
PacWave
TESTING WAVE ENERGY FOR THE FUTURE

PacWave Ocean Data Systems

EARTH Workshop 2025

Brett Hembrough | PacWave –
Oregon State University

FLOATr MetOcean Buoy

Fixed Location Ocean and Atmospheric Tracking

An autonomous buoy that monitors real-time marine weather and ocean conditions from a fixed location. It also tracks underwater currents and solar charging performance. Data are transmitted hourly to shore.

Sensors:

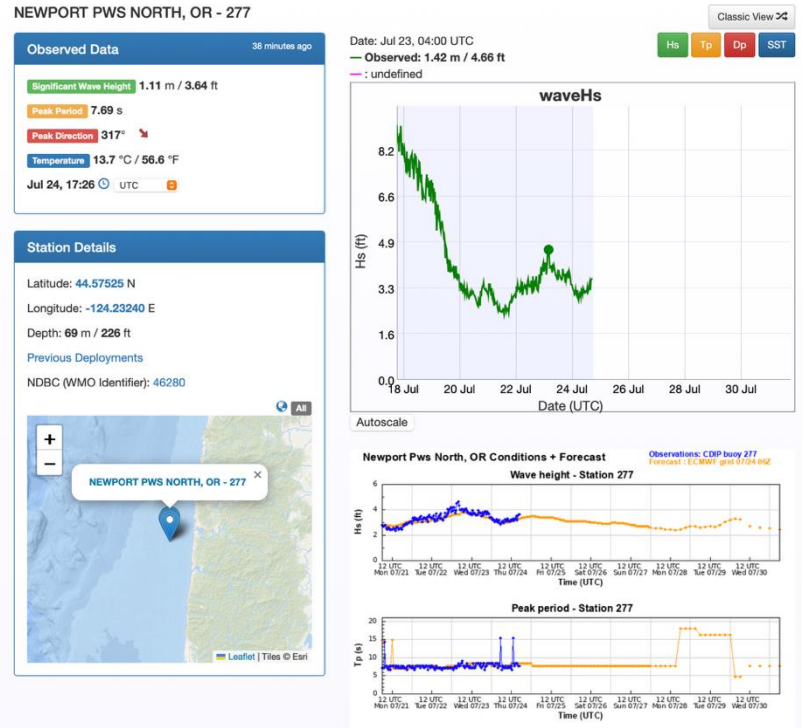
- Wind, air temp, barometric pressure
- Sea surface temperature, salinity, dissolved oxygen
- GPS drift, pyranometers (solar availability)
- Downward-looking ADCP (for water column current profiles)

System Features: Solar-powered, cellular-linked, autonomous

*Also deployed at PacWave North

CDIP Waverider Buoys (PacWave South)

These precision buoys are the cornerstone of wave monitoring at PacWave. They measure and record wave height, direction, and frequency content—critical for understanding energy potential and sea conditions.



Measures: Wave height, direction, period, energy spectrum

Links:

- Station 277: https://cdip.ucsd.edu/m/products/?stn=277p1
- Station 278: https://cdip.ucsd.edu/m/products/?stn=278p1
- Station 280: https://cdip.ucsd.edu/m/products/?stn=280p1
- Spectral Plot: https://cdip.ucsd.edu/themes/cdip?pb=1&d2=p70&u2=s:277:st:1:v:conpendium:max_frq:0.33:dt:202507:t:plot:os:278

