

that Europe suffered a few centuries ago. The North Atlantic will not freeze over, and English Channel ferries will not have to plow their way through sea ice....Instead of creating catastrophe in the North Atlantic region, a slowdown in thermohaline circulation would serve to mitigate the expected anthropogenic warming!²

Similarly, Seager questions the theory that a shutdown of the THC triggered the Younger Dryas, the mini-ice age of “10,000 years ago” or so, to which Gore refers. Some scientists have speculated that a sudden release of fresh water into the Labrador Sea, following the collapse of a giant ice dam in North America, shut down the THC and caused the Younger Dryas. “But,” says Seager, “the Younger Dryas was not a purely North Atlantic phenomenon: Manifestations of it also appeared in the tropical and southern Atlantic, in South America, and in Asia.” Moreover, “evidence has emerged that the Younger Dryas began long before the breach that allowed freshwater to flood the North Atlantic.”³

Even if a freshening of the North Atlantic did shut down THC thousands of years ago, the recurrence of such an event today is highly implausible. The rupture of the Laurentide ice dam allowed more than 100,000 cubic kilometers of fresh water to pour into the North Atlantic.⁴ The rate of fresh water infusion from Greenland today is a comparative trickle. According to a study in *Science*, in 2005, Greenland is shedding ice at a rate of 224±41 cubic kilometers per year.⁵

Northern Hemisphere climate during the last interglacial period (roughly 130,000 to 118,000 years ago) was relatively stable, even though Greenland experienced summertime temperatures 4°C-5°C warmer than the present for several millennia, and even though sea levels rose to several meters higher than present.⁶ These conditions may eventually have produced a “deep-water reorganization” that began the transition to the next ice age—but only after 8,000 years of comparative climate stability.⁷

Is the THC slowing down? Bryden et al. (2005)⁸ found that it is, but Meinen et al. (2006)⁹ and Schott et al. (2006)¹⁰ found that it isn't. There certainly is no indication that Europe is cooling due to any modification of the THC.

Finally, Gore conflates the THC with the Gulf Stream. The THC is a convective system driven chiefly by the sinking of dense (cold and salty) surface water in the high northern latitudes. The Gulf Stream, on the other hand, is a wind-driven system. It is energized primarily by the Earth's spin and secondarily by the lunar tides, not by salinity levels in the oceans. As one scientist put it, the Gulf Stream is safe as long as the Earth turns and the wind blows.¹¹ Thus, even in climate models that project a weakening of the THC in the 21st century, Europe continues to warm, “albeit more slowly than the rest of the world.”¹²

¹ Seager, R., D.S. Battisti, J. Yin, N. Gordon, N. Naik, A.C. Clement, and M.A. Cane. 2002. Is the Gulf Stream responsible for Europe's mild winters? 2002. *Quarterly Journal of the Meteorological Society* 128: 2563-2586.

² Richard Seager, "The Source of Europe's Mild Climate: The notion that the Gulf Stream is responsible for keeping Europe anonymously warm turns out to be a myth," *American Scientist*, Volume 94, pp. 340-341.

³ Seager, "The Source of Europe's Mild Climate," p. 339.

⁴ Barber, D.C., A.S. Dyke, C. Hillaire-Marcel, J.E. Jennings, J.T. Andrews, M.W. Kerwin, G. Bilodeau, R. McNeely, J. Southon, M.D. Morehead, and J.M. Gagnon. 1999. Forcing of the Cold Event 8200 years ago by catastrophic Drainage of the Laurentide Lakes. *Nature*, vol. 400, no. 22, p. 344-348, http://cgc.rncan.gc.ca/c14/cold_event_e.php

⁵ Rignot, E. and P. Kanagaratnam. 2006. Changes in the Velocity Structure of the Greenland Ice Sheet. *Science* 311: 986-990.

⁶ Otto-Bliesner, B.L., S.J. Marshall, J.T. Overpeck, G.H. Miller, and A. Hu. 2006. Simulating Arctic Climate Warmth and Icefield Retreat in the Last Interglaciation. *Science* 311: 1751-1753.

⁷ Adkins, J.F., E.A. Boyle, L. Keigwin., and E. Cortijo. 1997. Variability of the North Atlantic thermohaline circulation during the last interglacial period. *Nature* 390: 154-156.

⁸ Bryden, H.L., H.R. Longworth, and S.A. Cunningham. 2005. Slowing of the Atlantic meridional overturning circulation at 25°N. *Nature*, **438**, 655-657.

⁹ Meinen, C. S., M.O. Baringer, and S.L. Garzoli. 2006. Variability in Deep Western Boundary Current transports: Preliminary results from 26.5° N in the Atlantic. *Geophysical Research Letters*, **33**, L17610, doi:10.1029/2006GL026965.

¹⁰ Schott, F. A., J. Fischer, M. Dengler, and R. Zantopp. 2006. Variability of the Deep Western Boundary Current east of the Grand Banks. *Geophysical Research Letters*, **33**, L21S07, doi:10.1029/2006GL026563.

¹¹ Wunsch, C. 2004. Gulf Stream safe if wind blows and earth turns. *Nature* 428: 8.

¹² Pew Center on Global Climate Change. "The Day After Tomorrow: Could It Really Happen?" <http://www.pewclimate.org/dayaftertomorrow.cfm#6>.