

New Passive Microwave Sensors Aid Mapping of Tropical Cyclone Structure

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Abstract: Two new passive microwave sensors undergoing validation today will assist in mapping tropical cyclone structure. The Advanced Microwave Scanning Radiometer (AMSR), and WindSat, a polarimetric radiometer flown by the Navy will shortly be used to map TC rainbands and eyewall features in near real-time. Both systems have the channels and spatial resolution needed to assist in mapping TCS and reduce temporal gaps for near real-time analyses. Examples for each new sensor will be demonstrated and highlighted on the new information provided to tropical cyclone data sets. Passive microwave images have shown their utility in mapping tropical cyclone structure (TC) by viewing rainbands and eyewalls not seen via visible (vis) and Infrared (IR) sensors. Upper-level cloud obscuration limits vis/IR analysis that is mitigated in large part by passive microwave (PM) imagers. However, the temporal refresh attributes of PM polar orbiting data

sets is woefully less than the routinely updated geostationary vis/IR images. Therefore, multiple satellites with passive microwave capabilities must be accumulated in order to create some semblance of temporal continuity.

Passive microwave data from the Special Sensor Microwave/Imager (SSM/I) was first used to demonstrate the ability to map TC structure. Subsequent data from the Tropical Rainfall Measuring Mission (TRMM) Microwave Imager (TMI) provided new information due to its superior spatial resolution. Data from the Advanced Microwave Sounding Unit (AMSU-B) onboard the NOAA polar orbiters have more recently been treated as an imager to assist the temporal sampling issue. Results can be viewed on the Naval Research Laboratory's (NRL) tropical cyclone web page: http://www.nrlmry.navy.mil/tc_bin/tc_home/cgi