

*The Ocean as My Laboratory:  
The Buffering Effects of Atoll Islands  
on Ocean Acidification in the  
Equatorial Pacific*



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# Outline

- SEA Semester
  - Shore component
  - Sea component
- My research!
  - Ocean acidification
  - Carbonate ion comparison



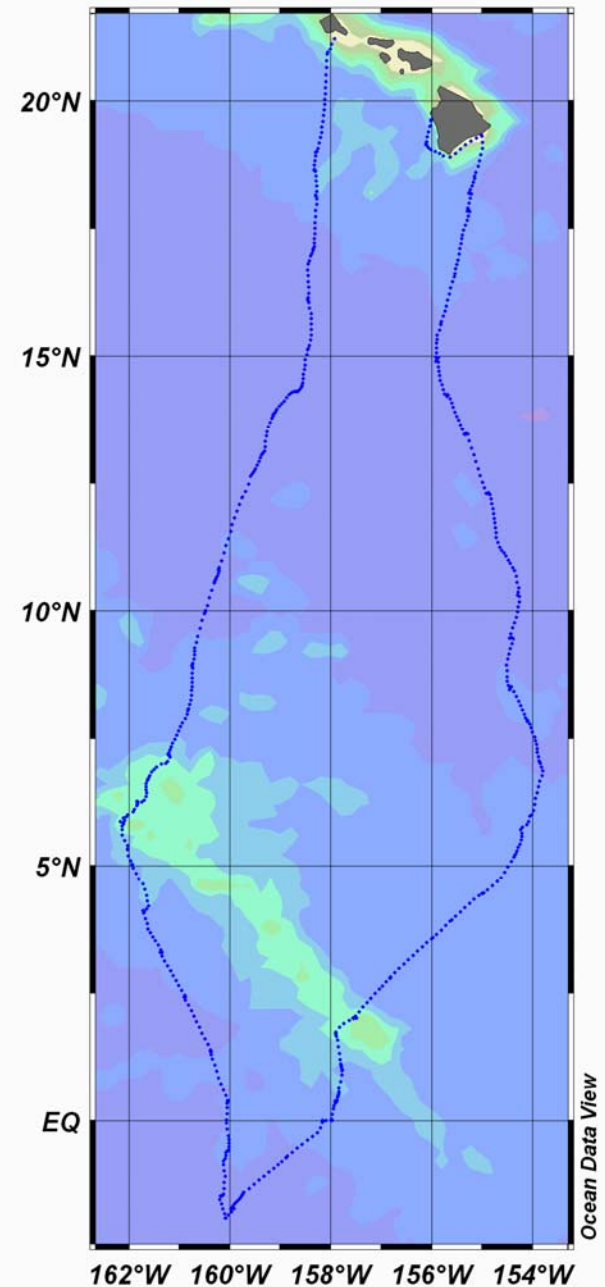
# Shore component

- Six weeks in Woods Hole, MA
- Courses in:
  - Nautical science
    - celestial navigation, sail theory, charting
  - Ocean Science and Public Policy
    - maritime history and culture, climate change and public policy
  - Oceans and Climate: Oceans in the Global Carbon Cycle
    - oceanography, climate change, and research proposal



# Sea Component

- 3500 nautical miles from Honolulu, HI to Honolulu, HI
- Two port stops
  - Palmyra Atoll
  - Christmas Island (Kiritimati Atoll)
- Sailed around the Hawaiian islands



