

GRAPE (GNSS Research and Application for Polar Environment) Expert Group

cross link between SSG PS and GS.

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The goal of the Expert Group GRAPE, built on the previous Action Group GWSWF (GPS for Weather and Space Weather Forecasting), is to continue to intensify the international efforts to build and coordinate a robust network of collaborations in order to answer a variety of space weather related needs through ad hoc data sharing and model development.

A number of activities have been successfully pursued since the last GRAPE business meeting held in Portland, during the XXXII SCAR in Portland (OR-USA), 13-25 July 2012 that can be briefly summarised as follow:

- 1) The GRAPE WEB has been designed and issued in October 2012, www.grape.scar.org, and will be maintained by INGV team.
- 2) The Annals of Geophysics GRAPE Special Issue has been published (De Franceschi and Candidi, 2013). This Special Issue collects recent reports on work performed in the Polar Regions and on the datasets collected in time by the instrumentation deployed across various countries. This collection will set the starting point for further research in the field, especially in the perspective of the new and very advanced space system that will be available in the next few years. Papers will be found that describe the initiatives to deploy instrumental arrays to observe the ionospheric scintillation phenomenon, to build hardware/ software structures to store the relevant data and to make it available in appropriate formats. Other papers deal with more proper scientific analyses of the available data, ranging from the analysis of the relation between scintillation and conditions in the interplanetary medium to the evaluation of the effects taking place in the near Earth regions, in the inner magnetosphere and in the statistical representation of ionospheric conditions. A climatological description of the scintillation scenario is given both for the Polar Regions and for the mid-latitudes. Finally, a different, but no less relevant, analysis is given with respect to the water vapor content and its effects at tropospheric levels.
- 3) A new project proposal has been submitted in April 2013 to the Italian National Program for Antarctic Research. The project, named DemoGRAPE and born into GRAPE, aims the realization of a demonstrator to provide on selected case studies an empirical assessment of the delay and of the corruption induced by the ionosphere on satellite signals in the Polar Regions. DemoGRAPE will demonstrate the usefulness of the proposed system to several scopes, from the applications to positioning, to space weather, to solid Earth and polar cap dynamics investigation, to the monitoring of cryosphere evolution, etc... DemoGRAPE will experiment the use of Cloud computing platform to create an innovative

technological tool. The proposal is supported by international partners already involved in GRAPE (UK, Brazil, Poland, South Africa, and USA) that expressed their interest in data/algorithms sharing and offering their polar infrastructures to host experimental equipment for ionospheric monitoring and for the ICT platform to be developed in CLOUD environment.

- 4) A GRAPE dedicated session has been organized and accepted for the **XXXIII SCAR Biennial Meetings and Open Science Conference** to be held in Auckland, New Zealand 23 August - 3 September, 2014. Twelve abstracts have been submitted to the GRAPE session (no. 11).

References

De Franceschi Giorgiana and Candidi Maurizio, GRAPE, GNSS Research and Application for Polar Environment, Expert Group of SCAR. Annals of Geophysics, Special Issue, Vol. 56, No2 (2013), ISSN 2037-416X. <http://www.annalsofgeophysics.eu/index.php/annals/issue/view/488>