

# 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 → algae bloom?
  - \* Genomic relocation → changes in plankton community?
  - \* Thermal gradients, low oxygen → animal behavior?
- \* HSWAC development = Opportunity for before-after study

energy goals and would be environmentally beneficial”

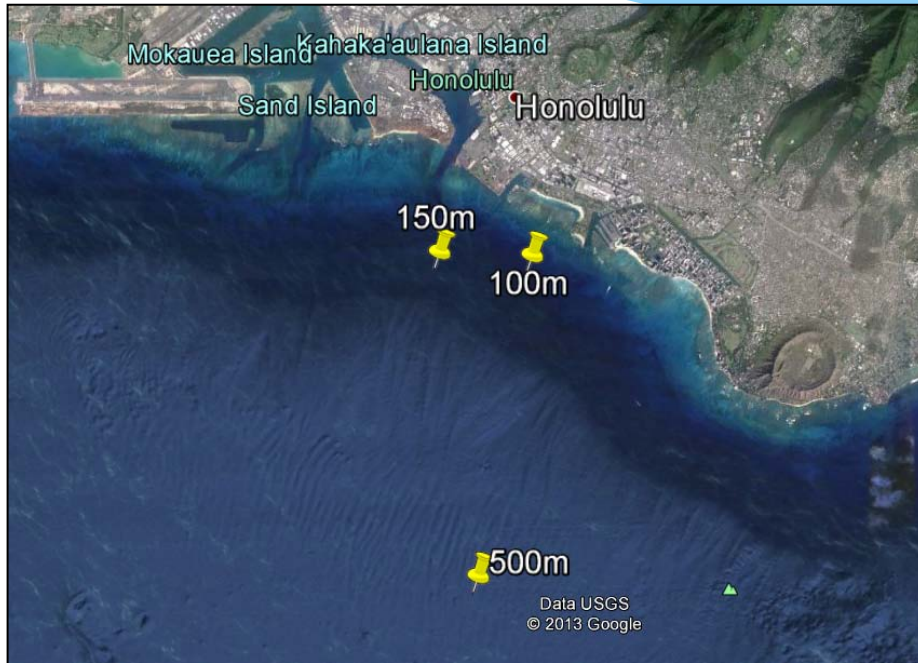
Hawaiian Electric Co., Inc.

