

NPP ADVANCED TECHNOLOGY MICROWAVE SENSOR (ATMS): SENSOR CALIBRATION AND PRELIMINARY DATA PRODUCT PERFORMANCE¹

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Abstract

A suite of sensors scheduled to fly onboard the NPOESS Preparatory Project (NPP) satellite in 2010 will both continue and improve the environmental data records provided by operational and research missions over the last 40 years. The Cross-track Infrared and Microwave Sounding Suite (CrIMSS), consisting of the Cross-track Infrared Sounder (CrIS) and the first space-based, Nyquist-sampled cross-track microwave sounder, the Advanced Technology Microwave Sounder (ATMS), will provide atmospheric vertical profile information needed to improve numerical weather and climate modeling. The ability of ATMS to sense temperature and moisture profile information in the presence of non-precipitating clouds complements the high vertical resolution of CrIS. Furthermore, the ability of ATMS to sense scattering of cold cosmic background radiance from the tops of precipitating clouds allows the retrieval of precipitation intensities with useful accuracies over most surface conditions.

This paper will present several assessments of the performance of ATMS and the geophysical quantities that are to be derived using ATMS measurements. Pre-launch testing of ATMS has characterized the principal calibration parameters and has enabled predictions of on-orbit performance with high levels of confidence. Planned on-orbit characterization of ATMS will further improve both the measurement quality and the understanding of various error contributions. This paper is organized as follows. First, an overview will be given of the prelaunch radiometric calibration of ATMS. Key calibration parameters will be discussed, as well as the error bars and dominant sources of uncertainty. Second, plans for on-orbit characterization of ATMS to further improve performance and reduce uncertainty will be presented. Finally, preliminary assessments of ATMS data product performance will be discussed, including vertical profile and precipitation products.

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