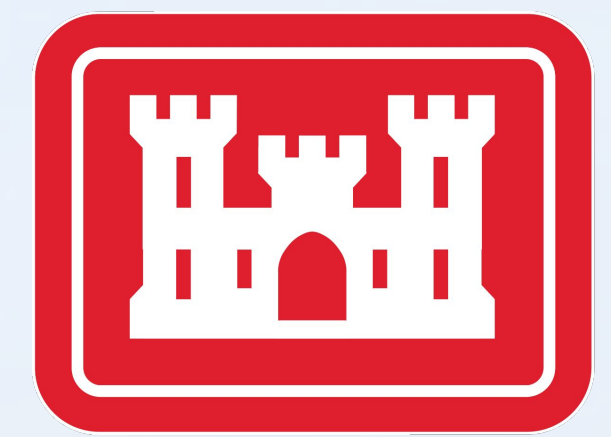




CDIP: A Wave Monitoring Buoy Array for U.S. Coastal Infrastructure Management



US Army Corps of Engineers®



UC San Diego

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BACKGROUND

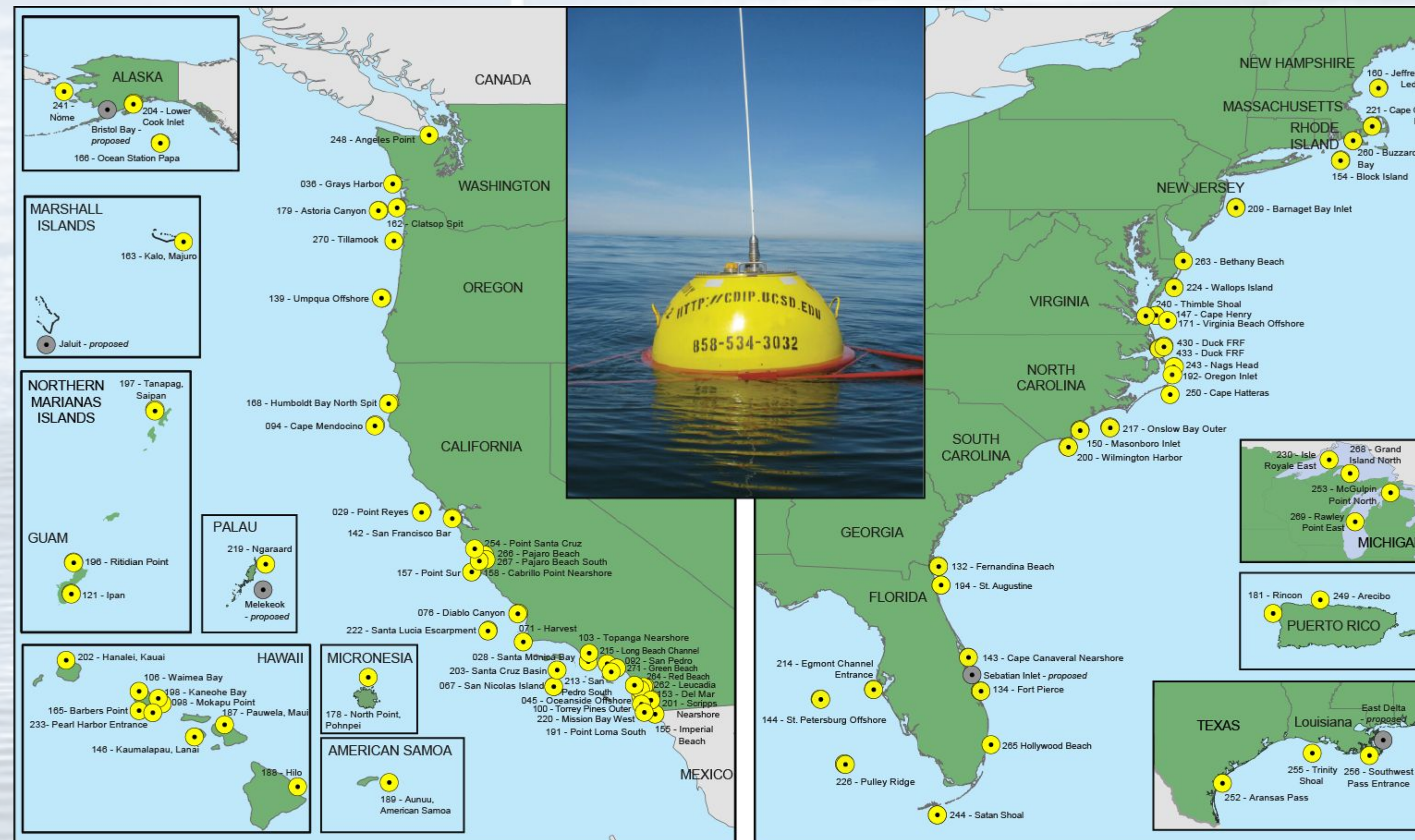
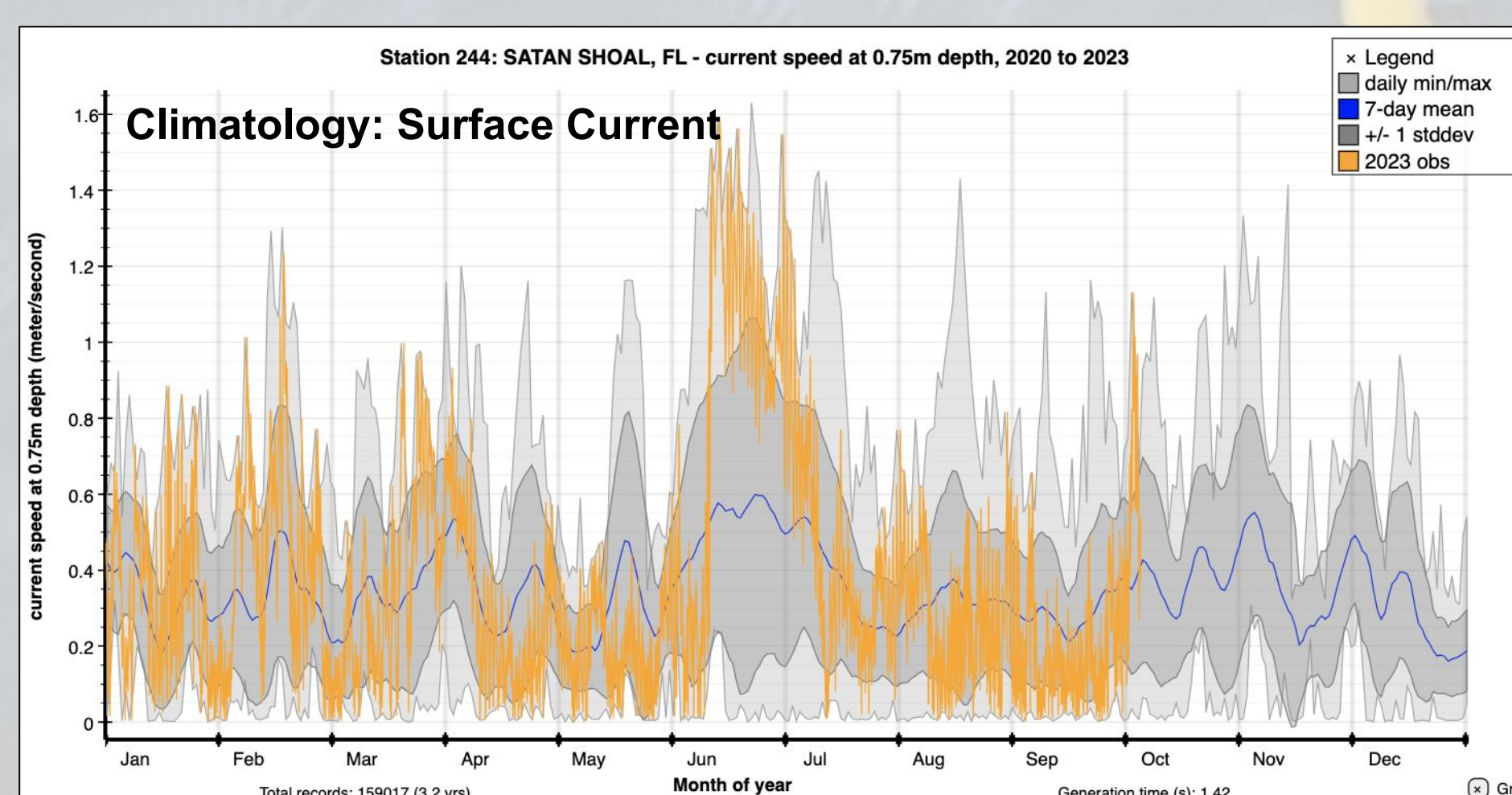
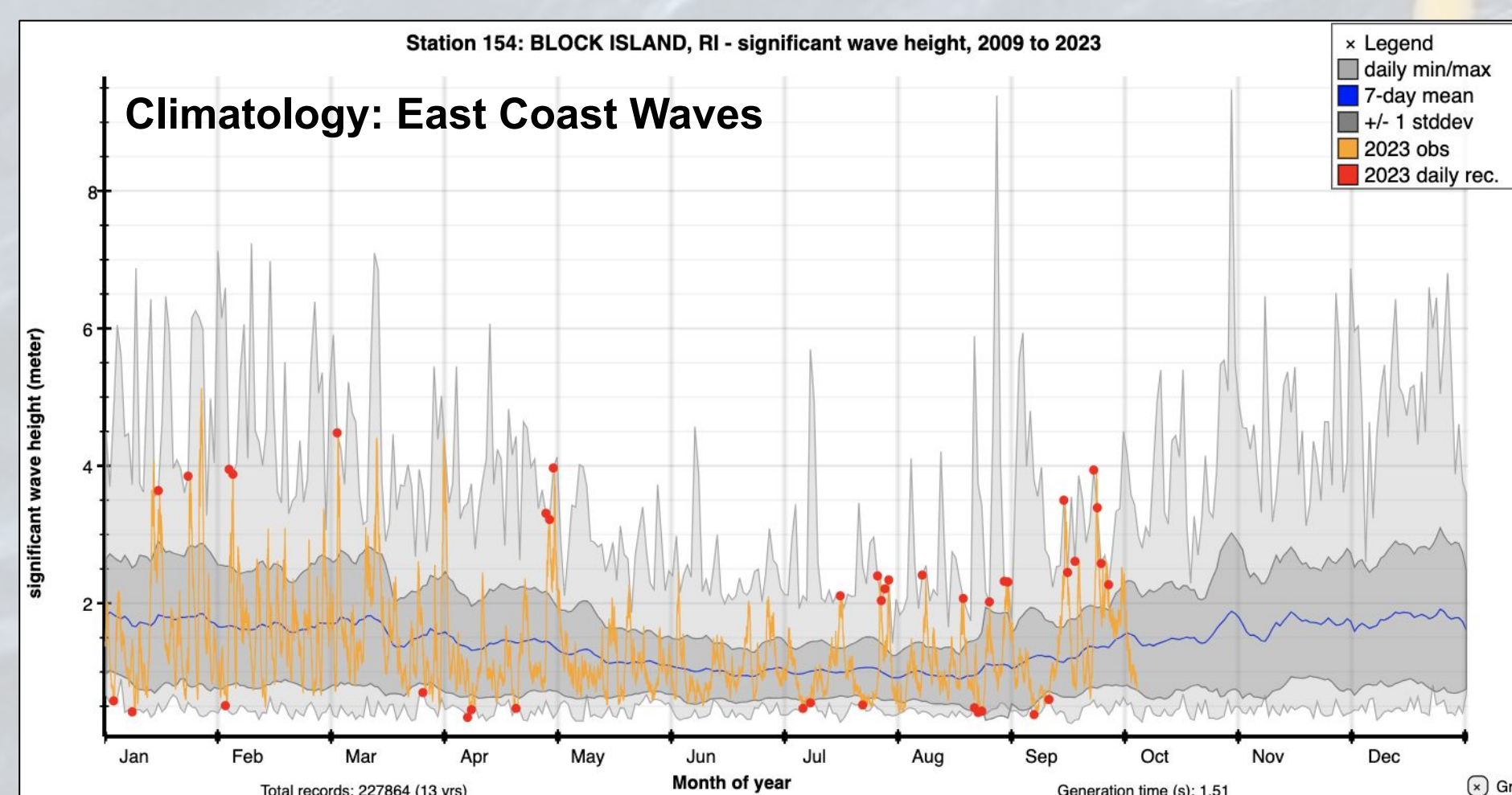
