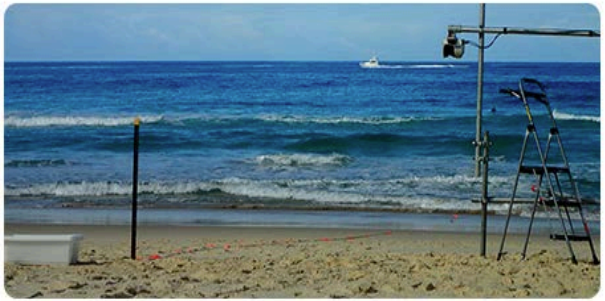
RBR

Welcome, the RBR Webinar will begin shortly…

Future Webinars



Measuring waves to better quantify coastal hazards

Dr. Hannah Power (University of Newcastle)

August 20, 2020 at 11AM AEST (GMT+10)

Measuring the pore pressure response in sandy beaches using RBR*solo*³ Ds

Nina Stark (Virginia Tech)

August 26, 2020 at 12PM EDT (GMT-4)

RBR

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rbr-global.com

Product Overview: RBR*solo*³ D

Daniel Nelson

Technical Sales Manager

North America, West

Loggers

OEM

Sensors

Systems

RBR


RBRcervello
RBRduet
RBRsolo
RBRvirtuoso
RBRduo
RBRconcerto
RBRfermata
RBRfermette
RBRssm
RBRcoda
RBRquartz
RBRmaestro
RBR

RBR*solo*³ D

Compact depth logger (self contained memory + battery)

Range: 0 to 20, 50, 100, 200, 500, 750, 1000 dbar (2000, 4000, 6000, 10 000 dbar in titanium)

±0.05% FS accuracy

<0.001% resolution

1Hz sampling = ~400 days / ~34 million readings on a single AA battery

2Hz sampling = >2 month / ~11 million readings on a single AA battery

5s sampling = 4.9 years / ~32 million readings on a single AA battery

RBR

Compact depth logger versions

- RBR*solo*³ D – shallow (1,000m) with ≦2Hz sampling

- RBR*solo*³ D|fast8 (16Hz or 32Hz) – shallow with fast sampling
- RBR*solo*³ D|tide16 or |wave16 – with tide and/or wave averaging
- RBR*solo*³ D|deep – deep (10 000m) with above options

- RBR*duet*³ T.D – as above with addition of thermistor (standard / fast)

RBR

Inside the RBR*solo*³ D

Ruskin v2.10.4.202007161249

simRBRsolo³ 903898

Configuration | Information | Calibration | Parameters

Schedule

Status: Not enabled

Clock: 2020-08-14 15:50:49+10:00 UTC Local

Start: 2020-08-14 2:00 PM Now

End: 2021-09-15 397 days +367 days

Power

Battery: Lithium thionyl chloride Fresh

Sampling

Mode: Continuous

Speed: Rate 1Hz

Memory used: 0% Download...

Enable Revert settings Use last setup

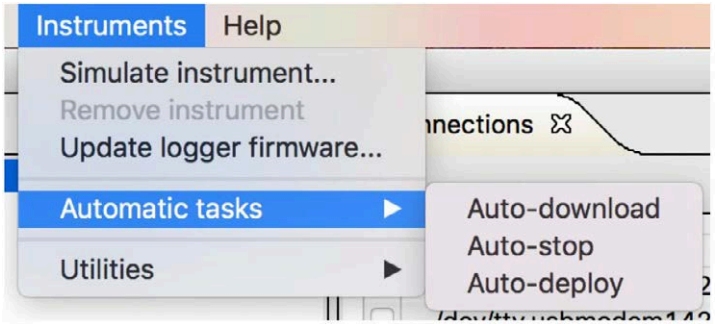
Schedule is valid

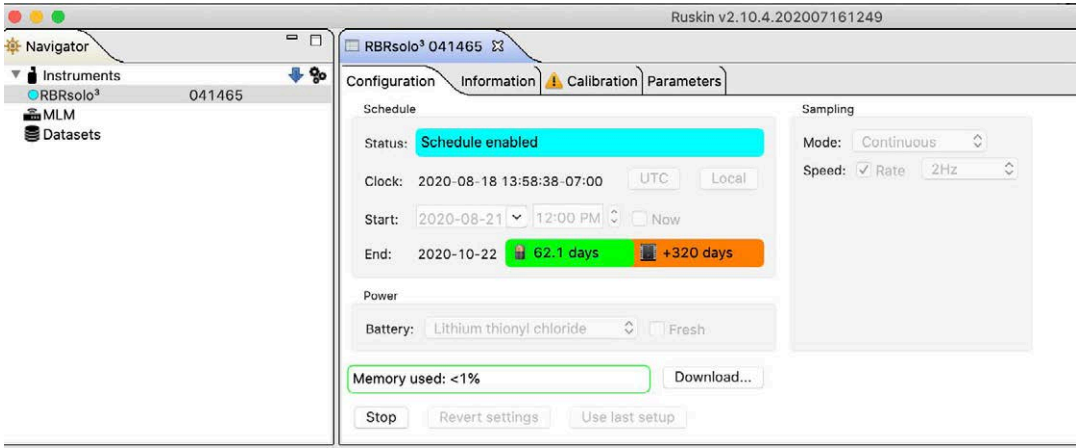
RBR

Standard Logger

- **RBRvirtuoso³ D**
- **RBRduo³ D**
  - 8x AA batteries
  - ~240 million readings
  - Twist Activation
  - WiFi ready
  - External communications options

Auto Deploy and Auto Download





RBR

Thank You

Contact Us

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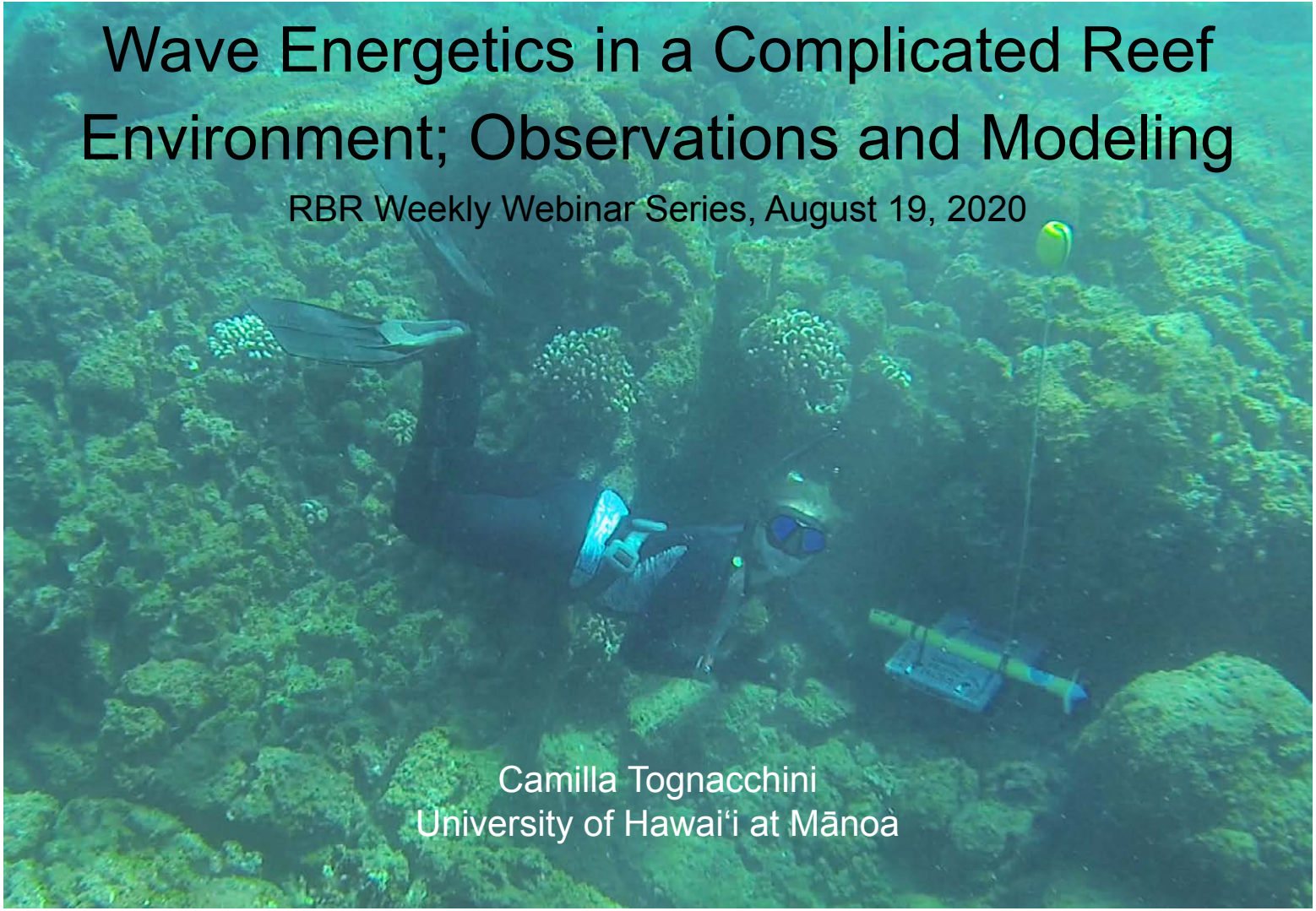
+1 613 599 8900

RBR

Wave Energetics in a Complicated Reef Environment; Observations and Modeling

RBR Weekly Webinar Series, August 19, 2020



Camilla Tognacchini
University of Hawai'i at Mānoa

Motivation for studying wave-induced runup in West Maui:

- severely impacted by wave-runup and inundation

- complicated nearshore environment:
  - alongshore variability
  - fringing reef
  - sloping beaches
  - rocky and armored shoreline

- important cultural and socioeconomic region

Motivation for studying wave-induced runup in West Maui:

- severely impacted by wave-runup and inundation

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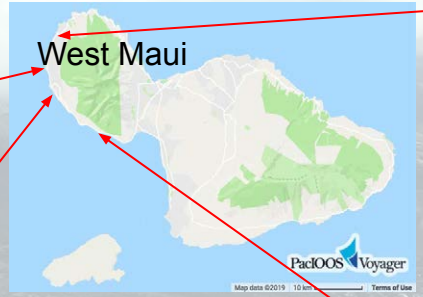
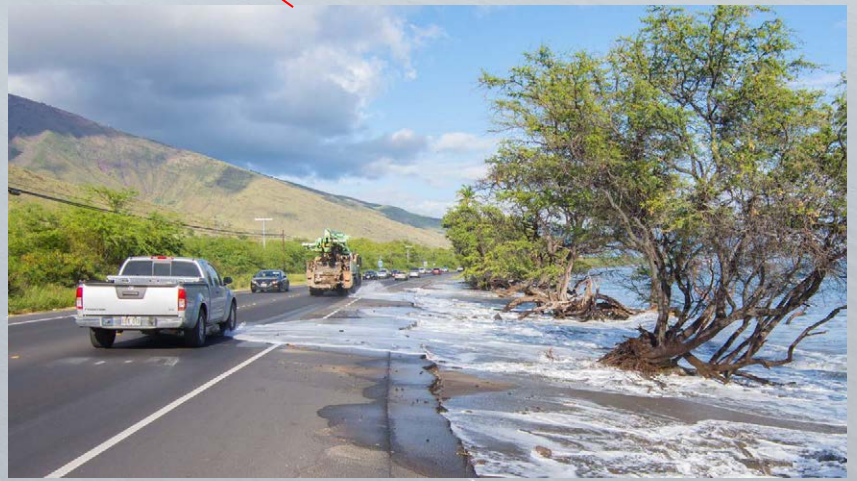
  - alongshore variability
  - fringing reef
  - sloping beaches
  - rocky and armored shoreline

