



Kartverket

Using the Ny-Ålesund facilities for space weather purposes

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Flagship programs



Atmosphere Research



Terrestrial Ecosystem



Kongsfjorden System



Glaciology Research

The Atmosphere Research Flagship Program brings key scientists studying the atmosphere from Ny-Ålesund together to establish and develop collaboration and joint research actions to tackle the challenge of climate change in the Arctic.

NySMAC

- Ny-Ålesund Science Managers Committee
- Established in 1994 to enhance the cooperation and coordination among researchers and research activity in Ny-Ålesund
- All parties with major research in Ny-Ålesund
- Secretariat at the Norwegian Polar Institute in Tromsø

Working groups

<http://nysmac.npolar.no/research/flagships/>

- WG1: Clouds, humidity, precipitation
- WG2: Long-term observations and trends in temperature, precipitation, clouds and radiation
- WG3: Boundary layer meteorology
- WG4: Interaction of snow, atmosphere, and aerosols
- WG5: Atmospheric aerosol
- WG6: Variability in surface UV irradiance and ozone column
- WG7: Atmospheric composition and pollution monitoring
- **WG8: Middle and Upper atmosphere**

WG 8

- Svalbard is located inside of the auroral oval, a region called the “cusp”, experiencing permanent income of electrons of solar origin, called the “polar rain”. Combining the upper atmosphere research in Longyearbyen with similar activities in Ny-Alesund offers additional capabilities for the study of the upper atmosphere for two main reasons: (i) Ny-Ålesund is less light polluted than Longyearbyen, and (ii) the presence of permanent wintering staff allows for more refined experiments. With several newly installed instruments, there is a good ground for further development of middle and upper atmosphere research in Ny-Alesund. This new WG will collaborate closely with WG1, WG5 since the cloud coverage is of prime importance for optical observations, and the polarization observations provide very sensitive mean to detect the presence of aerosols. It will also collaborate with WG2 on the impact of the solar activity on the climate.

Goals

- Presenting the already existing facilities in Ny-Ålesund, Longyearbyen, Hornsund or more largely in the Arctic,
- Ease and promote multi-instrument campaigns,
- Exchange data and knowledge on the polar middle and upper atmosphere
- Invite participants to participate to multi-instruments future campaigns.

