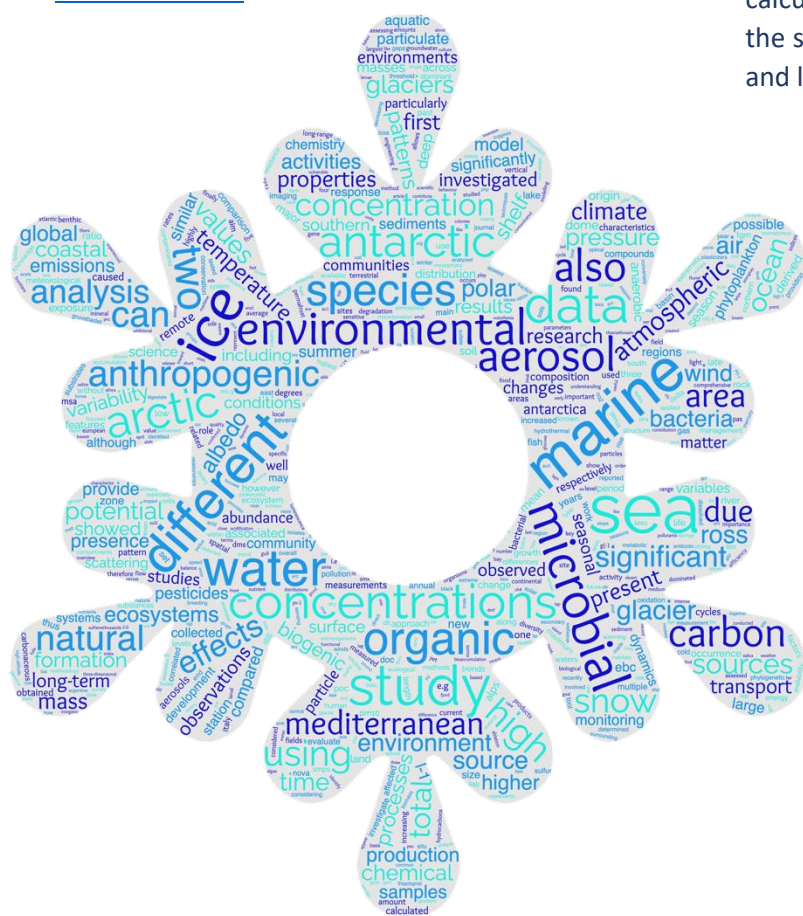




The ISP words of 2022

The WordCloud graphically displays the words present in the titles and abstracts of papers published by ISP staff in 2022. Words are calculated by frequency and are represented by the size each word takes: from the most frequent and largest, to the least frequent and smallest.



Upcoming events



TOP STORIES

Sunscreens at the South Pole

[Marianna D'Amico](#) and [Marco Vecchiato](#)

A [study recently published](#) in the *Microchemical Journal*, analyses the occurrence and distribution of 2-ethylhexyl 4-methoxycinnamate (EHMC) in Antarctic snow for the first time. This compound is largely used as a UV-B filter in sunscreens and in paints and polymers to protect outdoor materials exposed to sunlight. In recent years, growing concerns are arising due to its potentially harmful effects on the ecosystem: the European Union which included EHMC in the first watchlist that monitors emerging contaminants. Moreover, in 2021 the sale of sunscreens containing EHMC was



Credit: Vecchiato©PNRA

banned in Hawaii due to possible toxicity to the corals.

The aim of the research is to study the occurrence and behaviour of EHMC in polar ecosystems and to understand the likely sources of contamination. The sampling campaign covered a wide area of the Northern Victoria Land. The presence of EHMC has been observed both in snow samples collected nearby the Italian scientific station Mario Zucchelli and close to the main surrounding logistic points, where direct sources are plausible, but also in distant isolated areas not directly affected by human activities. Two different modelling

approaches investigated the patterns of this atmospheric transport.

Although in polar regions the presence of EHMC has been studied throughout the years and linked to local scientific activities, this is the first time it has been found in snow samples in Antarctica. It is possible that the presence of EHMC is not linked only to local sources but that this compound is transported in the atmosphere for long distances



Credit: Vecchiato©PNRA

and is therefore deposited in remote polar areas far from scientific stations.

