



SCIENTIFIC PROJECTS on THE INUIT WINDSLED 2011-2024

Scientific press Mentions and published Papers

The Greenland and Antarctic Ice Sheets provide a unique and valuable environment for research across various scientific disciplines. It is WindSled Project's desire to continue contributing in a sustainable manner to the key scientific disciplines that may be researched on the ice sheets.

- [Sustainability: A greener culture | Nature](#) Julia Rosen, June 2017
- <https://ir.canterbury.ac.nz/items/fc35790f-46bc-4a51-8c8a-e49d7b6afd58/full>

WINDSLED SCIENTIFIC EXPEDITIONS

- WINDSLED ANT 2011. ACCIONA WINDPOWERED ANTARCTICA. 3500 km. 2011
- WINDSLED GR 2014. Circumnavigation of Greenland. 4300 km. 2014
- WINDSLED GR 2016. Ice Summit Greenland Expedition. 2000 km. 2016
- WINDSLED GR 2017. Ice River Expedition. 1200 km. 2017
- WINDSLED ANT 2018. Antarctica Dome Fuji Circumnavigation. 2532 km. 2018-19
- WINDSLED GR 2022. Greenland South Dome Circumnavigation. 1000 km. 2022

TOTAL of PROJECTS ON WINDSLED 2011-2022: 34

TOTAL of PAPERS PUBLISHED to date: 7

SUMMARY of SCIENTIFIC DISCIPLINES AND PROJECTS

Following, a summary of Windsled's achievements and collaborative efforts in multidisciplinary and intradisciplinary science:

1 Glaciology: Understanding the dynamics, structure, and behavior of glaciers and ice sheets, including the study of ice flow, ice thickness, and glacial features. Physical properties of ice.

- **CHARACTERIZATION OF THE SNOW MANTLE ON THE INLANDSIS GLACIER**

Principal Investigator: Dr. Juan Ignacio López Moreno, Pyrenean Institute of Ecology-Higher Council for Scientific Research IPE-CSIC,

WINDSLED GR 2014/ WINDSLED GR 2016

[Snowpack observations from a circumnavigation of the Greenland Ice Sheet \(spring 2014\) - Dialnet \(unirioja.es\)](#)



- **THE DARK SNOW PROJECT ON ARCTIC ICE CONTAMINATION, EAST GREENLAND ICE-CORE PROJECT- EGRIP**

- Principal Investigator: Prof. Jason Box, Geological Institute of Denmark and Greenland **GEUS**,

WINDSLED GR 2017

<https://deeply.thenewhumanitarian.org/arctic/articles/2017/07/13/scientists-harness-wind-to-study-greenland-ice-sheet>

<https://www.eastgrip.org/Science.html>

[PBS Wisconsin: Investigating Smoke on the Greenland Ice Sheet](#)

- **ICE2ICE EUROPEAN PROJECT FOR CONTROL OF ARCTIC MELTING**

- Principal Investigator: Dr. Paul Vallelonga. Project developed by University of Bergen (Norway), Bjerknes Center for Climate Research (BCCR Norway), University of Copenhagen and the Danish Meteorological Institute (DMI),

WINDSLED GR 2017

2 Climate Science: Examining ice cores from the ice sheets to reconstruct past climate conditions, including temperature, atmospheric composition, and precipitation.

- **MONITORING OF TEMPERATURE AND RELATIVE HUMIDITY FOR VALIDATION OF CLIMATE MODELS OF GREENLAND**

- Principal Investigator: Dr. Juan Ignacio López Moreno, Pyrenean Institute of Ecology-Higher Council for Scientific Research IPE-CSIC,

WINDSLED GR 2014/ WINDSLED GR 2016

[Dialnet-SnowpackObservationsFromACircumnavigationOfTheGree-5689632.pdf](#)

- **ANTAIR Project (Antarctic Air Temperature Transect)**

- Principal Investigator: Prof. Miguel Ángel de Pablo Hernández, University of Alcalá de Henares,

WINDSLED ANT 2018-19

3 Paleoclimatology: Analyzing ice cores for paleoclimate data, including historical records of temperature, greenhouse gas concentrations, and other environmental indicators.

- **Project of polar 'Ice Witnesses' for the study of the history of climate change**

- Principal Investigator: Dr. Paul A. Mayewski, University of MAINE, Climate Change Institute (CCI) USA,



WINDSLED ANT 2018-19

[CCI joins forces with Windsled Antarctica 2018/2019 - Climate Change Institute - University of Maine \(umaine.edu\)](#)

4 Atmospheric Science: Monitoring atmospheric conditions, AWS, studying air-snow interactions, and analyzing aerosols and pollutants in the environment.

