

Coastal Data Information Program (CDIP)



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CEREMA
December 2, 2021

Based at Scripps Institution Of Oceanography since 1975

**~67 Active Wave Stations, 294 stations deployed since 1975
(includes buoys and pressure sensors)**

16 People (including Post Doc and student)

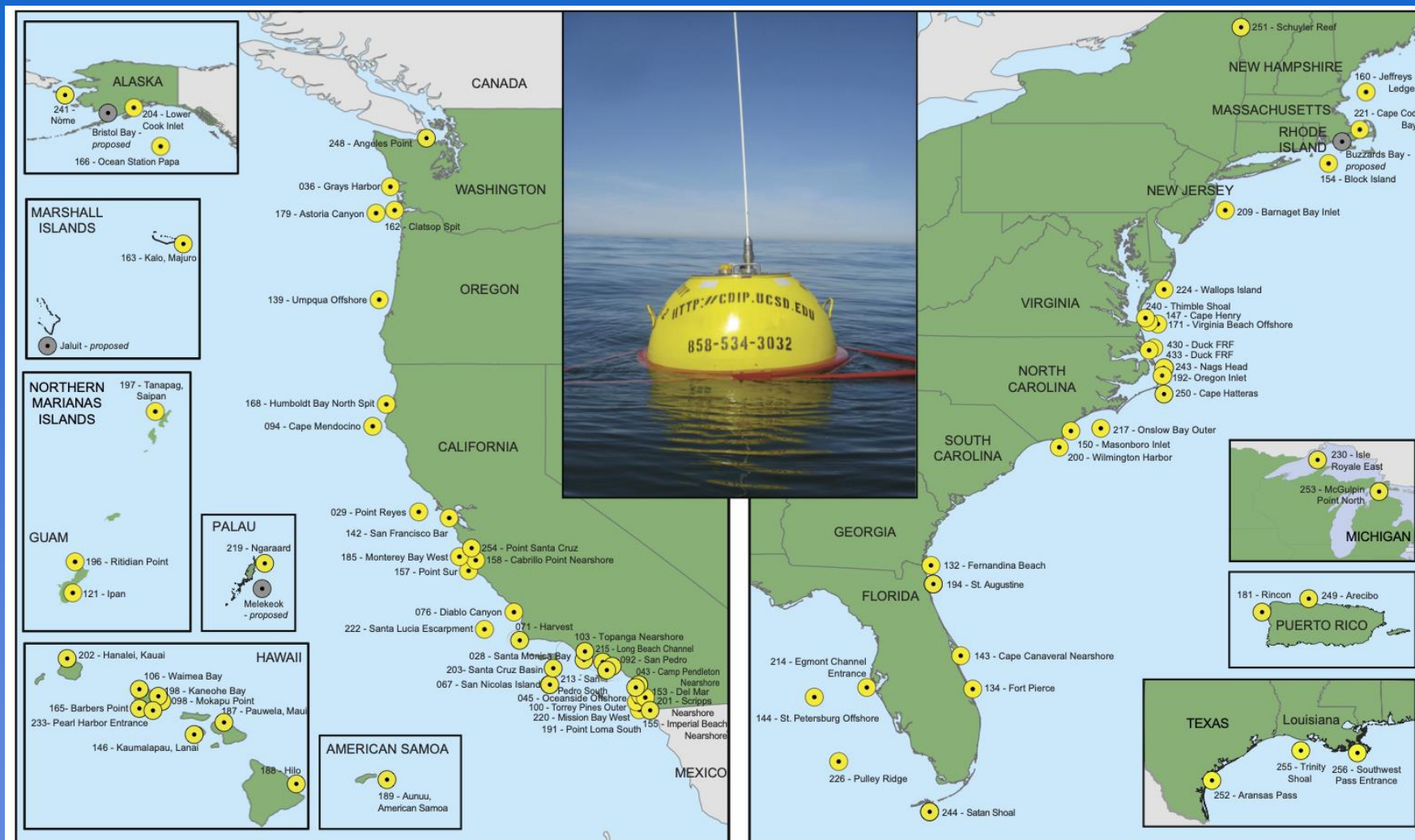
Major Funding by US Army Corps of Engineer

**Partners: State of California, Federal agencies including
military, industry, academia**

**Web Stats : Oct 2021 = 8,661,274 pageviews
(http://cdip.ucsd.edu/cdip_site_stats/)**

**Mission: Provide high quality observations for research or
operations**

Data sent to NDBC @ 30 min and distributed to National Weather Service for broadcast on their marine weather channel



COASTAL DATA INFORMATION PROGRAM

Waverider buoys

- Wave Energy Spectrum
- Directional Spectrum
- XYZ (E,N,V) Displacements
- Sea Surface Temperature
- *Sea Surface Currents*
- *Air Temperature*



% Coverage: Percentage of the deployed period for which good spectral data was obtained;

Total spectra: The number of spectra generated for the year.