Already in the group

Italy : Claudio Cesaroni, Vincenzo Romano, Luca Spogli,
Lucilla Alfonsi

Korea : Geonhwa Jee

Japan : Yasunobu Ogawa

Poland : Beata Dziak-Jankowska

Norway : Yngvild Linnea Andalsvik, Knut Stanley
Jacobsen

France : Jean Lilensten, Anne Rechou

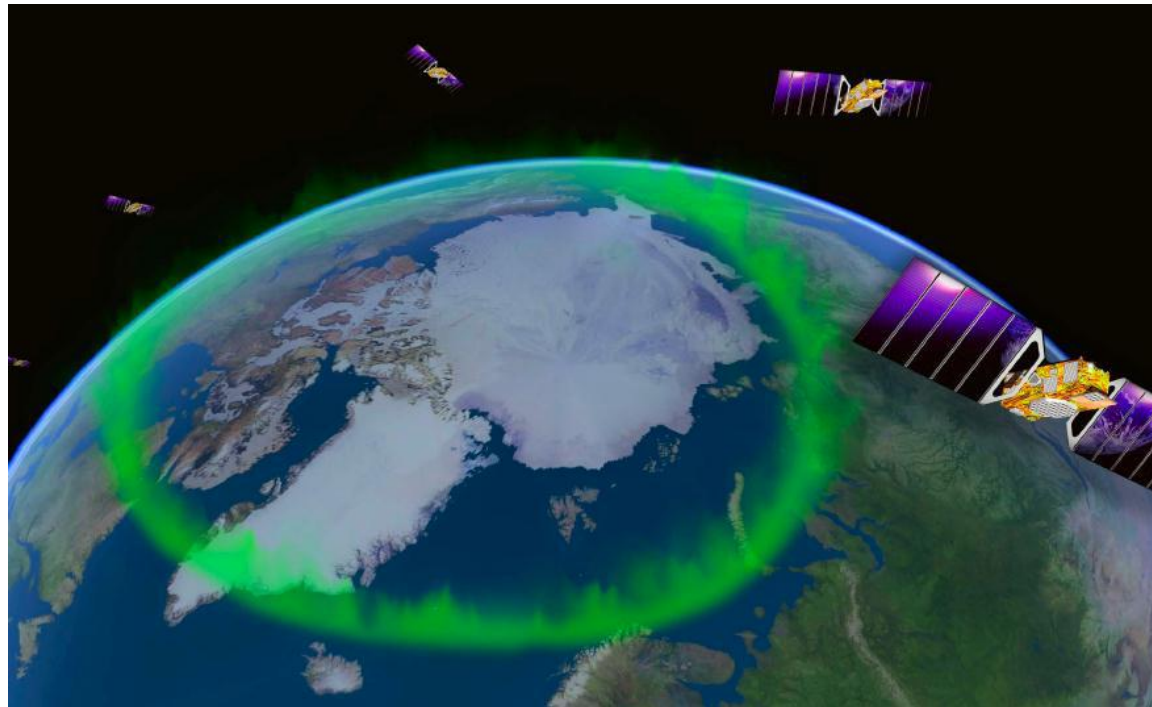
Ny-Ålesund

- Permanent settlement at 78.5 degrees North
- «Research town»
- Ny-Ålesund is easy to reach and has a well-developed infrastructure operated by Kings Bay AS. Kings Bay operates the flights between Longyearbyen and Ny-Ålesund, housing, meals and other services.



Ny-Ålesund and Svalbard

- Svalbard is a unique place to develop middle and upper atmosphere studies. Several scientific bases already address such researches, in Longyearbyen, Hornsund or Ny-Ålesund.
- Good location and easy access
- Ny-Ålesund is a radio silent area, with a long-term goal to minimize the emissions of electromagnetic (radio) pollution.



A very nice facility to make auroral physics, to perform observations in the cusp, to measure the effect of the solar wind on the polar rain, the ionospheric currents aso...



Instrumentation

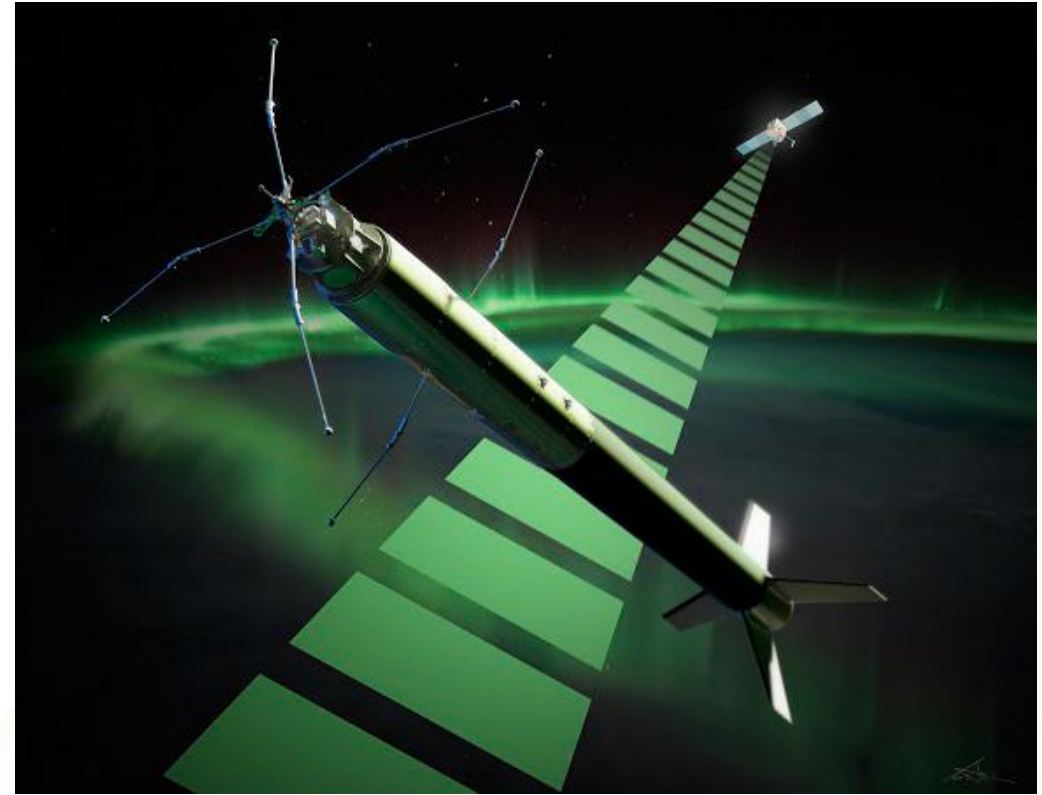
- Optical instrumentation
 - China
 - Allsky imagers
 - Riometer
 - University of Oslo
 - Allsky imager
 - Meridian scanning photometer
 - AWI
 - Lidar
 - Sun and star photometers
 - Korean station (KOPRI)
 - Allsky imager

