Observing ocean changes at the nation’s first SWAC system

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SWAC Introduction

- Similar to OTEC – renewable energy
- Environmental changes or risks? Unique considerations

- Seawater plume: moving seawater from 500m to 130m

- Ecosystem response unknown – possibilities:
  - Higher nutrients $\rightarrow$ algae bloom?
  - Genomic relocation $\rightarrow$ changes in plankton community?
  - Thermal gradients, low oxygen $\rightarrow$ animal behavior?

- HSWAC development = Opportunity for before-after study
Monitoring: Bottom mooring

- CTD (conductivity, temperature, pressure)
  - + oxygen, fluorescence and turbidity
- ADCP: 300kHz
- Nitrate sensor
- Tagged fish receiver
Monitoring: CTD casts and water sampling

- Nutrients (N,P,Si)
- Chlorophyll a
- Microbes
- Dissolved gases
- Flow cytometry
- DIC
Monitoring: MMPs and PacIOOS

- A moving moored profiler collects baseline current and CTD data
- PacIOOS – Pacific Islands Ocean Observing System
  - Gliders make passes through the area
  - HF radar provides surface current data
Preliminary results: Bottom mooring

- ADCP reveals low current velocities near bottom
- Typical along-isobath currents observed in midwater
- Across-isobath currents observed near bottom
Preliminary results: Bottom Mooring

- Tidal shifts in temp, salinity, fluorescence.
- Water mass shift in early May?
Preliminary results: CTD Casts
Items of note and path forward

* Cross-shore currents at site
  * Capable of advecting plume upslope?
  * Bring nutrients into well-lit water?
  * Density of plume vs. current field

* “Before-After” experimental design
  * ~1-1.5 years baseline
  * 1-2 years operational

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Photo: Christopher Pala, www.onewater.org

Mahalo! Questions?