# Atmospheric Implications of Ocean Alkalinity Enhancement

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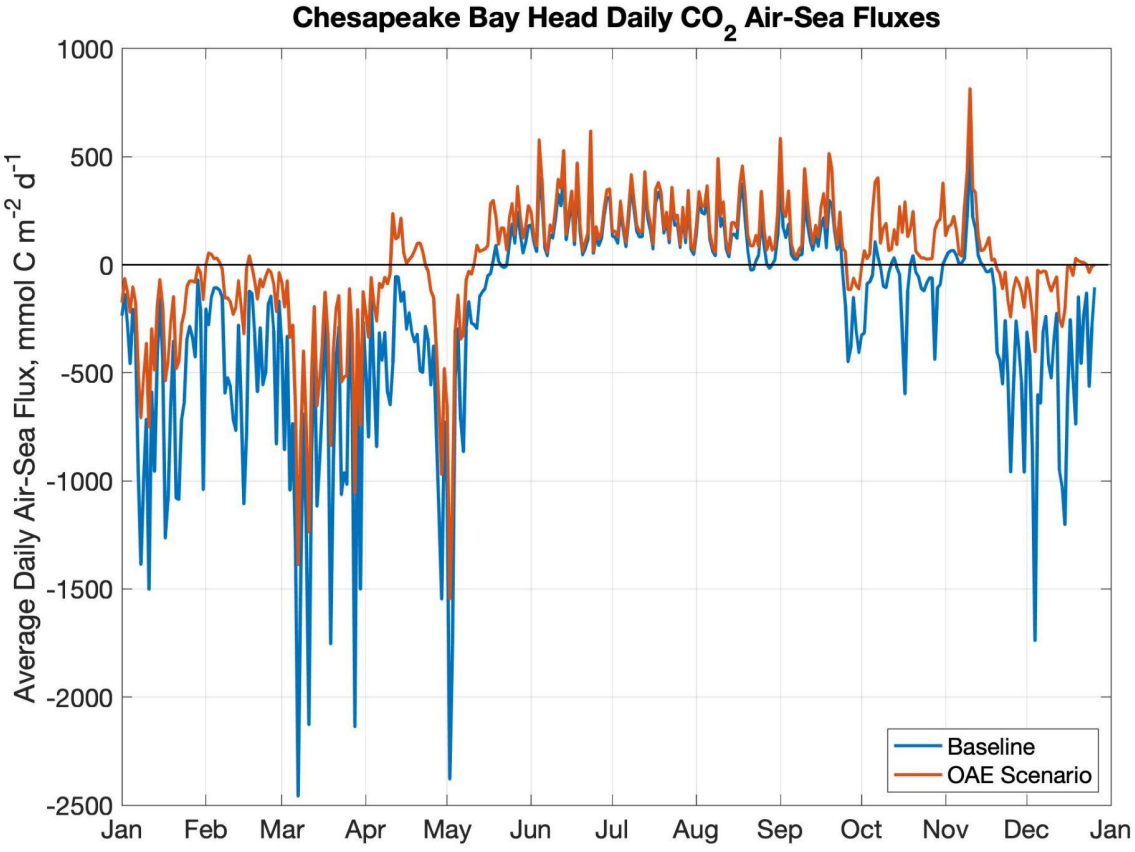
# Introduction

- Proposal to implement ocean alkalinity enhancement carbon capture in the Chesapeake Bay
  - Increase in water alkalinity converts dissolved carbon dioxide into carbonate and bicarbonate
  - The water then absorbs anthropogenic $CO_2$ from the air
- Questions:
  i. Will the decrease in carbon dioxide in the atmosphere be noticeable and detectable?
  ii. What will the effects be on the ocean and atmosphere?

# Methods

- A hypothetical OAE scenario was run that would result in an ingassing of 5000 tons of $CO_2$ per year
- Data from before & after the hypothetical alkalinity enhancement was tested for its atmospheric impact:
    i. In terms of eddy covariance from flux tower measurements
    ii. Using atmospheric budgeting to determine the change in mole fraction of $CO_2$ in the air as it crosses the bay

# Prediction based on OAE scenario (Hinson 2021)



# Conclusions

- There would not be a detectable difference in $CO_2$ as air crosses the bay (< 2 ppm)
- The change in air-sea flux (about 3 $\mu molCO_2/m^2s$ ) would be detectable for a flux tower in the Chesapeake Bay
  - There would be a larger change in flux in the winter than the summer
  - There is not currently an observation tower in the bay that could make these observations