- **On-line Meteorological Predictions**

- Antarctic Prediction Group, Spanish Meteorological State Agency **AEMET**,

WINDSLED GR 2017

- **AWE (Automatic Weather Station)**

- Principal Investigator: Dr. Sergi González, **AEMET** Antarctic Prediction Group,

WS ANT 2018-19

<https://journals.ametsoc.org/view/journals/bams/100/10/bams-d-19-0110.1.xml>

<https://blogs.helmholtz.de/polarpredictionmatters/2019/12/gone-with-the-wind-providing-forecasts-to-the-polar-windsled-expeditions/>

<https://www.sciencedirect.com/science/article/abs/pii/S0169809521002556>

- **PIONEER Project (EU funded), air monitoring in remote areas**

- Principal Investigator; Federico Dallo, Foscari University of Venice, CNR-Institute of Polar Science

WS GR 2024

5 Remote Sensing: Utilizing satellite imagery and other remote sensing technologies to monitor changes in the ice sheet's extent, surface elevation, and velocity.

- **JAPAN AEROSPACE EXPLORATION AGENCY (JAXA)**

- Principal Investigator: Dr. Hiroyuki Tsutsui, seasonal snow depth sat data validated with in situ observations

WS GR 2014

[Remote Sensing | Free Full-Text | Possibility of Estimating Seasonal Snow Depth Based Solely on Passive Microwave Remote Sensing on the Greenland Ice Sheet in Spring \(mdpi.com\)](#)



6 Microbiology and Biogeochemistry: Investigating microbial life in the ice and air in subglacial environments, as well as studying biogeochemical processes in the ice and underlying sediments.

- **MICROAIRPOLAR 1 and 2**
 - Principal Investigators: Dr. Ana Justel and Dr. Antonio Quesada, Universidad Autónoma Madrid,
WS GR 2016/ WS GR 2017/ WS GR 2022/ WS GR 2024
- **MICROAIRPOLAR Project**
 - Principal Investigators: Dr. Ana Justel and Dr. Antonio Quesada, Universidad Autónoma Madrid,
WS ANT 2018-19
<https://az659834.vo.msecnd.net/eventsairseasiaproduct/production-leishman-public/8ddeda2da9b743db82c68f9066e1fb65>
- **HELIOS Project (extremophile microbial communities)**
 - Principal Investigator: Dr. Manuel Porcar Miralles, Universidad de Valencia,
WS ANT 2018-19
<https://www.uv.es/institute-integrative-systems-biology-i2sysbio/en/news-1285990801509/Novetat.html?id=1286056806008>
- **Snow sample analysis of microbiological characteristics, including prokaryotic microorganisms and cold-adapted bacteria**
 - Principal Investigator: Vito Vitale, Director of Research CNR Institute of Polar Sciences (ISP), Bologna
WS GR 2024

7 Geological Studies/ Geophysics/ Geomorphology: Using geophysical methods to study the subsurface structure of the ice sheet, including ice thickness, bedrock topography, and subglacial features.

- **Ground/Ice Penetrating Radar GPR-IPR**
 - Principal Investigators: Francisco Navarro and Javier Lapizarán, Polytechnic University of Madrid,
WS GR 2017
- **Discovery of a rocky mountain**, approximately 30m above the ice cap and 2,205m above sea level. The “Nunatak” (in Inuit language) did not appear on maps and emerges as a result of climate change.
 - *WS TEAM, WS GR 2022*



8 Environmental Science/Chemistry: Assessing the impact of climate change on ecosystems, biodiversity, and the overall environment in the vicinity of the ice sheet.

- **SENTINEL Project**

- Principal Investigators: Dr. Ana Cabrerizo, Dr. Juan Pablo Albar and Dr. Jordi Dachs, Institute of Environmental Assessment and Water Research IDAEA CSIC,

WS ANT 2011-12

<https://www.sciencedirect.com/science/article/abs/pii/S1352231016308901?via%3Dihub>

“Organic Pollutants Have Reached the Remoteness Place on Earth” by Atmospheric Environment – A. Cabrerizo, R. Larramendi, JP Albar, J. Dachs. Dept. of Environmental Chemistry, IDAEA-CSIC, Nov 2011.

“Legacy Persistent Organic Pollutants Have Reached the Remoteness Place on Earth”, A. Cabrerizo, R. Larramendi, JP Albar, J. Dachs. Institute for Environment and Sustainability, European Commission, Dept. of Environmental Chemistry, IDAEA-CSIC, Nov 2016.