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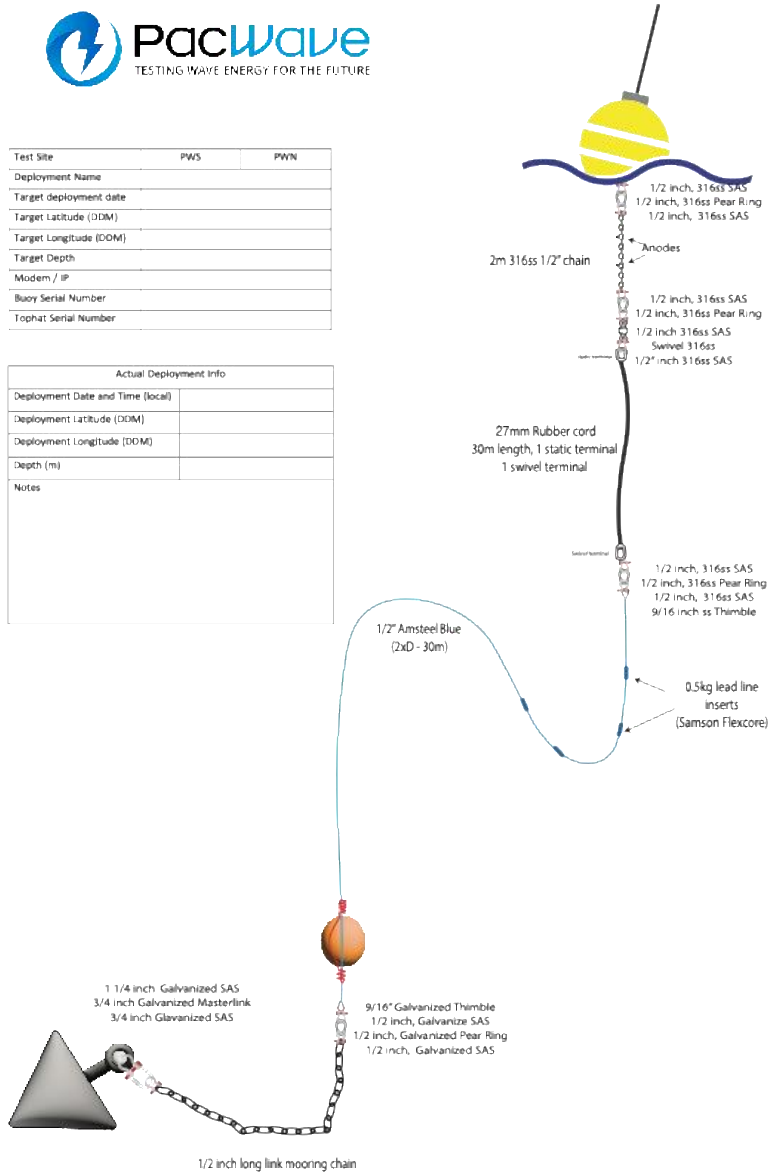
Test Site	PWS	PWN
Deployment Name		
Target deployment date		
Target Latitude (DDM)		
Target Longitude (DDM)		
Target Depth		
Modem / IP		
Buoy Serial Number		
Tophat Serial Number		

Actual Deployment Info	
Deployment Date and Time (local)	
Deployment Latitude (DDM)	
Deployment Longitude (DDM)	
Depth (m)	
Notes	

