

# CGD Seminar Series

## Exploring the impacts of circulation on biogeochemistry and ecosystems in a warming ocean

**Dan Whitt**

NCAR

**Date:** Tuesday 1 December 2020

**Time:** 11am – 12pm

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*For live stream information, visit the*

*CGD Seminar Webpage*

### ABSTRACT

Global warming will have profound deleterious impacts on marine ecosystems with important implications for human society. However, although increasing sea-surface temperature and decreasing sea-surface pH are well understood and robust consequences of global warming, the consequences for marine ecosystems are not fully understood. For example, Earth system models simulate substantial changes in marine biological productivity in a warmer climate, but the sign of the response differs regionally, and the models disagree on the details. In this talk, I will present recent work on the North Atlantic Ocean, where global warming reduces biological productivity by 50% in a high emission 21<sup>st</sup>-century scenario. Rapid change in two physically-coupled ocean processes—vertical mixing and horizontal circulation—drive a substantial decline in nutrient supply to the euphotic zone in this region under increasing atmospheric greenhouse gas concentrations. But, which of these changing physical processes curtails the nutrient supply in the North Atlantic? Do other responses to global warming, e.g. changes in small-scale physical and biophysical processes, impact the sensitivity of biological productivity to global warming in the North Atlantic? In this talk, I will address these questions and discuss what we've learned as well as the open questions for future work

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