- **SENTINEL Project: Persistent organic pollutants (POPs) in the Antarctic ecosystem**

- Principal Investigator: Dr. Jordi Dachs, Institute of Environmental Assessment and Water Research IDAEA CSIC,

WS ANT 2018-19

- **PFAS (per and polyfluoroalkyl substances) analysis**

- Principal Investigator: Dr. Paul A. Mayewski, University of MAINE, Climate Change Institute (CCI) USA,

WS GR 2024

- **Impurities in snow, including microplastics**

- Principal Investigator: J. Ignacio Lopez Moreno, Pyrenean Institute of Ecology-Higher Council of Scientific Research Spain, IPE-CSIC

WS GR 2024

- **Snow sample analysis of trace metals, mercury, and emerging contaminants (CEAC)**

- Principal Investigator: Vito Vitale, Director of Research CNR Institute of Polar Sciences (ISP), Bologna

WS GR 2024



- 9 Radiology or Environmental Radiochemistry:** This field involves studying the presence and distribution of radioactive substances in the environment.
- **Measurement of environmental radioactivity**
 - *WS TEAM, WS GR 2014*
- 10 Astrobiology:** The study of microorganisms in extreme environments, such as polar regions, can have implications for astrobiology. Understanding the limits of life on Earth can provide insights into the potential habitability of extraterrestrial environments.
- **SOLID Project (Signs of Life Detector)**
 - Principal Investigator: Dr. Victor Parro, CAB INTA-CSIC (NASA associated Astrobiology Center),
WS ANT 2018-19
 - [Antártida Inexplorada 2018-2019 | SOLID \(inta-csic.es\)](http://inta-csic.es)
 - **SOLID Project**
 - Principal Investigator: Dr. Víctor Parro, CAB INTA-CSIC (NASA associated Astrobiology Center),
WS GR 2022
 - **Deliquescence experiment in the Antarctic ice sheet**
 - Principal Investigator: Dr. Alfonso F. Dávila, NASA post-doc,
WS ANT 2018-19
- 11 Space Physics/Astrophysics:** A branch of physics that studies the physical properties and behavior of matter and energy in space.
- **Cosmic Rays Study, CRIO**
 - Principal Investigator: Juan José Blanco Ávalos, Alcalá de Henares University,
WS GR 2016
 - **Muon Twin Observers**
 - Principal Investigator: Juan José Blanco Ávalos, Alcalá de Henares University,
WS ANT 2018-19



12 Space Science and Technology: This field involves the study of technology and systems related to space exploration, satellite communication, and navigation.

- **GESTA PROJECT (multiple experiments)**
 - Principal Investigator: Dr. Javier Ventura Traveset, **European Space Agency**,
WS ANT 2018-19
[GESTA Galileo Experimentation & Scientific Tests in Antarctica | GSSC \(esa.int\)](https://www.esa.int/Science_Exploration/Space_Science/Gesta_Galileo_Experimentation_and_Scientific_Tests_in_Antarctica)
<https://spacetalks.net/event/european-space-agency-gesta-galileo-experimentation-and-scientific-tests-antarctica-in-windsled-antarctica-dome-fuji-2018-19-expedition/>
 - **Galileo Satellite Constellation:** Assessing the full capabilities of the 26 Galileo satellites within the EU's global navigation system.
https://www.esa.int/Applications/Navigation/Kite-blown_Antarctic_explorers_make_most_southerly_Galileo_positioning_fix
<https://www.nationalgeographic.es/ciencia/2019/02/ecoexpedicion-espanola-antartida-determina-posiciones-mas-australes-galileo>
 - **Extreme Conditions Testing:** Gathering data on Galileo receiver performance in harsh Antarctic conditions.
 - **GNSS Performance Measurement:** GESTA evaluates and calibrates the Galileo system, focusing on its operation in high latitudes like Antarctica.
 - **Scientific Experiments with GNSS:** Conducting experiments and data collection using GNSS and Galileo for scientific purposes, such as studying ionospheric luminescence and analyzing satellite signals in Antarctica.
 - **Ionospheric Studies:** Investigating ionospheric luminescence and its role in austral aurora formation using ESA-designed receptors.
 - **Antenna and Signal Reception Analysis:** GMV receptors test Galileo signal reception in Antarctica, providing crucial data for network operation analysis in challenging environments.

13 Planetary Science: Is a multidisciplinary field that involves the study of celestial bodies, including planets, moons, asteroids, comets, and other objects within our solar system and beyond.

- **MEDA (Mars Environmental Dynamics Analyzer)**



- Principal Investigators: Dr. Miguel Ramos, University of Alcalá de Henares/ José A. Rodríguez Manfredi, CAB INTA-CSIC (NASA associated Astrobiology Center),

WS ANT 2018-19

14 Human Physiology and Biomedical Sciences: Involves studying the impact of extreme conditions on the human body. Scientists explore how factors like cold temperatures, isolation, and altitude affect physiological processes.

- **Impact of polar crossings on the human body**

- Principal Investigator: Dr. Daniel Pérez del Castillo,

WS GR 2017

WindSled has already contributed to 14 major scientific disciplines, accounting for a total of 34 experiments.

Related:

<https://skyandtelescope.org/astronomy-events/north-greenland-windsled-expeditions-a-free-virtual-lecture/>

<https://www.arcus.org/events/arctic-calendar/33933>

<https://www.hamptonobservatory.org/events/lk>

<https://byrd.osu.edu/events/seminar-ram%C3%B3n-hernando-de-larramendi>

By: Carin E COLE, FEB & MARCH 2024