

DEVELOPING VICARIOUS CALIBRATION FOR MICROWAVE SOUNDING INSTRUMENTS USING LUNAR RADIATION

Hu Yang^{1†}, Fuzhong Weng², Quanhua Liu²

¹ Earth System Science Interdisciplinary Center, University of Maryland

² NOAA Center for Satellite Applications and Research, College Park, Maryland,

Abstract

Accurate global observations from space are critical for global climate change study. However, atmospheric temperature trend derived from space-borne microwave instruments remains a subject of debate, due mainly to the uncertainty in characterizing the long-term drift of instrument calibration. Thus, a highly stable target with a well-known microwave radiation is required to evaluate the long-term calibration stability. This study develops a new model to simulate the lunar emission at microwave frequencies and the model is then used for monitoring the stability of the Advanced Technology Microwave Sounder (ATMS) onboard Suomi NPP satellite. It is shown the ATMS cold space view of lunar radiation agrees well with the model simulation during the past five years and this instrument is capable of serving the reference instrument for atmospheric temperature trending studies, and connecting the the previous generation of microwave sounders from NOAA-15 to the future JPSS microwave sounder onboard NOAA-20 satellite.