# 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

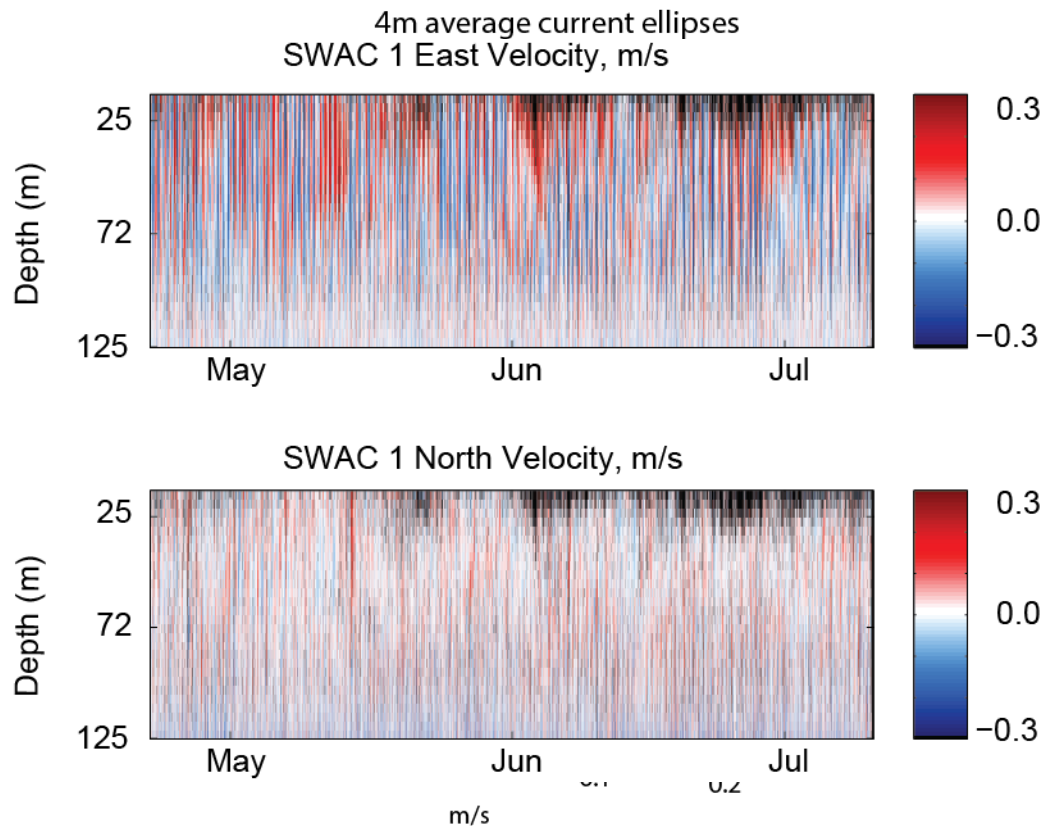


- \* A moving moored profiler collects baseline current and CTD data
- \* PacIOOS – Pacific Islands Ocean Observing System
  - \* Gliders make passes through the area
  - \* HF radar provides surface current data



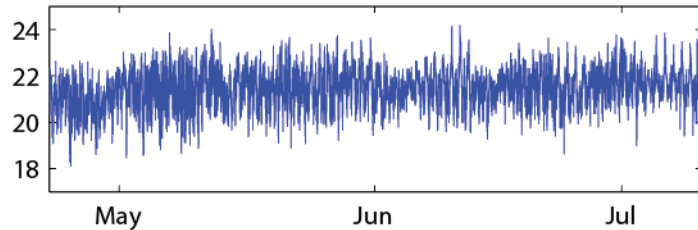
# Preliminary results: Bottom mooring

- \* ADCP reveals low current velocities near bottom
- \* Typical along-isobath currents observed in midwater
- \* Across-isobath currents observed near bottom

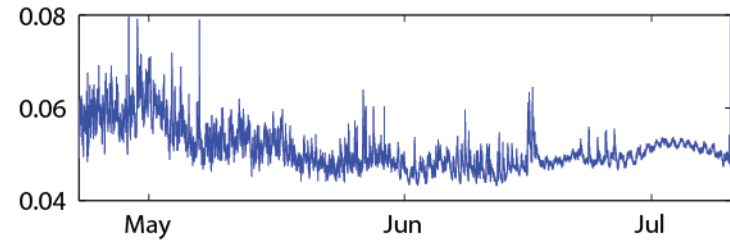


# Preliminary results: Bottom Mooring

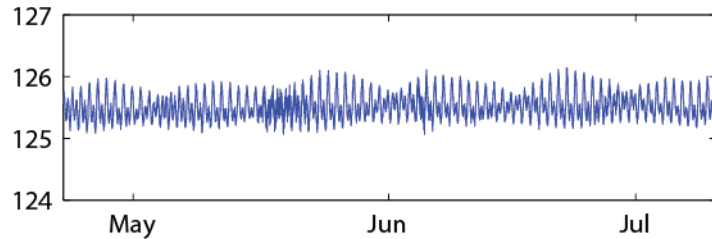
Temperature (C)



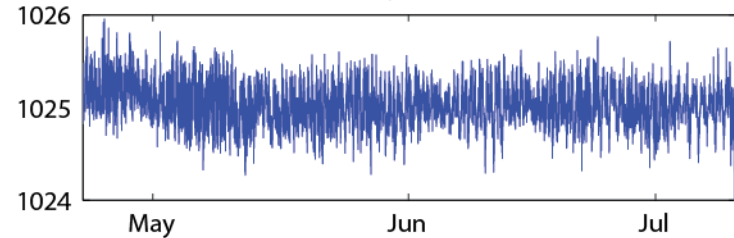
Fluorescence (mg/m3)