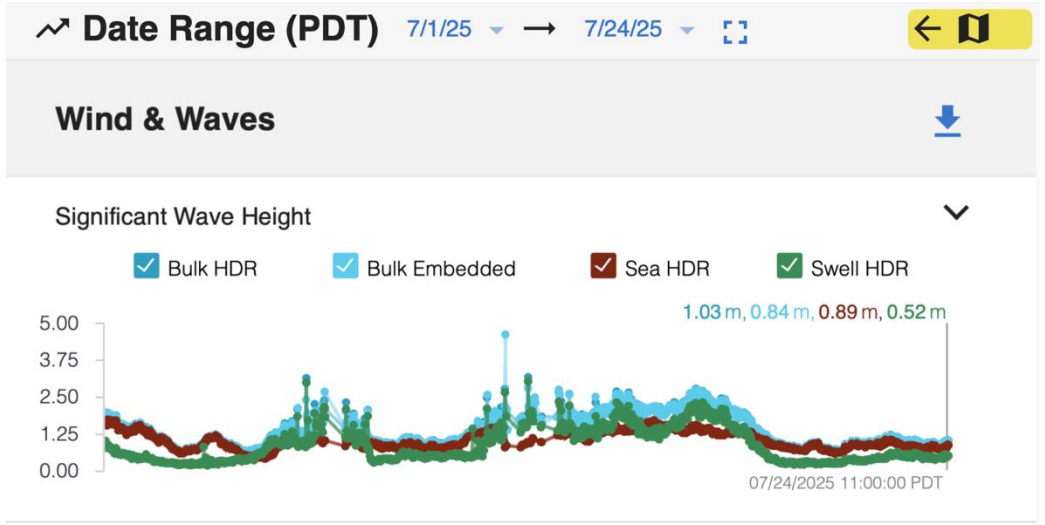


Sofar Spotter Buoys

Compact, solar-powered, GPS-tracked buoys that drift with surface currents and report real-time wave data.

Measures: Wave conditions, sea surface temp, GPS drift

Dashboard: https://spotters.sofarocean.com/?user-filter=1531



*Also deployed at PacWave North

Spotter Mooring

Site: PacWave North
Approximate Water Depth: 50 m
Revised Date: 8/28/2020

Actual Water Depth	
Deployment Coordinates	
Deployment Date	
Deployment Notes	

"Spotter" buoy
(16.4" wide x 12.2" high)

Sofar SS D-Ring
5/16" SS Safety-Pin Shackle
5 ft. 5/16" SS Chain
5/16" SS Jaw-Jaw Swivel
Splice w/ 5/16" SS Thimble

10 m of 5/16" Samson Quik Splice
Negative buoyancy w/ 20 g 1/4" tube lead per m
(Avg: 20 g lead per m)

70 m of 5/16" Samson Quik Splice
Neutral buoyancy w/ 12.5 g 1/4" tube lead every 5 m
(Avg: 2.5 g lead per m)

5/8" Galvanized Safety-Pin Shackle
1/2" Galvanized Safety-Pin Shackle
15 ft of 5/16" LL Galv Chain
5/16" Galvanized Safety-Pin Shackle
Splice w/ 5/16" Galvanized Thimble

10 m of 5/16" Samson Quik Splice
Positivce buoyancy w/ 0 glead per m

Dor-Mor Pyramid anchor
(35 lbs)