The goal of this study is to achieve knowledge of the processes involved in the transport of contaminants related to personal care products. This would make it possible to obtain better protection of polar ecosystems and limit human impacts in a pristine and delicate region such as Antarctica.



Credit: Vecchiato©PNRA



HERE DIRIGIBILE ITALIA

From the logbook of the station - August-October 2022

[Ombretta Dell'Acqua](#) - Station Leader

Early in August, terrestrial biologists from IRET, after fulfilled the study about plants abundance related to reindeers' presence, gave way to geologists from Turin Polytechnic, tireless

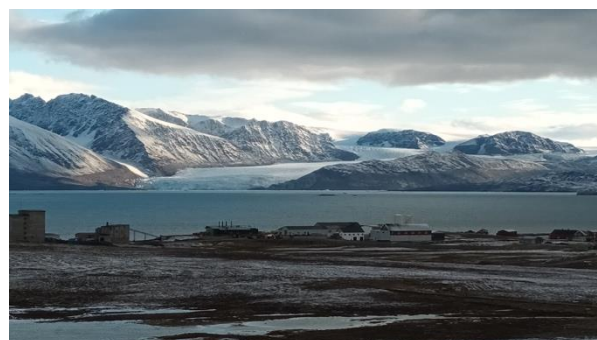


detective of the permafrost geophysical characteristics. Along with them, other scientists used to walk across moraines and beside the coast in order to study the ecosystem functioning of Arctic ponds (Univ. Sapienza & ISP). During September, marine scientists (IAS, ISP and Ca' Foscari University) came to recover the Italian mooring and their precious data, while others focused on microplastics and organic pollutants analysis in the water and sediment body. Atmospheric chemists and physicists from ISP made a check and calibrate the instruments installed on the Climate Change Tower. The

station leader, between greetings to outgoing

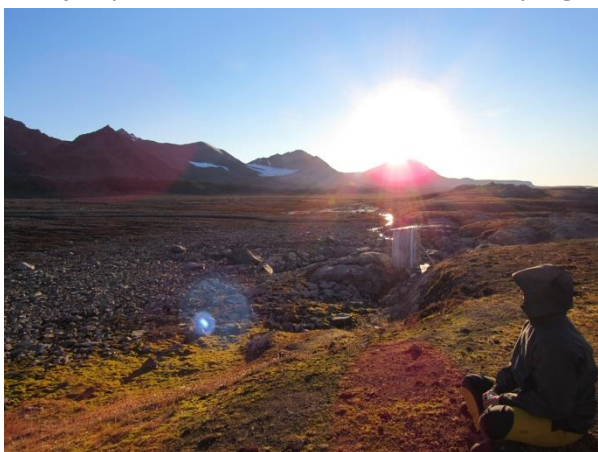


scientists and welcoming the new ones on the same days, carried out the sampling regarding Gruvebadet instrumentations. The same is going to happen for the next months with the colleague Simonetta Montaguti, with the addition of snow samples collection, wishing for a very White Christmas!



Ny-Ålesund routine was enriched by Norwegian government delegation visits plus Coast Guard drills involving Kings Bay as well, called to satisfy safety protocols for any different emergency situation. Normal operations came to a short halt after two polar bears sight at dawn in the village,

that jumped into the sea and swam away right



after. Among all the birthday parties and the running race around the village (followed by tacos dinner!) in honour of the ship incoming, bringing fresh fruits and other awaited goods, we Italians particularly remember the Saturday night we ran the Pub: “One of the best Saturday nights of the summer!” someone said!

Project Microtracer

[Massimiliano Vardè](#) e [Giulia Vitale](#)

Between August and September 2022, the sampling campaign of the [Microtracer project](#) (Small MICROplastics bioindicaToRs in the changing ArctiC EnviRonment; PI Gabriella Caruso of CNR-ISP, Messina), funded by the Arctic Research Program (PRA), took place in Ny-Ålesund. The aim of the project is to evaluate the concentrations and types of small microplastics (SMPs), additives and plasticizers (APs) in the marine environment, trying to understand their sources and transport.