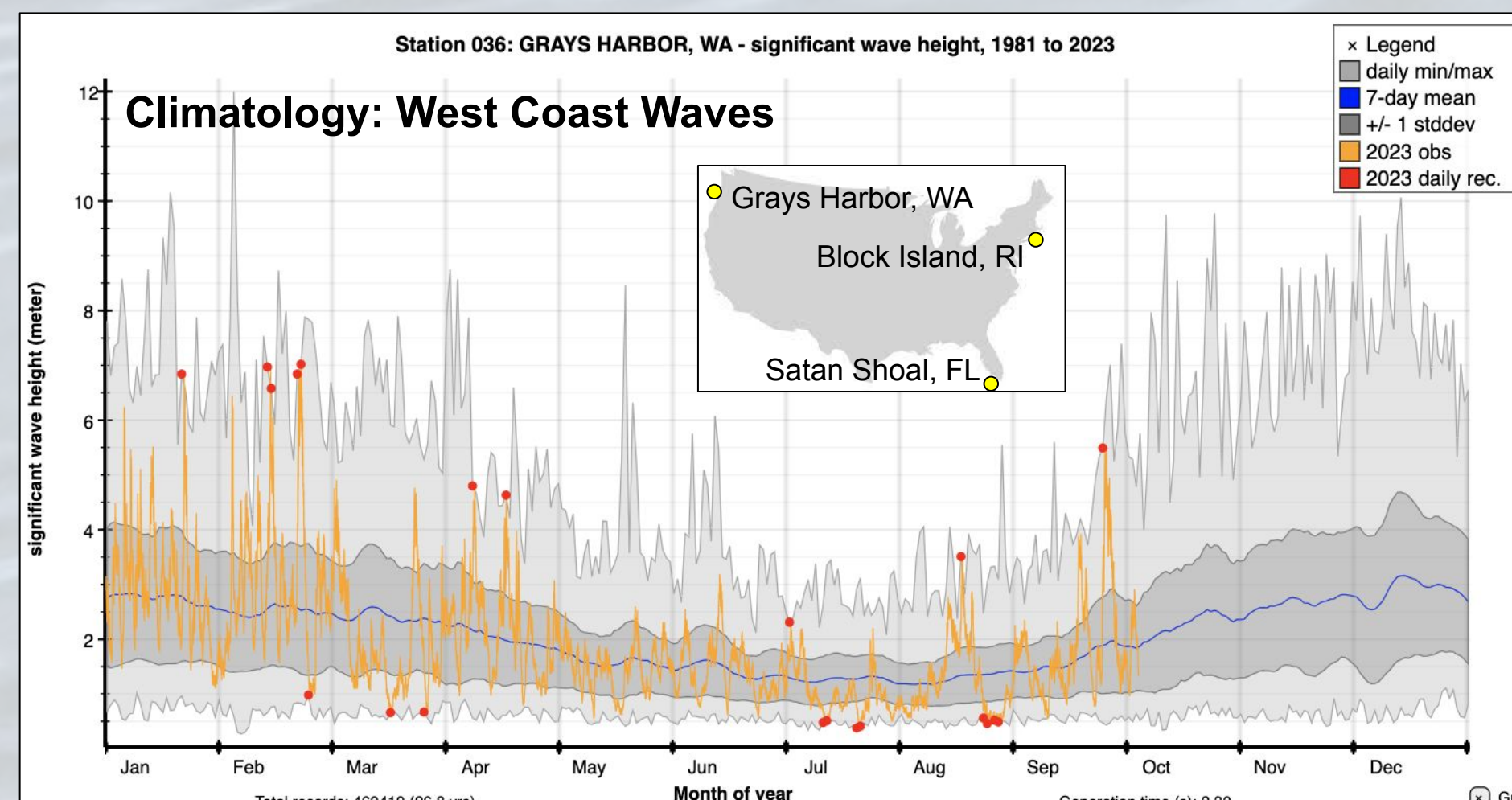
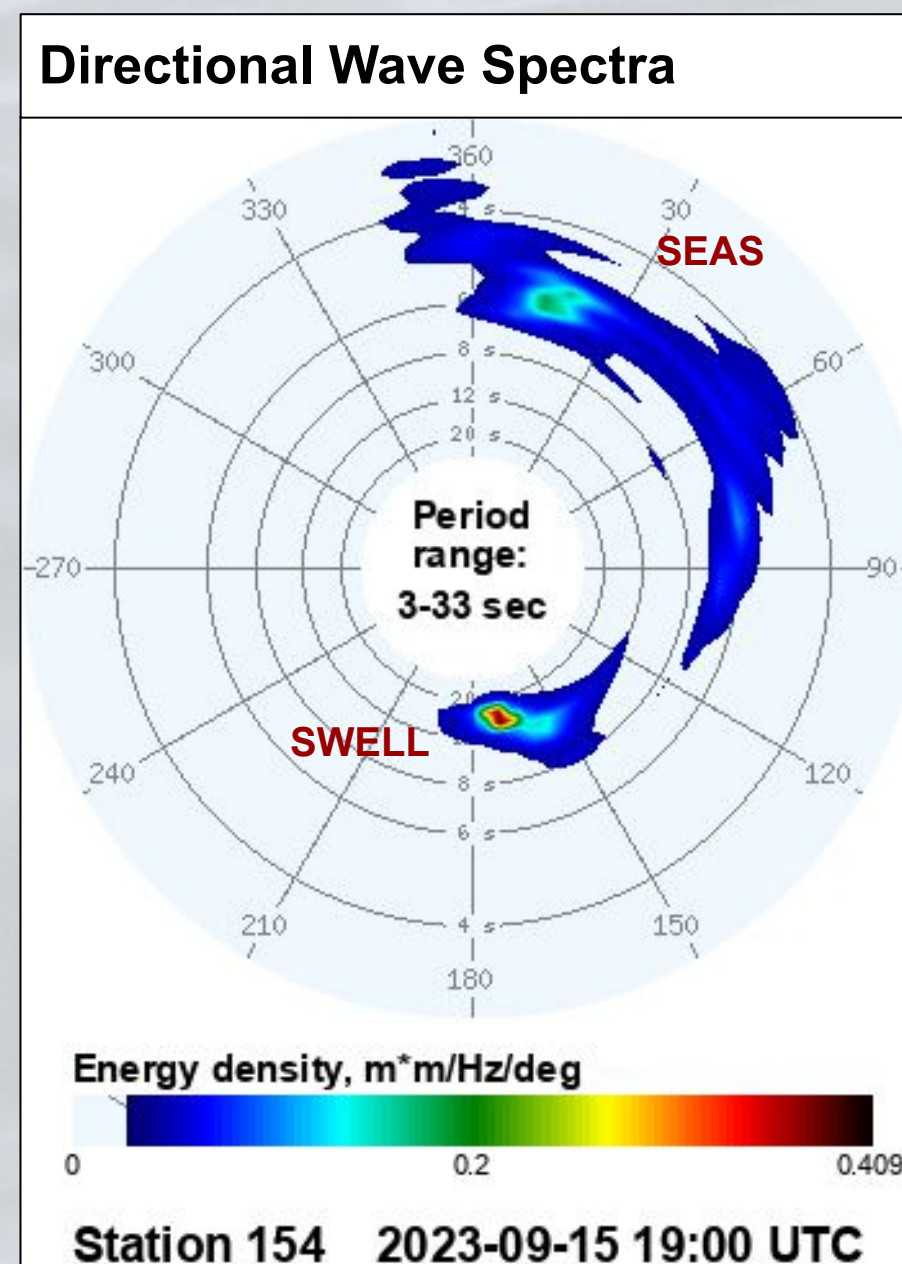
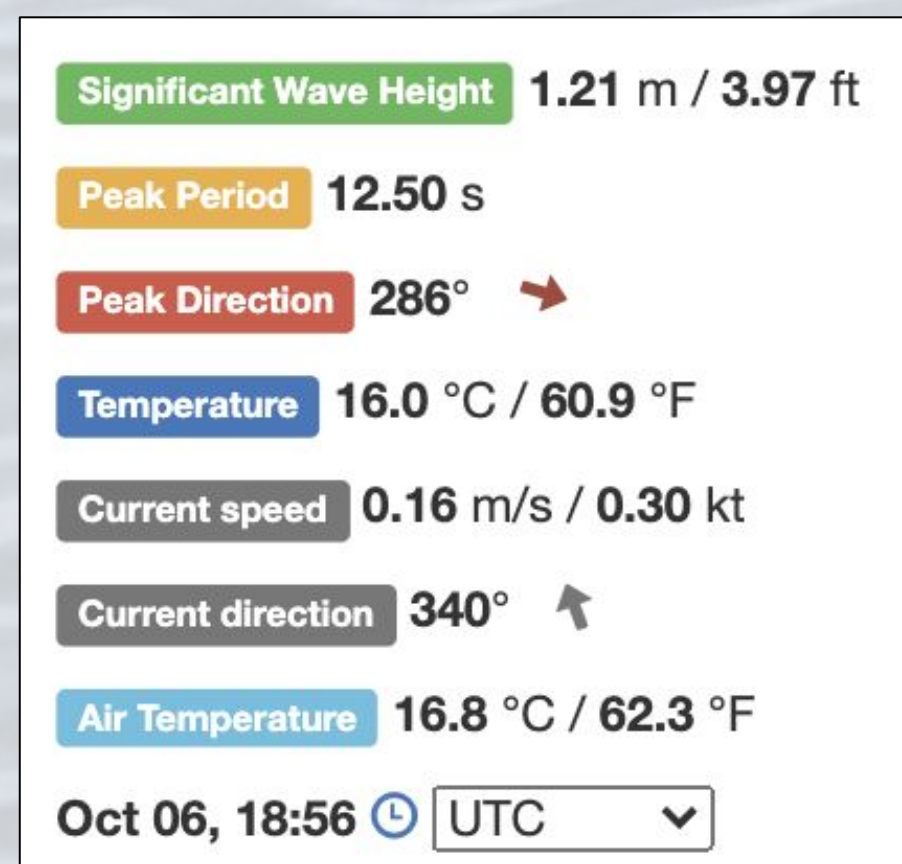
The Coastal Data Information Program (CDIP) includes an array of wave measuring moored buoy stations along the coastlines of the United States and Pacific island nations. Since its inception in 1975, the program has produced a vast database of publicly-accessible environmental data for use by coastal engineers and planners, scientists, mariners, and marine enthusiasts.

