

Observations for climate: Tracking Arctic changes and surprises

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Over the last decade the Arctic has experienced the impacts of a prolonged weak warming trend, highlighted with record-setting events. Impacts are wide ranging and include record temperatures, shrinking snow cover, thawing permafrost, and wildlife and vegetation shifts. Not surprisingly, the impact of this warming is evident in the dramatic loss in sea ice cover that defines the region. Summer 2007 had a record minimum sea ice extent of nearly 40% below climatology and the following years remained at a low level. Of more impact is loss of old thick multi-year sea ice which represents part of the climate system memory. Another surprise is the large extent and extreme heat of Arctic forest fires. In winter 2009-2010 and 2010-2011 there was a major breakdown of the AO / NAO vortex and increased meridional flow which contributed to warm Arctic-wide temperatures and record cold and snowy weather in Europe, eastern Asia, and eastern North America; winter 2009-2010 was most negative NAO in 145 years of record. The negative NAO in turn accelerated the ice loss on the west Greenland ice sheet. Since such multiple changes and associated feedbacks further feed the warming trend, the expectation is that surprises (new extremes) will continue. Three websites provide annual updated information and synthesis of recent changes in the Arctic environment: The Arctic Report Card presents annually-updated, peer-reviewed Arctic environmental data and interpretation for policy makers, scientists, educators, students and the public. The Report Card provides multiple lines of evidence of Arctic change (www.arctic.noaa.gov/reportcard). The Arctic Sea Ice Outlook provides a scientific forum for community discussion of anticipated September Arctic Sea Ice minimums. (www.arcus.org/search/seaiceoutlook). The "Futures" website presents the latest understanding on potential changes in the Arctic climate (www.arctic.noaa.gov/future).