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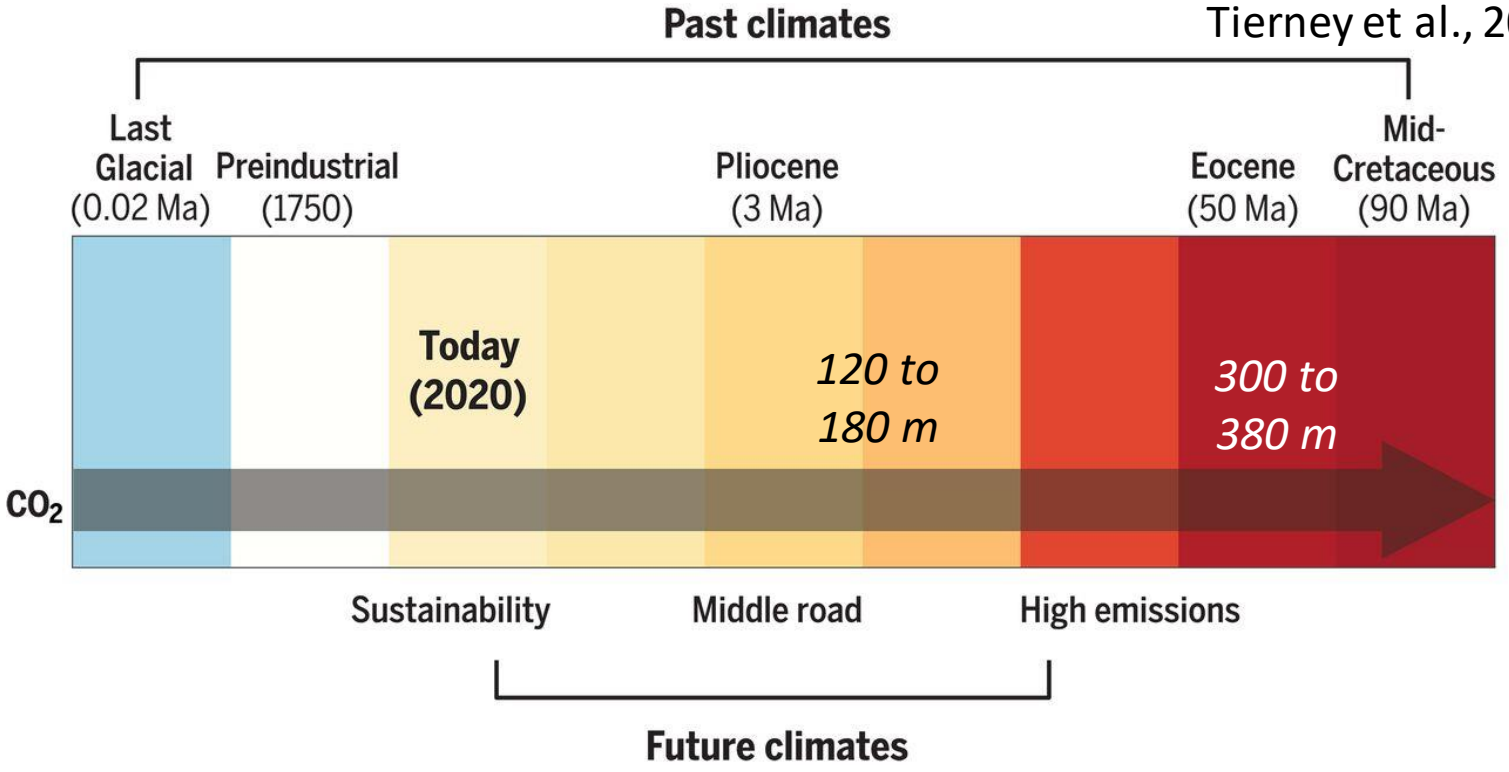
- How does climate change drive changes in ocean chemistry?
- How do the ocean chemical changes act as feedbacks to exacerbate climate change?

Research themes:

- Loss of oxygen
- Reorganization of nutrient cycles
- Shifts in ocean acidity (alkalinity)

Sea Change 2015-2025 Priority: How have ocean biogeochemical and physical processes contributed to today's climate and its variability, and how will this system change over **the next century**?

