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## **Changes 'amplify Arctic warming'**

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Arctic sea ice

Open water should result in warmer air temperatures in Autumn

Scientists say they now have unambiguous evidence that the warming in the Arctic is accelerating.

Computer models have long predicted that decreasing sea ice should amplify temperature changes in the northern polar region.

Julienne Stroeve, from the US National Snow and Ice Data Center, told a meeting of the American Geophysical Union that this process was under way.

Arctic ice cover in summer has seen rapid retreat in recent years.

The minimum extents reached in 2007 and 2008 were the smallest recorded in the satellite age.

"The sea ice is entering a new state where the ice cover has become so thin that no matter what happens during the summer in terms of temperature or circulation patterns, you're still going to have very low ice conditions," she told the meeting.

### Autumn return

Theory predicts that as ice is lost in the Arctic, more of the ocean's surface will be exposed to solar radiation and will warm up.

When the autumn comes and the Sun goes down on the Arctic, that warmth should be released back into the atmosphere, delaying the fall in air temperatures.

Ultimately, this feedback process should result in Arctic temperatures rising faster than the global mean.

Dr Stroeve and colleagues have now analysed Arctic autumn (September, October, November) air temperatures for the period 2004-2008 and compared them to the long term average (1979 to 2008).

The results, they believe, are evidence of the predicted amplification effect.

"You see this large warming over the Arctic ocean of around 3C in these last four years compared to the long-term mean," explained Dr Stroeve.

"You see some smaller areas where you have temperature warming of maybe 5C; and this warming is directly located of those areas where we've lost all the ice."

Wider changes

If this process continues, it will extend the melting season for Arctic ice, delaying the onset of winter freezing and weakening further the whole system.

These warming effects are not just restricted to the ocean, Dr Stroeve said. Circulation patterns could then move the warmth over land areas, she added.

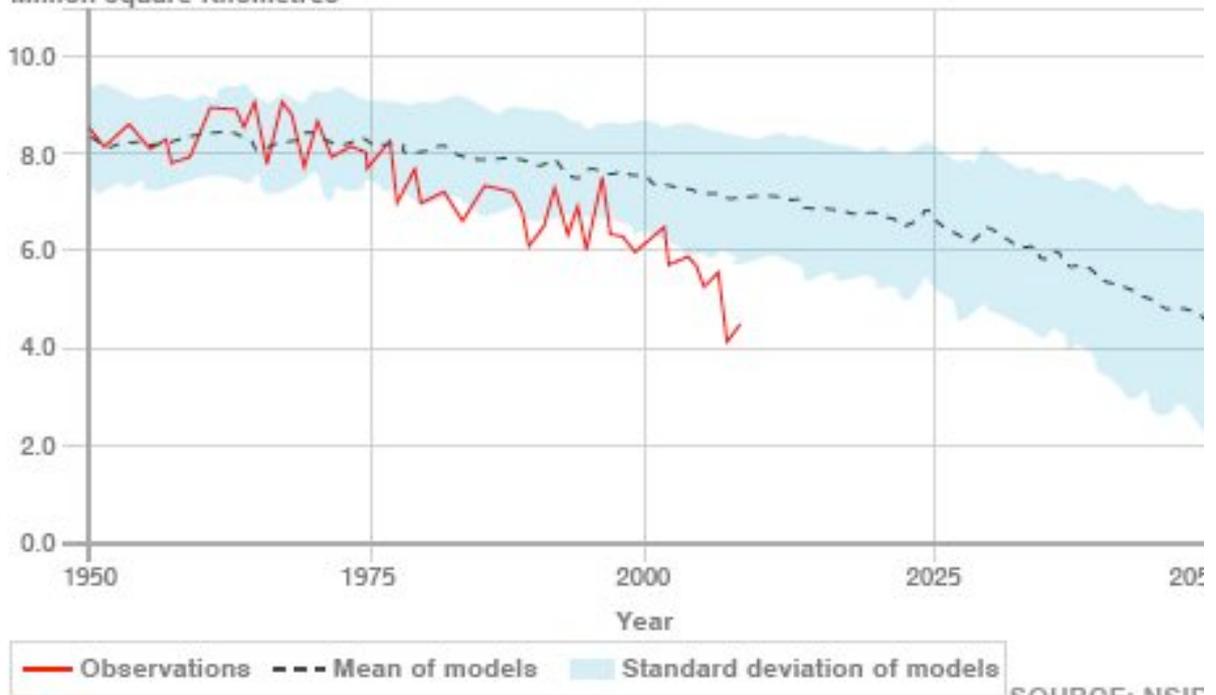
"The Arctic is really the air conditioner of the Northern Hemisphere, and as you lose that sea ice you change that air conditioner; and the rest of the system has to respond.

"You start affecting the temperature gradient between the Arctic and equator which affects atmospheric patterns and precipitation patterns.

"Exactly how this is going to play out, we really don't know yet. Our research is in its infancy."

The study reported by Dr Stroeve will be published in the journal Cryosphere in shortly.

### ARCTIC SEPTEMBER SEA ICE EXTENT Million square Kilometres



SOURCE: NSIDC

Sea ice extent (NSIDC)

Arctic sea ice is currently being lost even faster than the models predict

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