NOT TO SCALE

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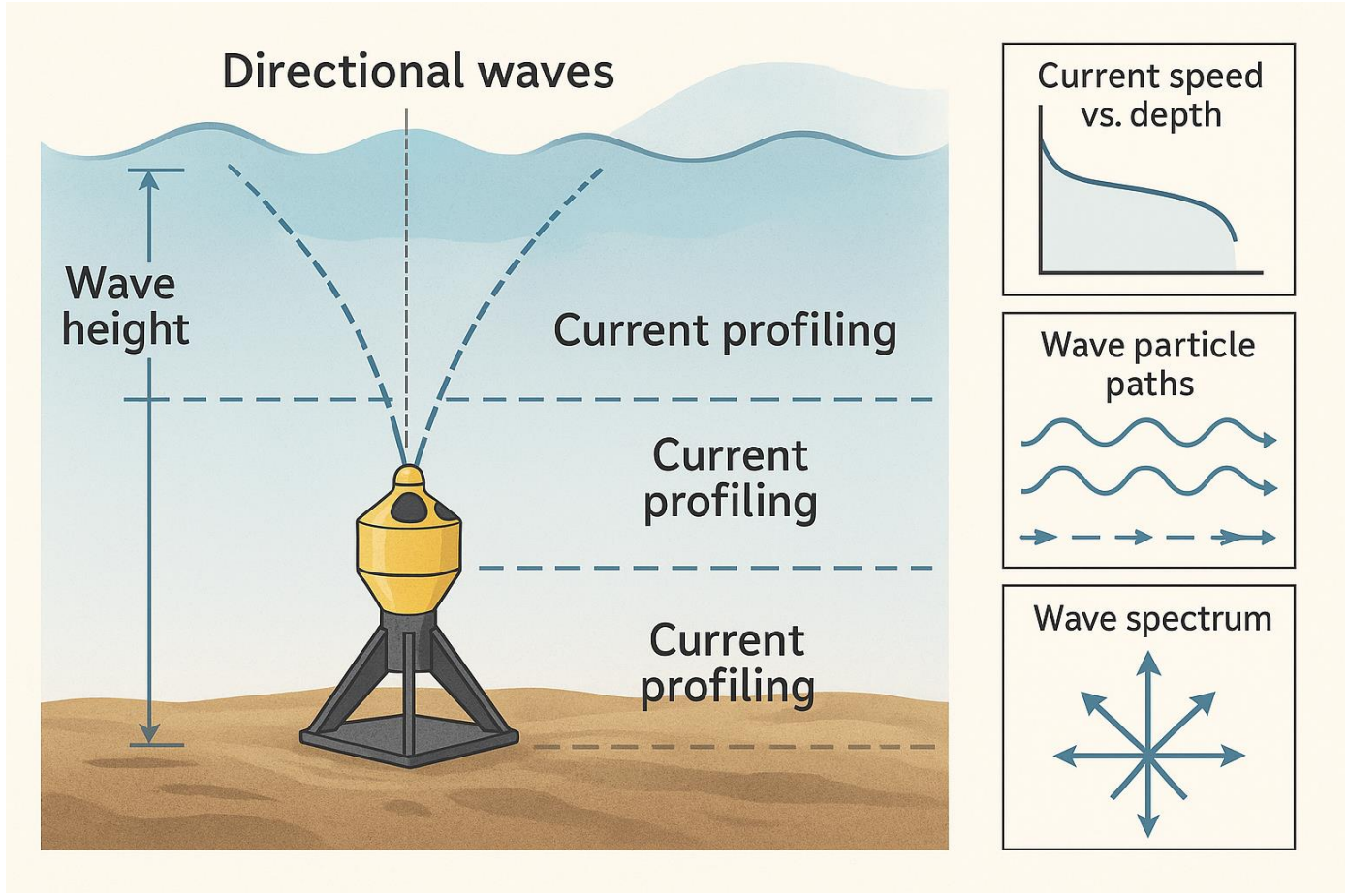
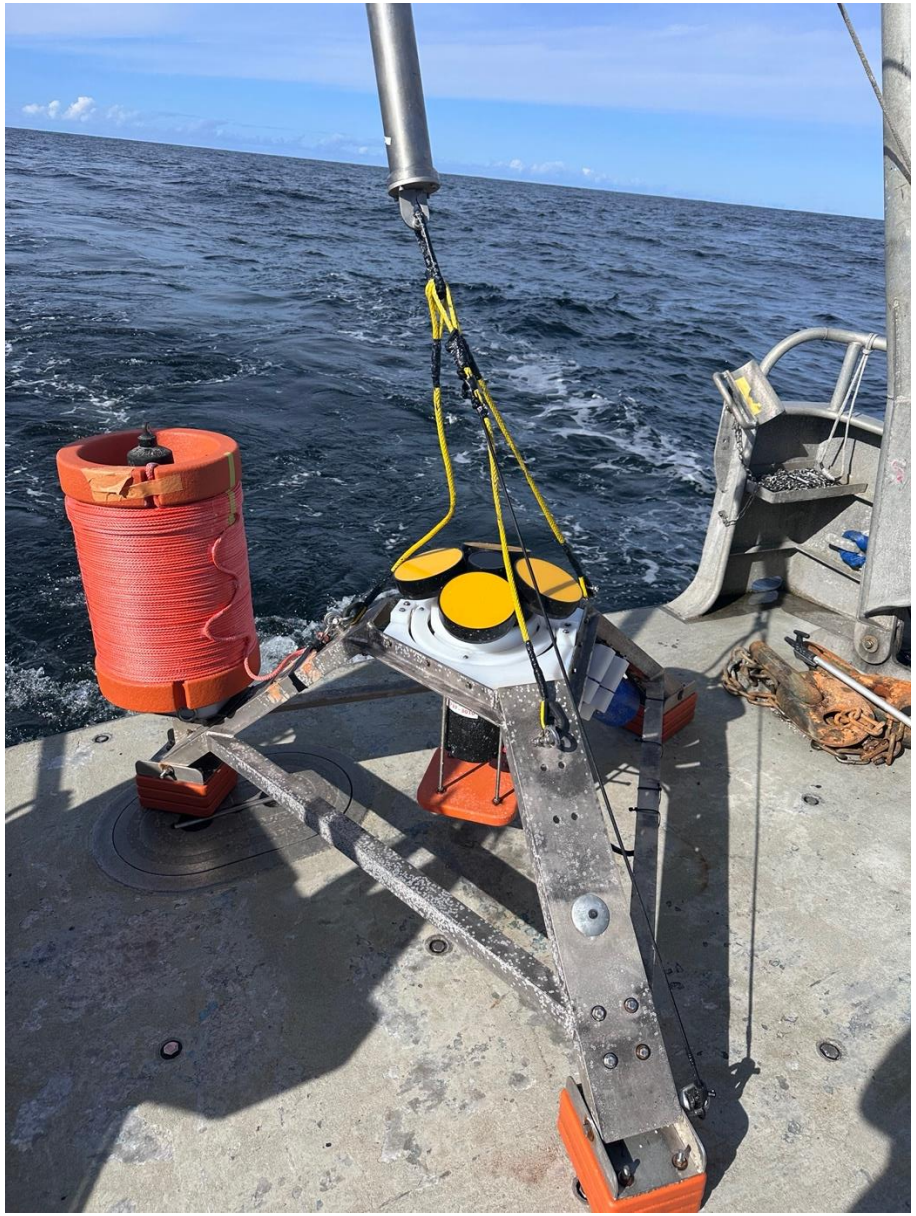
Nortek Signature 250 – AWAC