The U.S. Army Corps of Engineers (USACE) has been a long-standing sponsor of CDIP, utilizing the high precision data to validate and improve global wave models behind the USACE's official coastal wave climate information. USACE and CDIP conduct research on wind-generated surface gravity waves and intra-measurement evaluations of new wave measurement systems. Other key sponsors of CDIP are California State Parks and the U.S. Navy.

CDIP's array has grown to nearly 90 active stations, spanning Hawaii/Pacific, CONUS, Alaska, Puerto Rico. We work with dozens of partners, including IOOS Regional Associations as well as various federal and state agencies, energy and maritime entities, universities, and vessel operators of all kinds.

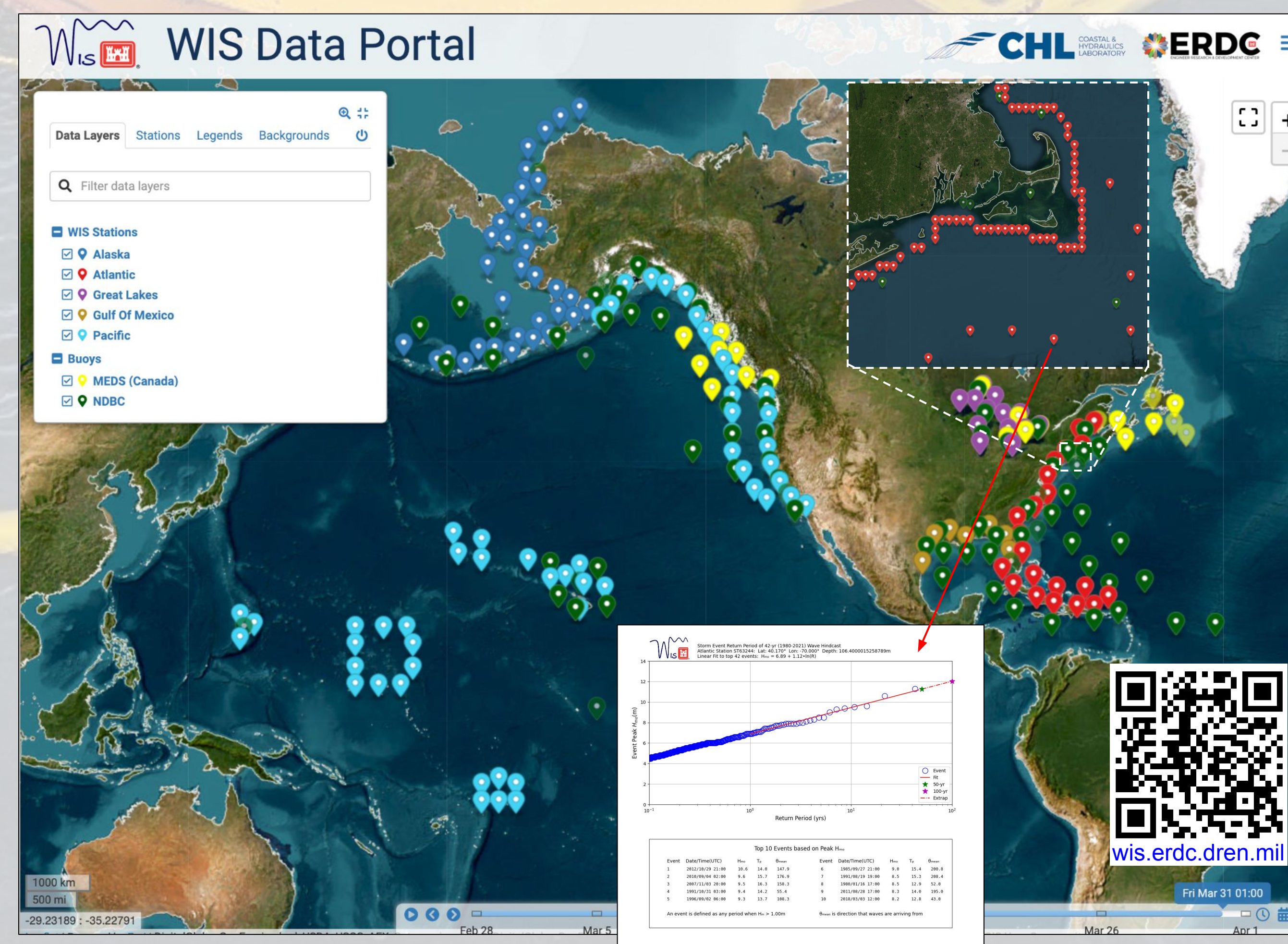
DATA

- Stations are instrumented with Datawell Waveriders.
- Wave spectra, height, period, direction, and displacement time series.
- Sea surface temperature, plus surface currents and air temperature.
- Rigorous QA: calibration facility, mooring components, station maintenance.
- Rigorous QC: real-time data alerts, research-grade archives.
- Climate signals can be discerned from decades of high-precision data.



