

environmental monitoring

New Study Reports Large-Scale Salinity Changes in the Oceans

Tropical ocean waters have become dramatically saltier over the past 40 years, while oceans closer to Earth's poles have become fresher, scientists recently reported. These large-scale, relatively rapid oceanic changes suggest that recent climate changes, including global warming, may be altering the fundamental planetary system that regulates evaporation and precipitation and cycles fresh water around the globe.

The study was conducted by Ruth Curry of the Woods Hole Oceanographic Institution (WHOI); Bob Dickson of the Centre for Environment, Fisheries and Aquaculture Science in Lowestoft, England; and Igor Yashayaev of the Bedford Institute of Oceanography in Dartmouth, Canada.

According to the study, an acceleration of Earth's global water cycle can potentially affect global precipitation patterns that govern the distribution, severity and frequency of droughts, floods and storms. It would also exacerbate global warming by rapidly adding more water vapor—itsself a potent, heat-trapping greenhouse gas—to the atmosphere. And, it could continue to freshen North Atlantic Ocean waters to a point that could disrupt ocean circulation and trigger further climate changes.

Curry, Dickson and Yashayaev analyzed a wealth of salinity measurements collected over recent decades along a key region in the Atlantic Ocean, from the tip of Greenland to the tip of South America. Their analysis showed that the properties of Atlantic water masses have been changing—in some cases radically—over the five decades for which reliable and systematic records of ocean measurements are available, the scientists report. They observed that surface waters in tropical and subtropical Atlantic Ocean regions became markedly saltier.

Simultaneously, much of the water column in the high latitudes of the North and South Atlantic became fresher. This trend appears to have accelerated since 1990—when 10 of the warmest years since records began in 1861 have occurred. The scientists estimated that net evaporation rates over the tropical Atlantic have

increased by five percent to 10 percent over the past four decades. These results indicate that fresh water has been lost from the low latitudes and added at high latitudes, at a pace exceeding the ocean circulation's ability to compensate, said the scientists.

Among other possible climate impacts, an accelerated evaporation-precipitation cycle would continue to freshen North Atlantic waters.

Monitoring Earth's hydrological cycle is critical, the scientists said, because of its potential near-term impacts on Earth's climate.