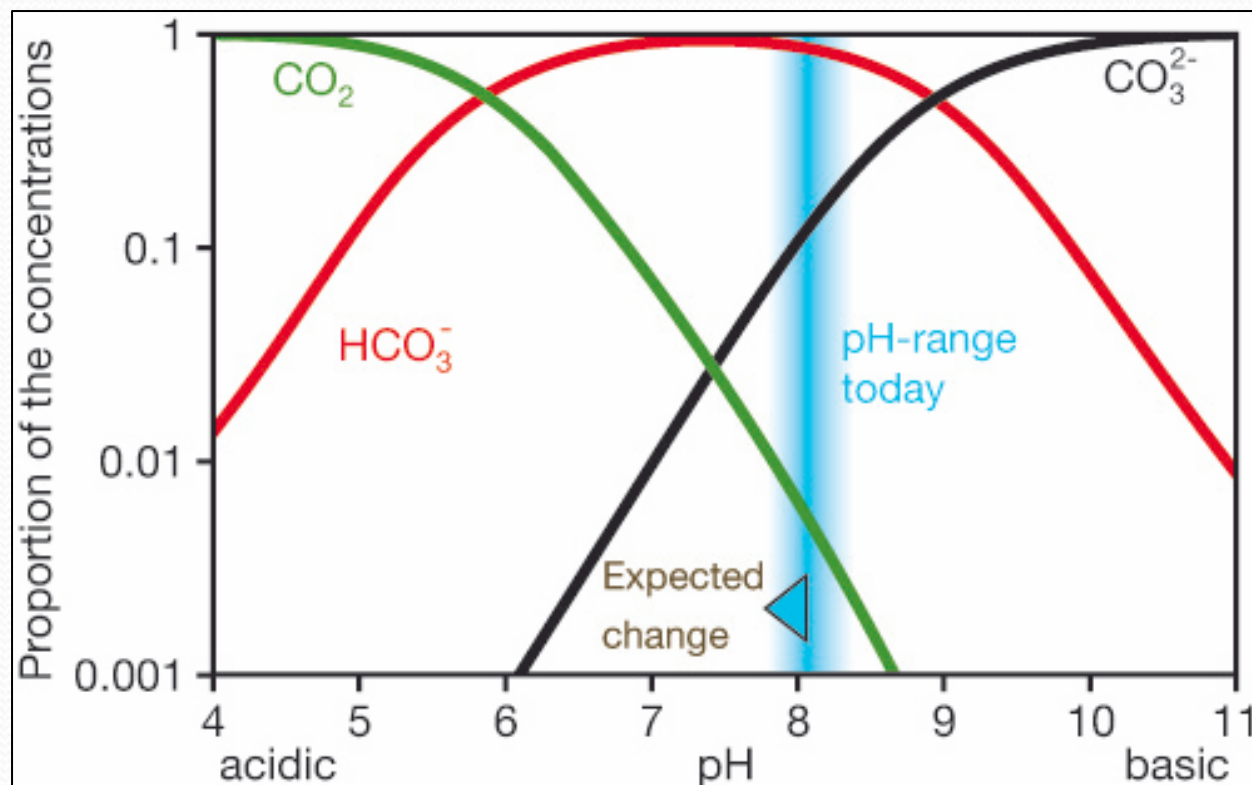
# Academics on a boat?

- Courses (with class daily at 14:30)
  - Practical nautical science
    - sail handling, navigation, and crewing the vessel
  - Oceanographic Field Methods
    - basics of oceanographic lab techniques
  - Research in Oceans & Climate
    - performing research, analyzing data, and writing final research paper



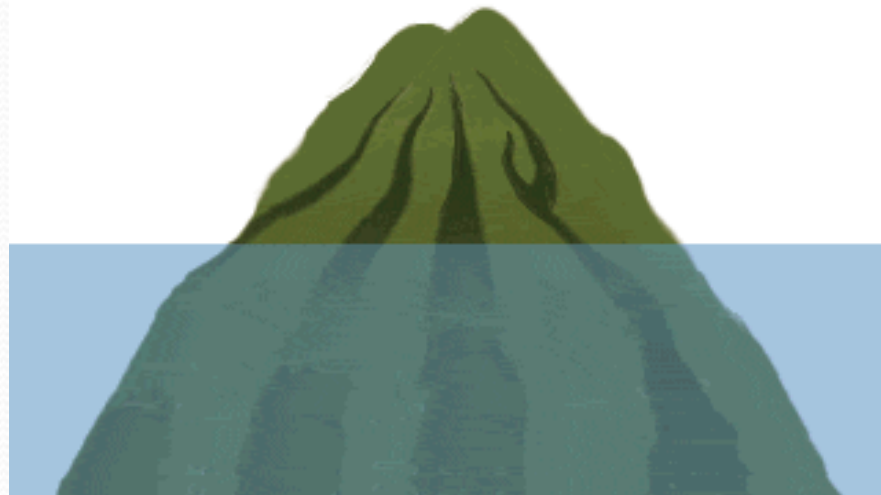
# My research: Ocean Acidification

- *Ocean acidification* - lowering of pH of ocean caused by increased atmospheric  $\text{CO}_2$