CDIP-operated stations

Stn	Name	% Deployed	% Coverage	Total Spectra
028	SANTA MONICA BAY, CA	99.98	100.00	17564
029	POINT REYES, CA	100.00	99.98	17565
036	GRAYS HARBOR, WA	88.87	100.00	31223
045	OCEANSIDE OFFSHORE, CA	99.98	100.00	29783
067	SAN NICOLAS ISLAND, CA	99.97	100.00	33720
071	HARVEST, CA	100.00	100.00	17568
092	SAN PEDRO, CA	100.00	100.00	35134
094	CAPE MENDOCINO, CA	99.98	100.00	31055
100	TORREY PINES OUTER, CA	100.00	100.00	17568
103	TOPANGA NEARSHORE, CA	36.17	100.00	6354
132	FERNANDINA BEACH, FL	91.59	99.83	16062
134	FORT PIERCE, FL	88.56	100.00	15578
139	UMPQUA OFFSHORE, OR	99.97	100.00	17630
142	SAN FRANCISCO BAR, CA	100.00	100.00	17568
143	CAPE CANAVERAL NEARSHORE, FL	98.72	100.00	17347
144	ST. PETERSBURG OFFSHORE, FL	68.33	99.56	11951
147	CAPE HENRY, VA	99.98	100.00	17565
153	DEL MAR NEARSHORE, CA	100.00	99.97	17563
155	IMPERIAL BEACH NEARSHORE, CA	59.80	100.00	10508
157	POINT SUR, CA	99.99	100.00	17578
162	CLATSOP SPIT, OR	96.76	99.85	16973
168	HUMBOLDT BAY NORTH SPIT, CA	100.00	99.96	17561
171	VIRGINIA BEACH OFFSHORE, VA	44.63	98.72	7740
179	ASTORIA CANYON, OR	93.55	99.95	16426
185	MONTEREY BAY WEST, CA	95.63	99.74	16756

http://cdip.ucsd.edu/themes/cdip?zoom=auto&tz=UTC&ll_fmt=dm&numcolorbands=10&palette=cdip_classic&high=6.096&r=999&un=1&pb=1&d2=p88

Quality Control - Calibration verification to measure drift.

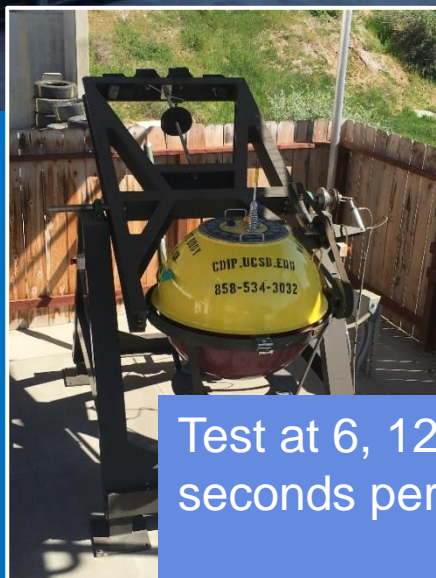
All verification data are archived
For easy access.

Enter a search string:

