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EOS Aqua AMSR-E Arctic Sea Ice Validation Program: Arctic2003 Aircraft Campaign Flight Report

D. J. Cavalieri and T. Markus

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

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Abstract

In March 2003 a coordinated Arctic sea ice validation field campaign using the NASA Wallops P-3B aircraft was successfully completed. This campaign was part of the program for validating the Earth Observing System (EOS) Aqua Advanced Microwave Scanning Radiometer (AMSR-E) sea ice products. The AMSR-E, designed and built by the Japanese National Space Development Agency for NASA, was launched May 4, 2002 on the EOS Aqua spacecraft. The AMSR-E sea ice products to be validated include sea ice concentration, sea ice temperature, and snow depth on sea ice. This flight report describes the suite of instruments flown on the P-3, the objectives of each of the seven flights, the Arctic regions overflown, and the coordination among satellite, aircraft, and surface-based measurements. Two of the seven aircraft flights were coordinated with scientists making surface measurements of snow and ice properties including sea ice temperature and snow depth on sea ice at a study area near Barrow, AK and at a Navy ice camp located in the Beaufort Sea. Two additional flights were dedicated to making heat and moisture flux measurements over the St. Lawrence Island polynya to support ongoing air-sea-ice processes studies of Arctic coastal polynyas. The remaining flights covered portions of the Bering Sea ice edge, the Chukchi Sea, and Norton Sound.

V Concluding Remarks

The successful completion of the Arctic2003 aircraft campaign promises to provide the data sets needed to validate the AMSR-E sea ice products. The Landsat 7 ETM+ imagery acquired over the Bering and Chukchi seas during the flights will be particularly useful for validating the sea ice concentration products, whereas the coordinated satellite/aircraft/surface data sets acquired in the Barrow and Navy ice camp study sites are expected to serve as the basis for the validation of the sea ice temperature and snow depth products. A new airborne snow radar (Gogineni et al., 2003) will be tested in the Antarctic this autumn and will provide the spatial coverage needed for truly validating snow depth over much larger areas of the Arctic. It is anticipated that this radar together with an airborne AMSR-E simulator will be flown in the 2005 Arctic campaign.

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