The INGV Arctic Ionospheric data management system and its synergy with the Italian NADC

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The Space Weather effects on the ionosphere considerably affect several modern technology infrastructures, such as telecommunication systems, power networks and in general systems relying on satellite navigation. The polar regions have always been a natural laboratory for the analysis of these phenomena and regular observations are required to gain better knowledge about the relationships between the ionized atmosphere and the others atmospheric layers as well as to provide support to civil aviation and maritime for the safety of the polar routes.

The Istituto Nazionale di Geofisica e Vulcanologia (INGV) has a long history in acquiring ionospheric data in the polar regions and currently operates in the Arctic two permanent observatories in Svalbard (Ny-Ålesund and Longyearbyen), Norway, equipped with three GNSS receivers for scintillation and TEC measurement. An additional receiver will be installed soon at the Thule Air Base (Greenland).

The uninterrupted data production from these instruments and the necessity to provide near real-time access to this information makes it necessary to develop suited procedures and ad-hoc IT infrastructures. To address these needs the INGV designed the SWIT system (Space Weather Information Technology) for data management and the web-platform eSWua (electronic Space Weather upper atmosphere) for data dissemination. With regard to the Arctic region, the information-flow from Svalbard stations is provided by optical fibre connections and the SWIT-DBMS operates the ingestion of this data at the INGV central repository within 15 minutes or less. The eSWua website offers a GUI for near real-time and historical data visualization, while web-based tools and a RESTful web-service will provide free access to the data at different processing levels. The planning and design of this infrastructure takes advantage of the experience gained from ongoing projects like the NADC (the Italian National Antarctic Data Center).

In this paper the state of the art of the INGV Arctic and Antarctic data management system for the Ionospheric and space weather data and the efforts undertaken to improve the access and availability of these information are presented and discussed.

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