datawell paros sensotec

kulite gulton all

tophat

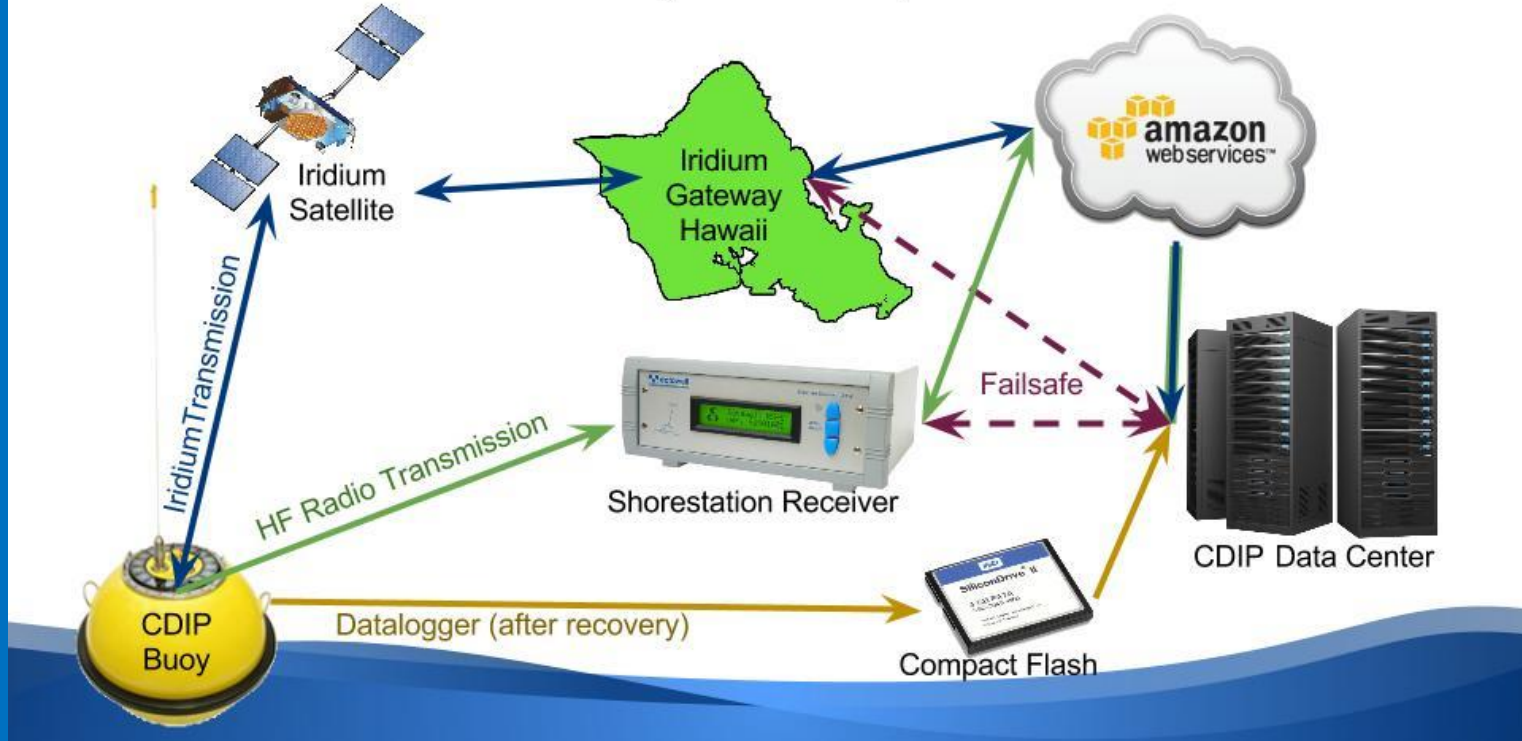


Test at 6, 12, and 20 seconds period

Heave within 2%,
Direction within 2 degrees

242	1	2018-08-14 00:00:00	2018-08-23 23:00:00	74081	74082
153	1	2019-12-05 20:00:00	2021-01-22 21:00:00	74082	74080
248	1	2020-04-01 16:00:00	2021-07-23 18:00:00	74081	74082
153	1	2021-01-22 21:00:00	2021-01-22 23:00:00	74082	74080
153	1	2021-01-22 23:00:00	2037-01-01 00:00:00	74082	74080
248	1	2021-08-27 00:00:00	2037-01-01 00:00:00	74081	74082

CDIP Buoy Data Acquisition

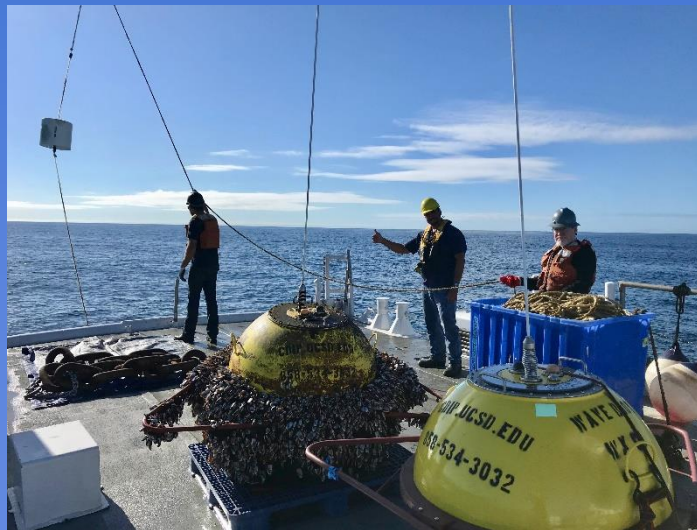


<http://cdip.ucsd.edu/m/documents/intro.html>

Data acquisition, processing, data management, data dissemination, products, etc.

