Ionospheric scintillation index study based on COSMIC occultation data

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Since GPS signals received on COSMIC satellites are affected by ionospheric scintillation, they are used for estimation of the scintillation parameters: S4 (considered in this study) and sigma_phi. For the CDAAC scintillation data product *scnLv1*, the data are collected from both precise orbit determination (POD) and occultation (OCC) antennas over the high elevation angles (>2.5deg). However, due to the satellite downlink bandwidth limitation, instead of using raw 50 Hz L1 amplitude data for S4 calculation, 1-second mean of L1 SNR and rms of intensity are downlinked and used to estimate the S4 index on the ground under the assumption of Gaussian distribution of scintillation. Low-elevation 50 Hz L1 amplitude data collected by the OCC antennas are also archived for neutral atmospheric study (*atmPhs*) in the CDAAC. Based on the overlapped period among (i) 1Hz POD data, (ii) 1Hz OCC data (from *scnLv1*) and (iii) 50Hz OCC data (from *atmPhs*), we can compare the CDDAC S4 calculated from (i) and (ii) to investigate the difference. Furthermore, by de-trending 50Hz OCC SNR in different windows, we investigate the optimal de-trending window for scintillation study and validate the CDAAC S4 calculated from 1Hz L1 amplitude data.