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## SCIENCE & SPACE

# Study: Current that warms Europe weakening

Change could cause dramatic temperature drop

By David Williams  
CNN

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**(CNN) -- The Atlantic Ocean's flow between the tropics and cold, northern waters appears to be weakening, which could drastically alter the weather in Europe, a newly released study shows.**

The findings, published in the journal Nature, found that the Atlantic Conveyor flow slowed by about 30 percent between 1957 and 2004.

The cycle of flow, technically known as the "Atlantic meridional overturning current," plays a key role in warming northern Europe.

This conveyor belt process "brings heat northward, gives it up to the atmosphere, and we benefit in England from having the winds pick up this heat and blow ... relatively warmer air over us," said oceanographer Harry Bryden, one of the study's authors. "So that's what gives us a good climate even in wintertime in England."

Bryden said that climate models suggest that if the Atlantic Conveyor shut down, temperatures in northwest Europe could drop by 4 to 6 degrees Celsius, or about 10 degrees Fahrenheit, in 20 years.



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The Atlantic Conveyor works because the cold water of the North Atlantic gets saltier and more dense, causing it to sink to the bottom of the ocean and flow south.

Warmer surface water then flows north from the tropics until it gets cold and sinks. Then the process starts over.

"Overall, there was a reduction in the net northward transport of warm upper waters, and a reduction also in the net amount of southward transport of cold, deep waters," Bryden said.

Scientists have predicted that global warming could disrupt the current. Melting ice caps would add freshwater to the ocean, which would reduce seawater salinity, which in turn reduces seawater density. Less dense water would reduce the flow.

Bryden said his study did not look at the cause of the increase of freshwater.

"I think it's a really important paper," said Jean Lynch-Stieglitz a professor of Paleoclimatology and Paleoceanography at the Georgia Institute of Technology. "Basically what he's saying is that there is a hint that there may be a change in the overturning circulation of the Atlantic under way. The caveat is that the uncertainty associated with his finding is still extremely large.

"It's pointing the way forward that this is something that may be happening, and we've really got to pay attention," she said.

The findings were based on measurements taken in the same area of the ocean in 1957, 1981, 1992, 1998 and 2004.

The study said that having constant data would help reduce the margin of error in their findings.

"There are definitely some uncertainties associated with the measurements, but they are convincing enough that one should focus on the change and take them into account," said Eric P. Chassignet, a professor of Meteorology and Physical Oceanography at the University of Miami.

"It is also consistent with some of the scenarios that have been put forward as far as climate change and the impact on circulation in the Atlantic Ocean," he said.

Bryden said that more measurements were needed.

"It is such an important current that carries so much heat northward and is responsible for an equitable climate in northwestern Europe that we must begin to understand what the variability is in this overturning circulation," he said.

Bryden said that change in Europe's climate could be substantial but would not be the sudden shift depicted in last year's blockbuster disaster film "The Day After Tomorrow."

"I mean the dramatic, rapid climate that occurred over maybe 10 days is not realistic at all," he said. "Whether that time scale of climate change could occur over 20 years is, I think, not outrageous. But it is not going to happen catastrophically within a week."

Lynch-Stieglitz said that climate models suggested that the temperature changes would be most dramatic in the area where the cold water sinks, known as the deepwater convergence. That's why Europe would feel the largest temperature change.

"So the changes outside of the regions of deepwater formation, in temperature, would be pretty subtle," she said. "But recent model results suggest that those subtle temperature changes could cause changes in, say, the precipitation bands in the tropics."

She said that rainy areas could become dry, while drier areas could get more rain.

If the Atlantic conveyor belt were to break down, many scientists say it could trigger an ice age in which northern Europe comes to resemble Siberia. The data in this study suggest the

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conveyor belt is not breaking, but it is slowing down.

CNN's Kate Tobin contributed to this report.

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