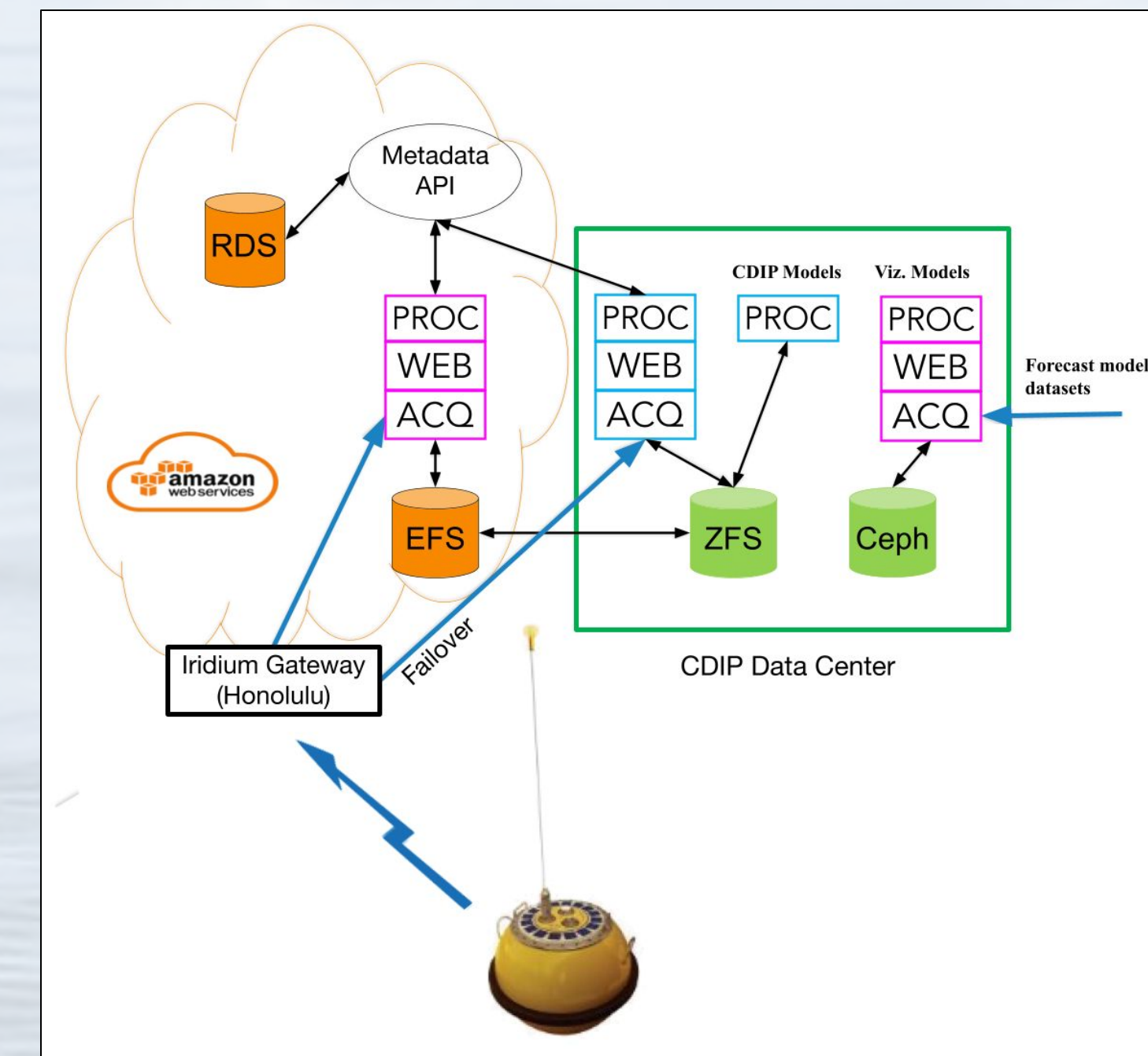
WAVE INFORMATION STUDY

- Primary sponsor for CDIP is USACE.
- Data are used for evaluation of Wave Information Study (WIS).
- WIS provides a national resource of long-term wave climatologies for all U.S. coastal waters to aid in the planning, design, construction, and maintenance of USACE projects along the U.S. coastal zone.
- WIS domains are Atlantic, Pacific, Gulf of Mexico, Alaska, and Great Lakes.
- CDIP provides point source wave measurements at locations over time periods long enough to be statistically significant, which validates remotely measured and modeled data.
- WIS provides high-quality coastal wave hindcast model estimates, extreme wave analyses products, and decision tools.
- Multi-decade hindcasts and storm event archives are generated to meet tomorrow's coastal engineering needs today.
- WIS Portal: <https://wisportal.erdrc.dren.mil/>.



