strait of the Atlantic meridional overturning circulation (AMOC2). Changes in the extension and type of sea ice have a direct impact on heat transfer and on Arctic biological and biogeochemical cycles. Sea ice is a physical barrier to heat and water vapor exchange, also influencing water stable isotopes in precipitation. Sea ice is also involved in the oxidative capacity of the Arctic atmosphere, injecting in spring enormous amounts of Br.

<https://www.programmaricercaartico.it/index-projects>

SENTINEL

Holthedalfonna ice drilling campaign

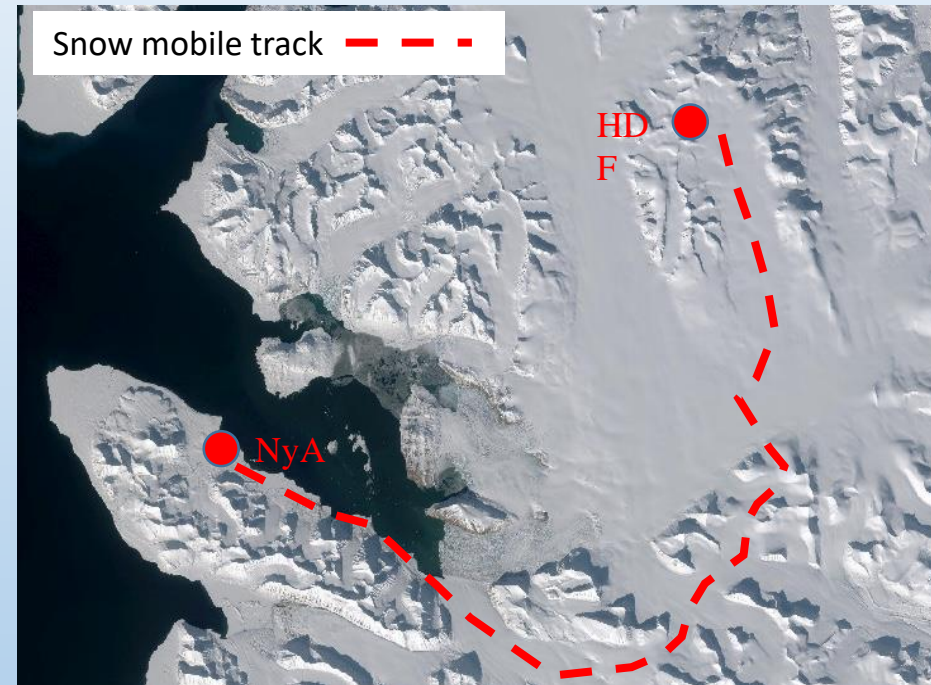
Svalbard

Proposed for April 2023



Logistic planning

- Campaign will take place in April 2023
- The headquarter will be located in Ny-Alesund with the support of the Italian Arctic Station Dirigibile Italia
- Installation of a remote camp at the summit of Holthedalfonna able to host 8 personnel (5 researchers, 1 driller, 1 drill support, 1 mountain guide)
- Equipment transportation from Ny-Alesund to HDF summit by snow mobile.
- Possibility for personnel and material exchange during the field operation.
- Ice core will be transported back to Ny-Alesund by snow mobile. This approach has already been successfully carried out in previous campaigns.
- Cores will be store in Ny-Alesund in a freezing container until transportation to Europe by IPEV.



MAIN GOALS

- Collect a deep ice core from Holtedahlfonna (HDF) Glacier summit.
- Reconstruct the atmospheric composition of the last 300 years
- Reconstruct the sea ice change of the last 300 year north of Svalbard
- Investigate the degradation (or not) of the climate signal compared to the 2005 core
- Investigate the role of sea ice dynamics on Svalbard biogeochemical cycles
- Investigate the impact of Arctic amplification on the Svalbard environment
- Reconstruct the history of microbial colonization and evolution in relation to past climate



Efforts to reduce environmental impacts

From this year the station will have an **electric car** for moving people and weights in and around the Ny-Ålesund.



Availability/opportunities for international infrastructure access in the next 2 years

The **INTERACT** Access program is at its last year (2023), waiting to receive the applications.

SIOS Access program will be operative for 2023, we got 3 request of access (<https://sios-svalbard.org>).

The station is applying for **new access programs** (physical, remote, virtual) in the frame of European initiatives.

Access is possible through **collaborations with Italian research institutions and universities.**



New version of the
Italian Arctic Data Center is
 available and slowly populating
<https://iadc.cnr.it>

Metadata via Geonetwork

Data via ERDDAP

Next Generation EU -> funds for improving (NRT) availability and sharing of polar data