OPERATIONS AND MAINTENANCE

- Batteries
- Moorings
- Anchors
- Acoustic Releases
- Service & Repairs



<http://cdip.ucsd.edu/themes/>
Click on More



Index of many real-time diagnostics

<http://cdip.ucsd.edu/m/diag/>

CDIP Diagnostic Tables All

Diag Tech Comm Links

Sorting: Default CDIP ⓘ

#	Station Name	Buoy State	GPS Age	Hs Age	SST Age	ACM Age	WOL	GPS NM	Hs m	SST C
246	Grand Isle, La	offsite	0:28	0:51	0:22		107	3.74	0.64	21.2
214	Egmont Channel Entrance, Fl	moored	0:28	0:51	0:22		8	0.01	0.40	26.0
224	Wallops Island, Va	moored	0:28	0:51	0:22		9	0.02	0.87	15.8
204	Lower Cook Inlet, Ak	moored	0:28	0:51	0:22		14	0.02	0.64	8.7
188	Hilo, Hawaii, Hi	moored	0:42	1:05	0:36		106	0.19	1.69	27.7
100	Torrey Pines Outer, Ca	moored	0:28	0:51	0:22		111	0.56	0.67	18.4
197	Tanapag, Saipan, Nmi	moored	0:28	0:51	0:22		31	0.34	0.95	29.2
092	San Pedro, Ca	moored	0:35	0:58	0:29		110	0.34	0.75	19.6
191	Point Loma South, Ca	moored	0:28	0:51	0:22		47 +	0.82	0.94	19.5
157	Point Sur, Ca	moored	0:28	0:51	0:22		150 +	0.34	1.32	13.8
244	Satan Shoal, Fl	moored	0:28	0:51	0:22		53	0.14	0.83	28.3
220	Mission Bay West, Ca	moored	0:28	0:51	0:22		34 +	0.38	0.88	19.1
071	Harvest, Ca	moored	0:28	0:51	0:22		184 +	0.47	1.68	15.5
196	Ritidian Point, Guam	moored	0:28	0:51	0:22		48	0.39	1.02	29.3
094	Cape Mendocino, Ca	moored	0:28	0:51	0:22		90 +	0.32	1.53	10.9
155	Imperial Beach Nearshore, Ca	moored	0:28	0:51	0:22		22	0.01	0.79	17.7
243	Nags Head, Nc	moored	0:33	0:56	0:27		31	0.03	0.88	18.6
036	Grays Harbor, Wa	moored	0:28	0:51	0:22		25	0.03	1.38	11.0
045	Oceanside Offshore, Ca	moored	0:28	0:51	0:22		62 +	0.21	0.65	18.9
029	Point Reyes, Ca	moored	0:28	0:51	0:22		162 +	0.38	1.52	13.1

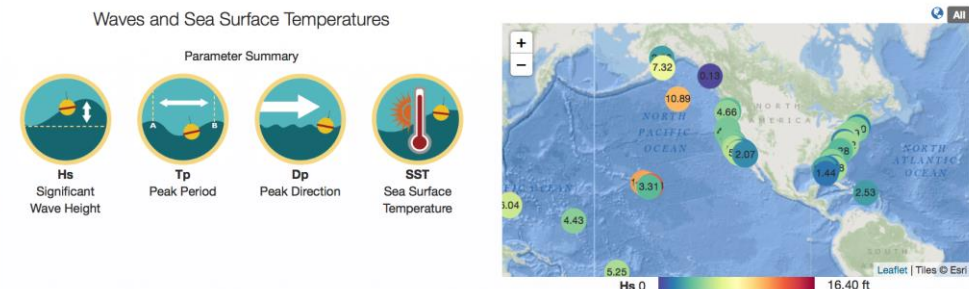
Quality Control

- QARTOD – Quality Assurance of Real-Time Data (<https://ioos.noaa.gov/project/qartod/>)
- Watchkeeping team with decades of wave observing experience
- Real time QC warnings
- Data archives (1975-present) with complete time series and additional QC
- Extensive metadata
- Legacy of R&D collaboration between Datawell and CDIP

Many Products!

