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Juan Durazo* (juan.durazo@asu.edu), Tempe, AZ 85281, and **Eric Kostelich** and **Alex Mahalov**. *Ionospheric Weather Forecasting Using a Climatology-Augmented Ensemble Kalman Filter*. Preliminary report.

We assess the performance of an ensemble Kalman filter in forecasting the global distribution of electron density when assimilating globally distributed electron density profiles. The forecast model used is the TIEGCM, which is a 3D non-linear model of the ionosphere on a global grid. Electron density observations are obtained from the COSMIC satellite mission and are assimilated to adjust the forecast once every hour. The data assimilation scheme used is the LETKF, and it incorporates observations within a prescribed radius of each grid point to compute a unique linear combination of the forecast ensembles at each grid point to update the initial conditions for the next forecast. The ensemble of forecasts is augmented with additional climatology-derived forecasts at analysis time to increase the effective rank of the forecast uncertainty estimate and potentially reduce forecast uncertainty in additional directions. We present the benefits of augmenting the ensemble with climatology in estimating global electron density distribution. This validation is done with independent satellite observations and ionosonde measurements of peak electron density in the F2-layer. (Received September 22, 2015)