


The Coastal Data Information Program
 Integrative Oceanography Division
 



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Introduction to CDIP

The Coastal Data Information Program (CDIP) is an extensive network for monitoring waves and beaches along the coastlines of the United States. 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 program has also remained at the forefront of coastal monitoring, developing numerous innovations in instrumentation, system control and management, computer hardware and software, field equipment, and installation techniques.

CDIP is operated by the Ocean Engineering Research Group (OERG), part of the Integrative Oceanography Division (IOD) at Scripps Institution of Oceanography (SIO).

History and Funding

With seed money from the **California Sea Grant Program**, Dr. Richard J. Seymour and the OERG staff developed a wave data collection system which could be accessed remotely by normal telephone lines.



In 1975, Dr. Seymour began what is now called CDIP with a single wave measurement station at Imperial Beach, California, with funding from the **California Department of Boating and Waterways (CDBW)**. In 1977 the **U.S. Army Corps of Engineers (USACE)** began funding CDIP in partnership with CDBW, and the project quickly expanded. Now the USACE provides the major share of the program's operating budget.

Managed by David Castel, CDIP was joined in 1991 by Co-PI Dr. Robert Guza and Associate PI Dr. William O'Reilly. Following his retirement in 2005, Julie Thomas, a long time employee of the program took over the management position. CDIP has grown steadily over the years so that to date it has deployed and maintained wave measuring stations at well over 100 locations in the western hemisphere. The majority of these stations were deployed along the US Pacific and Atlantic coasts, while others with some exceptions still occupy locations in the Great Lakes, Hawaiian Islands, Guam, Brazil, and the Gulf of Mexico. At some locations, the wave data have been complemented by the collection of other climatological parameters - temperature, winds and air pressure. In all respects - from sensor reliability to the speed of data distribution - CDIP has advanced significantly from its beginnings.

In the early years, most of the wave data were collected close to shore using underwater pressure sensors which in turn were connected to proximate land-based field stations via high density armored electrical cables. At prescribed intervals, in response to querying phone calls from CDIP's central computing facility, the remote stations would telemeter the data over standard phone lines to SIO where they would be quality controlled and analyzed in quasi real time and archived for dissemination to coastal engineers and others in the oceanographic community via printed monthly and annual reports.

Not long after its inception in 1977, CDIP began to collect directional wave data using arrays of underwater pressure sensors. Then, in 1978, non-directional buoys came into use, allowing data collection from locations further offshore. In the 1980s, use of all these instruments was expanded to many new locations. It was in the 1990s, however, that CDIP's operations underwent a wide range of changes.

In the 1990s CDIP first began to use directional buoys. These buoys, which measure sea surface temperature and wave direction in addition to wave energy, have become CDIP's primary instrument. By the late 1990s the nature of data acquisition increased to the point that continuous data collection was achieved at a nominal one Hz. sampling frequency. Equally momentous, in 1996 the program started to make its data available in real-time over the internet, including the highly popular swell models. Today, all of CDIP's data and products are available on the web in near real-time. Rapid dissemination of quality controlled data continues to be a hallmark of the program.

Since 2007, Datawell buoys can be equipped with Iridium satellite communication capabilities. CDIP is now in the process of converting all of their buoys to make use of Iridium communications, eliminating the need for shore stations and allowing for buoy deployments further from the coastline. In the years to come, CDIP will continue to strive to provide the most complete, accurate, and timely collection of wave and climatological data possible.

Program Goals

CDIP was established largely in response to a call for the development of a nearshore wave climatology for the United States which would allow coastal engineers and planners to make more rational design decisions. This focus was intensified with the addition of the US Army Corps of Engineers as a program sponsor. As the steward of the nation's coastal infrastructure, the USACE requires reliable, long-term wave measurements for use in planning, designing, and operating coastal projects. Fulfilling this need remains a central aim of CDIP to this day, one that the group takes very seriously. Waves are a critical factor in all shore processes, playing a central role in everything from stresses on coastal structures to sand transport and beach formation.

Wave data are also used in other research contexts, and CDIP strives to provide data suitable for these areas of study as well. For instance, laboratory and analytical research into the physics of wave generation, propagation, and transformation requires field measurements for calibration and verification. Similarly, studies of extreme events - where coastal structures may be damaged, or nearshore activities disrupted - rely heavily on accurate wave data sets.

CDIP's goals are not, however, limited to supplying the research community with data. Another central focus of the group's work is providing real-time wave data to a variety of users. Through the CDIP website and in cooperation with NOAA's **National Weather Service** and **National Data Buoy Center**, the program's latest measurements are distributed to thousands of users each and every hour. These users are both professional - harbor masters, lifeguards, mariners, etc. - and recreational - boaters, surfers and beach-goers. Through the widespread distribution of this information, CDIP aims to promote public safety and the responsible use and enjoyment of our coastal resources.

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CDIP's major funding contributors are the **US Army Corps of Engineers** and the **California Department of Boating and Waterways**.



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