Data Dissemination

- Updates every 30 minutes (> 99% reliable)
- Spectra, parameters, displacement path
- CDIP Website (~17,000 unique visitors/day)
- National Data Buoy Center / NOAA (NWS)
- National Centers for Environmental Information archive (NCEI)
- Physical Oceanographic Real-Time System (PORTS®): Humboldt Bay, San Francisco, LA/LB



Classic table

Recent Buoy Observations Jan 29, 17:39

Stations		Hs ft	Tp s	Dp °	SST °F
KALO, MAJURO, MARSHALL ISLANDS - 163	24 min ago	4.43	11.1	4	83.7
IPAN, GUAM - 121	9 min ago	6.04	7.1	83	82.0
RITIDIAN POINT, GUAM - 196	9 min ago	9.78	13.3	354	81.7

National Oceanic and Atmospheric Administration's

National Data Buoy Center NDBC

Center of Excellence in Marine Technology


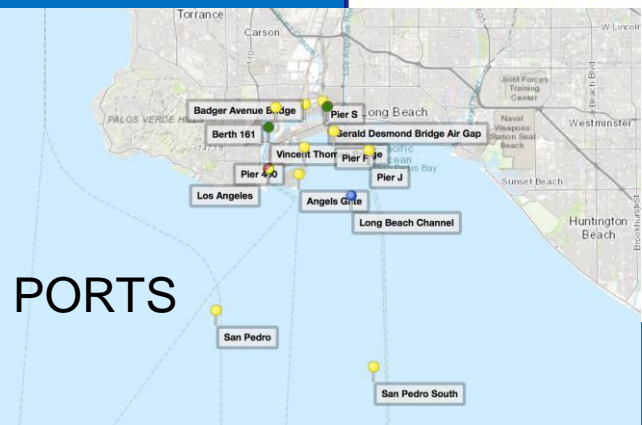
Home About Us Contact Us

Station 46258 - Mission Bay West, CA (220)

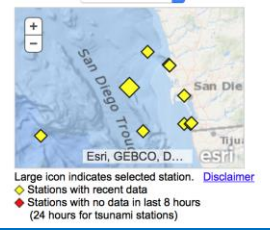
Information submitted by [Scripps Institution of Oceanography Waverider Buoy](#)
 32.752 N 117.501 W (32°45'6" N 117°30'3" W)

Site elevation: sea level
 Sea lamp depth: 0.46 m below water line
 Water depth: 588.6 m

[Latest NWS Marine Forecast](#)
[Search And Rescue \(SAR\) Data](#)
[Meteorological Observations from Nearby Stations and Ships](#)

PORTS



Hurricane and large storm events

<http://cdip.ucsd.edu/themes/cdip?pb=1&d2=p12>

COASTAL OBSERVATIONS:

