



The Issue of the Warming Atlantic

With oceans absorbing more than 93% of global warming, marine heatwaves are becoming hotter and larger and are lasting longer. Scientists say the trend has major ecological consequences, from altering fish and plant populations to forcing whales into hazardous waters.

The effects of climate change on oceans include the rise in sea level from ocean warming and ice sheet melting, and changes in pH value (ocean acidification), circulation, and stratification due to changing temperatures leading to changes in oxygen concentrations. There is clear evidence that the Earth is warming due to anthropogenic emissions of greenhouse gases and leading inevitably to ocean warming. The greenhouse gases taken up by the ocean (via carbon sequestration) help to mitigate climate change but lead to ocean acidification.

In an alert that warmer seas helped to fuel a record Atlantic hurricane season last year, along with intense tropical cyclones in the Indian and South Pacific Oceans, the World Meteorological Organization (WMO) also underscored the long-term threat from sea level rise.

According to the UN agency, the “blue economy” is estimated at \$3-6 trillion a year, accounting for more than three quarters of world trade and providing livelihoods for more than six billion people.

Despite technological advances that have revolutionized ocean monitoring globally and helped to understand its link to weather and climate, the UN agency cautioned that “big geographical and research gaps” remain in the Global Ocean Observing System, amid increasing demand for forecasts and services.

The COVID-19 crisis made matters worse when in March 2020, governments and oceanographic institutions recalled nearly all oceanographic research vessels home. “It also reduced the capacity of commercial ships to contribute vital ocean and weather observations,” WMO said. “Ocean buoys and other systems could not be maintained, in some cases leading to their premature failure.”

Sea level has risen by around 15 centimetres during the 20th century, according to WMO, from glacier melt, the expansion of warmer sea waters and additions from former ice sheets in Greenland and Antarctica.

Projections show that sea level rise could be in the order of 30-60 centimetres by 2100, even if greenhouse gas emissions are sharply reduced and global warming is limited to well below 2°C. However, if greenhouse gas emissions continue unabated, the increase will be between 60-110 centimetres.



Points to consider

- Should we prioritise human welfare, and target current socio-economic calamities, or should we take action now to protect the world from further long-term damage?
- Is scientific research seen to be quite impactful today, and should it be funded more? Should it be developed further?
- What should we expect in the way of major climate change impacts in the coming decades?

Useful links

- <https://www.gfdl.noaa.gov/global-warming-and-hurricanes/>
- <https://www.metoffice.gov.uk/weather/learn-about/weather/oceans/what-is-the-gulf-stream>
- <https://www.nytimes.com/interactive/2021/03/02/climate/atlantic-ocean-climate-change.html>
- <https://www.science.org/content/article/ancient-warming-threw-crucial-atlantic-current-chaos-it-could-happen-again>
- <https://ocean.si.edu/ocean-life/invertebrates/ocean-acidification>
- <https://www.sciencedaily.com/releases/2021/03/210304161117.htm>
- <https://www.un.org/en/chronicle/article/climate-change-poses-threat-our-oceans>