Ice sheets of West Antarctica are warming fast

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THE ice sheets of West Antarctica are warming much faster than we thought, suggesting swathes of it could melt and send global sea levels soaring.

Climatologists have struggled to work out whether Antarctica is warming, and how quickly, because it has few weather stations and the records from some are incomplete.

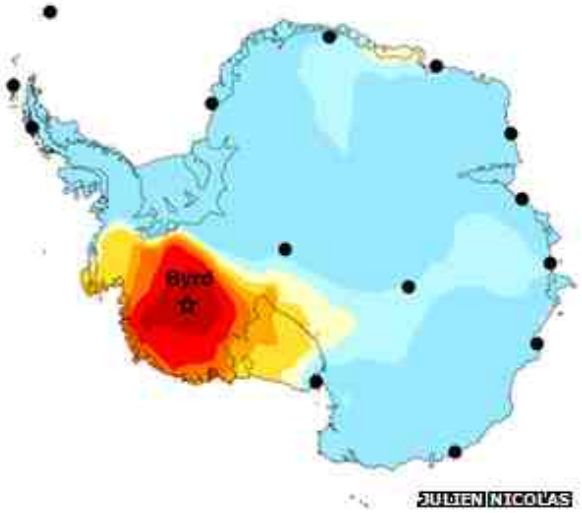
David Bromwich of Ohio State University in Columbus and his colleagues filled in the gaps for one key station using statistics and data from a climate model. They conclude that temperatures since 1958 have risen about 0.46 °C per decade - more than twice as fast as previously thought (*Nature Geoscience*, doi.org/j351).

But Michael Mann at Penn State University in University Park says that warmer ocean water flooding in underneath the sheet poses a greater threat.

23 December 2012 Last updated at 18:15 GMT

West Antarctic Ice Sheet warming twice earlier estimate

By Matt McGrath Environment correspondent, BBC News



The data from Byrd Station shows rapid warming on the west Antarctic ice sheet

A new analysis of temperature records indicates that the Western Antarctic Ice Sheet is warming nearly twice as fast as previously thought.

US researchers say they found the first evidence of warming during the southern hemisphere's

summer months.

They are worried that the increased melting of ice as a result of warmer temperatures could contribute to sea-level rise.

The study has been published in the journal Nature Geoscience.

The scientists compiled data from records kept at Byrd station, established by the US in the mid-1950s and located towards the centre of the West Antarctic ice sheet (WAIS).

Previously scientists were unable to draw any conclusions from the Byrd data as the records were incomplete.

The new work used a computer model of the atmosphere and a numerical analysis method to fill in the missing observations.

The results indicate an increase of 2.4C in average annual temperature between 1958 and 2010.

"What we're seeing is one of the strongest warming signals on Earth," says Andrew Monaghan, a co-author and scientist at the US National Centre for Atmospheric Research.

"This is the first time we've been able to determine that there's warming going on during the summer season." he added.

Top to bottom
It might be natural to expect that summers even in Antarctica would be warmer than other times of the year. But the region is so cold, it is extremely rare for temperatures to get above freezing.

"This place has very variable weather, some of it is influenced by human acts and some of it isn't ”

Prof David Bromwich Ohio State University

According to co-author Prof David Bromwich from Ohio State University, this is a critical threshold.

"The fact that temperatures are rising in the summer means there's a prospect of WAIS not only being melted from the bottom as we know it is today, but in future it looks probable that it will be melting from the top as well," he said.

Previous research published in Nature indicated that the WAIS is being warmed by the ocean, but this new work suggests that the atmosphere is playing a role as well.

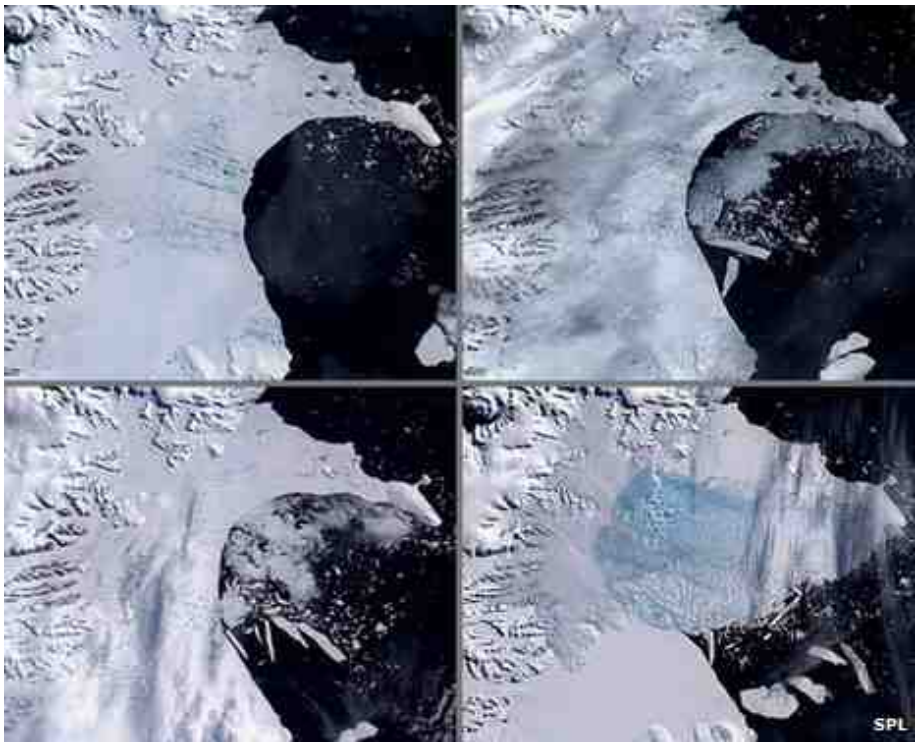
The scientists say that the rise in temperatures has been caused by changes in winds and weather patterns coming from the Pacific Ocean.