CDIP observations of recent extreme wave conditions on U.S. coasts

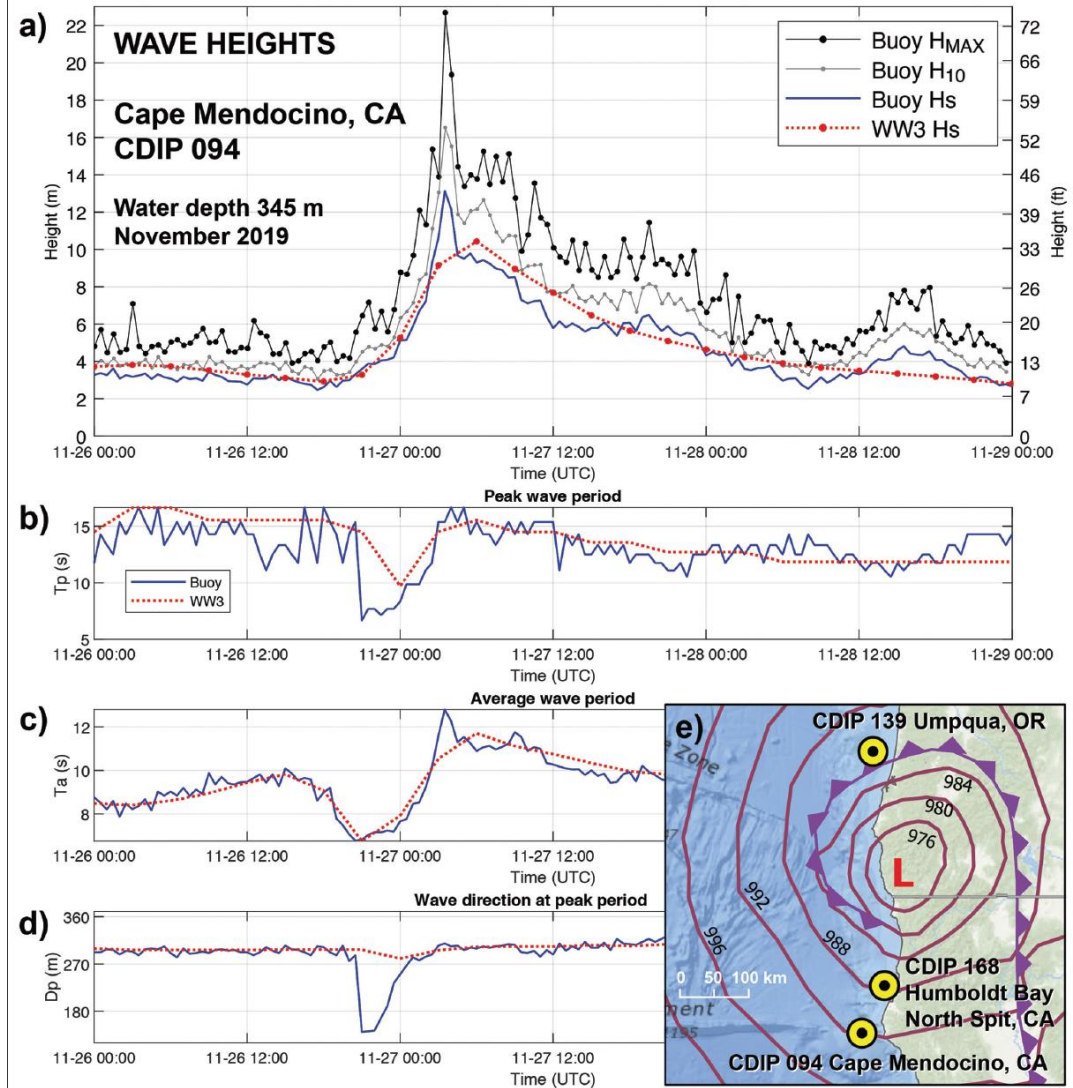
By

James Behrens,¹ Ross Timmerman,¹ Eric Terrill,¹ Sophia Merrifield,¹ and Robert E. Jensen²

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² U.S. Army Corps of Engineers

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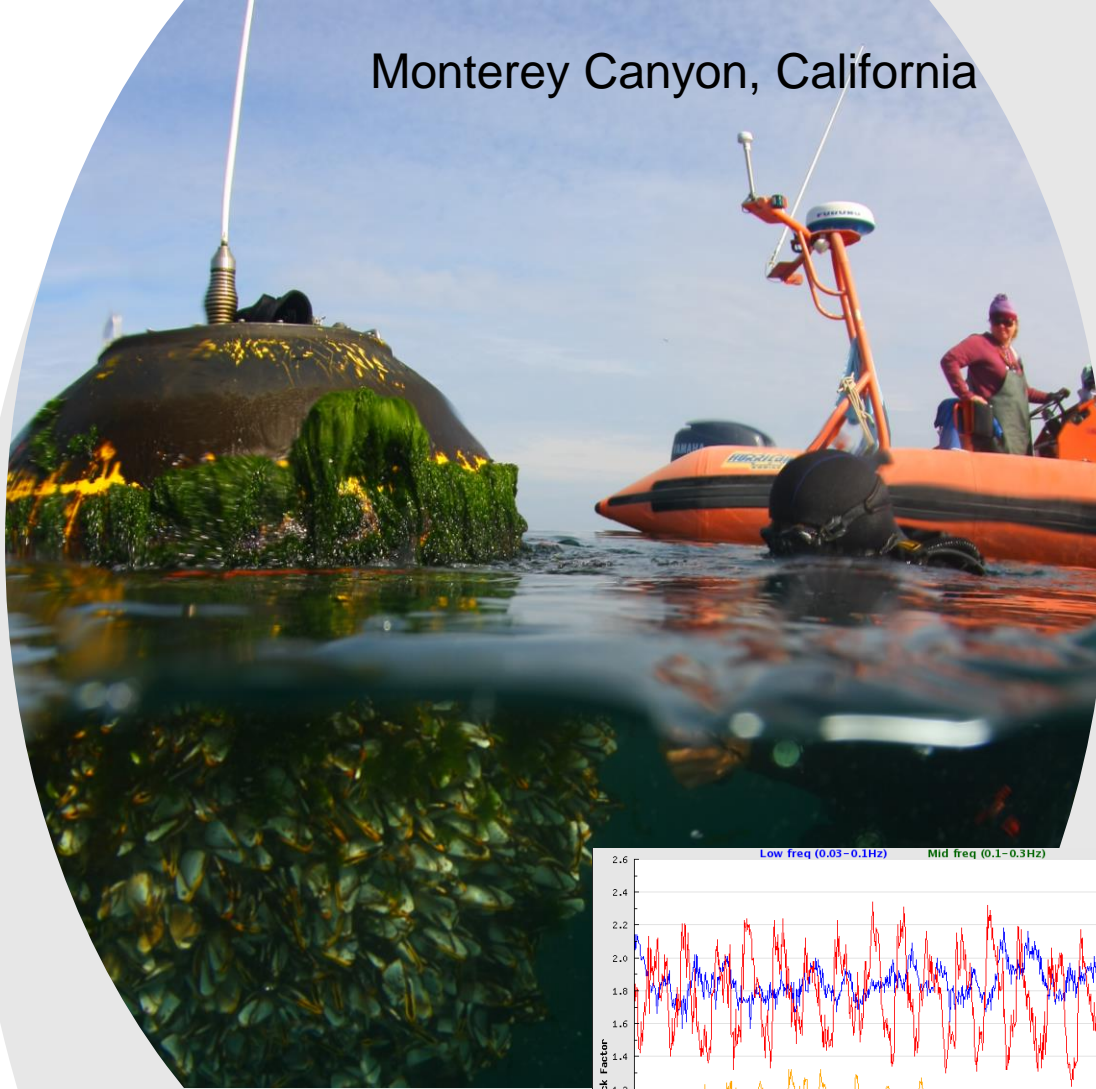


