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Space-Based 135.6 nm Emissions and Ground-Based GPS-TEC Observed in the Equatorial Ionization Anomaly Region

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Simultaneous measurements of 135.6 nm emissions observed by TIMED GUVI and total electron content (TEC) derived from ground-based receivers of the global positioning system (GPS) in the equatorial ionization anomaly (EIA) region are examined. It is found that the 135.6 emission generally is proportional to the square of the concurrent TEC. The well agreement between two measurements indicates that the GUVI images provide the ionospheric TEC estimation where no ground based GPS receiver is available for studying the ionospheric EIA structure. Meanwhile, the conversion factor between the two might be useful to derive the horizontal electron density gradient from 135.6 nm measurements of the Tiny Ionospheric Photometer (TIP) of the FORMOSAT-3/COSMIC.