A New Record in 2007 for Melting in Greenland

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The 2007 melting season set a new record for snowmelt over the Greenland ice sheet, according to analysis of spaceborne microwave brightness temperatures measured by the Special Sensor Microwave Imaging radiometer aboard the U.S. Defense Meteorological Satellites Program.

As shown in Figure 1a, positive melting anomaly values, calculated as the difference between the number of melting days occurring in 2007 and the average number of melting days during the period 1988–2006, are concentrated on large inland areas in southern Greenland.

Areas higher than 2000 meters in elevation melted up to 25–30 days longer than the average number of days calculated for the previous 18 years (1988–2006).

Further, the 2007 melting index—defined as the melting area times the number of melting days—for areas above 2000 meters was 153% greater than the average (Figure 1b), setting a new record. Though it did not exceed the higher values of previous years, the melting index for areas below 2000 meters also was above the average by about 30%.

Over the entire ice sheet, snowmelt extent—defined as the extent of areas experiencing at least one melting day—was about 930,000 square kilometers in 2007, slightly greater (4%) than the average of the previous 18 years. The 2007 melting index for the entire ice sheet was about 20% greater than average, with a value of about 20 million square kilometers (approximately 2.2 times the surface of the continental United States).

Thus, 2007 had the fifth-highest melting index after 2005, 2002, 1998, and 2004. Prior to this year, 2006 had ranked seventh.

As melting is strongly connected to surface temperature, melting events during this year's season suggest warmer temperatures at high elevations. Continuing to monitor melting over the Greenland ice sheet is fundamental for its implications on sea level rise and Earth's energy budget.

Acknowledgment

Thanks to Mary Brodzik and Richard Armstrong (National Snow and Ice Data Center) for microwave data.

—MARCO TEDESCO, University of Maryland Baltimore County, Baltimore, and NASA Goddard Space Flight Center, Greenbelt, Md.; E-mail: mtedesco@umbc.edu

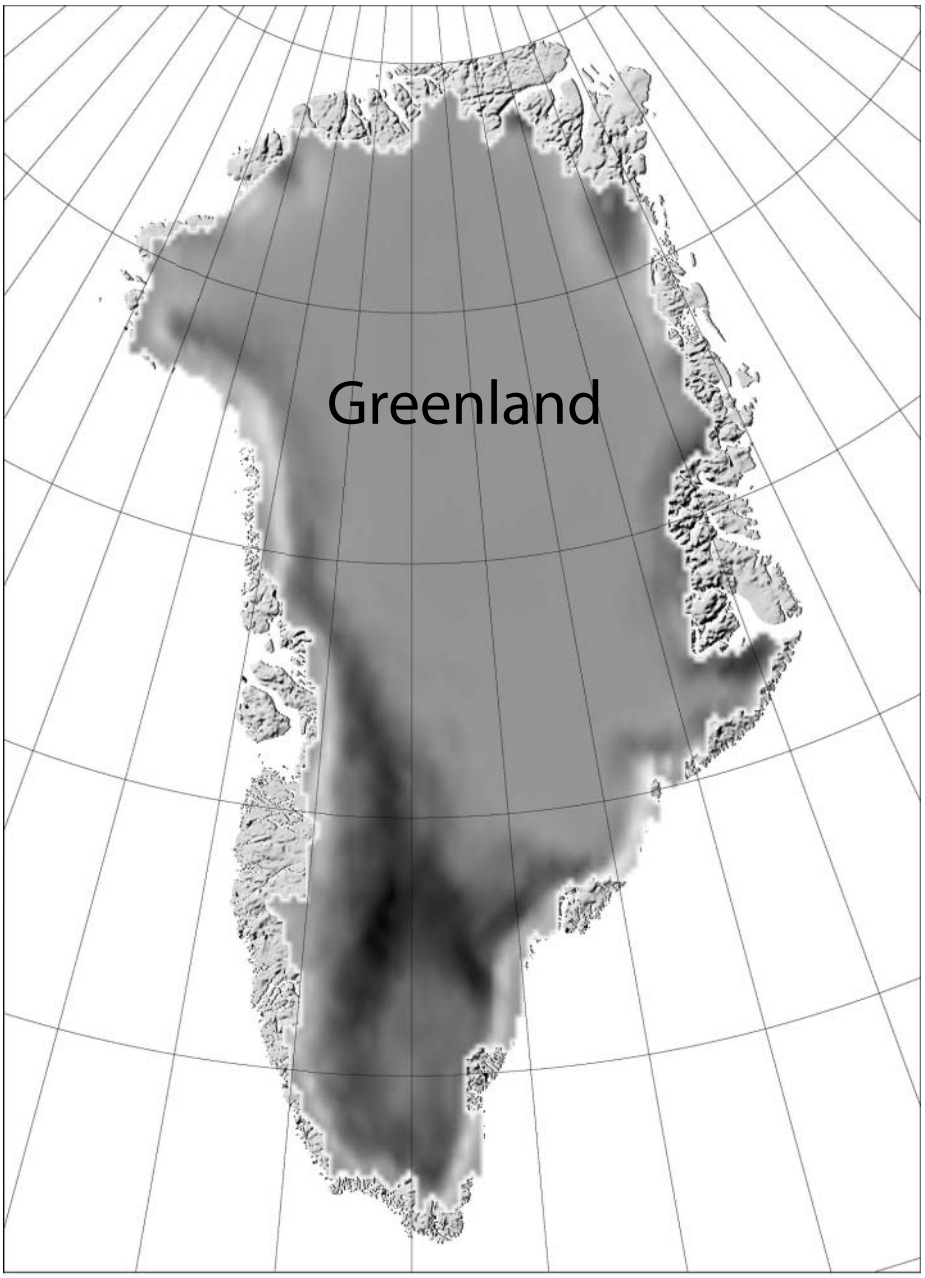

Fig. 1. (a) Greenland's 2007 melting anomaly calculated as the difference between the number of melting days occurring in 2007 and the average number of melting days during the period 1988 and 2006. (b) Temporal trend of melting index for areas above 2000 meters. (Design by M. Jentoft-Nilsen and R. Simmon.)