



COLLOQUIUM

Warming Signals in the Arctic From Satellite Observations

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Global warming signals are expected to be amplified in the polar regions because of ice-atmosphere feedbacks associated with the high reflectivity of the ice and snow that blankets much of the region. Analysis of infrared satellite data reveals that the Arctic region has been warming at the rate of 0.5 °C per decade since 1981 but large spatial variability in the trends are apparent with the most positive occurring in North America and the Western Arctic and with some negative trends occurring in parts of Russia. During approximately the same period, the Arctic perennial ice cover declined at a rapid rate of 9.2 % per decade. While large interannual variability in the perennial ice area was observed in the 1980s and early 1990s, the perennial ice areas from 1998 to 2004 have been abnormally low compared to the average perennial ice area during the previous 20 years. Moreover, the length of melt temperatures has also been increasing by 13 days per decade over sea ice covered areas, suggesting concurrent thinning in the ice cover. In other regions, the length of melt has increased by 5 days per decade over Greenland, showing consistency with the observed thinning in the ice sheets and increasing extent of melt areas. The length of thawing at the permafrost areas of North America has also been increasing at 7 days per decade, which can be a major concern in inhabited regions. Furthermore, the areal extent of the snow cover in the entire Northern Hemisphere has been decreasing by about 2.6 % per decade while most glaciers in the Arctic region have been declining. The locations of most rapid changes are in same general areas as where the surface temperature data show considerable warming. The overall impact of aforementioned changes in the Arctic region can be profound, especially if the current trends continue into the next decade.

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4:15 p.m. (Refreshments at 4:00 p.m.)

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