

Rapid Trend towards a Seasonal Arctic Sea Ice Cover

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Signals of a global warming are expected to be first detected in the polar regions because of amplification of the signal due to 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 area from 1998 to 2004 has been consistently lower than 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 and 7 days per decade in North America, showing consistency with the observed thinning in the ice sheets and increasing extent of melt areas. Interannual changes in drift patterns of the perennial ice cover were studied using inferred multiyear ice cover data during winter and spring periods and the results show some correlations with the ice retreat. The major effect is leading to the more seasonal Arctic ice cover may be the warming of the upper layer of the Arctic Ocean due to the increasing open water area in the region.