Geophysical Research Abstracts
Vol. 12, EGU2010-6620, 2010
EGU General Assembly 2010

Analysis of strong scintillation events by using GPS data at low latitudes

Biagio Forte (1), Norbert Jakowski (2), and Volker Wilken (2)

(1) University of Nova Gorica, Centre for Atmospheric Research, Nova Gorica, Slovenia (biagio.forte@ung.si, +386 5 3315 240), (2) Deutsches Zentrum für Luft- und Raumfahrt

Drifting structures charaterised by inhomogeneities in the spatial electron density distribution at ionospheric heights originate scintillation of radio waves propagating through. The fractional electron density fluctuations and the corresponding scintillation levels may reach extreme values at low latitudes during high solar activity.

Strong scintillation events have disruptive effects on a number of technological applications. In particular, operations and services based on GPS signals and receivers may experience severe disruption due to a significant degradation of the signal-to-noise ratio, eventually leading to signal loss of lock.

Experimental scintillation data collected in the Asian sector at low latitudes by means of a GPS dual frequency receiver under moderate solar activity (2006) have been analysed. The GPS receiver is particularly modified in firmware in order to record power estimates on the C/A code as well as on the carriers L1 and L2. Strong scintillation activity is recorded in the post-sunset period (saturating S4 and SI as high as 20 dB).

An overview of these events is presented, by taking into account scintillation impact on the signal intensity, phase, and dynamics. In particular, the interpretation of these events based on a refined scattering theory is provided with possible consequences for standard scintillation models.