- important cultural and socioeconomic region

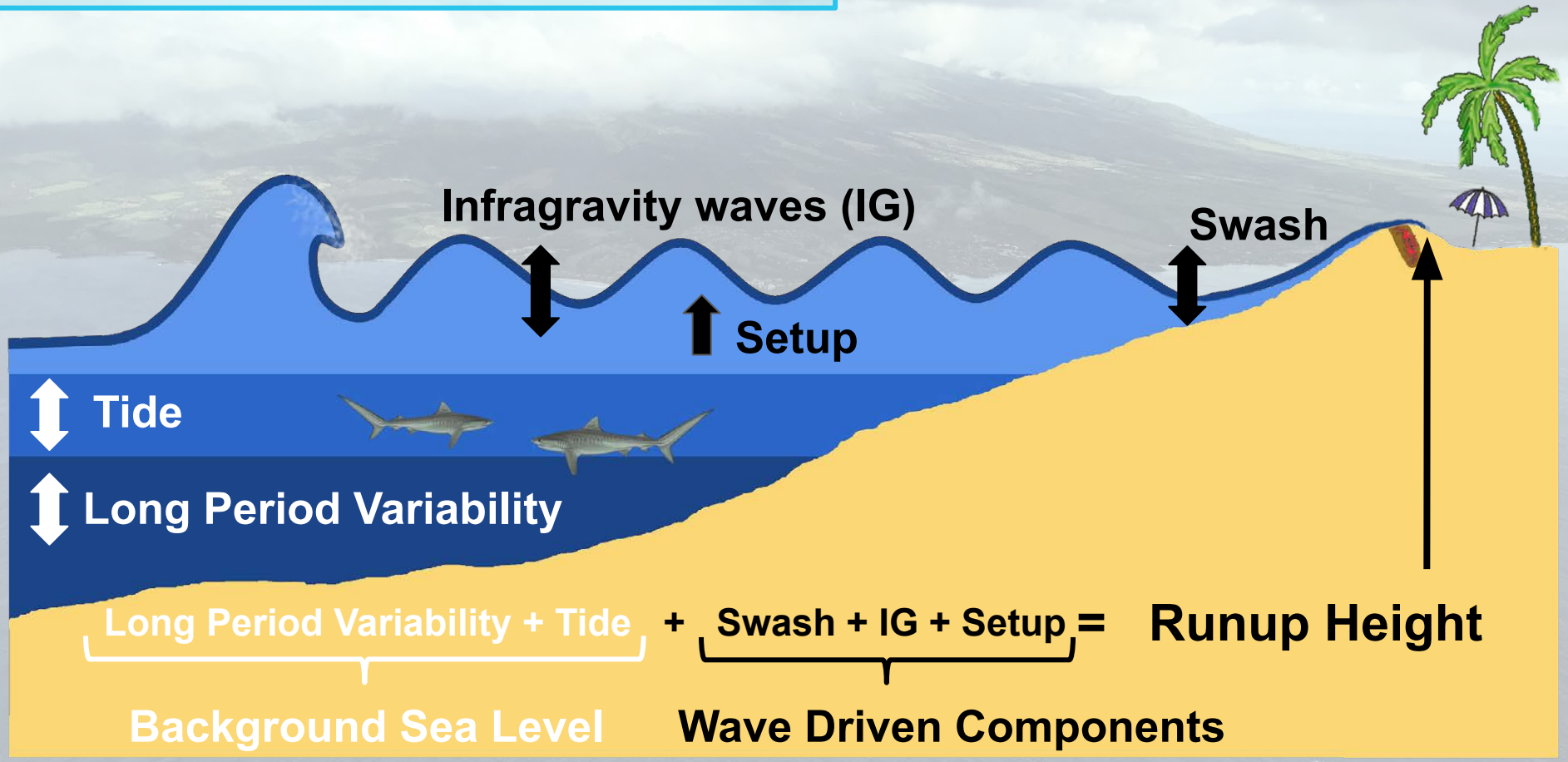
Our objectives are to understand variations of gravity wave transformations in the nearshore and to ultimately provide near term forecasts of wave-induced runup for West Maui

Impacts of Wave Runup in West Maui





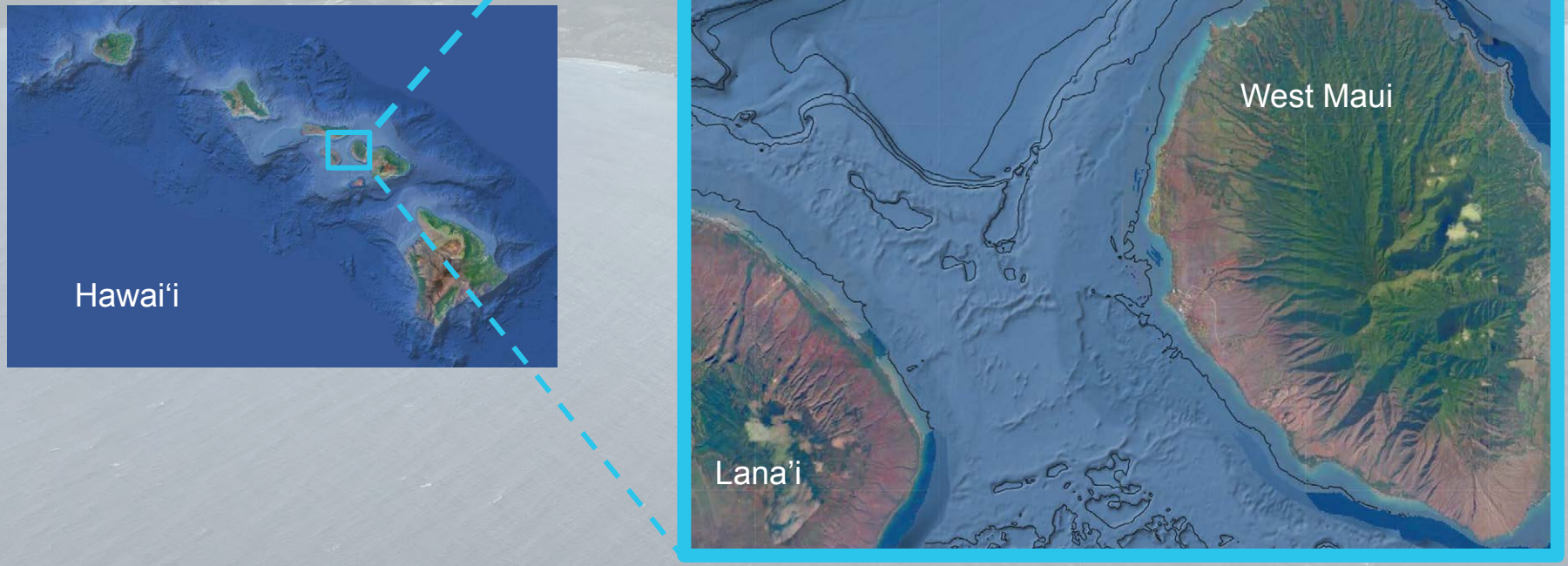
Components of Wave-Driven Runup



A quick look at infragravity waves

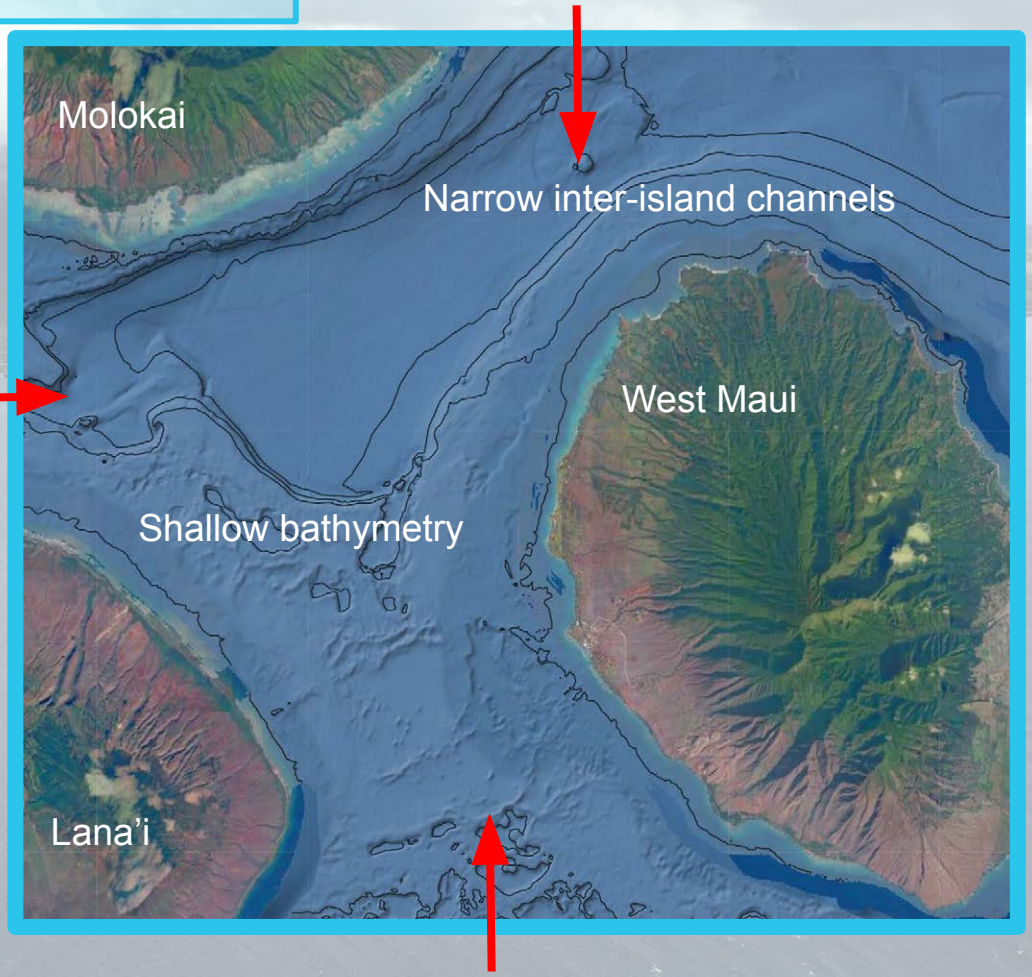
Surge at 02:20 and 07:30

Study Site: West Maui



Complex Bathymetry around West Maui

Incoming swell from the North, South and West



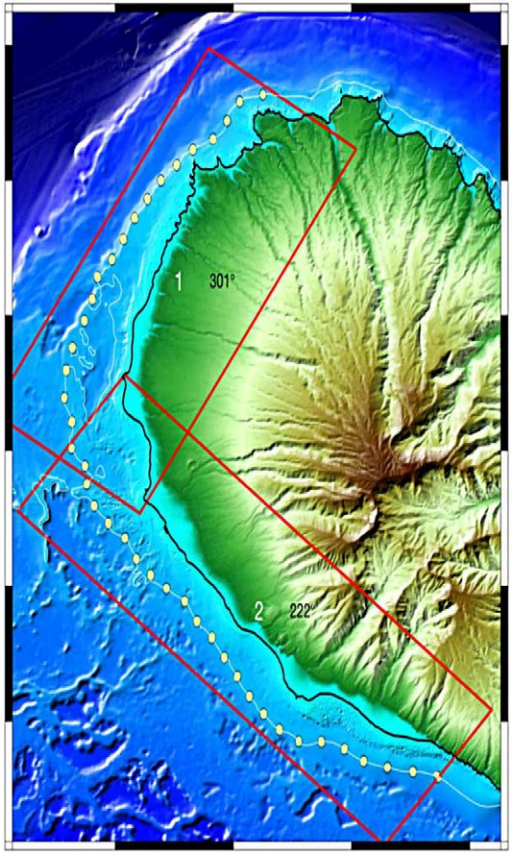
Complex Bathymetry around West Maui requires 2-D modeling

BOSZ (Boussinesq Ocean & Surf Zone Model, *Roeber & Cheung,* 2012):

- 2-Dimensional, fully non-linear and weakly dispersive, phase resolving numerical wave model

