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Ionospheric scintillation climatology at Ny-Ålesund across solar cycle 23 and 24

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Content

INGV operates a network of GNSS receivers acquiring data at 50 Hz incorporating a firmware especially modified to provide several parameters useful to monitor the perturbations of the high latitudes upper atmosphere. In particular, the first GPS receiver was installed in 2003 at Ny-Ålesund (Svalbard Island, 78°55'N 11°55'E). Currently, three receivers are operating at Ny-Ålesund, recording GPS, GLONASS, Galileo signals. The analysis exploits the scintillation parameters (S4 and sigmaphi), TEC and its rate of change (ROT) measured by INGV receivers to study the behaviour of the high latitudes ionosphere during the different phase of a solar cycle. The analysis is supported by the climatological reconstruction of the probability of the scintillation occurrence sorted also according different conditions of the geospace and of the geomagnetic field. This would enable to infer the relationship between the physical processes ruling the morphology of the high latitudes ionosphere and the amplitude and phase scintillations on GNSS signals. The knowledge of such relationship is necessary in view of a long term forecasting of the disruptive effects of the ionosphere on the L-band signals affecting the applications based on GNSS such as precise positioning and navigation.

Summary

Primary author(s) : Dr. SPOGLI, Luca (Istituto Nazionale di Geofisica e Vulcanologia)

Co-author(s) : Dr. CESARONI, Claudio (INGV); Dr. ALFONSI, Lucilla (Istituto Nazionale di Geofisica e Vulcanologia); Dr. DE FRANCESCHI, Giorgiana (INGV); Dr. ROMANO, Vincenzo (Istituto Nazionale di Geofisica e Vulcanologia); Dr. HUNSTAD, Ingrid (Istituto Nazionale di Geofisica e Vulcanologia)

Presenter(s) : Dr. SPOGLI, Luca (Istituto Nazionale di Geofisica e Vulcanologia)

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