



**The importance of the polar regions to understand the magnetosphere-atmosphere coupling:
the AGATA initiative**

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AGATA (Antarctic Geospace and ATmosphere research) is a new established Programme Planning Group approved by SCAR (Scientific Committee on Antarctic Research) to propose a new Scientific Research Programme (SRP) after more than 10 years from the previous initiative on similar topics. The proposed SRP will aim to gather the scientific communities working on polar regions to answering the outstanding scientific questions within atmospheric and space physics over polar regions:

- How are different atmospheric layers coupled in the polar regions?
- How does the upper polar atmosphere respond to increased geomagnetic activity, including energy transfer from space?
- How does the whole polar atmosphere impact short- and long-term climate variations?

As the central role of the polar regions in understanding the coupling between the magnetosphere and the neutral and the ionized atmosphere (ionosphere), answering these questions will not only have implications on the understanding of processes in the polar atmosphere, but it will also greatly improve our understanding of the global atmospheric dynamics, thus contributing to the development of large-scale whole atmosphere and climate models.

AGATA will bring together communities which investigate the polar atmosphere and geospace, with a particular focus on Antarctica, but also with a bi-polar perspective. AGATA will be a coordinated, worldwide effort to monitor, investigate and better understand the physics of the polar atmosphere and the impact of the Sun-Earth interactions on the polar regions. AGATA will take advantage of existing and planned instrumentation in Antarctica, but also in the Arctic and satellite-based observations, and it will aim for coordinated research efforts and data exchange. AGATA will also be important for sciences that depend on the removal and mitigation of negative effects of the atmosphere on their observations (such as, e.g., radio astronomy and geodesy). At this stage the AGATA Planning Group is working for submitting the proposal for the new SRP to SCAR and it welcomes new members to contribute to our endeavor. To learn more you can visit the AGATA web pages: www.scar.org/science/agata/home/

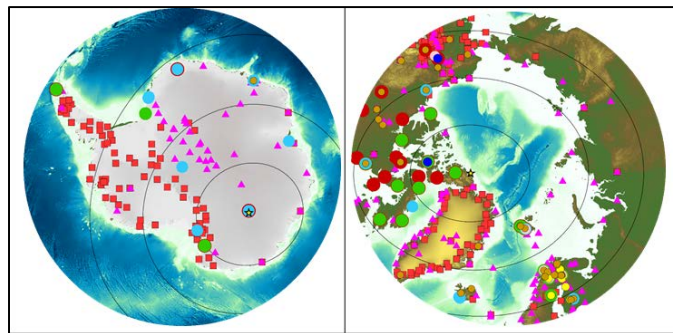


Figure 1. Scientific instrumentation infrastructure in Antarctica and Arctic regions (from [1])

1. L. Alfonsi, et al. "Review of Environmental Monitoring by Means of Radio Waves in the Polar Regions: From Atmosphere to Geospace." *Surv Geophys* 43, 1609–1698 (2022). doi: 10.1007/s10712-022-09734-z

2. N. Bergeot, L. Alfonsi, P.J. Cilliers, G. De Franceschi, E. Correia, C-F Enell, M.J. Engebretson, I. Häggström, G. Heygster, K. Kauristie, M. Kosch, C. Lee, E. Macotela, F. Marcucci, W. J. Miloch, J. Morton, M. Negusini, E. Pottiaux, P.R. Shreedevi, P. Prikryl, L. Spogli, J.A.E Stephenson , O. Troshichev , R. Van Malderen , S. Zou and the GRAPE EG members (2020). Polar atmosphere and Geospace: Present knowledge, infrastructures and future research directions <https://scar.org/scar-library/reports-and-bulletins/scar-bulletins/5570-scar-bulletin-203/>