



Overview of the SCAR Expert Group GRAPE (GNSS Research and Application to Polar Environment) activity 2012-2021.

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One particular technological system that has rapidly grown in the last decades is the Global Navigation Satellite System (GNSS). The main threat to the reliable and safe operation of GNSS is the variable propagation conditions encountered by GNSS signals as they pass through the Earth's upper atmosphere, particularly at high and low latitudes and under perturbed conditions coming from the outer space.

With the aim of tackling the polar atmosphere and its effects on GNSS-based systems, GRAPE (GNSS Research and Application for Polar Environment) was established as an Expert Group of **SCAR** (Scientific Committee on Antarctic Research) during the Delegates meeting of the XXXII SCAR OSC (Portland, USA, 2012). **GRAPE** (www.grape.scar.org), built on the former SCAR Action Group GWSWF (GPS for Weather and Space Weather Forecasting), dealt with the multi-instrument monitoring and investigation of the bi-polar neutral and ionized atmosphere, by encouraging the establishment of a permanent network of GNSS receivers for multi-purposes investigations over the Arctic and Antarctica and by involving international efforts within the topic of solar terrestrial interactions and space weather.

In 2022 GRAPE is going to conclude its main tasks, i.e. the networking of the scientific community dealing with the polar environment, and the involvement of students and early career scientists on the related topics.

The main activities of GRAPE 2012-2021 are presented to stimulate discussions and to encourage scientists and research groups to participate in the future actions leading to a possible new SCAR Scientific Research Program (RESOURCE- Radio Sciences Research on AntarCtic AtmosphEre).