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Validation of Special Sensor Ultraviolet Limb Imager (SSULI) Ionospheric Tomography using ALTAIR Incoherent Scatter Radar Measurements

Abstract:
The Special Sensor Ultraviolet Limb Imager (SSULI) instruments are ultraviolet limb scanning sensors that flying on the Defense Meteorological Satellite Program (DMSP) satellites. The SSULIs cover the 80-170 nanometer wavelength range which contains emissions at 91 and 136 nm, which are produced by radiative recombination of the ionosphere. We invert these emissions tomographically using newly developed algorithms that include optical depth effects due to pure absorption and resonant scattering. We present the details of our approach including how the optimal altitude and along-track sampling were determined and the newly developed approach we are using for regularizing the SSULI tomographic inversions. Finally, we conclude with validations of the SSULI inversions against ALTAIR incoherent scatter radar measurements and demonstrate excellent agreement between the measurements.