Credit: Jan Ivar Pettersen - NPI

Fieldwork activities were characterized by sampling surface seawater, sediment and biota (amphipods) in the Kongsfjorden and the Krossfjorden, and a preliminary treatment of collected samples in the laboratories of the Dirigibile Italia Arctic station, waiting for the results of the analyses at the laboratories of the CNR-ISP (Messina and Venice), ENEA in Rome and of the other research groups. In fact, researchers from the Department of Biology and Biotechnology of the Sapienza University of Rome and the Department of Chemistry of the University of Padua are involved in the project.



Amphipod sampling by immanent screens at the Loven Islands. Credit: Vimercati - CU

The chemical-physical and microbiological analyses will be able to identify and quantify SMPs and APs, as well as trace metals and organic micropollutants, defining their distribution in the environment and in the biota, providing indication of potential effects on some bioindicators of the Arctic ecosystem.

The boats owned by Kings Bay AS (MS Teisten) and the Norwegian Polar Institute-NPI (Zodiac) were used for the sampling of seawater and sediment. The scientific activities were carried out by Giulia Vitale (PhD student in Polar Sciences), who obtained an Arctic Field Grant for the PLACEBO project funded by the Research Council of Norway (RCN), and by Massimiliano Vardè (Researcher, CNR-ISP).

Giulia, on her first experience in the Arctic, and Massimiliano on his fourth Arctic expedition, worked in a positive and collaborative atmosphere with Italian and foreign colleagues, who are

sincerely thanked for their support given during all fieldwork activities.



Subdivision of sampled amphipods into different aliquots - Laboratory analyses will be conducted at CNR-ISP in Messina and Venice and at ENEA in Rome. Credit: O. Dell'Acqua - ISP



Surface water sampling by Niskin bottles on board the MS-Teisten. Credit: M. Sabino - ISP

given the beginning of the first dark evenings of the autumn season they were able to admire the first hint of the northern lights!

RESEARCH HIGHLIGHTS

Gap-filling method for early precipitation series

[Francesca Becherini](#), [Dario Camuffo](#) e [Antonio della Valle](#)

Datasets of past weather conditions are extremely valuable for the assessment of climate change and related consequences. Almost all long instrumental series are affected by gaps, due to different reasons, lasting from a single day up to several years. Over the last decades, a number of techniques have been developed to fill gaps in precipitation series. The most successful ones require the availability of contemporary datasets correlated between them, a condition rarely satisfied in early periods: the observations are few, performed in places far from each other, and



Marine sediment sampling by bucket aboard KingsBay's MS Teisten. Credit: S. Giansiracusa - ISP

Before leaving Ny-Ålesund to come back to Italy, Giulia and Massimiliano also had a bit of luck, and

the observational procedure, when known, was not standardized. A careful search of the historical sources combined with data analysis is thus necessary to reconstruct data and metadata, in particular the instrument characteristics, their exposure and the observation protocol.

During the long study devoted to the recovery and revision of the Padua 1713-2018 precipitation series (Camuffo 1984; Camuffo et al. 2020; Camuffo et al. 2022), recently completed (della Valle et al. 2022 preprint), different methods were implemented to fill gaps and reconstruct missing values. The most reliable one was based on

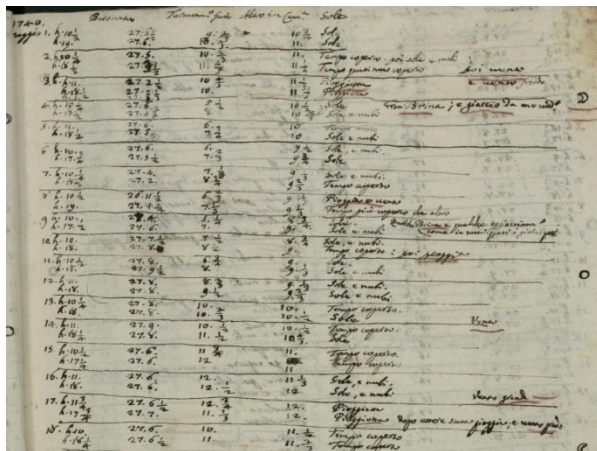


Fig.1 Example of register where the observer Morgagni reported weather notes, May 1740 (by courtesy Historical Archive of the INAF-Astronomical Observatory of Padua. The Morgagni register is available online, on the [website of the Archive](#).

