NEWS

Updated 2008 Surface Snowmelt Trends in Antarctica

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Surface snowmelt in Antarctica in 2008, as derived from spaceborne passive microwave observations at 19.35 gigahertz, was 40% below the average of the period 1987–2007. The melting index (MI, a measure of where melting occurred and for how long) in 2008 was the second-smallest value in the 1987–2008 period, with 3,465,625 square kilometers times days ($km^2 \times$ days) against the average value of 8,407,531 $km^2 \times$ days (Figure 1a). Melt extent (ME, the extent of the area subject to melting) in 2008 set a new minimum with 297,500 square kilometers, against an average value of approximately 861,812 square kilometers. The 2008 updated melting index and melt extent trends over the whole continent, as derived from a linear regression approach, are –164,487 $km^2 \times$ days per year (MI) and –11,506 square kilometers per year (ME), respectively.

Negative trends for the period 1987–2008 of the number of melting days (Figure 1b) over the Antarctic Peninsula are observed at a rate down to –2 days per year for internal areas and about –0.7 days per year for coastal areas. Contrarily, positive trends (up to approximately +0.25 days per year) are observed on part of the Larsen Ice Shelf.

In East Antarctica, positive trends are observed over the Amery, West, Shackleton, and Voyeykov ice shelves, with values of up to +0.7 days per year for Shackleton and +0.8 days per year for Amery. Interestingly, the latter shows negative trends (down to –0.3 days per year) for internal areas but positive values for coastal areas.

Large-scale monitoring of ice shelves is an important task for many reasons: Though ice shelves do not contribute directly to sea level rise, they play an important role in keeping the warm marine air at a distance from glaciers; and recent observations also suggest the buttressing effect of ice shelves in preventing acceleration of ice sheets. An increasing surface snowmelt over ice shelves might lead to persisting melt ponds, which, in turn, might contribute to ice shelf disintegration as liquid water fills small surface cracks. Depending on the amount of water and the depth of a crack, the water can deepen the crack and eventually wedge through the ice shelf. Along with surface processes, it is imperative to focus on verifying hypotheses regarding those processes occurring at the ice-ocean boundaries, such as, for example, the thinning of ice shelves driven by ocean-induced melting.

A color version of Figure 1 can be viewed in the electronic supplement to this *Eos* issue (http://www.agu.org/eos_elec).

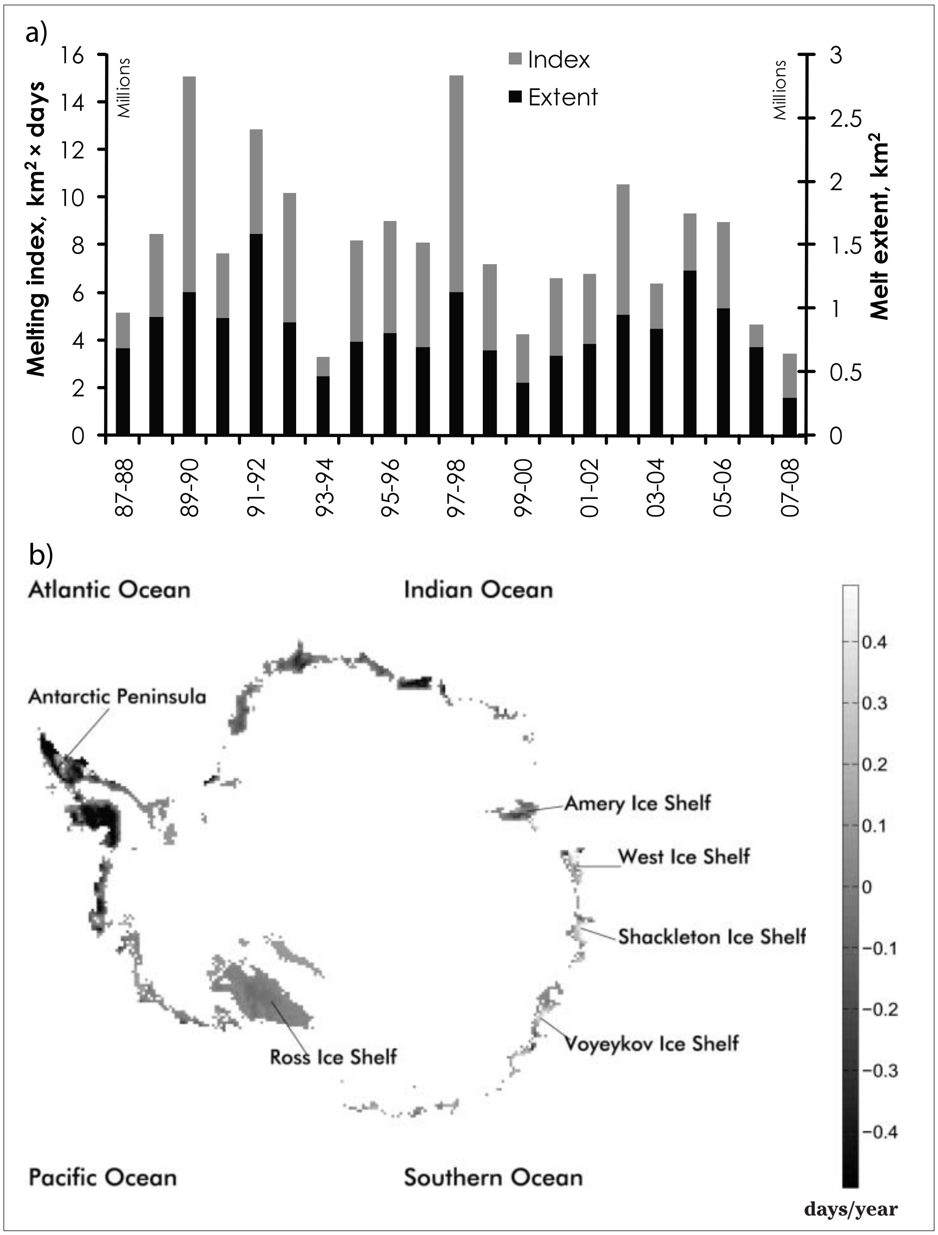

Fig. 1. (a) Snowmelt surface melting index (gray) and melt extent (black) over the whole of Antarctica between 1987 and 2008. (b) Trend of the number of melting days for the period 1987–2008.

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