Three-Dimensional Ionospheric Structure Observed by FORMOSAT-3/COSMIC

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The Formosa Satellite 3, also named as the Constellation Observing System for Meteorology, Ionosphere, and Climate (abbreviated as FORMOSAT-3/COSMIC, F3/C), is a constellation of six micro-satellites, designed to monitor weather and space weather. The constellation was launched into an initial circular low-Earth orbit at an altitude of 512 km on 15 April 2006. Currently, the six micro-satellites have deployed to six mission obits at around 800 km altitude with 30-degrees separation in longitude for evenly distributed global coverage. This is the first time that a satellite constellation observes both the lower and upper parts of the ionospheric electron density up to the altitude of the satellites. The major payload onboard F3/C, GPS occultation experiment (GOX) instrument daily provides more than 2500 soundings of ionospheric vertical electron density profile. With the global coverage occultation observations, the ionospheric structure over many continents and most of oceans, where ground-based observation is limited, are now constructed continuously and uniformly. Taking advantage of the uniqueness of the dense global coverage vertical electron density profiles, three-dimensional ionospheric structures can be constructed routinely.