the accurate analysis of the documentary sources and transformation of the daily weather notes reported by the observer into numerical values. The notes contained the precipitation type, e.g. rain, snow, but also a short description, e.g. light rain, few drops, big rain (Fig.1). The relation between the description and amount was assessed analyzing the periods in which both were regularly reported. Firstly, the terms used to describe the precipitation were classified and analyzed statistically. The result was a skewed distribution, so the most representative estimator of every class, i.e. the mode, median or mean (Fig.2), was selected. Then, the missing daily amounts were reconstructed by assigning the value of the estimator to the correspondent class,

keeping the homogeneity in the average, variance, and percentile distribution.

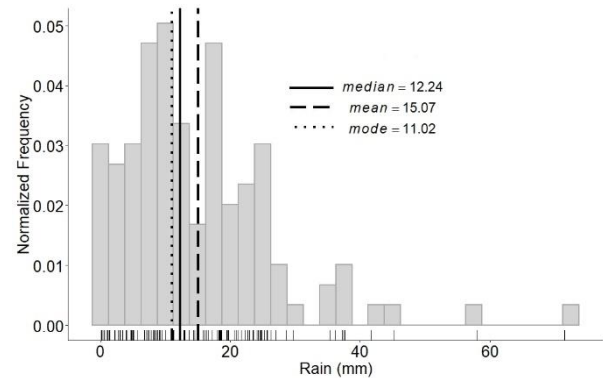


Fig.2 Normalized frequency of daily precipitation amounts (mm) of the class "big rain" (Camuffo D, Becherini F, della Valle A, 2022).

This method was applied to fill the 4-year continuous gap, from 1764 to 1767; for the calibration the 24-year (1740-1763) common period between Poleni's instrumental readings and Morgagni's weather notes was used.

Moreover, it was possible to reconstruct the missing values of the 1812-1864 period, distributed irregularly. The same observer performed instrumental readings and weather observations, so there was no bias for subjective interpretation, different instruments, observation protocols and locations. The same method was used to split cumulative amounts into individual daily amounts. The slope of the cumulative precipitation amount was greatly improved after the correction (Fig.3), showing better agreement with the previous and subsequent periods.

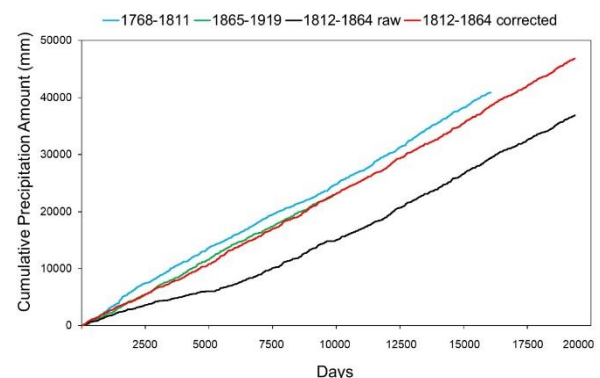


Fig.3 Comparison of the cumulative precipitation amount of 1812-1864 period, and the previous (1768-1811) and subsequent (1865-1919) ones. For the 1812-1864 period, raw data are compared with calculated data using mean as estimator.