- resolves along shore and across shore wave dynamics to simulate wave runup

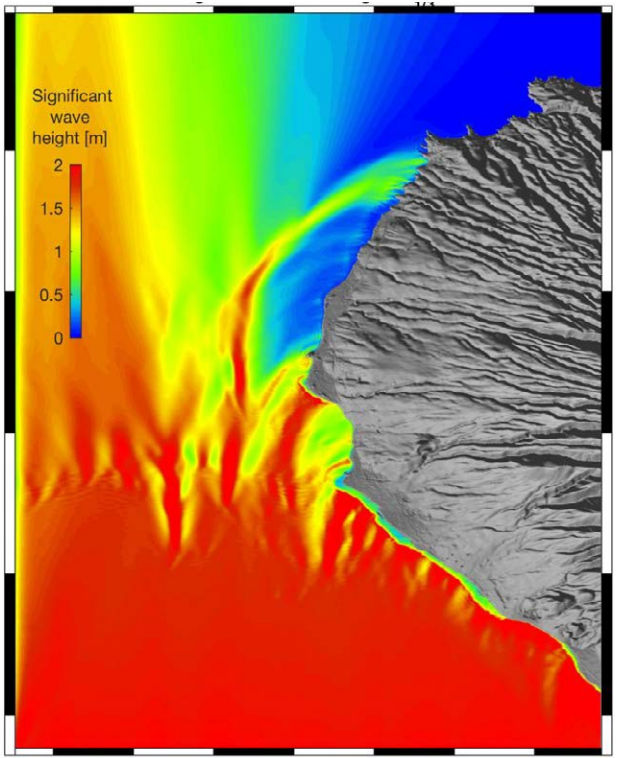
Progression of forecast models leading to directional energy spectrum which is the BOSZ wavemaker input



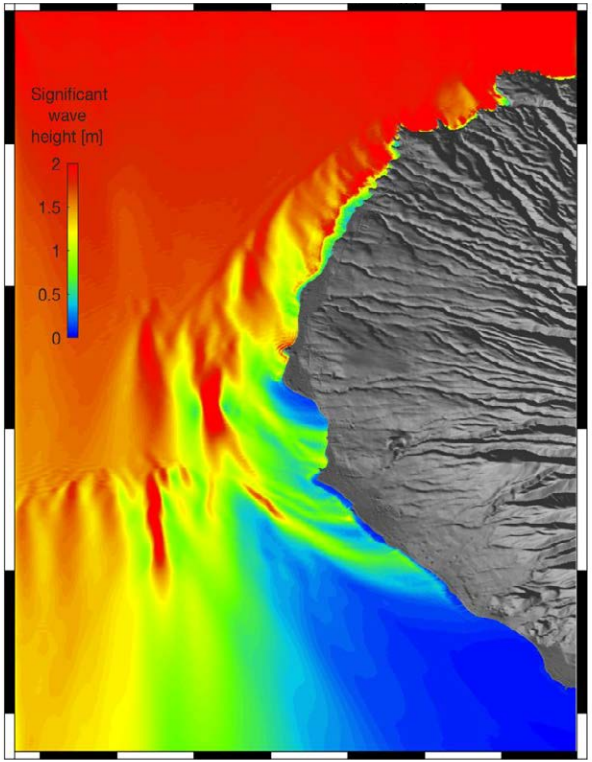
BOSZ 2 domain setup with 40 virtual gauges for high resolution SWAN input

Model simulations of significant wave height, for both South and North swells

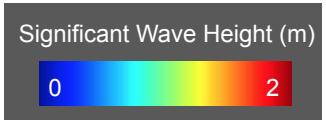
Refraction and focusing of swell energy into the entire West Maui domain for both swell directions



South Swell

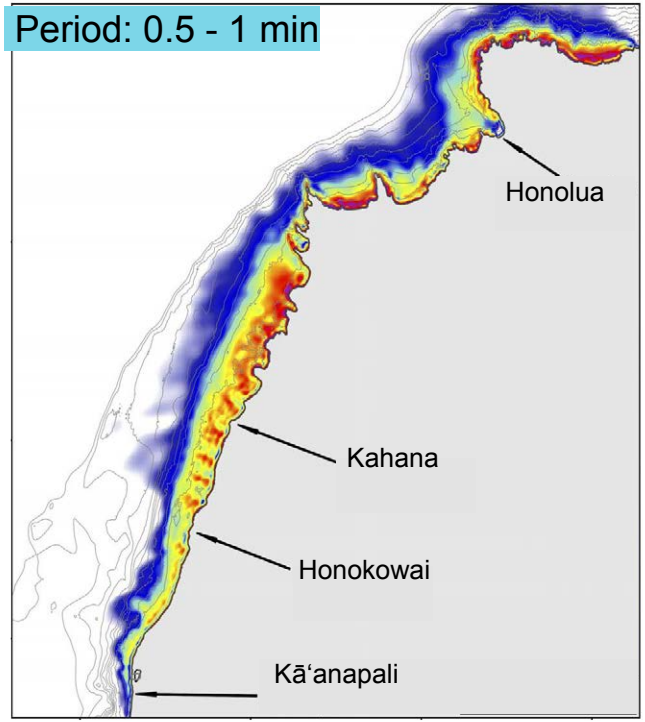


North Swell

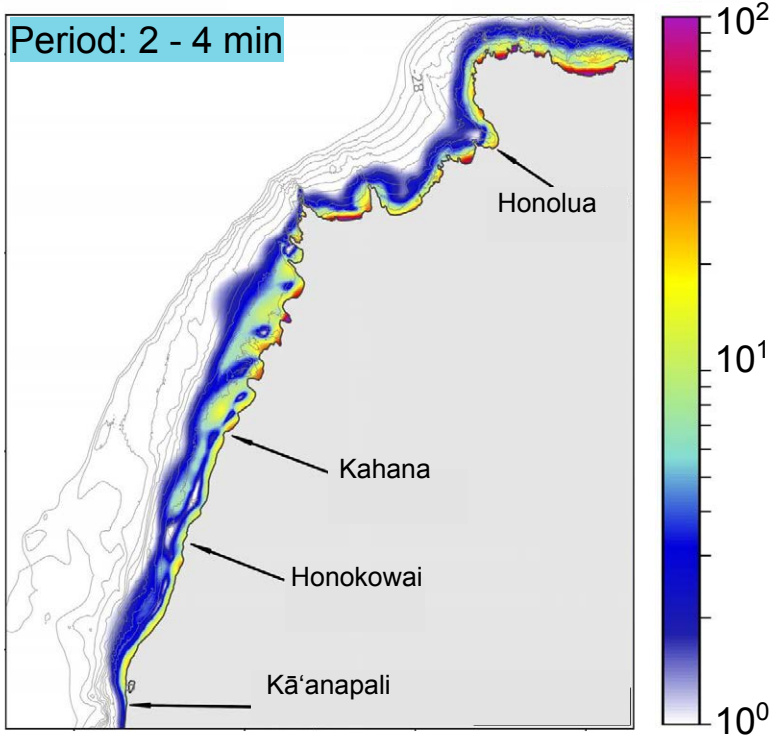


Model simulations of spatially distributed energy in different period bands for a North swell

$S_{\eta,\eta}$ [m^2/Hz]



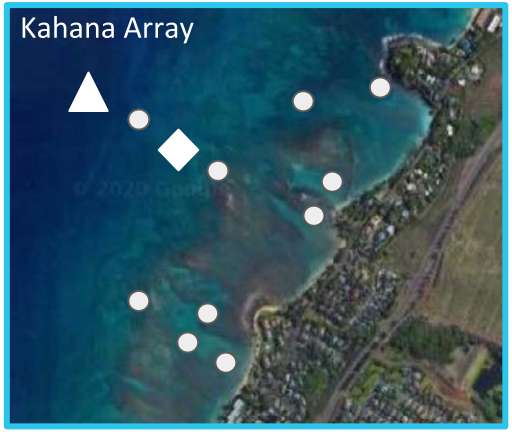
$S_{\eta,\eta}$ [m^2/Hz]

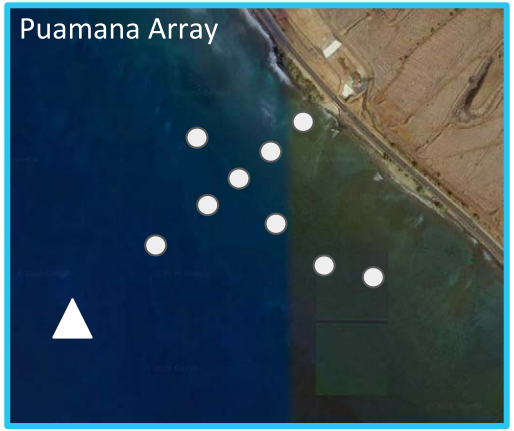


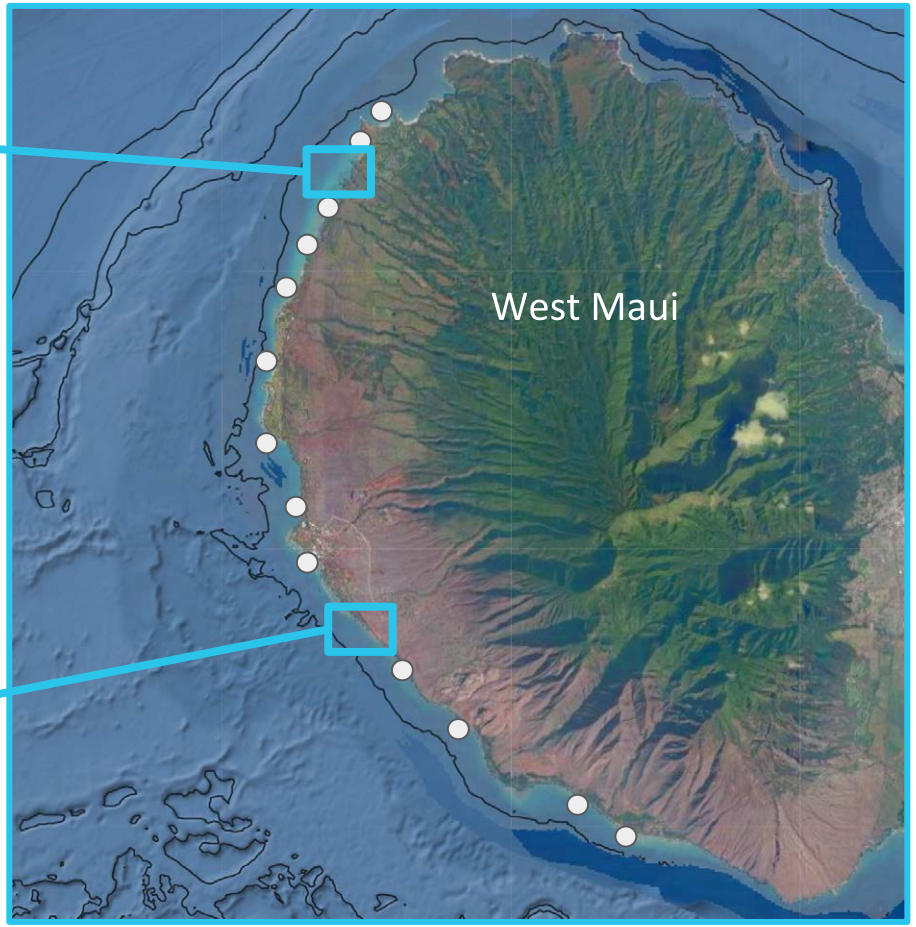
The model results are being validated with observations

