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Abstract: **ATMS- and AMSU-A-derived Hurricane Warm Core Structures Using a Modified Retrieval Algorithm**

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The Advanced Technology Microwave Sounder (ATMS) is a cross-track microwave radiometer. Its temperature sounding channels 5–15 can provide measurements of thermal radiation emitted from different layers of the atmosphere. In this study, a traditional Advanced Microwave Sounding Unit-A(AMSU-A) temperature retrieval algorithm is modified to remove the scan biases in the temperature retrieval and to include only those ATMS sounding channels that are correlated with the atmospheric temperatures on the pressure level of the retrieval. The warm core structures derived for Hurricane Sandy when it moved from tropics to middle latitudes are examined. It is shown that scan biases that are present in the traditional retrieval are adequately removed using the modified algorithm. In addition, temperature retrievals in the upper troposphere (~250 hPa) obtained by using the modified algorithm have more homogeneous warm core structures and those from the traditional retrieval are affected by small-scale features from the low troposphere such as precipitation. Based on ATMS observations, Hurricane Sandy's warm core was confined to the upper troposphere during its intensifying stage and when it was located in the tropics but extended to the entire troposphere when it moved into subtropics and middle latitudes and stopped its further intensification. The modified algorithm was also applied to AMSU-A observation data to retrieve the warm core structures of Hurricane Michael. The retrieved warm core features are more realistic when compared with those from the operational Microwave Integrated Retrieval System (MIRS).