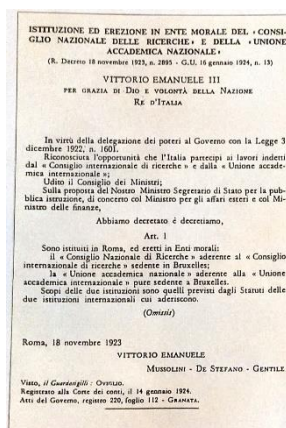


SPECIAL 100 CNR

100 years of CNR: an important piece of Italian history

Angelo Pietro Viola

Established as a non-profit organization on 18 November 1923, in the same year the National Council of Research Italy adheres to the International Research Council which has its headquarters in Brussels. The CNR history is closely related to the scientific, technical and cultural evolution of Italy. The premise for this relation is linked to the *Decreto Luogotenenziale*



of 1945. This act transforms the CNR into a state body under by the Presidency of the Council of Ministers, to carry out training, promotion and research coordination for the scientific and technological progress of the country. In this formulation, the CNR

acquires many prerogatives in terms of programming and indications in the various scientific sectors which it still retains today. Under the aegis of CNR INFN (1951) and CNRN (1952) now ENEA are born. In the years 1948-50, on the proposal of the physicists Amaldi and Bernardini,

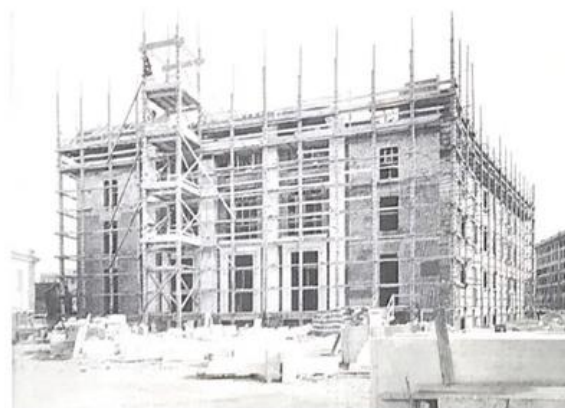


20 agosto 1934, posa della volta del primo piano.

strongly supported by President of the CNR, Gustavo Colonnetti the internationalization process starts and sees the European

countries to join their resources, both in the technical-scientific field and in the industrial economic field. In the years of the reconstruction, the CNR launches a reform program concerning the consultative bodies, expanding the consultancy committees to the humanities sector,

establishing research areas, institutes, consultancy groups to support Universities to face international challenges. The figure of the researcher is born and the CNR set up its own research network on the national territory from the Center North to the South. In 1961 the Center for Atmospheric Physics and Meteorology (CENFAM) and the Institute of Molecular Chemistry are established. To support the scientific research in the southern Italy, a dedicated program is launched to rebalance the gap between North and South. In the coming



20 marzo 1935, completamento della facciata principale.

years, various reforms of the national research system will take place to transform the CNR, confirming its multidisciplinary function, into what we know today.

In 1933 the Italian government promotes funding for the construction of the CNR headquarters in the San Lorenzo district in Rome. The building which extends over an area of 2105 m², plus 1720 m² added later, for a height of 25 m, is inaugurated on November 21, 1937, few months after the death of Guglielmo Marconi to whom it will be dedicated the council hall (today Aula Marconi) frescoed by Antonio Achilli.



21 novembre 1937, inaugurazione.



Il salone del Consiglio affrescato da Antonio Achilli.

We thank Ms Anna Capasso (CNR Press Office) for the documentation provided.

POSTCARDS FROM THE FIELD

In the context of the INTERACT project "Mercury concentration and tolerant microorganisms in Arctic SNOW: new Bioremediation challenges", sampling activities at the Kuujjuarapik (Québec, Canada) village are carrying out. The goal of the project is to determine, in terms of quality and quantity the mercury presence in snow samples. Furthermore, the second objective of the project is the evaluation of the presence of Hg tolerant/degrading microorganisms and the study of metabolic process that are the base of this peculiarity activities.

Maria Papale Warren Cairns



Greetings from the CEN Whapmagoostui-Kuujjuarapik Research Station (Québec, Canada)

.....

