

Finale report: PolarEduSpace

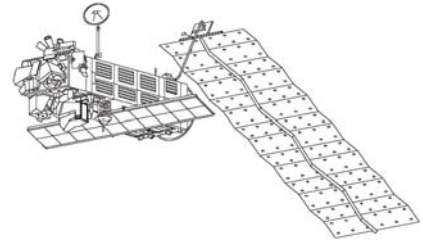


The researcher and satellite bringing polar science into the classroom

Background

NAROM, The Norwegian Centre for Space-related Education, wanted to run an educational IPY project related to Arctic satellite applications as part of its activities in 2007-2008.

The focus on the project has been on accepted Norwegian IPY research projects that use satellite data as a tool in their research, and projects for which satellite data from our educational project (PolarEduSpace) may be a useful supplement to scientific results.



Objective

PolarEduSpace wanted to encourage the youth, students and teachers to join in IPY events and share the global enthusiasm during this extraordinary opportunity.

The overall aim was to inspire and stimulate an increased interest and understanding in polar research among young people aged 13-18.



An overview of science around specific themes (e.g. sea ice, weather situations, ocean currents, atmosphere) related to relevant accepted IPY projects have been provided to show how the natural fascination with extreme environments can be used to introduce on-going research to the classroom from multiple disciplines. Remote sensing, use of fresh satellite images and thematic data have been integrated tools.

On-line classroom resources and activities (in Norwegian and English) related to the IPY have been prepared in the space educational website sarepta.org.

Implementation

The PolarEduSpace project was implemented from spring 2007 until end of 2008 through funding from the Norwegian Research Council, with support from the Norwegian Directorate for Education and Training, the Norwegian Space Centre, ESA (the European Space Agency) and NAROM.

Website

An IPY/ PolarEduSpace website has been developed as part of sarepta.org with general information regarding IPY and the PolarEduSpace, connections to the Norwegian curriculum and resources in sarepta.org, invitations and activities for the classroom.



Contest for young students

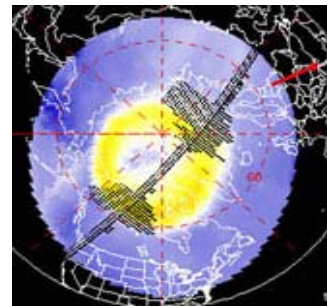
In November 2007 we invited students at upper secondary school to attend contest with the title: “Polar Year contest for young Sun and Northern lights researchers at upper secondary school”. The contest was related to the IPY-ICESTAR. In close cooperation with Norwegian ICESTAR researchers, different contest activities and experiments were provided at sarepta.org.

One task for the students was: “You are now going to be a researcher of the Sun and the Northern lights, and you are going to study and analyse real time data. Is it possible that there will be any Northern lights in week 47 or 48?”



Important tools for these activities have been on-line space weather observations of the current conditions as solar wind, sunspots and the current extent and position of the auroral oval in the Arctic using measurements from NOAA POES satellite.

In addition the participants used on-line information from magnetometer measurements and all-sky-images from different stations to find out where the Northern lights lie.



The participants have reported their observations in a blog followed up by the researchers with comments on the results. We received final reports from 50 young students.

Eleven winners participated in three days fieldwork at Andøya Rocket Range in February 2008. Read more at sarepta.org.

Activities for the teachers and students

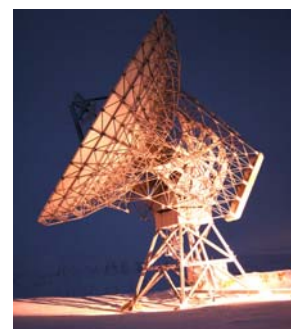
The PolarEduSpace project has also provided opportunities for classroom teachers to attend on-line activities presented at the website sarepta.org. The participants have been provided with content knowledge and ideas for activities related to current curricula and focusing on polar science.