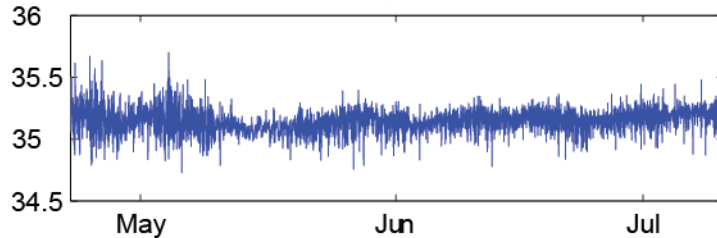
Depth (m)



Density (kg/m3)

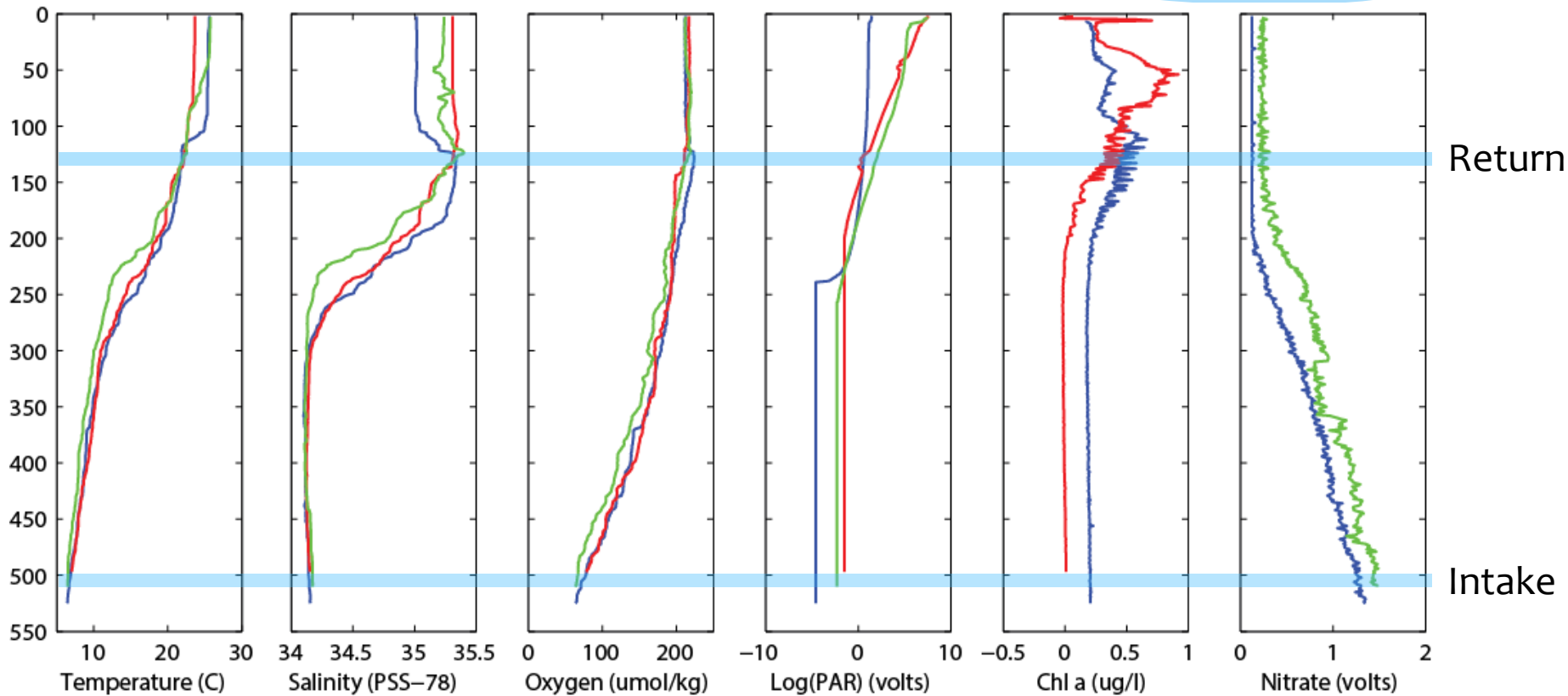


Salinity (PSU)



- \* 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

Mahalo!  
Questions?



Photo: Christopher Pala, [www.onewater.org](http://www.onewater.org)

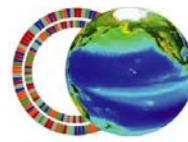
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