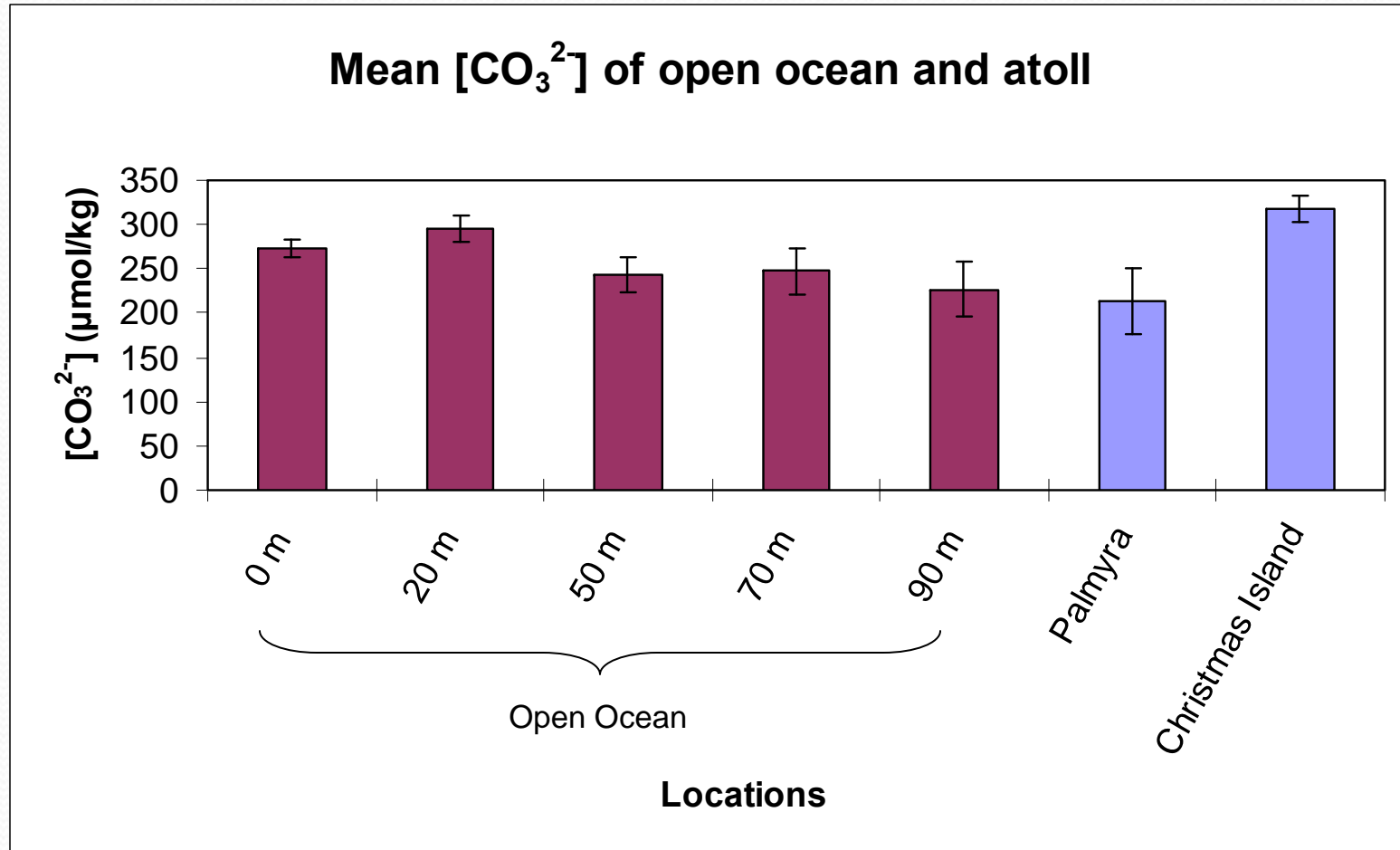


# Open ocean vs. atoll island

- Comparison of carbonate ion concentration between:
  - Surface water (thermocline) in Equatorial Pacific
  - Surface water at Palmyra Atoll and Christmas Island



# Results



# Research conclusions

- Palmyra's carbonate ion concentration **lower**
  - Healthy coral reef
  - Small atoll size
  - High water flushing rates
- Christmas Island's carbonate ion concentration **higher**
  - Suggests local buffering effect
  - Unhealthy coral reef
  - Large atoll size
  - Low water flushing rates

