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GLOBAL ASSIMILATIVE IONOSPHERIC MODELING AND COSMIC2

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Summary: With the launch of the COSMIC constellation of GPS radio occultation sensors in 2006, research began on assimilating data from multiple GPS radio occultations into global assimilative ionospheric models. These space-based observations provide the advantage of global coverage compared to ground-based GPS stations but suffer from low horizontal resolution. Plans are on the table to deploy even larger constellations of GPS radio occultation sensors. Will these larger constellations with double and triple the number of observations of the space environment drive the assimilative models to the next level of performance in resolution and accuracy? Early in the COSMIC mission multiple spacecraft were in the same orbit, providing a high density of radio occultation data near the local time of that orbit – a condition analogous to proposed COSMIC-2 constellations with multiple sensors in each orbit. The resulting high density radio occultation data are ingested into global assimilative models, and the performance of the models are validated using high resolution UV photometer data from COSMIC. The Tiny Ionospheric Photometer (TIP) on COSMIC is a compact, nadir directed, narrow-band, ultraviolet photometer operating at the 135.6 nm wavelength and measuring the horizontal structure of the ionosphere with 15-30 km resolution. Comparisons with TIP data reveals the horizontal performance of these models and demonstrates the improvement obtained from ingesting the high density radio occultation data.