

Why did the Younger Dryas Occur?

Many hypotheses have been proposed to explain the Younger Dryas event. Climatologist Wallace Broecker and his colleagues proposed one of the most famous hypotheses in 1985. Broecker noted that the Younger Dryas happened at the end of the last ice age. A glacier sheet, called the Laurentide Ice Sheet, which covered most of Canada and parts of the northern United States, was melting and retreating. Melt water from the retreating ice sheet formed a large lake, called Lake Agassiz, which was bigger than all of the modern Great Lakes combined. It spanned northern Minnesota and North Dakota as well as southern Manitoba and Ontario. As the ice sheet retreated to the north, it opened a drainage route to the east through the St. Lawrence River for the water of Lake Agassiz. The water suddenly was able to drain down the St. Lawrence River and into the North Atlantic Ocean (see Figure 1).

Broecker proposed that this input of freshwater could have altered the salinity of surface water in the North Atlantic, leaving it too light to sink. Without the constant sinking of water in the North Atlantic, warm currents would not have been pulled up from the tropics and Northern Europe would have been deprived of one of its major heat sources. The thermohaline conveyor belt may have slowed or deep water formation may have shifted further south. Some people who support Broecker's hypothesis also suggest that a shift in the conveyor belt would have had climate repercussions around the world.

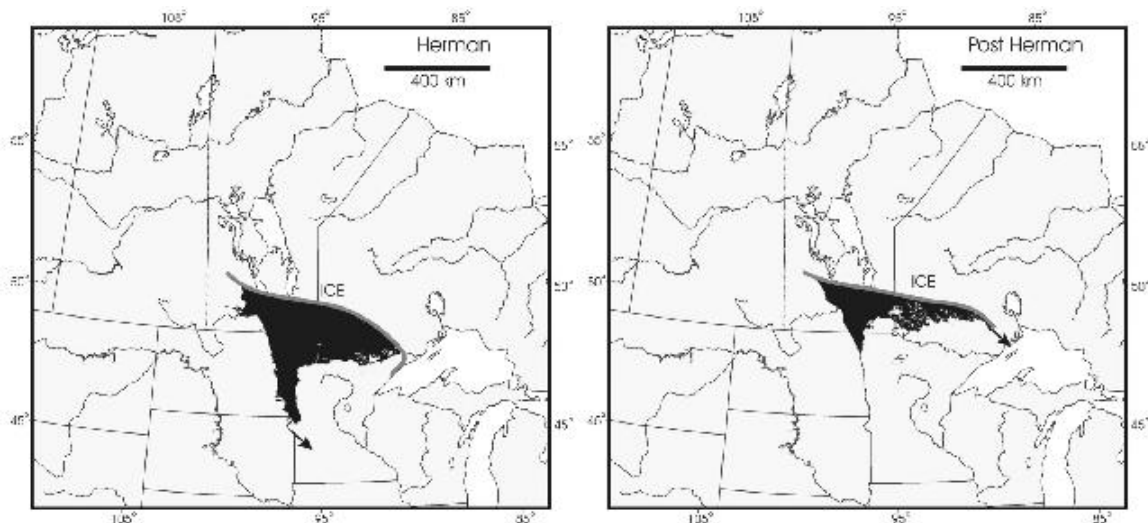


Figure 1: (Left) Lake Agassiz before it was able to drain through the St. Lawrence river. At that time its outlet was to the south into the Mississippi drainage. (Right) The outline after the opening of the eastward outlet.

[Broecker](#) *Science* 300 (5625): 1519-1522 JUN 6 2003.

<http://www.ldeo.columbia.edu/res/pi/arch/examples.shtml#R2>