

18.1 Lake Agassiz: A Lesson for the Present from the Distant Past

Background: Towards the end of the last Ice Age, between 12,000 and 8,000 years ago, a cold fresh glacial melt water lake was trapped on an ice shelf above what is now Minnesota and Manitoba in southern Canada. Between 8,400 and 8,200 years ago water from Lake Agassiz broke through an ice barrier and drained into Hudson Bay. As the cold fresh water flowed into the North Atlantic, sea levels rose by as much as nine feet. Even more catastrophic for agrarian communities in far away Mesopotamia were shifts in ocean currents causing prolonged cooling and droughts that destroyed crops and with them early civilizations. The draining of Lake Agassiz may be the origin of flood myths in early cultures, including the Biblical story of Noah and the Sumerian Epic of Gilgamesh. Some scientists believe that a relatively rapid melting of the Greenland ice cap today or in the near future would have a similar impact on climate and human civilization.



Questions

1. What was the impact of the draining of Lake Agassiz?
2. What is happening to the Greenland ice sheet?
3. What will be the impact of this change?
4. In your opinion, what are the lessons from the distant past that will help scientists understand the present?

Greenland's Melting Ice Nears a 'Tipping Point,' Scientists Say

By John Schwartz, NYT, January 22, 2019: A9

<https://www.nytimes.com/2019/01/21/climate/greenland-ice.html?action=click&module=News&pgtype=Homepage>

A. Greenland's enormous ice sheet is melting at such an accelerated rate that it may have reached a "tipping point," and could become a major factor in sea-level rise around the world within two decades, scientists said in a study published on Monday. The Arctic is warming at twice the average rate of the rest of the planet, and the new research adds to the evidence that the ice loss in Greenland, which lies mainly above the Arctic Circle, is speeding up as the warming increases. The authors found that ice loss in 2012, more than 400 billion tons per year, was nearly four times the rate in 2003. After a lull in 2013-14, losses have resumed.

B. The study is the latest in a series of papers published this month suggesting that scientific estimates of the effects of a warming planet have been, if anything, too conservative. Just a week ago, a separate study of ice loss in Antarctica found that the continent is contributing more to rising sea levels than previously thought. Another new analysis suggested that the oceans are warming far faster than earlier estimates. Warming oceans are currently the leading cause of sea-level rise, since water expands as it warms. Researchers said these findings underscored the need for action to curb emissions of planet-warming gases and avoid the worst effects of climate change.

C. Rising sea levels are one of the clearest consequences of global warming; they are caused both by thermal expansion of the oceans and by the melting of ice sheets on land. Current projections say that if the planet warms by two degrees Celsius (3.6 degrees Fahrenheit) over preindustrial times, average sea levels will rise by more than two feet, and 32 to 80 million people will be exposed to coastal flooding.

D. Much of the previous research on Greenland's ice has dealt with the southeast and northeast parts of the island, where large chunks of glacial ice calve into the sea. The new paper focuses on the ice-covered stretches of southwest Greenland, which has few large glaciers and was not generally considered as important a source of ice loss. But as the earth warms, the paper concludes, the vast plains of southwestern ice will increasingly melt, with the meltwater flowing to the ocean. Within two decades, it says, the region "will become a major contributor to sea level rise."