Tierney et al., 2020 *Science*



Approximate depths below the seafloor of sediments from Exp 392 - Site U1581 S. Indian Ocean

Scientific ocean drilling allows us to use the sedimentary record to test the feedbacks between ocean chemistry and climate change during **past warmer climates**

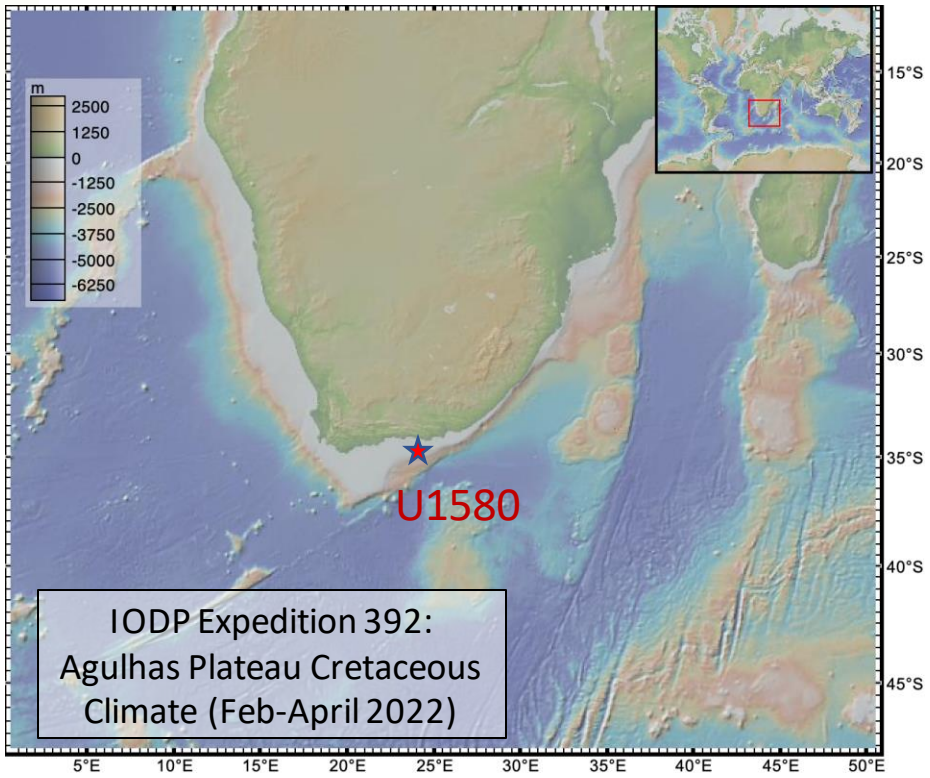
Controls on ocean chemistry from beneath the seafloor

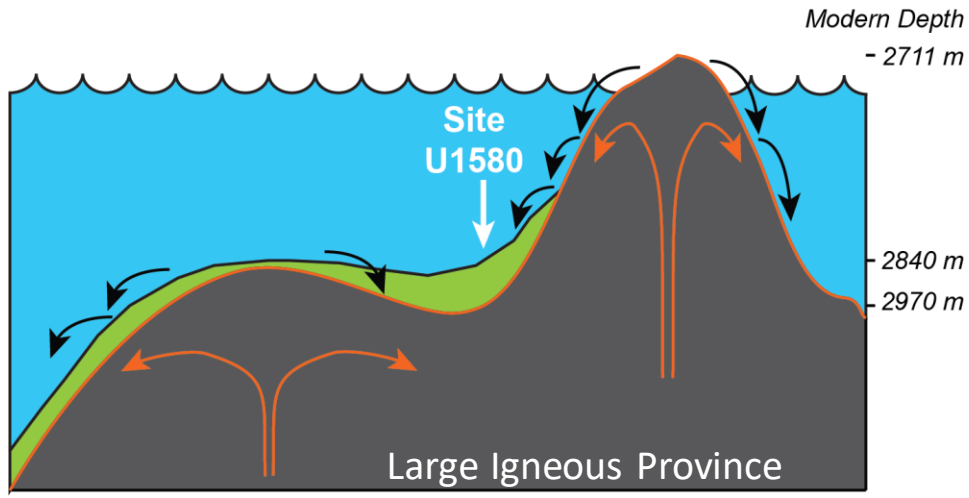
Pore water extraction via squeezing on the JOIDES Resolution

Sea Change 2015-2025 Priority: What is the geophysical, chemical, and biological character of the subseafloor environment and how does it affect global elemental cycles and understanding of the origin and evolution of life?

Pore (or interstitial) water geochemistry allows us to investigate active biogeochemical cycling below the seafloor, **but this work requires new core material and cannot be completed from archive material**

Controls on ocean chemistry from beneath the seafloor





Exp. 392 retrieved a sedimentary record of enhanced basalt weathering that provides a natural laboratory to investigate the impacts of proposed climate mitigation techniques

White House Ocean Climate Action Plan Priorities:

-Sequestration of CO_2 in Sub-Seabed Geologic Formations

-Marine Carbon Dioxide Removal (including ocean alkalinity enhancement)