This seafloor-mounted instrument measures underwater currents and wave forces below the surface.

Measures:

- Current profiles
- Wave height, direction, orbital velocities
- Acoustic backscatter


Directional waves
Wave height
Current profiling
Current profiling
Current profiling
Current speed vs. depth
Wave particle paths
Wave spectrum



Regional Buoy Network (NDBC)

NOAA buoys provide broader context for comparing offshore and nearshore conditions.

- Local Waveriders:
  - 46280: https://www.ndbc.noaa.gov/station_page.php?station=46280
  - 46281: https://www.ndbc.noaa.gov/station_page.php?station=46281
  - 46283: https://www.ndbc.noaa.gov/station_page.php?station=46283

- Nearby Stations:
  - 46094: https://www.ndbc.noaa.gov/station_page.php?station=46094
  - 46050: https://www.ndbc.noaa.gov/station_page.php?station=46050
  - NWPO3: https://www.ndbc.noaa.gov/station_page.php?station=nwpo3
  - 46098: https://www.ndbc.noaa.gov/station_page.php?station=46098
  - 46089: https://www.ndbc.noaa.gov/station_page.php?station=46089

Open Data Repositories

PacWave shares its sensor datasets through national repositories for public use. Marine Hydrokinetic Data Repository

MHKDR: https://mhkdr.openei.org

OpenEI Portal: https://openei.org

PacWave Raw Data: https://data.openei.org/s3_viewer?bucket=marine-energy-data&prefix=pacwave%2F

*raw unprocessed data

Classroom Activity Ideas

- Storm Tracker – Compare wave height across buoys before/during/after storms
- Wave Spectra – Analyze CDIP plots for energy peaks
- Drift Mapping – Track buoy position relative to wind/current/swell
- Sensor Comparison – Fixed (seafloor) vs. surface measurements
- Mooring Design – Discuss different mooring systems and pro/cons for wave measurement

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