Nov 27, 2019 – Central California
Hmax 22m

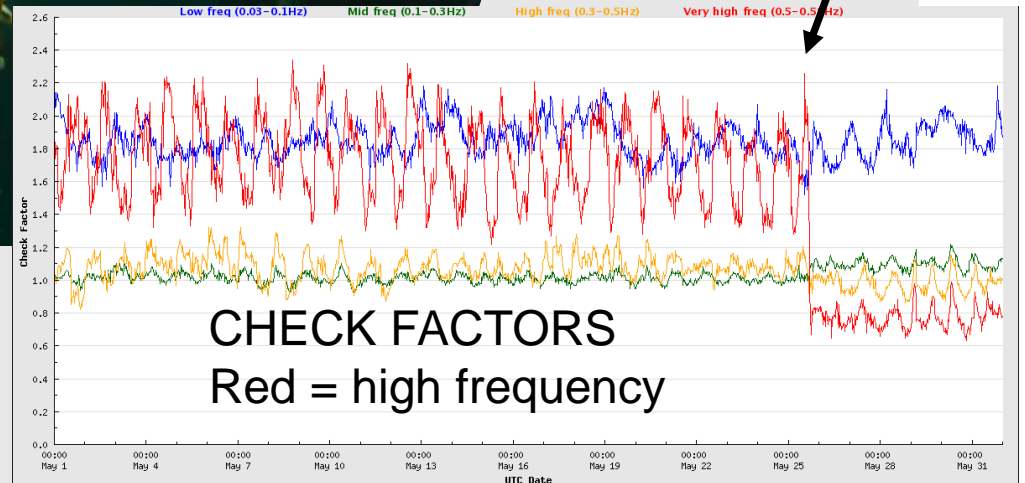
Challenges

- Growth on the buoys is becoming less of an issue with copper hulls and silicone coating.
- Vessel strikes are a major problem. Avoiding trawling activity in particular involves careful positioning and communications with many organizations.
- USCG resistance to add the buoys on Synthetic (Virtual) AIS broadcast
- Loose 1-2 buoys per year to catastrophic vessel interactions.
- Mooring entanglement is a problem that is worse with acoustic releases and the added hardware.
- Aging buoy fleet
- A few buoys are moored in high current environments that require inspections and kelp cleanings monthly to quarterly.
- Operating within Marine Sanctuaries adds significant additional restrictions/requirements-must remove anchor/and mooring line for all deployments

Monterey Canyon, California



Buoy cleaned



CDIP has been automated checks to flag buoy/battery/location anomalies

Under-Keel Clearance: Port of Long Beach

How can we reduce the risk they touch bottom?