The first oceanographic mission of Gaia Blu, the new CNR research vessel, ended the 20th October 2022. The scientific party on board consisted of researchers from four different institutes (ISP, ISMAR, IGAG and IRBIM). In a twenty-one days cruise, almost five thousand km² of seabed were mapped in the Gulf of Naples and Salerno, using cutting-edge multibeam systems for bathymetric surveys. The data were processed on board and made available via satellite with updates every 24 hours. With its 83 meters in length, Gaia Blu will be able to conduct multidisciplinary research in the Mediterranean Sea and in the ocean, up to the Arctic Sea in summer, and will serve the entire Italian scientific community in the context of Italian, European and international projects.

Paolo Montagna



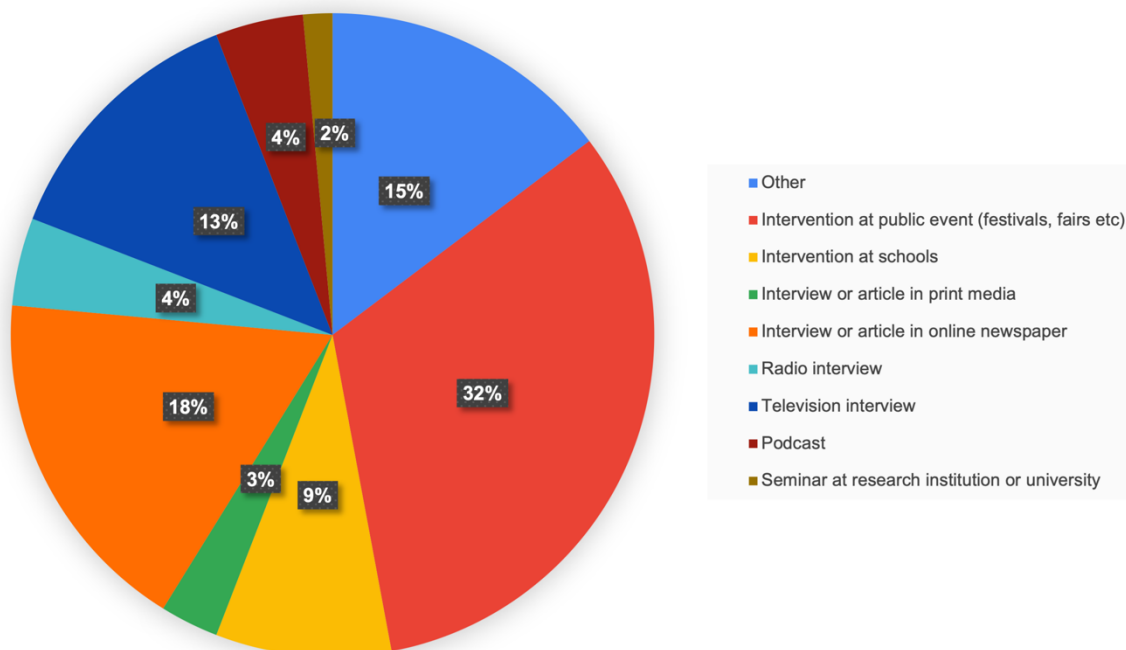
The research vessel Gaia Blu at the Naples harbour Part of the team on board R/V Gaia Blu during the third leg "Jamme Gaia"



ISP OUTREACH AND BIBLIOGRAPHY

The CNR Institute of Polar Sciences is very active in communication within and outside the scientific community. The tools made available by technology (social media), but also the physical presence in fairs, festivals, public events, and above all in schools, allow researchers to illustrate tell their research activities and involve the public in a light but rigorous way even non-scientific audiences.

Outreach Activities for Institute of Polar Sciences for 2022



The distribution for the year 2022 of Outreach activities, represented as a percentage out of a total of 68 activities carried out - [Jessica Marzaro](#).



Bibliography data period: 2019-2022 - [Ivan Sartorato](#) (WoS data. The areas on the chart are not strictly proportional to the values of each entry).

UPCOMING EVENTS



The Outreach and Communication Team wish you
Happy Holidays!

STAY IN TOUCH:



Consiglio Nazionale delle Ricerche
Istituto di Scienze Polari

<https://www.isp.cnr.it/index.php/en/> - E-mail: isp-gdl-comunicazione@isp.cnr.it

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