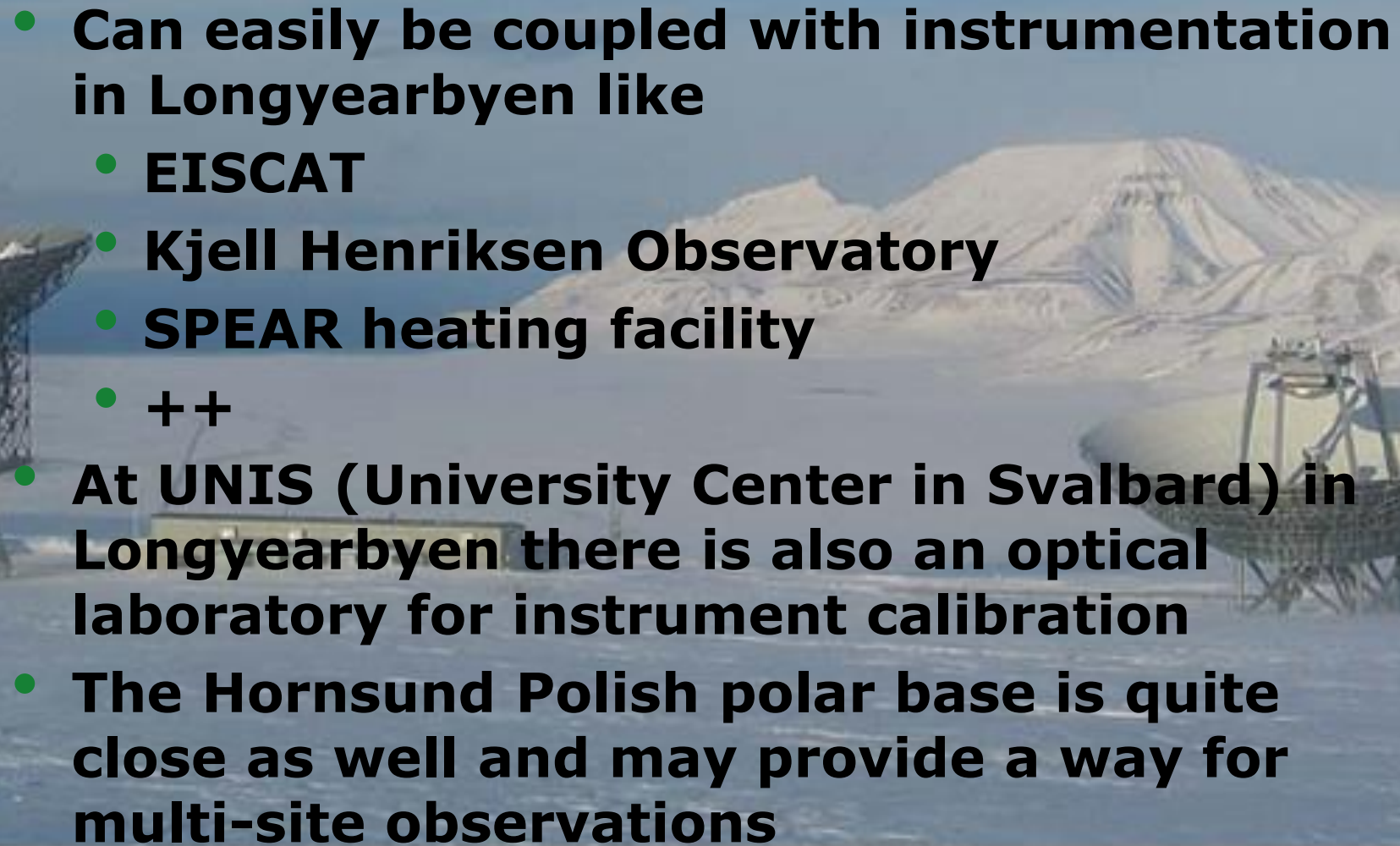
GNSS receivers

- University of Oslo
 - 1 GNSS receiver (50 Hz, Novatel)
- INGV
 - Scintillation receiver (?)
- Norwegian Mapping Authority
 - At least 6 GNSS receivers (1Hz)
 - 1 scintillation receiver (100 Hz, Septentrio)
- Chinese station
 - Scintillation receiver
- Korean station (KOPRI)
 - Scintillation receiver



Sounding rocket range



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- **Can easily be coupled with instrumentation in Longyearbyen like**
 - **EISCAT**
 - **Kjell Henriksen Observatory**
 - **SPEAR heating facility**
 - **++**
 - **At UNIS (University Center in Svalbard) in Longyearbyen there is also an optical laboratory for instrument calibration**
 - **The Hornsund Polish polar base is quite close as well and may provide a way for multi-site observations**

Instruments in operation

Optical Instruments

All-Sky Imager	University of Oslo (UiO)
All-Sky Camera	University Centre in Svalbard (UNIS)
All-Sky Imager	Finnish Meteorological Institute (FMI)
All-Sky Colour Imager	University College London (UCL)
All-Sky Camera	UNIS
Sony a7s All-sky Camera	UNIS
All-Sky Airglow Camera	UNIS
Auroral Spectrograph (ASG)	National Institute of Polar Research Japan (NIPR)
Spectrographic Imaging Facilities (SIF)	University of Southampton / Univeristy College London (UCL)
Meridian Scanning Photometer	UNIS
1 m 'Silver' Ebert-Fastie Spectrometer	UNIS
1 m 'Green' Ebert-Fastie Spectrometer	UNIS
1/2 m 'Black' Ebert-Fastie Spectrometer	UNIS
1/2 m 'White' Ebert-Fastie Spectrometer	University of Tromsø (UiTø)
Imaging Fabry-Perot Interferometer	UCL
Scanning Doppler Imager	UCL
Monochromatic Auroral Imager	Polar Research Institute of China (PRIC)
All-Sky Airglow Imager	Kyoto University
Hyperspectral tracker (Fs-Ikea)	UNIS
All-Sky hyperspectral camera	UNIS
