

Comparison of the Effect of High-Latitude and Equatorial Ionospheric Scintillation on GPS Signals During the Maximum of Solar Cycle 24

David Mulindwa (Uganda)

Key words: GNSS/GPS; Positioning

SUMMARY

Radio signal scintillation caused by electron density irregularities in the ionosphere affects the accuracy and integrity of Global Navigation Satellite Systems, especially in the equatorial and high-latitude regions during solar maxima. Scintillation in these two regions, nevertheless, is usually influenced by different factors and thus has different characteristics that cause different effects on GNSS signals. This paper compares the characteristics of high-latitude and equatorial scintillation using multifrequency GPS scintillation data collected at Gakona, Alaska, Jicamarca, Peru, and Ascension Island during the 24th solar maximum. Several statistical distributions are established based on the data to characterize the intensity, duration, and occurrence frequency of scintillation. Results show that scintillation in the equatorial region is generally more severe and longer lasting, while high-latitude scintillation is, in general, more moderate and usually dominated by phase fluctuations. Results also reveal the different impacts of solar activity, geomagnetic activity, and seasons on scintillation in different geographic locations.

Comparison of the Effect of High-Latitude and Equatorial Ionospheric Scintillation on GPS Signals During the Maximum of Solar Cycle 24 (9998)
David Mulindwa (Uganda)

FIG Working Week 2019
Geospatial information for a smarter life and environmental resilience
Hanoi, Vietnam, April 22–26, 2019