Field Program: Instrument deployment sites

AWAC
Aquadopp
RBRsolo³ D

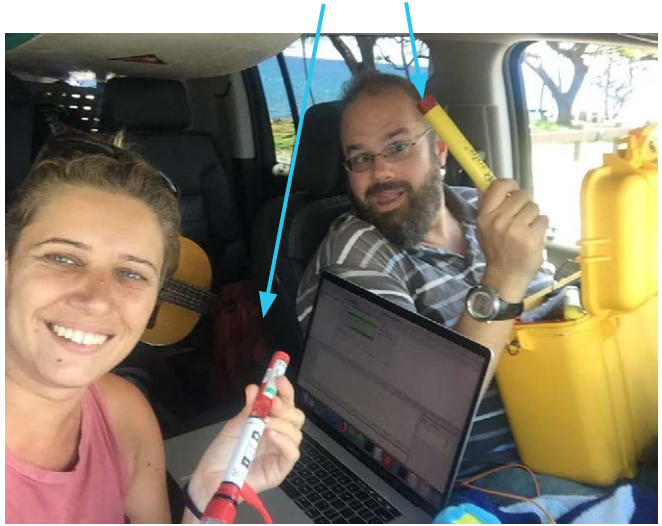






Field Program: Instruments Deployments

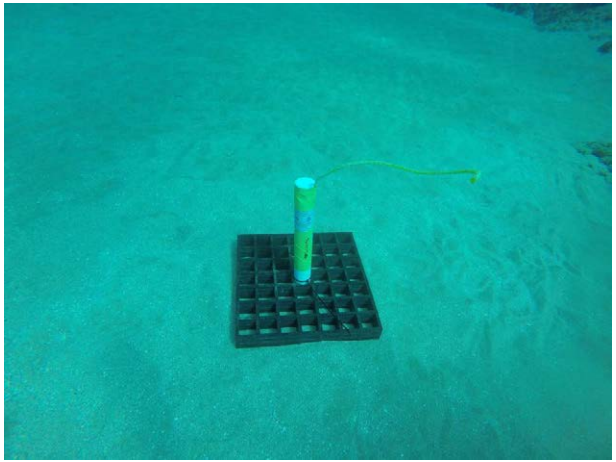
Programming RBRsolo³ D in the SUV

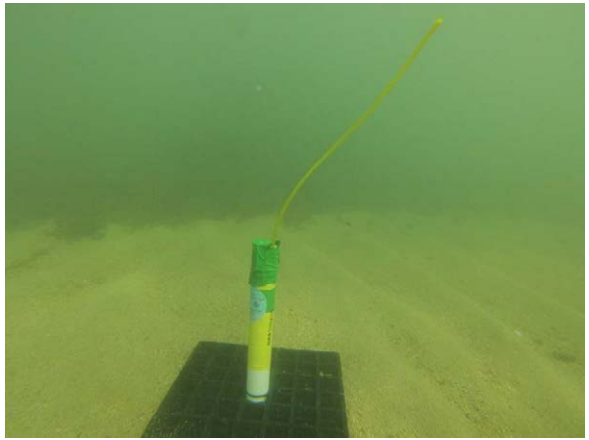


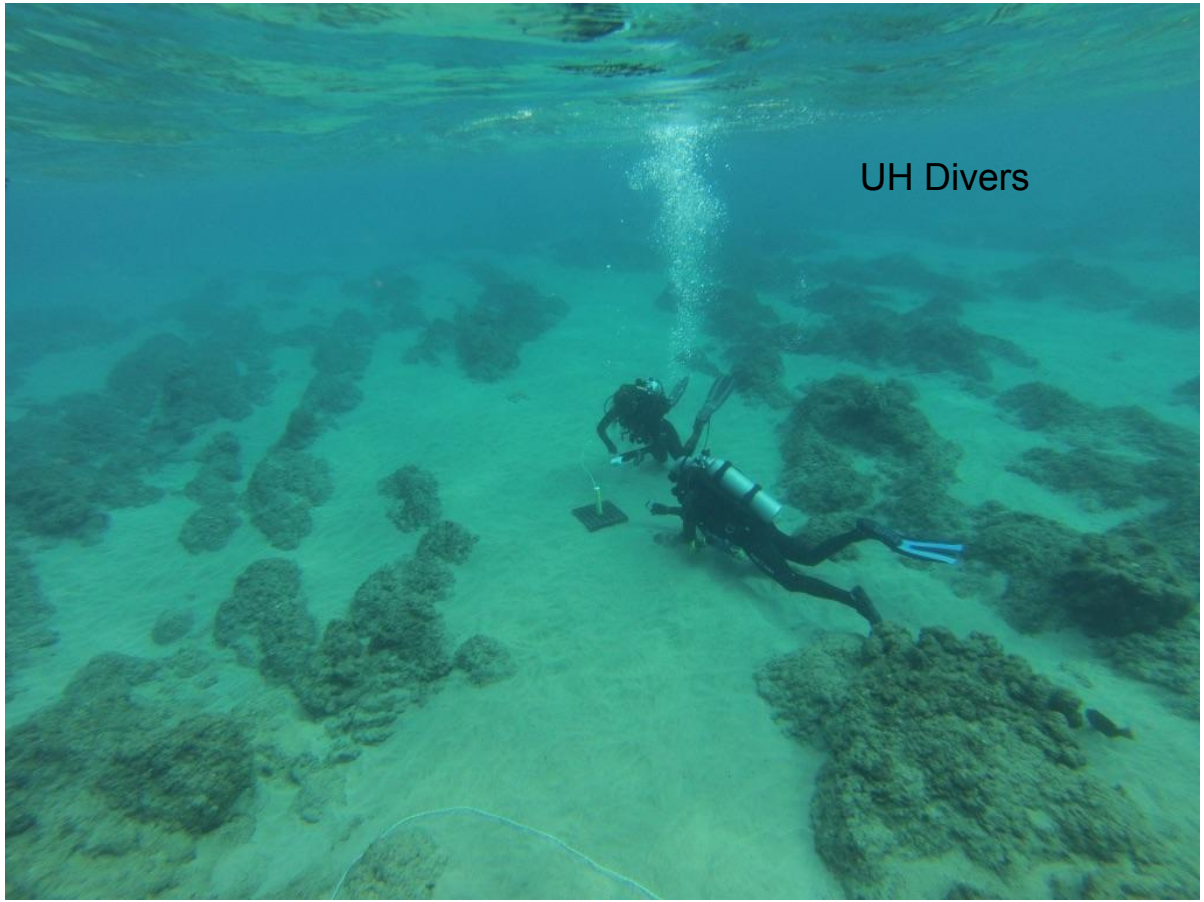
Preparing instrument packages at the park

We used a research vessel and the help of scuba divers for deeper sites, and surfboards, kayaks and snorkel for the shallower sites

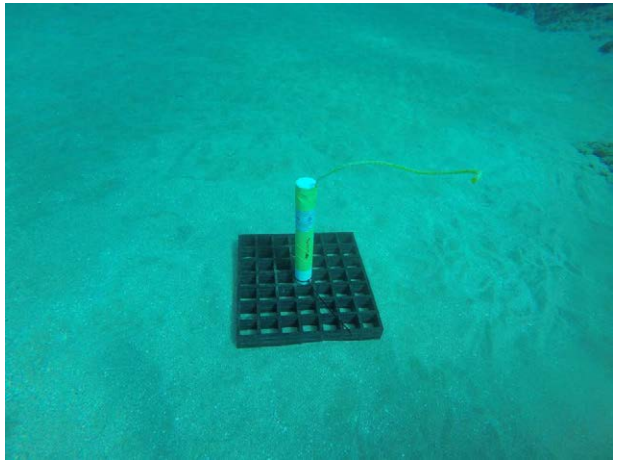
RBRsolo³ D Deployment in a sand environment:

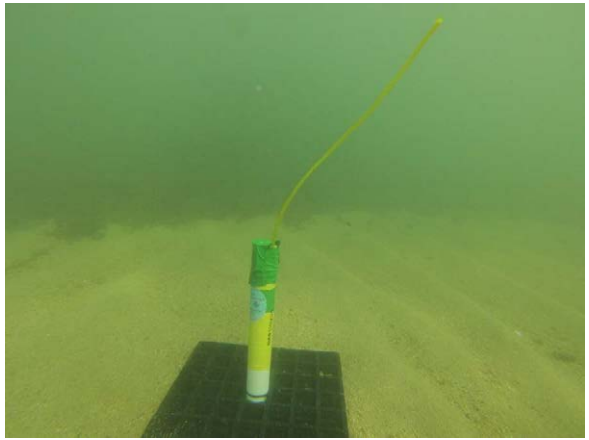






RBRsolo³ D Deployment in a sand environment:



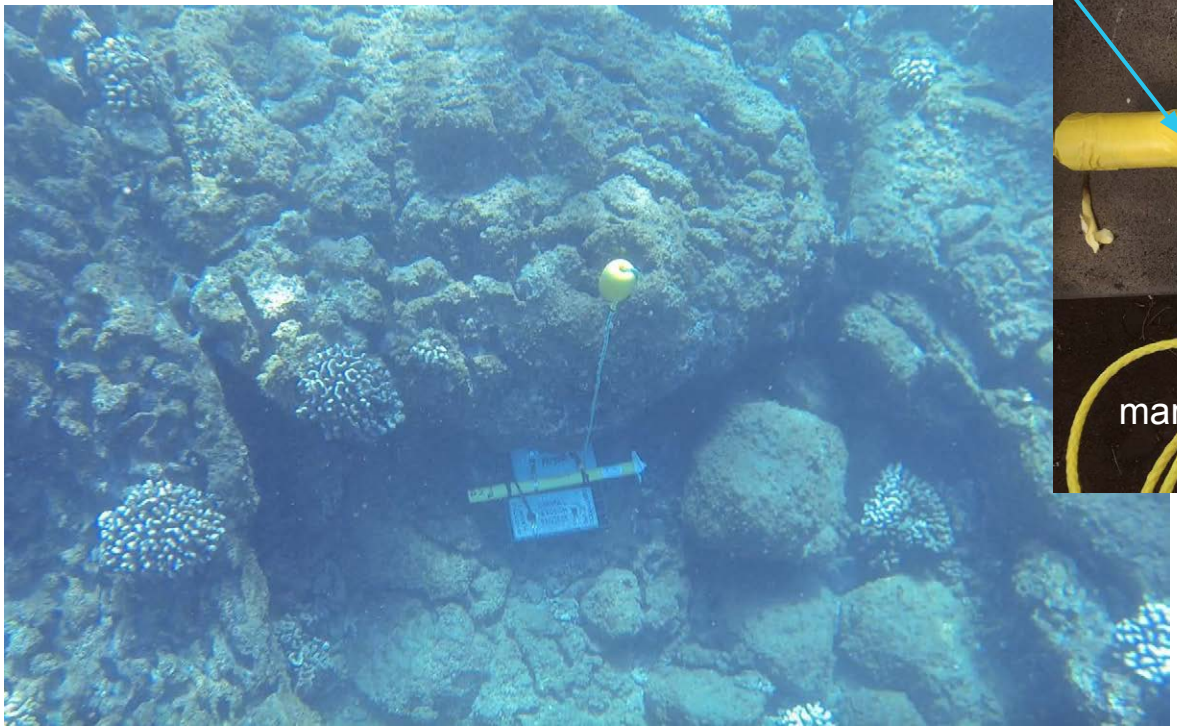


fiberglass grate

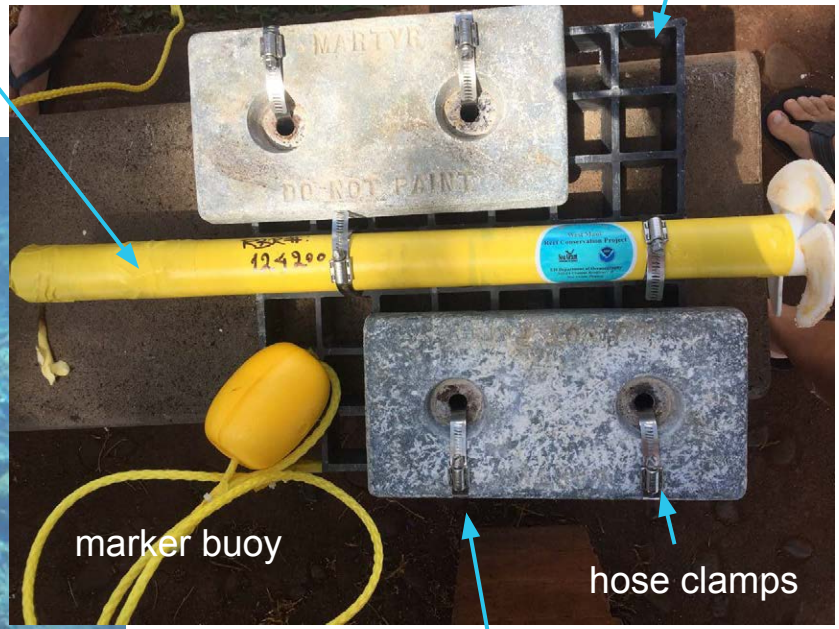
Sand anchor tube
containing RBRsolo³ D

yellow vinyl tape

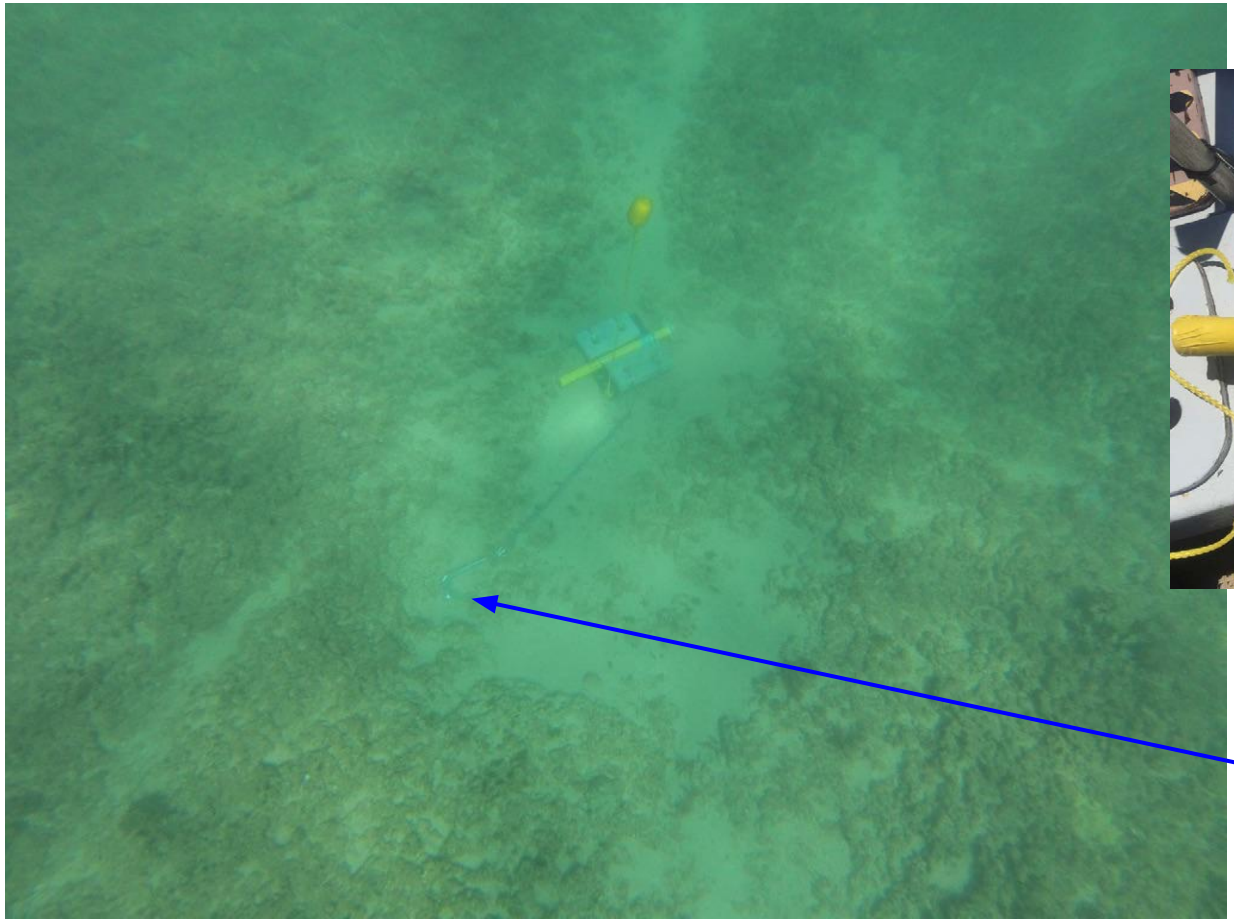
RBRsolo³ D Deployment in a reef environment:



PVC tube containing RBRsolo³ D covered in vinyl tape

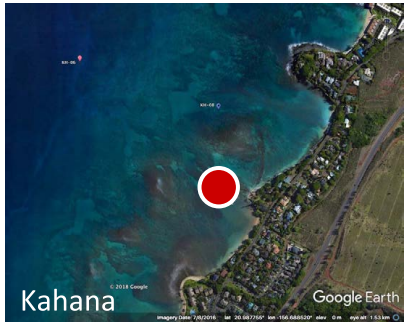


RBRsolo³ D Deployment package for a mixed sand-reef environment:



anchor

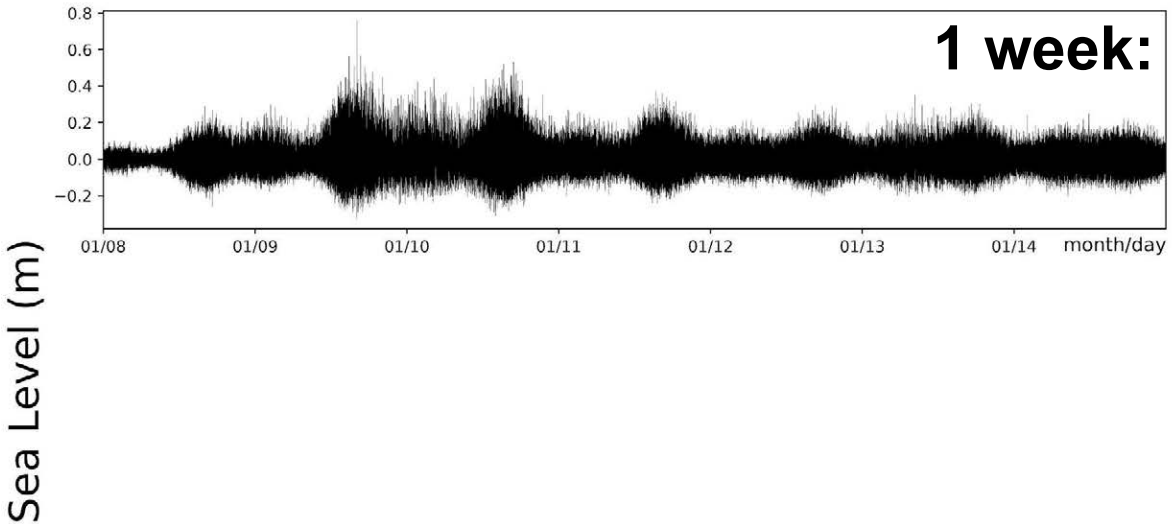
Nearshore Sea Level Data



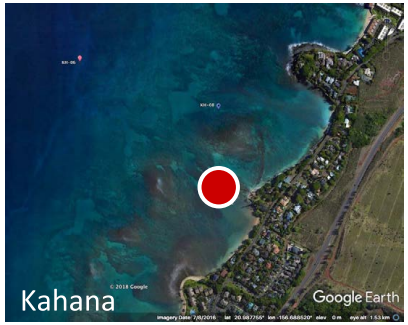
Site:

Depth:
2 m

RBRsolo³ D data with the low passed signal removed

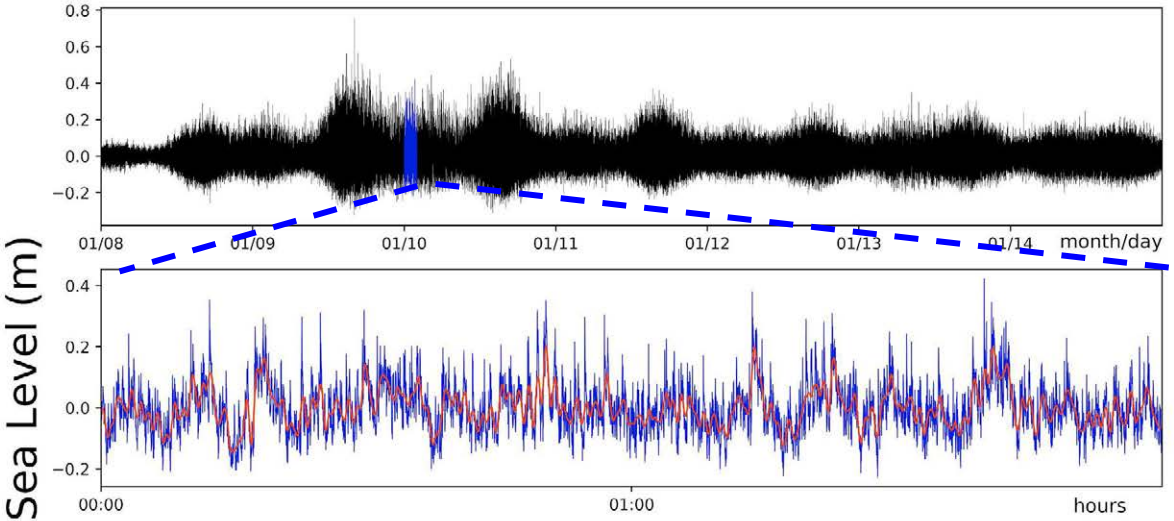


Nearshore Sea Level Data



Site: Depth:
2 m

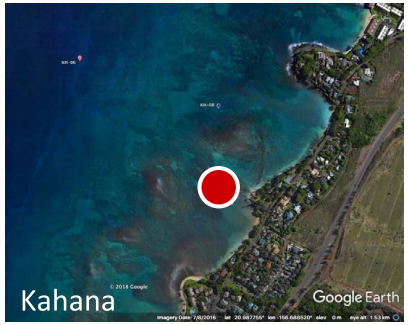
RBRsolo³ D data with the low passed signal removed



1 week

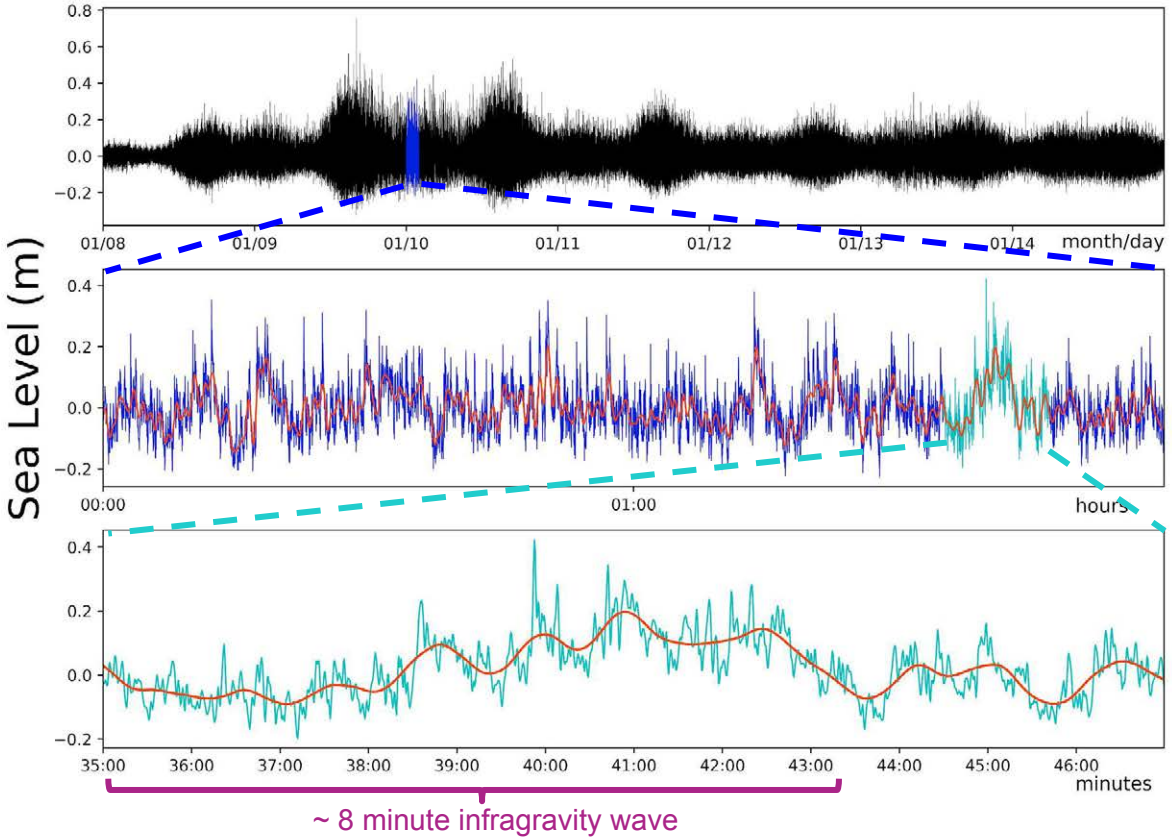
2 hours

Nearshore Sea Level Data



Site: Depth:
2 m

RBRsolo³ D data with the low passed signal removed

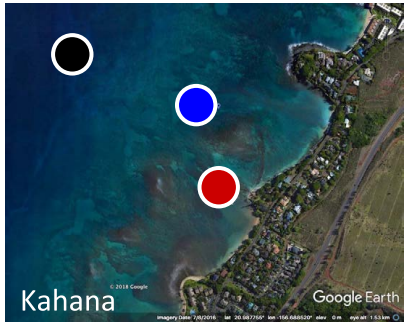


1 week

2 hours

12 min.

