Radiative Transfer Models (RTM) have many applications in the satellite remote sensing field, such as the retrieval of environmental parameters, including surface wind vectors and sea surface temperatures, and to simulate brightness temperatures (Tb). A key component of the ocean RTM is the emissivity model used to determine emissivity at the ocean’s surface, which is not easily modeled at higher wind speeds due to the complexity of rough ocean surfaces caused by interactions with varying wind vectors. A new wideband ocean emissivity RTM developed by the CFRSL calculates ocean emissivity over a wide range of frequencies, incidence angles, sea surface temperatures, and wind vector. This thesis presents the validation of this CFRSL model using independent WindSat measurements collocated with Global Data Assimilation System (GDAS) environmental parameters for frequencies between 6.8 to 37 GHz and wind speeds between 0 \text{ m/s} to 20 \text{ m/s} over the July 2005 to June 2006 year. In addition, the CFRSL emissivity model is validated using Environmental Data Record (EDR) wind speeds combined with the GDAS environmental parameters. Finally, the validation includes comparisons to the well-established XCAL ocean emissivity RTM. The focus of this validation and comparison is to assess performance of the emissivity model results with respect to a wide range of wind speeds.

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The public is welcome to attend.