

# New report confirms Arctic melt accelerating

**AP** Associated Press

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STOCKHOLM – Arctic ice is melting faster than expected and could raise the average global sea level by as much as five feet this century, an authoritative new report suggests.

The study by the international Arctic Monitoring and Assessment Program, or AMAP, is one of the most comprehensive updates on climate change in the Arctic, and builds on a similar assessment in 2005.

The full report will be delivered to foreign ministers of the eight Arctic nations next week, but an executive summary including the key findings was obtained by The Associated Press on Tuesday.

It says that Arctic temperatures in the past six years were the highest since measurements began in 1880, and that feedback mechanisms believed to accelerate warming in the climate system have now started kicking in.

One mechanism involves the ocean absorbing more heat when it's not covered by ice, which reflects the sun's energy. That effect has been anticipated by scientists "but clear evidence for it has only been observed in the Arctic in the past five years," AMAP said.

The report also shatters some of the forecasts made in 2007 by the U.N.'s expert panel on climate change.

The cover of sea ice on the Arctic Ocean, for example, is shrinking faster than projected by the U.N. panel. The level of summer ice coverage has been at or near record lows every year since 2001, AMAP said, predicting that the Arctic Ocean will be nearly ice free in summer within 30-40 years.

Its assessment also said the U.N. panel was too conservative in estimating how much sea levels will rise — one of the most closely watched aspects of global warming because of the potentially catastrophic impact on coastal cities and island nations.

The melting of Arctic glaciers and ice caps, including Greenland's massive ice sheet, are

projected to help raise global sea levels by 35 to 63 inches (90-160 centimeters) by 2100, AMAP said, though it noted that the estimate was highly uncertain.

That's up from a 2007 projection of 7 to 23 inches (19-59 centimeters) by the U.N. panel, which didn't consider the dynamics of ice caps in the Arctic and Antarctica.

"The observed changes in sea ice on the Arctic Ocean, in the mass of the Greenland ice sheet and Arctic ice caps and glaciers over the past 10 years are dramatic and represent an obvious departure from the long-term patterns," AMAP said in the executive summary.

The organization's main function is to advise the nations surrounding the Arctic — the U.S., Canada, Russia, Denmark, Norway, Sweden, Iceland and Finland — on threats to the Arctic environment.

The findings of its report — Snow, Water, Ice and Permafrost in the Arctic — will be discussed by some of the scientists who helped compile it at a conference starting Wednesday in the Danish capital, Copenhagen.

In the past few years, scientists have steadily improved ways of measuring the loss of ice into the oceans.

In research reported in March in the journal *Geophysical Research Letters*, U.S. and European scientists used two independent methods to corroborate their findings: the on-the-ground measurement of ice thickness and movements using GPS stations and other tools, and the measurement of ice mass through gravity readings from satellites.

That team, led by Eric Rignot of NASA's Jet Propulsion Laboratory, projected that the accelerating melt of the vast Greenland and Antarctic ice sheets would itself raise sea levels by about 6 inches (15 centimeters) by 2050. Adding in other factors — expansion of the oceans from warming and runoff from other glaciers worldwide — would raise sea levels a total of some 13 inches (32 centimeters) by 2050, they said.

They did not project sea levels to 2100 because of long-range uncertainties.

Currents, winds and other forces would make sea-level rise vary globally, but Bangladesh, Florida and other such low-lying areas and coastal cities worldwide would be hard hit.

The AMAP report said melting glaciers and ice sheets worldwide have become the biggest contributor to sea level rise. Greenland's ice sheet alone accounted for more than 40 percent of the 0.12 inches (3.1 millimeters) of sea-level rise observed annually between 2003 and 2008, AMAP said.

It said the yearly mass loss from Greenland's ice sheet, which covers an area the size of Mexico, increased from 50 gigatons in 1995-2000 to more than 200 gigatons in 2004-2008.

Scientists are still debating how much of the changes observed in the Arctic are due to natural variances and how much to warming caused by the release of carbon dioxide and other greenhouse gases. AMAP projected that average fall and winter temperatures in the Arctic will climb by 5.4-10.8 F (3-6 C) by 2080, even if greenhouse gas emissions are lower than in the past decade.

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