

Title: The Development of AMSU FCDR's and TCDR's for Hydrological Applications

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Current passive microwave sounder data, used in hydrological applications, are derived from POES satellites for which the primary mission is operational weather prediction. These data are not calibrated with sufficient stability for climate applications. A properly calibrated FCDR needs to be developed to enable the utilization of these data for TCDR and Climate Information Records and to extend their application into the NPOESS era (e.g., POES/AMSU to NPP/ATMS to NPOESS/ATMS). Once developed, TCDR's for water cycle applications (precipitation, water vapor, clouds, etc.) will be developed for use as key components in international programs such as GEWEX, CEOS and GPM; collaborators on this project hold key roles in many of these programs.

Passive microwave sounder data have proven their worth in more than just tropospheric temperature and moisture monitoring. NOAA/NESDIS generates operational products from the Advanced Microwave Sounding Unit (AMSU) focused on the hydrological cycle (e.g., rainfall, precipitable water, cloud water, ice water, etc.) through two product systems known as the Microwave Surface and Precipitation Products Systems (MSPPS) and the Microwave Integrated Retrieval System (MIRS). MSPPS has the longest legacy dating back to NOAA-15 (July 1998) while MIRS is an advanced, 1DVar retrieval system that is portable to different passive MW sensors thus making it attractive for multi-sensor TCDR generation. MSPPS and MIRS products are archived at NCDC and are being widely used in the scientific community. As we enter the NPOESS era, AMSU-A and AMSU-B (and its successor, MHS) will be replaced with the ATMS sensor, first to be flown on NPP, then on all of the NPOESS spacecraft. These data offer the unique opportunity to develop CDR's that can contribute to other satellite time series with similar capabilities such as the DMSP SSM/I and SSMIS, the TRMM TMI, and Aqua AMSR-E. This project will focus on the development of AMSU FCDR's for the AMSU-A window channels and the AMSU-B/MHS sensor.

This project will utilize established methods to generate FCDR's and take "multiple paths" to determine which methodology is the most applicable to AMSU. This will include a workshop during the first year of

the project focused on water cycle CDR's. The generation of TCDR's is a necessary step to assess the accuracy of the FCDR's; similar results by multiple methods yield confidence and uncertainty estimates in the CDR's. By project completion, an 11-year (2000 – 2010) AMSU CDR is anticipated.