New Antarctic sea ice record—but scientists aren't 'confounded'

September 15 2014, by James Whitmore

Sea ice on the Ross Sea - part of Antarctica where the ice is increasing. Credit: Brian Stetson/Flickr, CC BY-NC-SA

Antarctic winter sea ice has once again broken the record for maximum extent. On September 12, the coverage measured 19.619 million square kilometres, the highest since satellite records began.

The ice has broken daily records on about 150 days this year, indicating

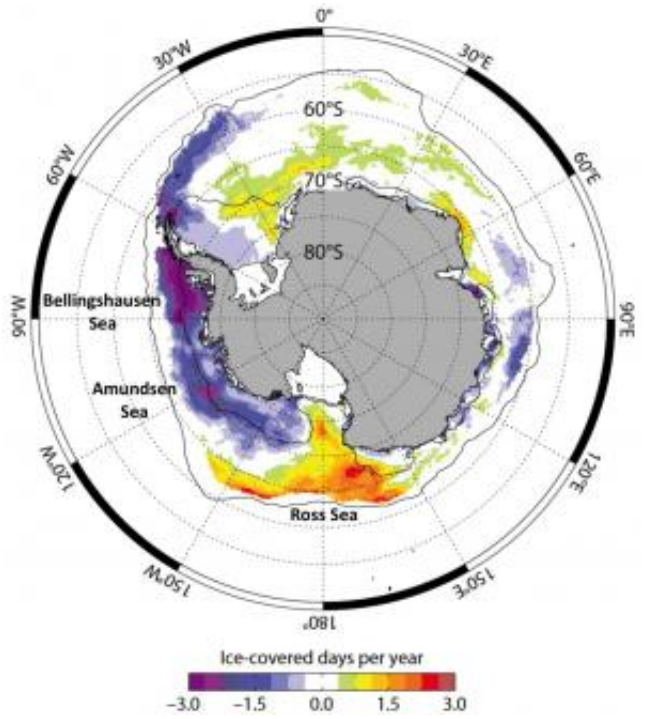
consistently greater coverage than in previous years. With several weeks of growth still to go, more records could fall.

2014 is the third year in a row that the ice has broken the maximum extent record. In 2013 the sea ice reached 19.47 million square km, 3.6% above the average for 1981-2010. The records continue a weak trend towards greater sea ice cover, which evidence suggests is linked to increasing greenhouse gases and climate change.

Dr Guy Williams, a sea ice specialist at University of Tasmania who has previously written on The Conversation, said the new records add to an "exciting" puzzle for climate scientists. Each record-breaking year is different due to variations in seasonal weather and ocean conditions—"it's those differences that will tell us something."

Total sea ice extent is not the full story either. The weak positive trend masks declines in some regions, and increases in others. Parts of the Antarctic—particularly to the west of the Antarctic Peninsula—show a very large decline in sea ice. In other regions, such as the Ross Sea, sea ice is increasing.

There are also as yet no published data on sea ice volume—a much better measure of whether sea ice is increasing or decreasing.



Trends in sea ice duration, 1979-2010, showing large regional variations. Figure from Maksym et al. 2012. Credit: Guy Williams

Two suspects: wind and water

There are two main hypotheses to explain the changes in Antarctic sea ice. The first is that westerly winds, which flow around Antarctica, are speeding up and shifting south. Counter-intuitively, this drives sea ice further north.

Scientists have shown that there is a direct link between the winds shifting south and increasing greenhouse and ozone-depleting gases, and a link between the winds and increasing sea ice cover, but not as yet a link between all three.

Dr Williams said so far this year the hypothesis checks out—atmospheric patterns, comparable to El Niño that affects the

Pacific Ocean, mean the westerly winds are further south than normal.

The other hypothesis is that melt water from Antarctica's melting glaciers and ice sheets is making it easier for sea ice to form. As the ice melts, cold, fresh water pours into the surrounding ocean. Colder and fresher surface water freezes more easily, and also reduces the heat from deeper in the ocean reaching the surface.

Dr Williams said scientists investigating satellite-derived sea surface temperatures in the Ross Sea—where sea ice is increasing—are reporting that the surface water has indeed been colder this year.

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