Significant wave heights for different frequency bands of observed sea level from an across shore array, showing the evolution of a North swell



Site: Depth:

- 12 m
- 3 m
- 2 m

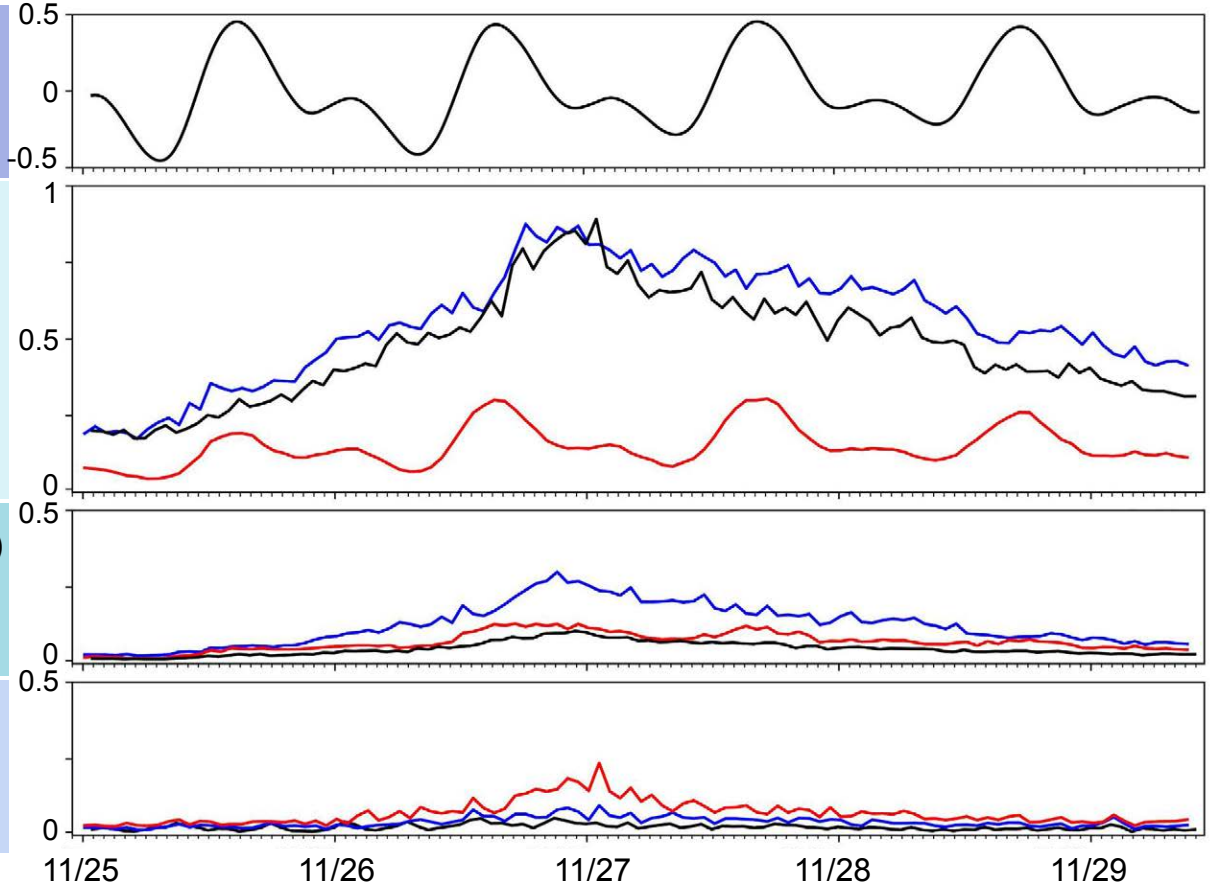
Nov. 25 - Nov 29, 2018

Long Period Sea Level (m) Periods: Hours - Days

Swell Hs (m) Periods: 5 s - 30 s

Near IG Hs (m) Periods: 30s - 5 min

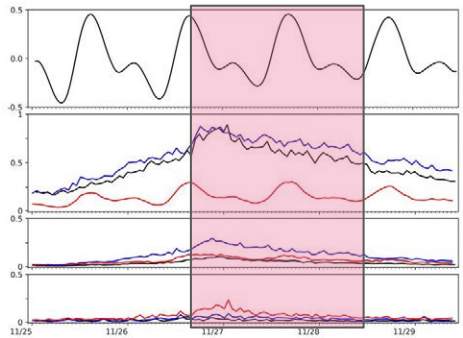
Far IG Hs (m) Periods: 5 min - 90 min



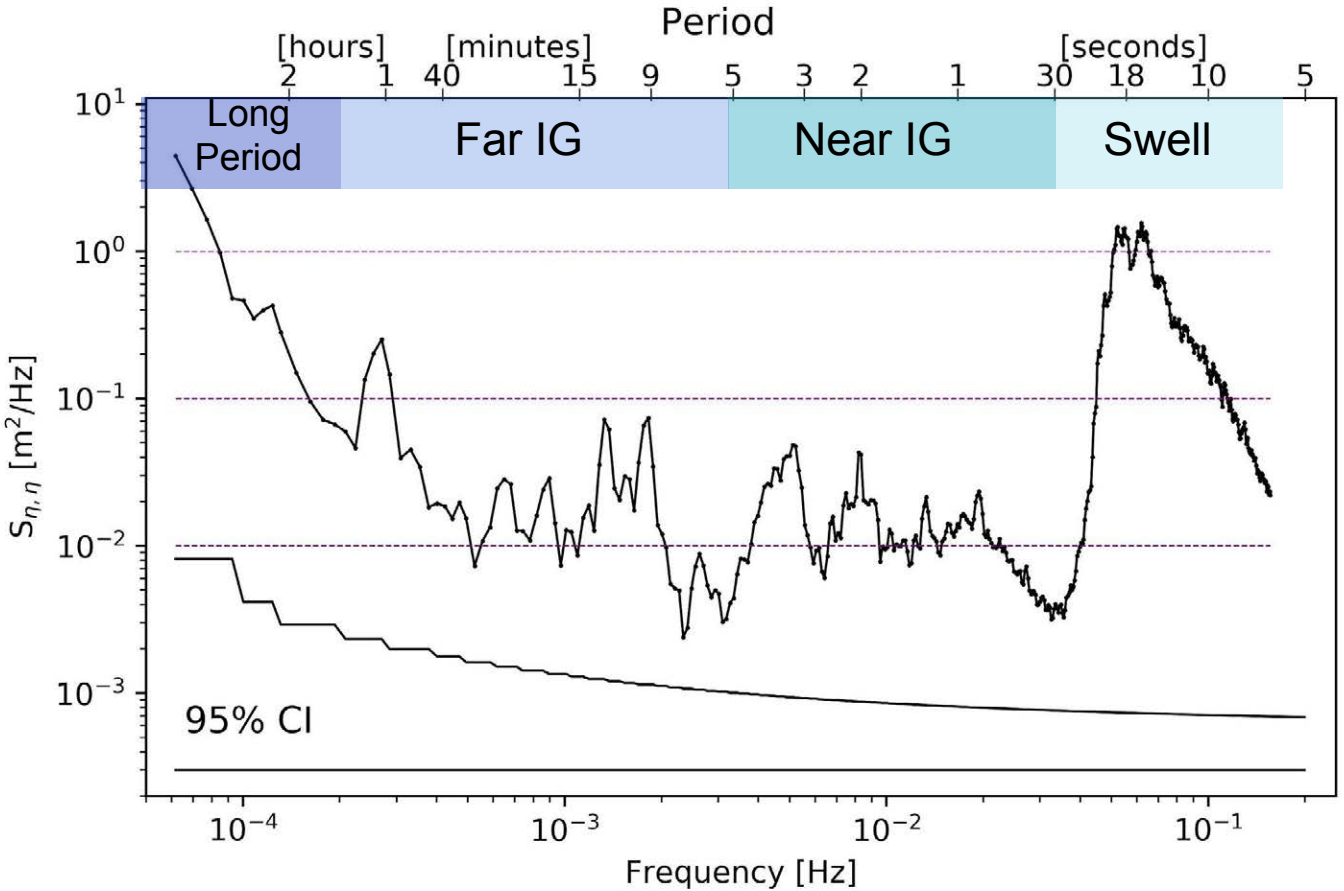
Spectra from the pre-breaking zone has lots of energy in the swell band

Site:

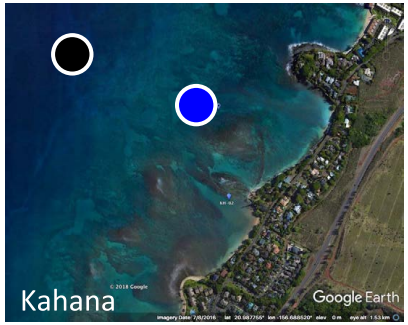
Depth:
12 m



Nov. 26 - Nov 27, 2018



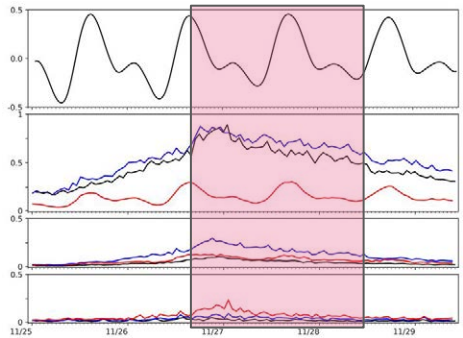
Spectra from the breaking zone shows non linear transfer of energy from the swell frequency band to higher and lower frequency motions, as well as elevated IG energy



