

## Data assimilation model study of day-to-day ionosphere variability using radio occultation and ground-based GNSS observations.

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The Earth's ionosphere is highly variable due to its interactions with planetary waves, solar oscillations, and lunar tides overlapping on top of the original ionospheric climatological electron density morphologies. To study the strong day-to-day variability of the ionosphere, we have developed a global ionospheric data assimilation model using radio occultation observations of COSMIC mission together with auxiliary observations from ground-based GNSS stations. The assimilation system is capable of producing day-to-day and hour-to-hour ionospheric electron density maps three dimensionally for the study. With the advance given by the newly developed data assimilation model, we re-examine the wave-4 variations on daily basis, as well as the migrating tidal variations during the stratospheric sudden warming events. The products of the assimilation system using COSMIC-2 observations will be available in near future.

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