

GPS for weather and space weather forecast

Inter SSG WG Icestar/Polenet initiative



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UAMPY

Upper Atmosphere Monitoring for Polar Year 2007-2008: *a bipolar consortium inside cluster 63* *Heliosphere Impact on Geospace*

Consortium

*INGV, Rome, **ITALY**, ISC-CNR, Florence, IFAC-CNR, Florence, **ITALY**, HMO, **SOUTH AFRICA** University of Bath, **UK**, University of Calgary, **CANADA**, Polish Academy of Sciences Warsaw, **POLAND***

The **UAMPY** overall **aim** is to create new international cooperation in ionospheric research to develop polar upper-atmosphere observation networks for:

1. mapping ionospheric features continuously from mid through to polar latitudes
2. making conjugate studies of magnetospheric-ionospheric coupling processes
3. relating the large-scale to the small-scale features, in particular the auroral and polar ionospheric irregularities causing scintillation



POLENET
www.polenet.org

POLar Earth observing NETwork for the International Polar Year *cluster 234*

POLENET is a consortium involving people from 28 nations that aims to dramatically improve the coverage of many different kinds of geophysical data across the polar regions of the Earth.

Specific objectives:

- Realize a combined, multipurpose network of GPS systems
- Enhance multidisciplinary applications
- Collect and distribute data with shorter latency
- Densify the network
- Realize and increase co-location

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Objectives of the Action Group

- Ionospheric imaging over Antarctica *planned by both the projects*
- Exchange of data and expertise for the application of tomography to other fields of interest for both the communities *e.g. 3D water vapour reconstruction*
- Exchange of technologies to install and manage remote GPS stations.
- Possibility to host instruments in the polar stations represented by the two communities.

First steps

Action group representatives from Italy, UK, and Brazil had an informal meeting during AGU Fall Meeting (December 2008) in San Francisco to discuss on the activities to carry on in 2009.

During the last campaign in November 2008, the Italian members of the group have upgraded some GPS receivers settings in Antarctica for a feasibility study on the possible use of the data acquired by the ionospheric community to reconstruct the water vapor concentration

Between May and October 2008, the China Research Institute of Radiowave Propagation deployed three GPS ionospheric scintillation/TEC monitors at Yellow River station (Svalbard) in Arctic. Some observation data has been gotten. The analysis work is being done.

Currently, a total of 9 GPS receivers for TEC and scintillation monitoring are operating at Svalbard managed by Istituto Nazionale di Geofisica (It), the China Research Institute of Radiowave Propagation, and the Space Research Center, Warsaw-Po. Investigations on the characteristics of the scintillation and the ionospheric irregularities in Arctic region, especially the movement of the irregularities, will be studied.

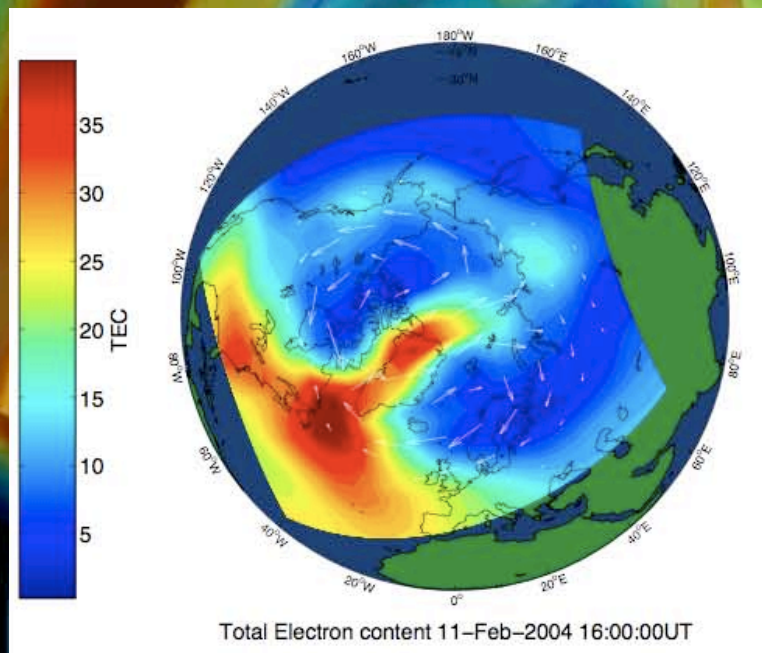
First steps an example

GPS IMAGING OF THE ANTARCTIC IONOSPHERE: A FIRST ATTEMPT

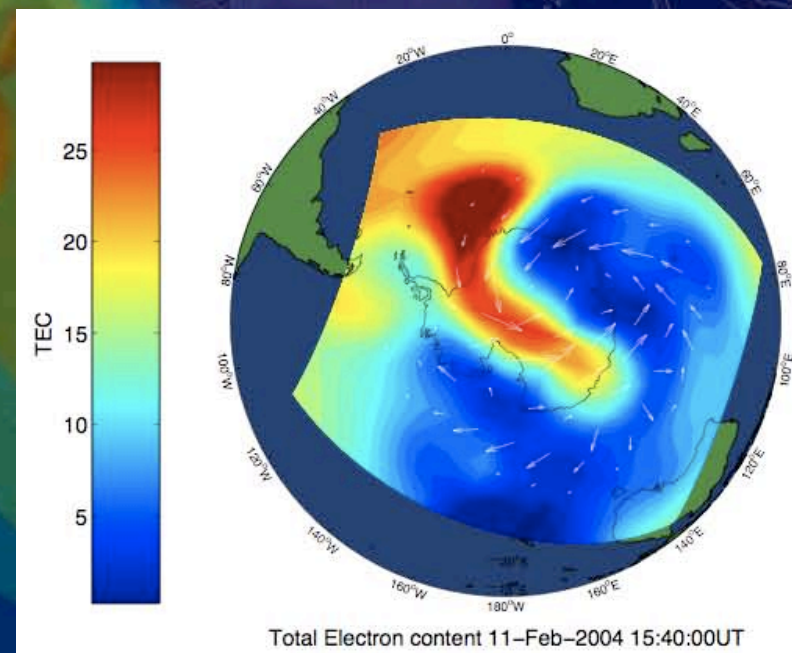
by L. Alfonsi, Y. Ping, C.N. Mitchell, G. De Franceschi, V. Romano, P. Sarti, M. Negusini, A. Capra, *SCAR Open Science Conference (St. Petersburg, July 2008)*.

The work presents the potentialities of using the geodetic data also for producing ionospheric imaging, for the first time, over Antarctica.

Arctic



Antarctic



Conjugate plasma controlled by electric field

Next steps

The **first workshop** of the Action Group will be held in May 2009 in Modena (or Bologna)

- to stimulate the international collaborations on the use of GPS for neutral/ionized atmosphere investigations over Arctic and Antarctica,
- to coordinate the efforts on data managements and treatments,
- to plan the use of existing infrastructures and facilities to optimize the network.

Deliverables

- One meeting per year among the WG members
- Joint publications on peer reviewed journals
- Joint presentation at national and international conferences
- Web site realization, maintenance and updating