Assimilation of SSMIS UAS brightness temperature observations for mesospheric analysis

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A major impediment for achieving ground to space NWP capability, is the lack of near-real-time middle atmospheric state measurements for assimilation. The only operationally available source of extensive meteorological observations in the mesosphere is provided by the Upper Air Sounding (UAS) channels of the Defense Meteorological Satellite Program (DMSP) Special Sensor Microwave Imager/Sounder (SSMIS) instruments. To date, this data has been underutilized because: 1) typical global NWP models do not span the required vertical range (surface to 100 km), and hence do not include mesosphere; and 2) the fast radiative transfer (RT) models used in data assimilation systems lacked explicit treatment of the Zeeman effect on the oxygen molecule's interaction with the geomagnetic field in the microwave 60 GHz range at altitudes above 40 km. Version 2 of the Community Radiative Transfer Model (CRTM) has implemented the Zeeman-splitting spectroscopy calculations required for the UAS channels. In this poster we evaluate the utility of assimilating the newly developed SSMIS Unified Pre-Processor for the UAS (UPP-UAS) channels by comparing the radiances with the CRTM calculations using coincident SABER temperatures profiles. We also show an example UAS assimilation analysis using the Navy Global Environmental Model (NAVGEM).