Celestron 14" Telescope	UNIS
Narrow field of view sCMOS tracker	UNIS

KHO? <http://kho.unis.no/>

Radio Instruments

Fluxgate Magnetometer

2-axis Search-coil Magnetometer

64-beam Imaging Riometer

Auroral Radio Spectrograph

GNSS Receiver

HF acquisition system

Balloon Telemetry Station

Scintillation and TEC receiver

Beacon satellite receiver unit

Fluxgate Magnetometer

Induction Magnetometer

UiTø

Augsburg College and University of New Hampshire

Danish Meteorological Institute (DMI)

Tohoku University

Nagoya University

Institute of Radio Astronomy / UiTø

Nobile/Amundsen-Stratospheric Balloon Center /
Italian Space Agency

University of Bergen (UiB)

FMI

PRIC

PRIC

Ny-Ålesund Atmosphere Flagship open workshop

15-19 October 2018 , AWI Potsdam, Germany

- 10 years since the Atmosphere Research Flagship Programme was initiated as part of the NySMAC science plan for Ny-Ålesund in 2008

-further develop and support international collaboration in atmospheric research and Ny Ålesund and Svalbard region

- Meet friends and colleagues, old ones, new ones
- Overview of what has happened in past couple of years
- Discuss, exchange and work on joint papers
- Develop ideas and future projects and field experiments
- Better use and utilization of atmospheric research infrastructure
- pan-Svalbard perspective of the Atmospheric Flagship

The way forward

- Make the other actors (working on low atmosphere) aware of what we do: Would you participate in an Atmospheric Flagship meeting in order to meet with other atmospheric scientists and start to link our sciences ?
- Opportunity to explore the cusp versus space weather events: Would you like to install an instrument in Ny-Ålesund?
- Shall we organize a dedicated meeting ? Tromsø ? Longyearbyen? Or simply during the next ESWW?