Radio Occultation Measurements of Ionospheric Scintillation

P. R. Straus and R. Bishop

Rapid fluctuations in radio occultation (RO) signal to noise ratios and phase can signify the presence of fine-scale ionospheric density irregularities along the occultation ray path. While such signatures are clearly identifiable in 1 Hz observations that are typically made at ionospheric tangent altitudes, high rate (50 Hz) data is required to sample the full range of irregularity scale sizes responsible for L-band scintillation. We present results of scintillation analysis of data from the CORISS instrument on C/NOFS, as well as from COSMIC RO receivers that illustrate the characteristics of these irregularities. Differences between scintillation indices derived from 1 Hz and 50 Hz observations will be discussed. The limb-viewing geometry afforded by RO instrumentation enhances the sensitivity to ionospheric irregularities over what is possible for ground-based GPS receivers, making L-band scintillation observations possible even under the current solar minimum conditions. Under some conditions, it appears possible to measure bottomside irregularity layers, as opposed to the larger scale plume structures more commonly associated with equatorial irregularities.

Author information:
Paul R Straus (presenting & primary contact)
The Aerospace Corporation
Mail Stop M2/260
PO Box 92957
Los Angeles, CA 90009
(310) 336-5328
paul.straus@aero.org

Rebecca Bishop
Same affiliation as P R Straus