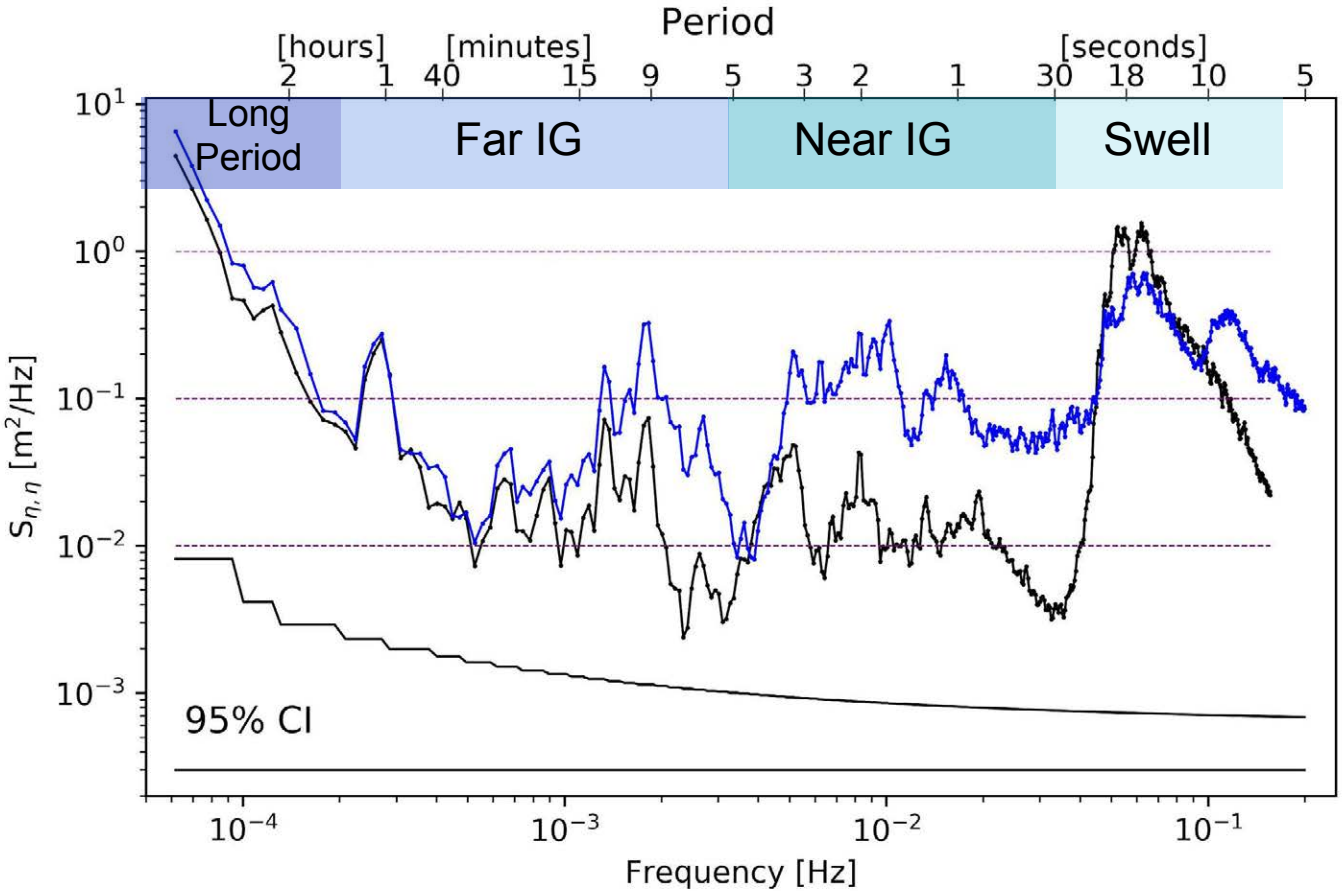
Site: Depth:

12 m

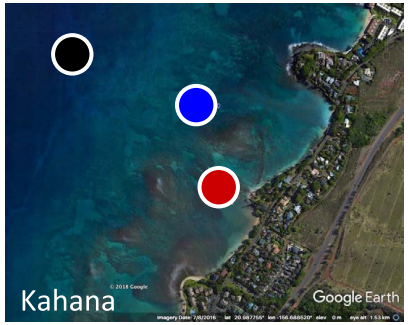
3 m



Nov. 26 - Nov 27, 2018

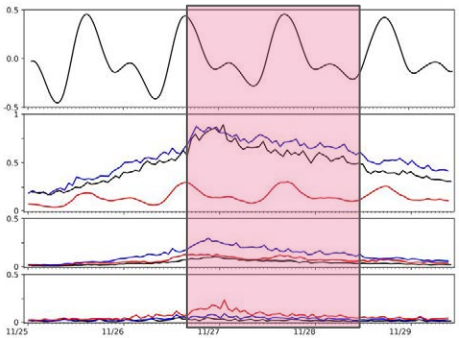


Spectra from the nearshore has almost no energy in the swell band and elevated energy in the Far IG

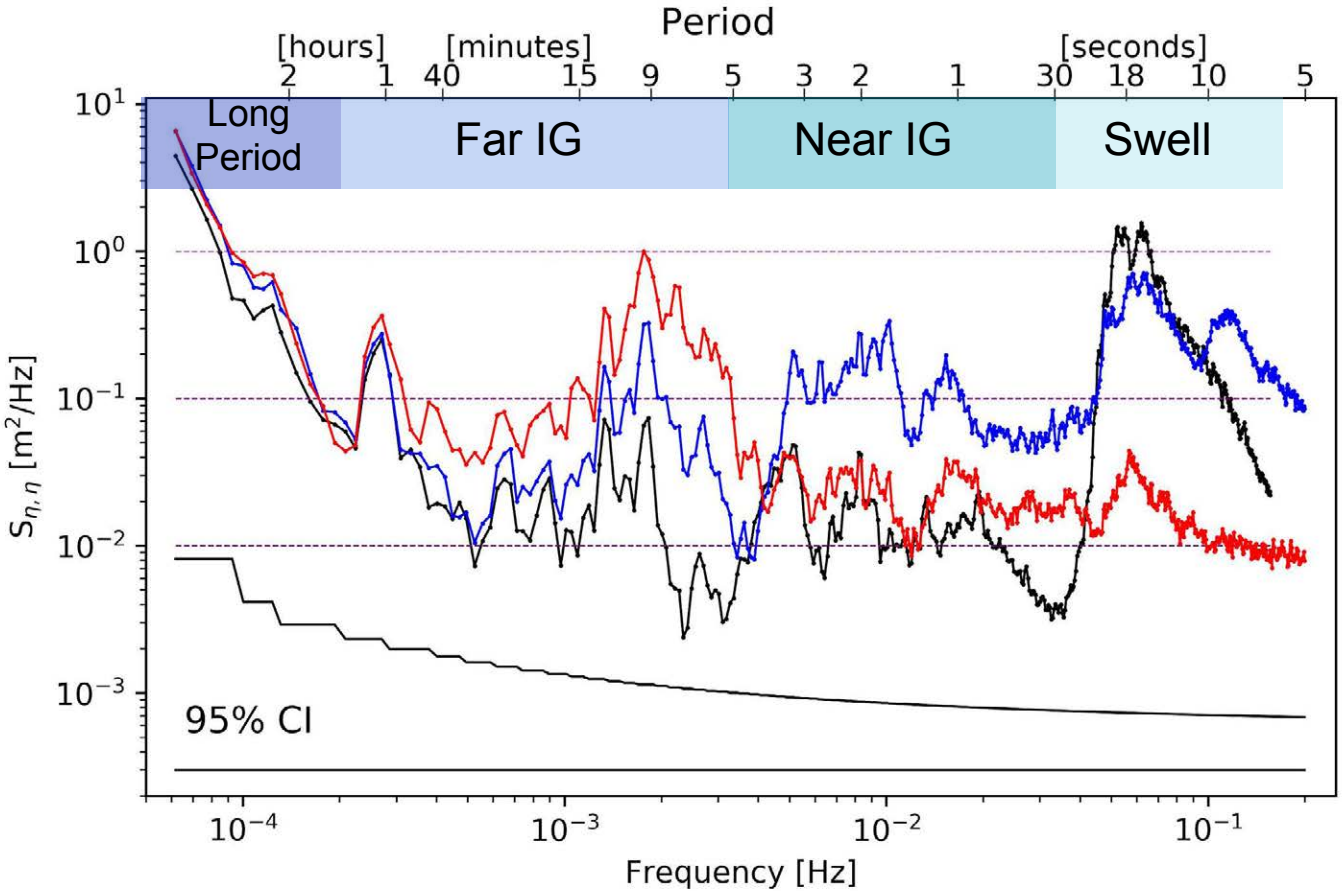


Site: Depth:

