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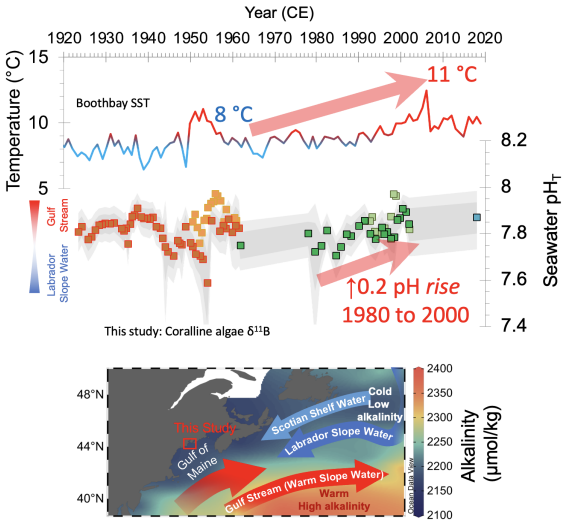
Delayed onset of ocean acidification in the Gulf of Maine

JOE STEWART[1], BRANWEN WILLIAMS[2], MICHELE LAVIGNE[3], AARON STRONG[4], BRITTANY JELLISON[3], NINA WHITNEY[5], DIANA THATCHER[6], LAURA F. ROBINSON[1,7], JOCHEN HALFAR[8] AND WALTER ADEY[9]

[1]University of Bristol
[2]Claremont McKenna Keck
[3]Bowdoin College
[4]Hamilton
[5]Western Washington University
[6]Iowa State
[7]University of York
[8]University of Toronto
[9]Smithsonian Institution



The Gulf of Maine holds significant ecological and economic value for fisheries and communities in north-eastern North America. However, there is apprehension regarding its vulnerability to the effects of increasing atmospheric CO_2. Substantial recent warming and the inflow of low alkalinity waters from rivers and the Labrador Sea into the Gulf of Maine have raised concerns about the impact of ocean acidification on resident marine calcifiers (e.g. oysters, clams, mussels). With limited seawater pH records, the natural variability and drivers of pH in this region remain unclear. To address this, we present coastal water pH proxy records using boron isotope ($\delta^{11}B$) measurements in long-lived, annually banded, crustose coralline algae (1920–2018 CE). These records indicate seawater pH was low (~ 7.9) for much of the last century. Contrary to expectation, we also find that pH has increased (+ 0.2 pH units) over the past 40 years, despite concurrent rising atmospheric CO_2. This increase is attributed to an decreased input of low alkalinity waters derived from Labrador Slope Waters. This delayed onset of ocean acidification is cause for concern. Once ocean circulation-driven buffering effects reach their limit, seawater pH decline may occur swiftly. This would profoundly harm shellfisheries and the broader Gulf of Maine ecosystem.