

## Thème 2 : Enjeux contemporains de la planète

T2-B. Les climats de la Terre : comprendre le passé pour agir aujourd'hui et demain

### Arctic Ice Melt Is Changing Ocean Currents

**With the help of the documents, show how climate change can affect Ocean Currents.**

#### Document 1 – A major ocean current in the Arctic, the Beaufort Gyre,

*A new study from NASA by Rexana Vizza / Matthew Segal  
Jet Propulsion Laboratory, Pasadena, Calif., February 6, 2020*

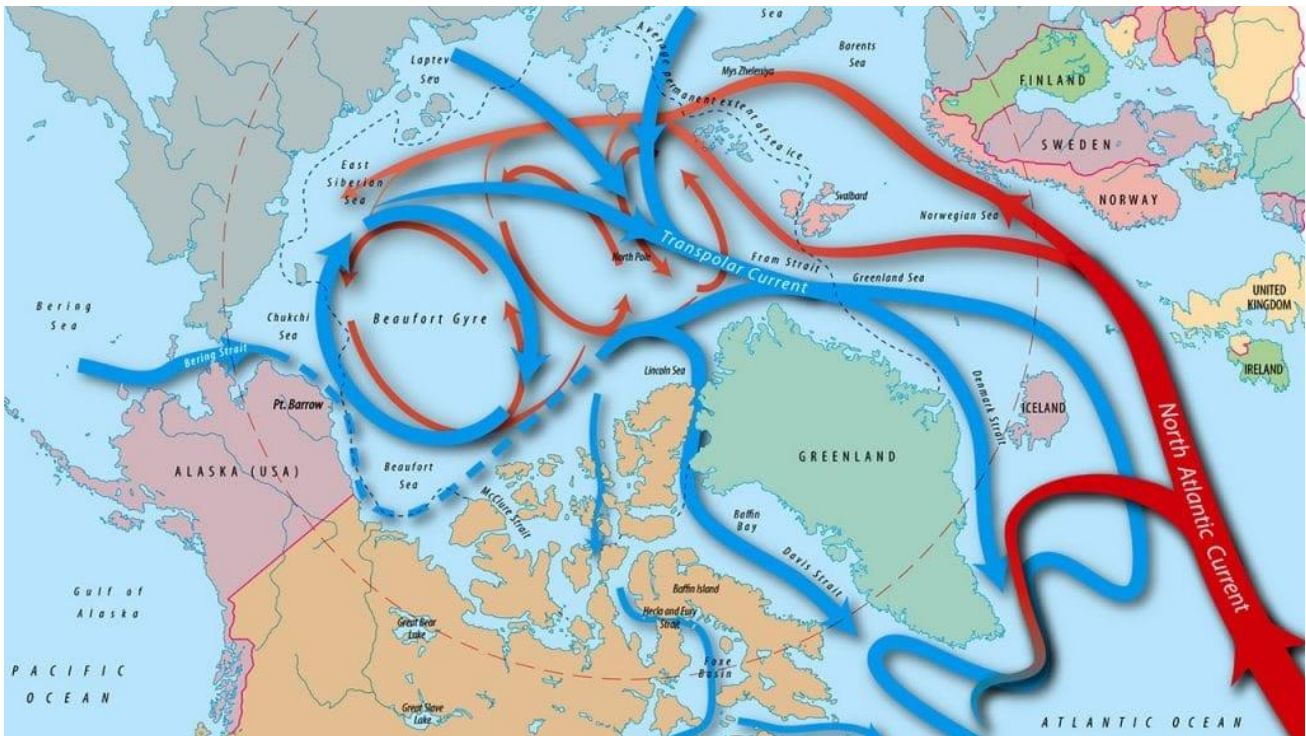
Scientists have measured how this circular current, called the Beaufort Gyre, has balanced an influx of unprecedented amounts of cold, fresh water — a change that could alter the currents in the Atlantic Ocean and cool the climate of Western Europe.

The Beaufort Gyre keeps the polar environment in equilibrium by storing fresh water near the surface of the ocean. Wind blows the gyre in a clockwise direction around the western Arctic Ocean, north of Canada and Alaska, where it naturally collects fresh water from glacial melt, river runoff and precipitation. This fresh water is important in the Arctic in part because it floats above the warmer, salty water and helps to protect the sea ice from melting, which in turn helps regulate Earth's climate. The gyre then slowly releases this fresh water into the Atlantic Ocean over a period of decades, allowing the Atlantic Ocean currents to carry it away in small amounts.

But since the 1990s, the gyre has accumulated a large amount of fresh water 8,000 cubic kilometers — or almost twice the volume of Lake Michigan. The new study, found that the cause of this gain in freshwater concentration is the loss of sea ice in summer and autumn. This decades-long decline of the Arctic's summertime sea ice cover has left the Beaufort Gyre more exposed to the wind, which spins the gyre faster and traps the fresh water in its current.

Fresh water released from the Arctic Ocean to the North Atlantic can change the density of surface waters. Normally, water from the Arctic loses heat and moisture to the atmosphere and sinks to the bottom of the ocean, where it drives water from the north Atlantic Ocean down to the tropics like a conveyor belt.

**Document 2 : Delicate balance of the complex circulation in the Arctic system, including a dramatic reduction in sea ice cover and a weakening of the Beaufort Gyre circulation system.**



*from <https://climate.nasa.gov/news/2950/arctic-ice-melt-is-changing-ocean-currents/>  
Credit: NASA/Kathryn Hansen*