- 12 m
- 3 m
- 2 m



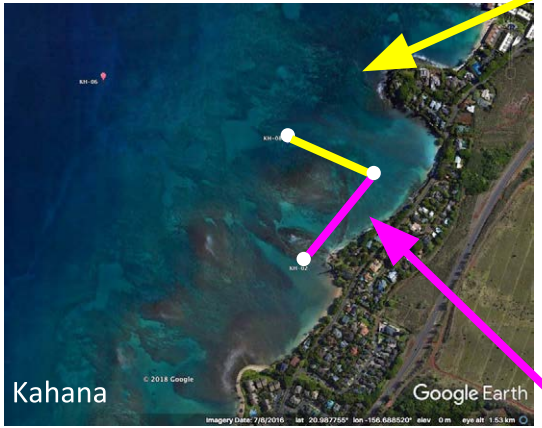
Nov. 26 - Nov 27, 2018



Comparison of Coherences: Observations & Modeling

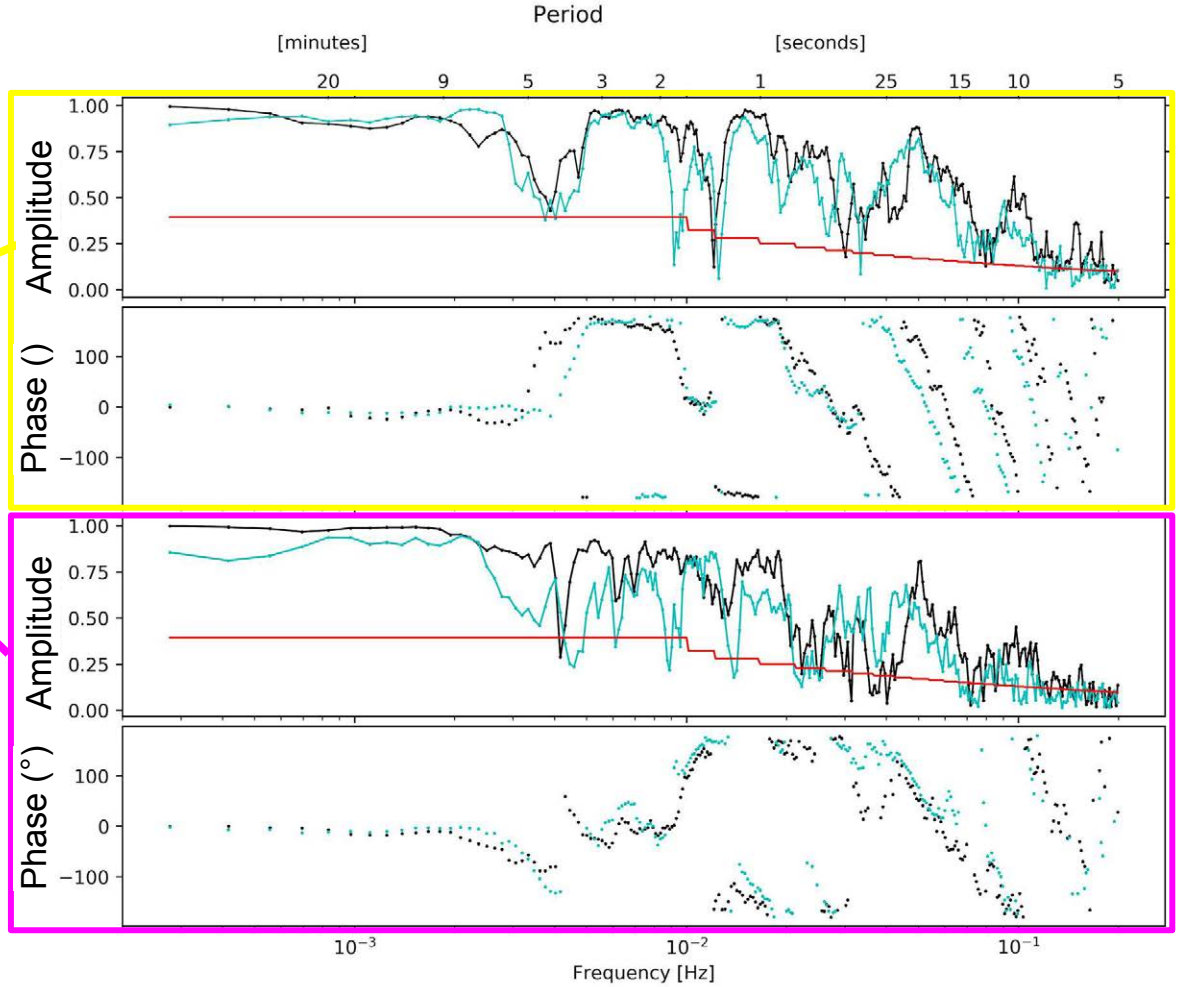
Across shore

200 meters apart



Along shore

300 meters apart

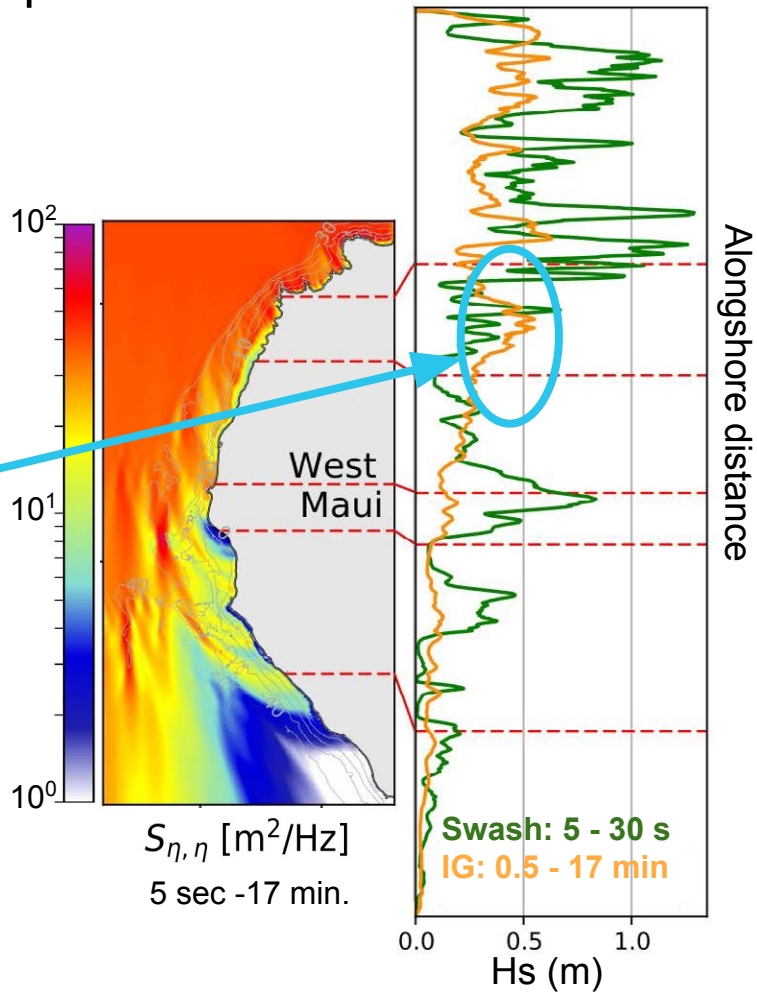


Nov. 26 2018, 18:00 - 22:00

Modeled along shore variability of runup components in the nearshore

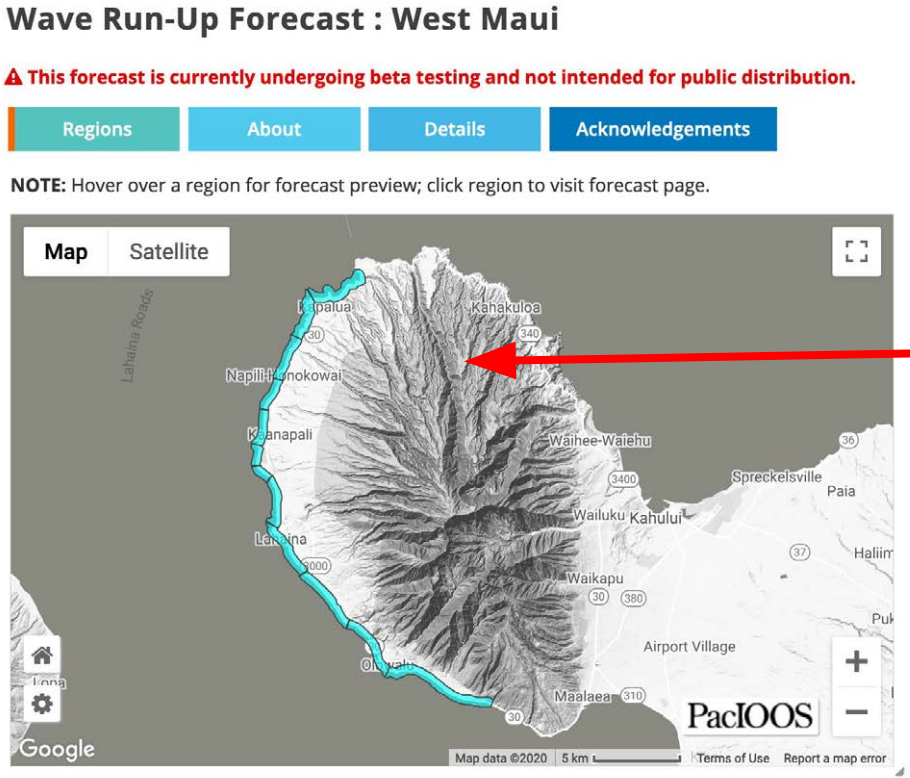
- Transfer of energy to longer period waves (0.5 - 17 min shown here) has along shore and across shore spatial components

- High IG energy at Kahana



Wave Runup Forecasts for West Maui - Website Beta

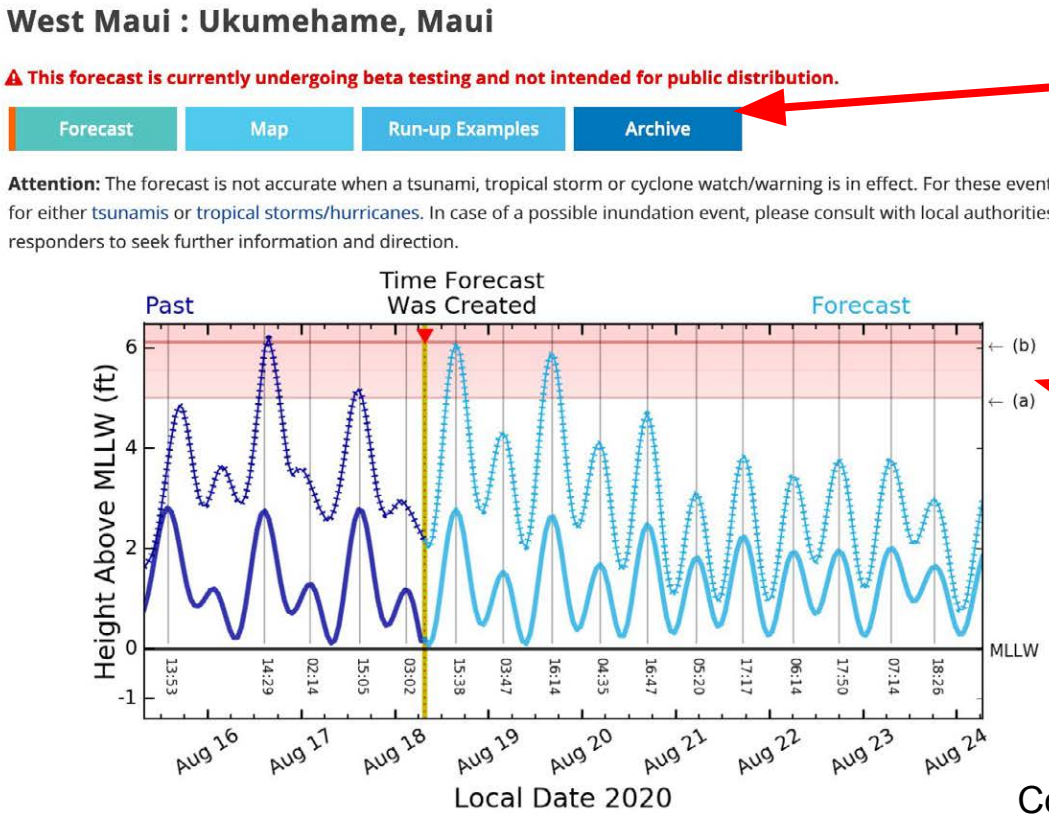
Each of the eleven separate domains will have an individual runup forecast



Main page has mouseover regions along the coastline that bring up mini forecast and are clickable, leading to the forecast page.

Coming soon on www.pacioos.hawaii.edu/

Wave Runup Forecasts for West Maui - Website Beta

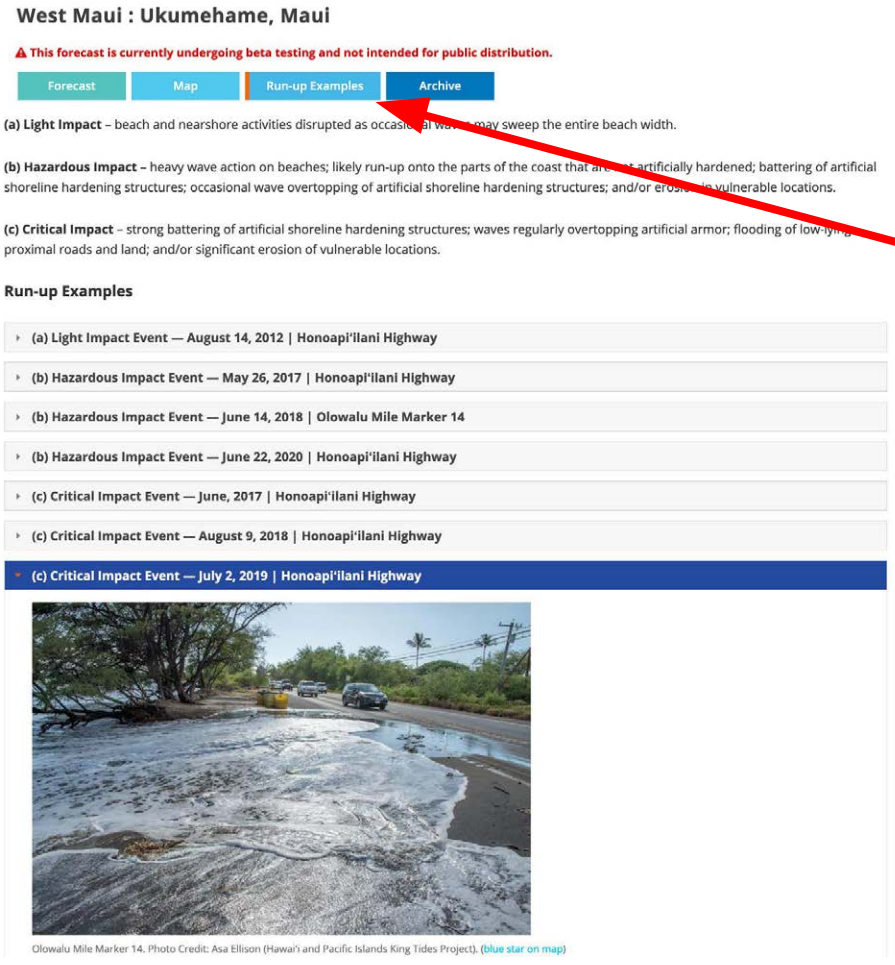


Each region has the current forecast and a set of tabs for more information.

Critical feature of the forecast is setting thresholds based on observed events. We have a coordinated group of citizen scientists working on this validation now.

Coming soon on www.pacioos.hawaii.edu/

Wave Runup Forecasts for West Maui - Website Beta



The examples tab contains the important calibration event information. This is our main focus right now, establishing expected impact given a forecast level.

Coming soon on www.pacioos.hawaii.edu/

Thank you to all of our collaborators!

NOAA West Maui Coastal Resilience Team:
- Doug Luther
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- Donna Brown

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- Amy Venema

Soleil Management:
- Wayne Cober
- Gary Mano

West Maui Citizen Scientists

Questions?