The first invitation in November 2007 was activities of interest for the science teachers with the title “Study the sun-wind and the Northern lights phenomenon”. The teachers were offered almost the same as for the contest for students.

Based on the answers and feedback from the activities, we selected thirteen teachers who we invited for one week activities together with the researchers at Svalbard and Andøya in February 2008.

That way we got interested and enthusiastic participants who really wanted to learn more, and they got a foundation of knowledge which made the field trip that much more valuable to them.



The next invitation was announced spring 2008 for the geography and science teachers focusing on IPY research projects in the area of sea ice, glacier monitoring, ocean currents, permafrost and arctic weather situation. For these activities we cooperated close with researcher in following IPY projects: Glaciodyn, BIAC, ArcChange and Permafrost/ TSP Norway.

A number of exercises/ activities using the current satellite images (radar and optical data) together with thematic data and other results from research IPY projects have been developed, and are available for the schools in sarepta.org.

Based on report from these activities, we selected a group of fifteen teachers who we invited for one week field based training course at Svalbard in August 2008.



Activities for young students

In the PolarEduSpace project there has also been a possibility for school classes to visit Engabreen, an outlet glacier with a subglacial laboratory at the Svartisen ice cap, Northern Norway.

With support from a researcher (IPY/Glaciodyn) the young students were introduced to the influence of melt water supply on ice velocities and glacier dynamics.

In the classroom they have prepared themselves using satellite SPOT images, old maps and thematic data to analyse the changes of the glacier since 1965.



After the field trip the young students made a report published both in the local newspaper (Avisa Nordland) and in sarepta.org.

Project outcomes and future

In addition to activities and resources for the classroom, the PolarEduSpace project have the following outcomes:

1) In cooperation with the University in Bergen, IPY/ICESTAR, we have developed four “Space Suitcases” filled with instruments. Among these are a sunspotter (a simple solar telescope) and magnetometer to measure the magnetic disturbances due to electrical currents in the Aurora. The schools will have the possibility to borrow the Suitcase to do some exciting field research in the classroom combined with on-line space weather observations. These activities will be highly focused in the International Year of Astronomy 2009.

2) Through PolarEduSpace we have given acceptance regarding access to SPOT 5 satellite data in the SPIRIT archive. SPIRIT (*Spot5 stereoscopic survey of Polar Ice: Reference Images & Topographies*) is an IPY project managed jointly by the French Space Agency (CNES) and Spot Image. This gives us opportunities for further developments of case studies in close cooperation with glacier scientists/ researchers at UNIS (The University Centre in Svalbard).

3) In autumn 2008 we started a process to develop a “Glacier module” in cooperation with the European Space Agency (ESA).

This module will consist of three parts:

(1) an introduction to glaciers featuring the glaciological background relevant to glacier remote sensing (e.g. glacier structure and dynamics, glacier response to climate change, glacier hazards); (2) techniques and applications of glacier remote sensing (e.g. multispectral classification, radar interferometry, optical stereo, altimetry), and (3) advanced methods of glacier remote sensing (e.g. polarimetry, change detection).

Parts (1) and (2) are meant for the secondary and high school level, part (3) as an introduction for university undergraduates.



4) In spring 2008 we applied the Nordplus horizontal programme announced by the Nordic Council of Ministers. We wanted to develop “Polar research in the classroom” at Nordic level based on experience, knowledge and data from the PolarEduSpace project. Our project was accepted in October 2008. In a Nordic educational network and cooperation we will develop two different web based and field based teacher training courses (10 credits) at Nordic level with the title ”Below the Polar sky” and ”Climate research in Polar landscape”.

The first training course will be offered autumn 2010 with a week field work at Svalbard in August.

After the IPY periode the published content related to PolarEduSpace in sarepta.org will be maintained, further developed and translated into English. We will also secure a continuation of access to fresh satellite images delivered from Kongsberg Satellite Services and ESA.

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