Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10477, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10477
EGU General Assembly 2008

Global blended snow products from EOS data

JAMES FOSTER1, DOROTHY HALL1, JOHN EYLANDER2, GEORGE RIGGS3, ED KIM1, KIMBERLY CASEY3, MARCO TEDESCO4, SON NGHIEM5, RICHARD KELLY6, BHASKAR CHOUDHURY1

1 NASA/GSFC, HYDROSPHERIC AND BIOSPHERIC SCIENCES LAB., GREENBELT, MD, USA

2 HQ AF WEATHER AGENCY,106 PEACEKEEPER DR. SUITE 2N3, OFFUTT AFB, NE, USA

3 SCIENCE SYSTEMS AND APPLICATIONS, GREENBELT, MD, USA

4 GODDARD EARTH SCIENCE AND TECH. CTR., U. OF MD. BALTIMORE CO., MD, USA

5 NASA/JPL, 4800 OAK GROVE DRIVE, PASADENA, CA, USA

6 WATERLOO, UNIVERSITY, GEOG. DEPT., WATERLOO, ONTARIO, CANADA

More accurate and reliable seasonal snow cover and snow water equivalent (SWE) data are critically needed to better forecast the weather as well as streamflow. Snowmelt data, including timing of snow pack ripening, is also required to improve forecast accuracy of flood prediction. In addition, improved knowledge of snow pack conditions is essential for applications such as flood control and irrigation. Melting snow in India, Pakistan, Afghanistan, and Nepal, from the Hindu Kush and Himalayan ranges, is a vital resource for nearly 1 billion people. Thus the ability to characterize snow storage more accurately at the drainage basin scale is crucial for improved water resource management, and in some cases for human survival.

The blended snow product presented here considers the necessary snow inputs required for climate and hydrology purposes in one user-friendly product. Snow cover extent, SWE and snowmelt are mapped and measured globally on a daily or near-daily basis, initially at a resolution of 25 km, utilizing Moderate Resolution Imaging Spec-

troradiometer (MODIS), Advanced Microwave Scanning Radiometer for NASA's Earth Observing System (AMSR-E) passive microwave data and QuikSCAT scatterometer data. Because the confidence for mapping snow cover extent is greater with the visible product than with the microwave product, when cloud free MODIS observations are available, they are used as "truth." The microwave-derived snow cover will be used as "truth" only in those areas where MODIS is not usable due to the presence of clouds and darkness. AMSR-E data at 19 GHz (horizontal channel) are used in association with the difference between ascending and descending satellite passes (Diurnal Amplitude Variations, DAV) to detect the onset of melt, and QuikSCAT data (14 GHz) are used to map areas of snow that are actively melting. Snow water equivalent (SWE) from AMSR-E is currently being included into our blended product. In addition, we are beginning to enhance the resolution (currently 25 km) of the global daily snow cover and SWE products. It is envisioned that we can improve the resolution, in some wavelengths, to 5 km. We will also incorporate an 89-GHz global snow detection and SWE algorithm into the blended-product software. A snow algorithm referred to as the Air Force, NASA Snow Algorithm (ANSA) has been developed, and is still being fine tuned, to derive the snow cover, snow water equivalent, and onset of snowmelt. The algorithm results are being validated in the Great Lakes area of North America and in Colorado (Cold Lands Project Experiment sites) as well. In the coming months, we will validate results in portions of Finland, Norway and the Kola Peninsula area of northwestern Russia.