Press release

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Arctic sea ice is getting thinner as well as receding

Last winter, the thickness of sea ice in large parts of the Arctic fell by nearly half a metre (19 per cent) compared with the average thickness of the previous five winters. This followed the dramatic 2007 summer low when Arctic ice extent dropped to its lowest level since records began.

Up until last winter, the thickness of Arctic sea ice showed a slow downward trend during the previous five winters, but after the summer 2007 record low extent, the thickness of the ice also nose-dived. What is concerning is that sea ice is not just receding but it is also thinning.

Some scientists blamed the record summer 2007 ice extent low on unusually warm weather conditions over the Arctic, but this summer, sea ice extent reached the second lowest level since records began, even though the Arctic had a relatively cool summer. Dr Katharine Giles, who led the study and is based at the Centre for Polar Observation and Modelling at University College London – part of the National Centre for Earth Observation, says: "This summer's low ice extent doesn't seem to have been driven by warm weather, so the question is, was last winter's thinning behind it?"

The team of researchers, including Dr Seymour Laxon and Andy Ridout, used satellites to measure sea ice thickness over the Arctic from 2002 to 2008. Winter sea ice in the Arctic is around two and half metres thick on average. Ice thickness can be calculated from the time it takes a radar pulse to travel from a satellite to the surface of the ice and back again.

The research - reported in *Geophysical Research Letters* - showed that last winter the average thickness of sea ice over the whole Arctic fell by 26cm (10 per cent) compared with the average thickness of the previous five winters, but sea ice in the western Arctic lost around 49cm of thickness. This region of the Arctic saw the North-West passage become ice free and open to shipping for the first time in 30 years during the summer of 2007.

The team is the first to measure ice thickness throughout the Arctic winter, from October to March, over more than half of the Arctic, using the European Space Agency's Envisat satellite. Before this, Christian Haas of the Alfred Wegener Institute for Polar and Marine Research in Bremerhaven, Germany, had discovered thinner ice in a small region around the North Pole. Whilst the overall loss of older, thicker ice led researchers to speculate that Arctic sea ice had probably thinned, this is the first time scientists have been able to say for definite that the ice thinning was widespread and occurred in areas of both young and old ice.

"The extent of sea ice in the Arctic is down to a number of factors, including warm weather melting it as well as currents and the wind blowing it around, so it's important to know how ice thickness is changing as well as the extent of the ice," added Giles.

The team will continue to monitor the thickness of the ice over this coming winter. Laxon says: "We'll be keeping our eyes on the ice thickness this winter as it'll be interesting to see what happens after a second summer of low ice extent."

The Envisat satellite that provided the UCL scientists with their data doesn't cover the whole of the North Pole. Because of the satellite's orbit, there's a hole north of 81.5 degrees, which is about 600 miles shy of the North Pole. But a team, including Laxon, at the Centre for Polar Observation and Modelling has designed a satellite – CryoSat-2 – to plug this hole.

CryoSat-2 is the first radar satellite specifically designed to measure ice thickness. It will do this with greater resolution than is possible with Envisat and so will give scientists a much more detailed picture of what is happening to ice in the Arctic. CryoSat-2 is being prepared for launch at the end of 2009.

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Further information

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Drs Giles and Laxon are available for interview on 27 October 2008. They can also provide photos on request.

Notes

1. Giles, K. A., S. W. Laxon, and A. L. Ridout (2008), Circumpolar thinning of Arctic sea ice following the 2007 record ice extent minimum, *Geophys. Res. Lett.*, doi:10.1029/2008GL035710, in press (accepted 10 October 2008).

2. The work was carried out at the Centre for Polar Observation and Modelling at University College London and was partly-funded by both the Natural Environment Research Council and the European Union. The European Space Agency provided the data for this research.

3. The Centre for Polar Observation and Modelling is part of the National Centre for Earth Observation. The centre studies the ice sheets, sea ice, ocean circulation and sea level by combining satellite and field measurements with models. CPOM also provides the scientific leadership for the European Space Agency's CryoSat-2 mission. www.cpom.org.

4. Founded in 1826, UCL (University College London) was the first English university established after Oxford and Cambridge, the first to admit students regardless of race, class, religion or gender, and the first to provide systematic teaching of law, architecture and medicine. In the government's most recent Research Assessment Exercise, 59 UCL departments achieved top ratings of 5* and 5, indicating research quality of international excellence. www.ucl.ac.uk

1. The National Centre for Earth Observation (NCEO), created on 1 April 2008, uses data from earth observation satellites to monitor global and regional changes in the environment to develop a detailed understanding of the natural world, so that we might predict future environmental conditions. The NCEO, under the directorship of Professor Alan O'Neill (University of Reading), is a partnership involving 26 universities and Research Centres and more than 100 scientists and is carrying out research in a wide range of areas including climate change, glaciology, tectonics and the carbon cycle. The NCEO also includes technology development, mission support and advises NERC on its national and international investments in earth observation.

5. The Natural Environment Research Council (NERC) funds world-class science, in universities and its own research centres, that increases knowledge and understanding of the natural world. It is tackling major environmental issues such as climate change, biodiversity and natural hazards. NERC receives around £400m a year from the government's science budget, which is used to provide independent research and training in the environmental sciences. www.nerc.ac.uk

6. The Natural Environment Research Council is a member of the British National Space Centre, which is at the heart of UK efforts to explore and exploit space. BNSC is a partnership of seven Government Departments, two Research Councils, the Met Office and the Technology Strategy Board. It co-ordinates UK civil space activities and represents the UK at the European Space Agency. www.bnsc.gov.uk