"We're seeing a more dynamic impact that's due to climate change that's occurring elsewhere on the globe translating down and increasing the heat transportation to the WAIS." said Dr Monaghan.

But he was unable to say with certainty that the greater warming his team found was due to human activities.

"The jury is still out on that. That piece of research has not been done. My opinion is that it probably is, but I can't say that definitively."

This view was echoed by Prof Bromwich, who suggested that further study would be needed.



The Larsen B ice shelf collapsed in just a month in 2002

"The tasks now are to look at the relative contributions of natural variability," he said.

"This place has very variable weather - some of it is influenced by human acts and some of it isn't. I think its premature to answer that question right now."

Whatever the source, the researchers are concerned that this warming can lead to more melting and have direct and indirect effects on global sea levels. The direct impacts are the run-off of melting waters into the sea.

But the scientists say this is unlikely to happen for several decades because much of the water is likely to percolate down the ice sheet and refreeze.

Glacial pace

The indirect effect is that it can "pre-condition" the ice shelves that float at the edges of the ice sheet. The scientists say that this is what happened in 2002 on the Antarctic peninsula when the Larsen B shelf collapsed spectacularly in just a month.

"The melt water went down into the crevasses and filled them up," Dr Monaghan said.

"Just like a pothole in the road in wintertime, the water will freeze and expand and break it apart."

He is concerned that a similar situation could now occur on the WAIS.

"What we saw after the breakup of Larsen was that the glaciers that were buttressed by the ice

shelves sped up tremendously, by a factor of eight. That's a potential concern of the enhanced melt in west Antarctica if the warming trend we find in summer continues."

The authors say they are confident that the data from Byrd Station is representative of the region because the scientific outpost sits on a plateau and conditions are essentially uniform for a considerable distance.

Antarctica warming at triple speed

By Steve Connor

5:30 AM Thursday Dec 27, 2012

New fears around rising sea levels after study finds thawing is faster than estimated.

Rising temperatures cause huge ice blocks to slide off the continent into the sea, raising water levels, scientists say. Photo / Thinkstock
Temperatures in the western part of Antarctica are rising almost twice as fast as previously believed, adding to fears that continued thaws are causing sea levels to rise, according to comprehensive research published this week.

In a discovery that raises new concerns about the effects of climate change on the South Pole, the average annual temperature in the region has risen by 2.4C since the 1950s, three times faster than the average around the world.

The unexpected jump was discovered after David Bromwich, professor of geography at Ohio State University, led a research team to the previously uninhabited Byrd Station research centre 1800km from the South Pole in the heart of West Antarctica.

Their research claims that original estimates, which were half those revealed this week, were based on faulty data. They found that nearly one third of temperature observations had been missing for the past 60 years due to regular power outages and limited resources. Professor Bromwich and the study's co-author, Andrew Monaghan, went back over the outpost's findings since it opened in 1957, reassessing previous predictions and modelling atmospheric changes.

The link between rising temperatures and rising sea levels is based on the principle of displacement. In this instance, the 2.4C rise has added to worries that huge blocks of ice could slide into the ocean, causing the surrounding seas to rise to accommodate new icebergs.

Several ice shelves - thick ice blocks attached to the land at one end - have already collapsed around the Antarctic Peninsula, an area just to the north of the Byrd Research Centre. Once these shelves break up, glaciers trapped behind them can slide faster into the sea, raising water levels.

Professor Bromwich said: "Our record suggests that continued summer warming in West Antarctica could upset the surface mass balance of the ice sheet, so that the region could make an even bigger contribution to sea level rise than it already does."

The region contains enough ice to raise sea levels by at least 3.3m if it all melted, a process that would likely take centuries. But, according to these findings, it is now the second largest contributor to global rises with 0.3mm a year to Greenland's 0.7mm.Independent

By Steve Connor

Global sea levels rising faster than expected - report

By Josh Martin

6:53 PM Friday Nov 30, 2012

The world's oceans are already rising faster than projected, according to a new report this week.

The latest report found levels were above projected levels that were released by the UN Intergovernmental Panel on Climate Change (IPCC) in 2007.

Authors Stefan Rahmstorf, Grant Foster and Anny Cazenave found the rate of sea-level rise of the past few decades was greater than projected by the IPCC models.

Their work, published in *Environmental Letters* this week, concluded that IPCC sea-level projections for the future may also be biased low.

The trio analysed global temperature and sea-level data over the past few decades and compared them to projections published in the third and fourth assessment reports of the IPCC.

They wrote that their concern was supported by the fact that the ice sheets in Greenland and Antarctica were increasingly losing mass.

The study was released in the same week as a United Nations report found 2012 temperatures were the ninth highest on record since 1850, despite the effect of La Niña weather patterns which cool the earth's atmosphere.

The next IPCC report, on the state of the earth's climate and necessary reposnses to climate change, is due out in 2013-2014.

By Josh Martin