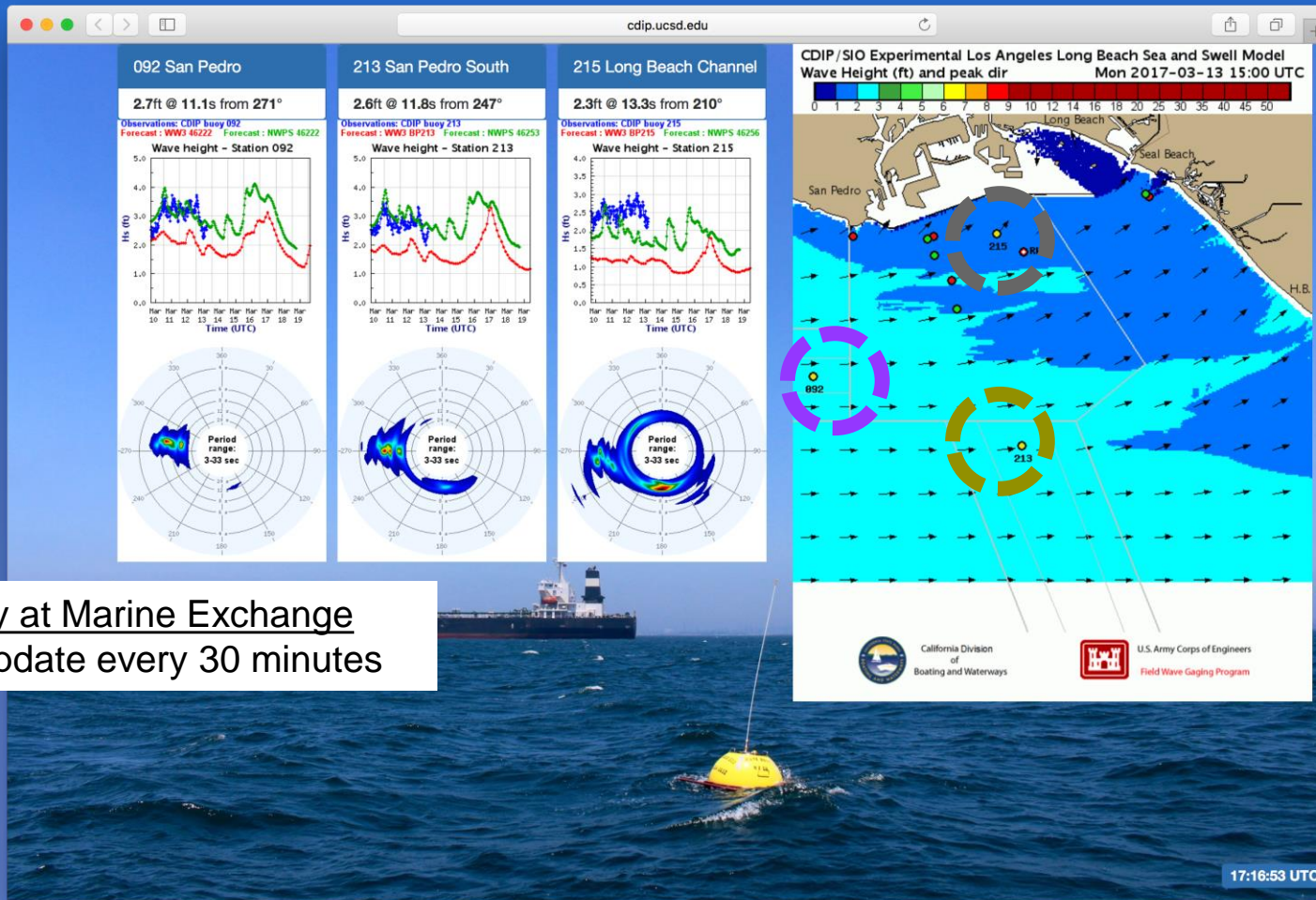
- Over \$235 billion in annual trade
- > 14 million TEU's annually
- **47 % of containers entering U.S.**
- > 235 million metric tons of cargo
- > 1 million passengers
- ~500,000 autos
- > 50 % of California's oil
- ~3 million jobs nationwide



In collaboration with Marine Exchange of Southern California, CDIP buoy-driven 1-3 hour forecast is used to make final "go / no-go" decision on VLCC transits.



- ✓ PROTIDE (Charta Software) is developed in the Netherlands to support the operational transits. The UKC project in Long Beach sends waves, tides, channel depth, ship dimensions, and vertical ship motion (roll/pitch/squat) to Protide for real-time calculations.



Display at Marine Exchange
Buoys update every 30 minutes



Contacts:

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Ross Timmerman – Research Data Analyst