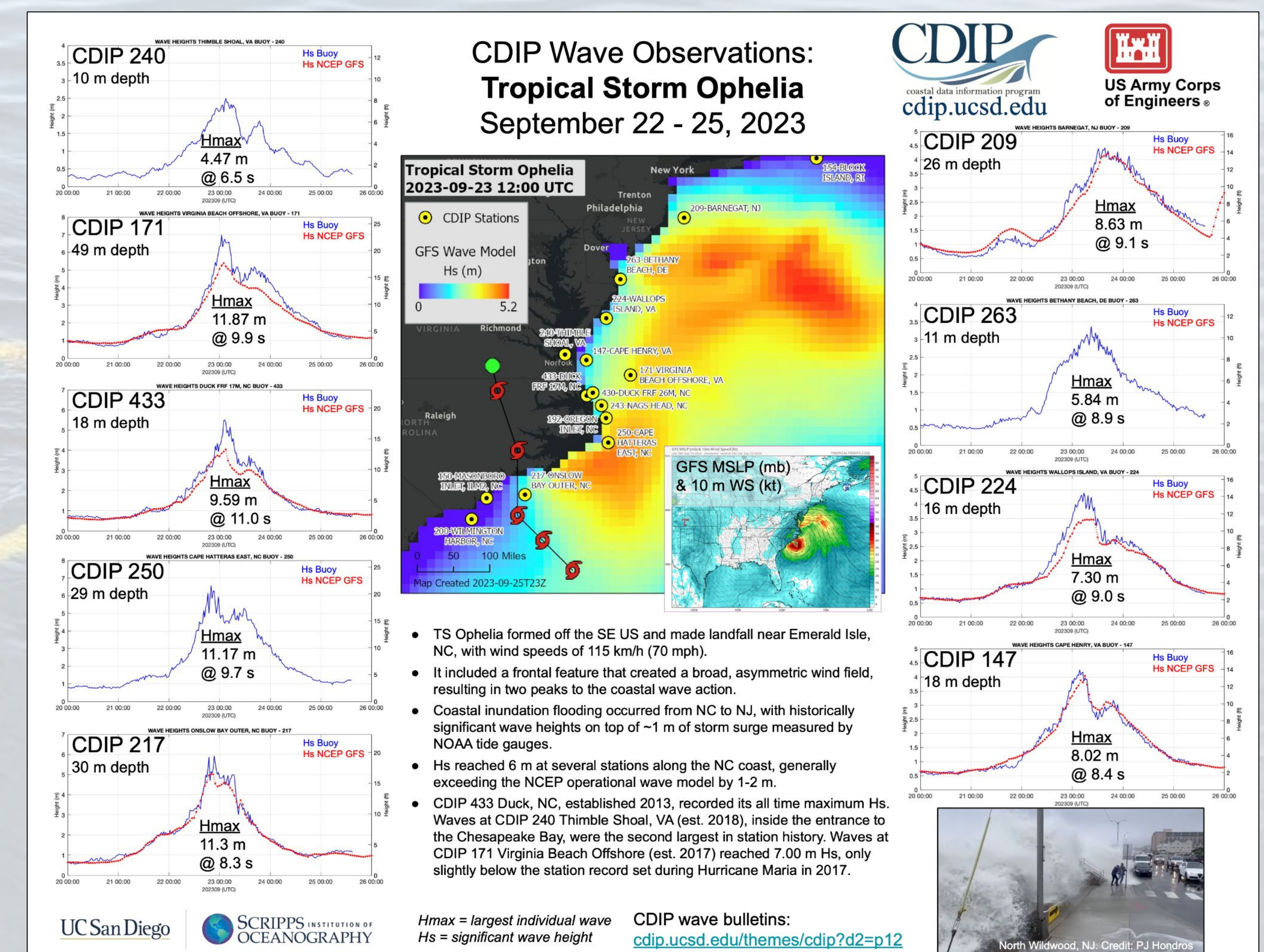
DATA DISSEMINATION

- CDIP data are accessible in real-time by the general public.
- Buoys report data every 30 minutes via Iridium.
- CDIP website receives ~20k unique visitors per day.
- All CDIP buoy data, real-time and archived, are available via NetCDF.
- Following QC, data sent in near real-time to NOAA/NDBC, and are available via NWS, NOAA PORTS®, IOOS RA data portals, etc.
- Monthly NCEI archive accession.



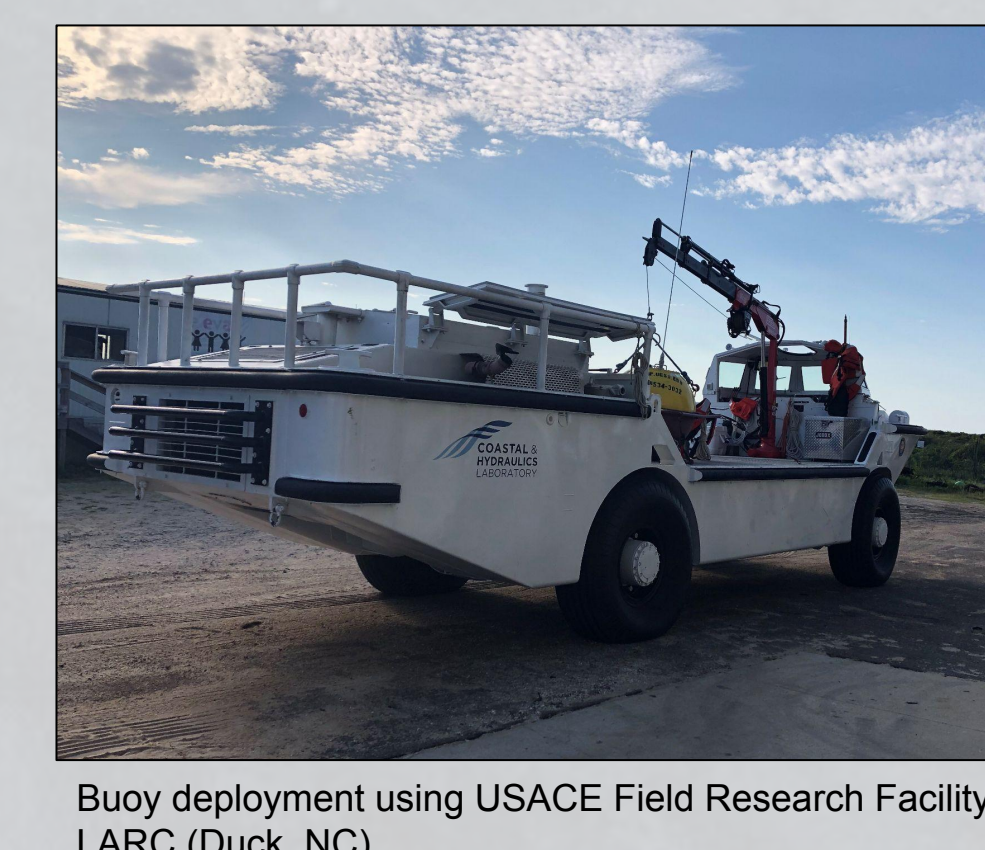
EXTREME EVENTS

- Wave models commonly underestimate the most energetic wave events.
- CDIP issues wave event bulletins to regional stakeholders following notable wave events: agencies, researchers, etc.
- Email www@ucsd.edu to sign up for new bulletins.



ONGOING RESEARCH

- Impacts of wave-current interaction in modulating nearshore wave climate.
- Forecast errors during extreme events.
- Wave propagation in regions of complex bathymetry and topography.
- Wave runup, coastal inundation, and infragravity waves.
- Extratropical cyclones.



cdip.ucsd.edu