

## Topside Ionospheric Plasma Temperatures Retrieved From FORMOSAT-3/COSMIC Observations

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Bottom-side ionospheric electron profiles now can be well-determined thanks to mature development of ground-based instruments, such as ionosonde, or incoherent radar. However, the topside ionosphere, located above the F2 layer peak to the exobase (from 200~400 km to 600~1000km, depending on solar activity) is still not well understood. Previously, the electron density distribution and plasma temperatures in the topside ionosphere could only be measured by incoherent scatter radar, in-situ sounding rocket, or certain satellite instruments, making it hard to draw a global map of electron density and plasma temperatures in the topside ionosphere. FORMOSAT-3/ Constellation Observing System for Meteorology, Ionosphere, and Climate (F3/C) using the GPS radio occultation method (GPS-RO) now can give us great opportunities to determine the global electron density profiles above the F2 layer peak. We also present results showing how the plasma temperatures may be estimated from such GPS-RO observations.

This study first examines the structure and variability of electron densities in topside ionosphere. Seasonal F3/C observations will first be assimilated into a gridded model in latitude, longitude, altitude, and local time. The resulting vertical profiles at each gridpoint will then be used to infer the vertical scale height of the topside ionosphere. Next, we retrieved the seasonal and local-time variabilities of topside plasma temperature from the scale height of topside ionospheric electron densities. This is one of the first times that topside plasma temperatures can be globally determined using remote sensing techniques.

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