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MAD- 2020
GEOGRAPHY
Day – 41

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Question:

Atlantic Meridional Overturning Circulation (AMOC) was in news due to rising temperature in the Indian Ocean, Define what is AMOC along with its significance and how it will be affected by the rising temperatures in the Indian Ocean.

Structure

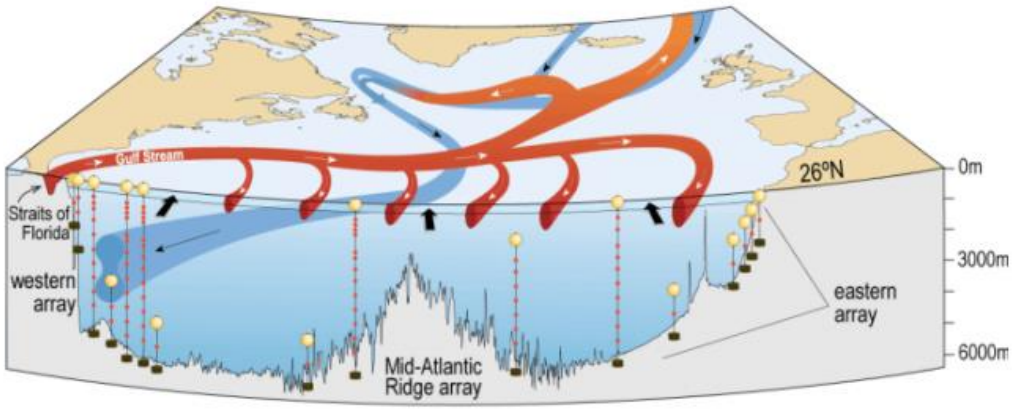
Introduction - What is Atlantic Meridional Overturning Circulation (Draw the relevant diagram alongside)

Body - Significance of AMOC

Conclusion - How it will be affected by the rising temperature in the Indian Ocean.

Answer:

- AMOC is a large system of Ocean Currents that transport warm water from the tropical Atlantic Ocean north towards the Arctic. The circulation is driven by differences in the water density, caused by differences in temperature and salinity.
- When the warm water reaches the North Atlantic it cools and its salinity increases, this denser water then sinks and slowly moves southwards, back to tropics, where it is warmed and the circulation continues.



Significance of AMOC

- One of the Earth's largest water circulation systems where ocean currents move warm, salty water form the tropics to regions further north, such as Western Europe and sends colder water south.
- Part of the Earth's largest water circulation system known as Thermohaline circulation.
- Aids in distributing heat and energy around the earth and help in maintaining the Earth's heat budget.
- Acts as carbon sink by absorbing and storing atmospheric carbon.

However in the recent decades it has been observed that AMOC has been weakening due to increasing supply of glacial melt water into the North Atlantic with fresh water reducing the salinity and density of

the surface water which is then unable to sink southwards. This whole process is being disrupted by the climate change.

- This change can have a drastic impact on Europe and parts of Atlantic Rim along with African and Indian monsoon rainfall, atmospheric circulation of relevance of hurricanes and climate over North America and Western Europe.

As the temperature of the Indian Ocean rises, it is likely to boost a system of currents in the Atlantic Ocean. As the tropical Indian Ocean warms, increased evaporation of the surface water leads to a rise in rainfall along with heat release. This influences local airflow and strengthens the tropical atmospheric circulation.

In the Atlantic Ocean these changes in the atmospheric circulations strengthen the cross equatorial winds and lower the sea surface temperature, leading to atmospheric changes that reduce rainfall, this rainfall reduction increases surface water salinity and thus density and over time more water is being transported by the AMOC to the northern Atlantic, increased volume of water accelerates the deep water convection currents due to which AMOC gets stronger.