

The FORMOSAT-3/COSMIC Global Scintillation Model

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Humans heavily rely on Global Navigation Satellite System (GNSS) for applications of satellite communication, navigation, and positioning on the ground and/or aviation in the troposphere/stratosphere. However, ionospheric scintillations could severely impact on these applications. In this study, an empirical ionosphere scintillation model of the globe is constructed with S4-index data of FORMOSAT-3/COSMIC (F3/C) during 2007-2014 (hereafter F3CGS4 model). The model describes the S4-index as a function of diurnal variations in local time, seasonal variations in day of year, geographic variations in dip-latitude, and solar activities in EUV flux index PF10.7. The model well reproduces the F3/C S4-index observations, and yields good agreements with results of ground-based receiving satellite signals. These confirm that the constructed model can be used to forecast global L-band scintillations on the ground and in the near surface atmosphere.

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