

# Satellite data reveals extreme summer snowmelt in northern Greenland

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The northern part of the Greenland ice sheet experienced extreme snowmelt during the summer of 2008, with large portions of the area subject to record melting days, according to Dr. Marco Tedesco, Assistant Professor of Earth & Atmospheric Sciences at The City College of New York (CCNY), and colleagues. Their conclusion is based on an analysis of microwave brightness temperature recorded by the Special Sensor Microwave Imager (SSM/I) onboard the F13 satellite.

"Having such extreme melting so far north, where it is usually colder than the southern regions is extremely interesting," Professor Tedesco said. "In 2007, the record occurred in southern Greenland, mostly at high elevation areas where in 2008 extreme snowmelt occurred along the northern coast."

Melting in northern Greenland lasted up to 18 days longer than previous maximum values. The melting index, i.e. the number of melting days times the area subject to melting) was three times greater than the 1979-2007 average, with  $1.545 \cdot 10^6$  square kilometers x days. The findings were reported in the October 6 edition of "EOS," a weekly newspaper published by the American Geophysical Union.

"The results obtained from SSM/I are consistent with the outputs of the MAR (Modèle Atmosphérique Régional) regional climate model, which indicated runoff 88 percent higher than the 1979 – 2007 mean and close to the 2007 value," Professor Tedesco noted. In addition, analysis of ground measurements from World Meteorological Organization

automatic weather stations located close to where the record snowmelt was observed indicate surface/air maximum temperatures up to 3° Celsius above average.

The snowmelt and temperature anomalies occurred near Ellesmere Island, where several ice shelf break-ups were observed this summer. The region where the record melting days were recorded includes the Petermann glacier, which lost 29 square kilometers in July.

Professor Tedesco and his colleagues are currently analyzing possible causes for the high snowmelt in northern Greenland. High surface temperatures are, so far, the most evident factor. However other factors, such as solar radiation, could play a role, as well, he noted.

"The consistency of satellite, model and ground-based results provides a basis for a more robust analysis and synthesis tool," Professor Tedesco added. Next June, he and his colleagues plan to conduct field work in northern Greenland.

Source: City College of New York

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