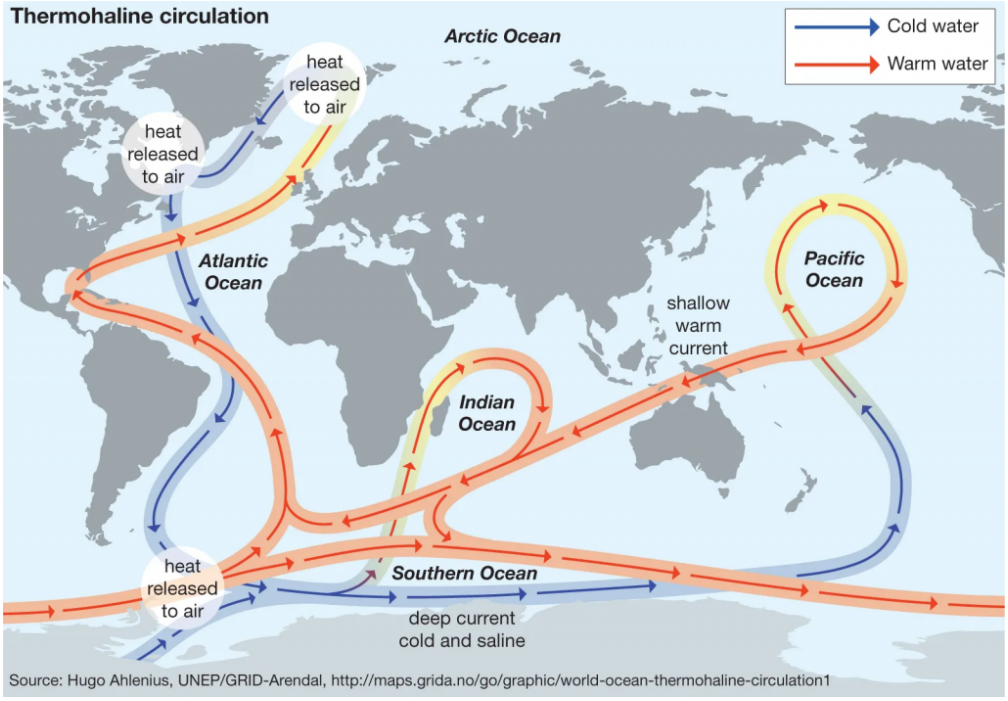
Atlantic Meridional Overturning Circulation (AMOC)

Prelims: *Current events of National & International importance | Geography*

Why in News?

A recent study suggests that building a massive 50-mile dam across the Bering Strait could, in theory, help stabilise the AMOC, a critical ocean current system that regulates global climate.

- **AMOC** – It is a *massive system of ocean currents* that moves warm water north and cold water south, acting like a "*global conveyor belt*."
- It regulates climate by distributing heat and nutrients, but scientists warn it is *weakening due to climate change*, which could disrupt rainfall, raise sea levels, and cool Europe.
- **Working**
- **Surface currents** – It transports warm, salty surface water from the tropics toward Europe via the Gulf Stream and the North Atlantic Current.
- As it reaches Europe, it releases heat into the air and helps moderate the weather in Britain and the Nordic countries.
- **Deep currents** – In the process, the water cools, sinks in the Arctic, forming the North Atlantic Deep Water (NADW) and heads back southwards.
- It goes on to influence rainfall patterns in Africa, South America and beyond.
- **Global link** – These currents connect with the Antarctic Bottom Water (AABW) and circulate through the Indian and Pacific Oceans.



- **Driving Forces** – The system is driven by *thermohaline circulation*, which depends on differences in temperature & salinity of the water.
- **Carbon & Nutrients** – It plays a vital role in the global carbon cycle by *sequestering carbon from the atmosphere into the deep ocean* and circulating nutrients that support marine life.
- **Disruption/Weakening due to Climate Change** – The warming from greenhouse gases in the atmosphere is disrupting this system.
- Rising temperatures make the Arctic wetter.
- Greenland's ice sheet melts, adding fresh water to the North Atlantic.
- This fresh water dilutes the saltiness, making the surface less dense.
- Without enough density, the water doesn't sink properly, slowing the circulation, which in turn causes it to draw less warm water northward from the tropics.
- **Impact of weakening of AMOC** – If the AMOC were to stop completely -
    - **Northern Europe** would lose its warming influence and become much colder.
    - **U.S. East Coast** sea levels would rise as water shifts westward.
    - **Tropical regions** would see rainfall patterns change—some areas drying out, others flooding more.

References

1. Indian Express | Recent study published about weakening of AMOC
2. Britannica | AMOC
3. NOAA | AMOC

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