



Estuary Data Mystery

Title: Tsunamis in New Jersey?

Reserve, State: Jacques Cousteau Research Reserve, New Jersey

SWMP Stations: Water Quality Buoy 126 and Meteorological Station at Nacote Creek

Parameters: Barometric pressure and depth

Start and End Dates: June 13, 2013

Data: Available and easy to graph at nerrsdata.org

Investigate This: On June 13, 2013, a derecho weather system moved through the Jacques Cousteau Reserve with high wind, rain, and a large drop in atmospheric pressure. (NOTE: Increases in wind speed and precipitation can also be observed in the data, but don't contribute to the cause of the meteotsunami.) See **figure 1**.

Figure 1: Precipitation and wind speed

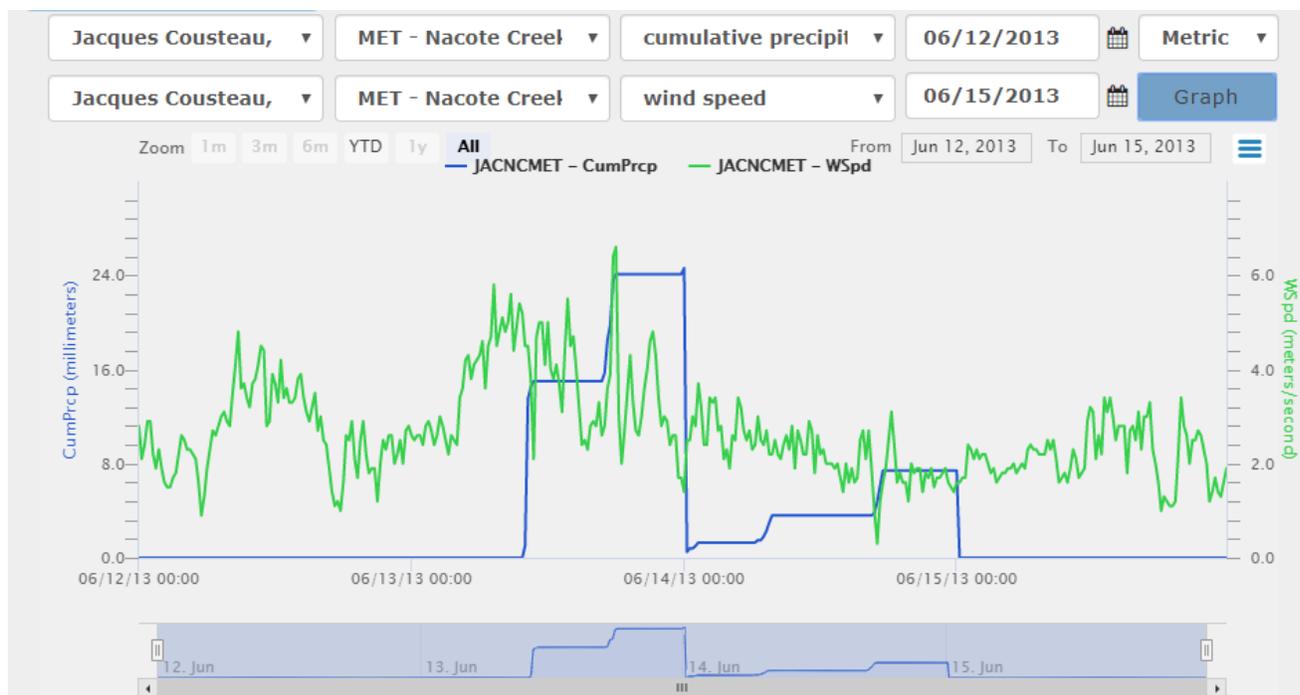
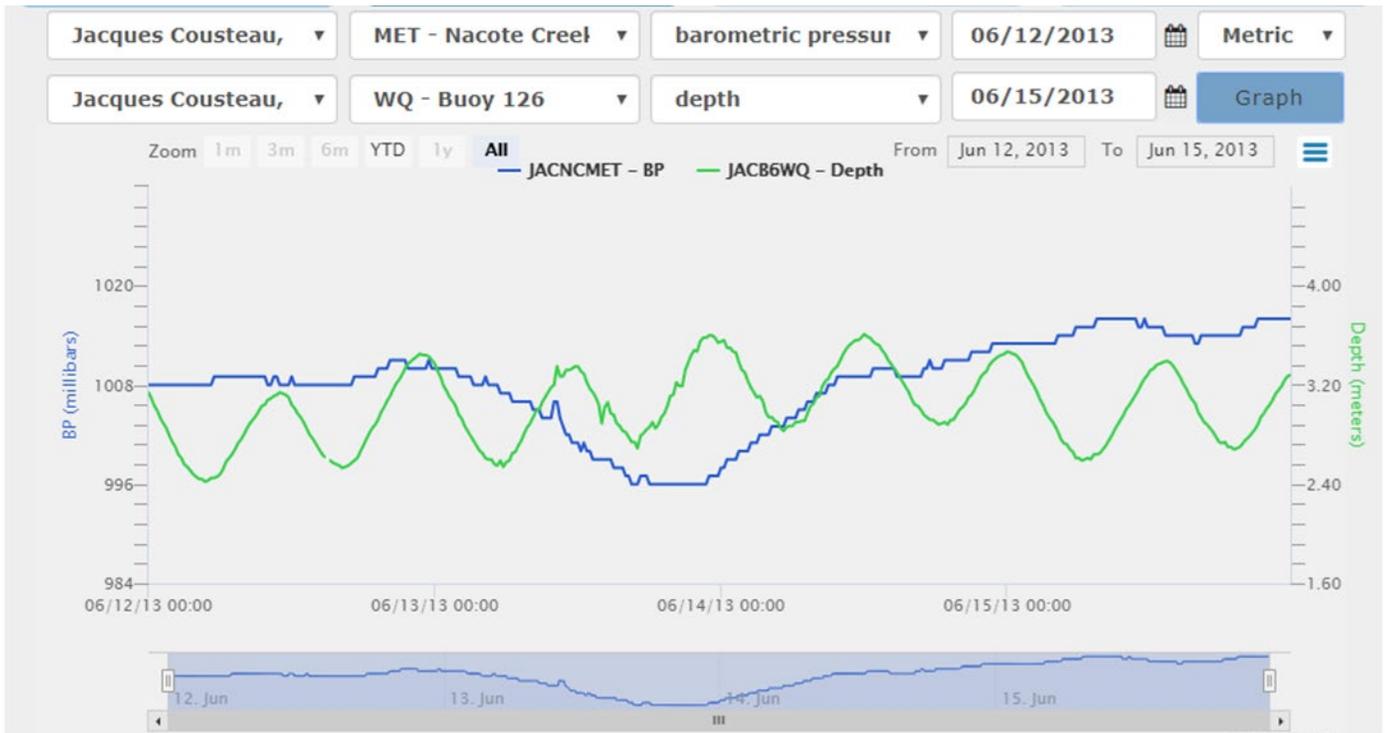


Figure 2: Depth and barometric pressure data



Explanation: This derecho weather system that moved through the Jacques Cousteau Reserve resulted in a steep drop in atmospheric pressure, causing a small scale tsunami. This is known as a *meteotsunami*, or tsunami-like waves generated by changes in atmospheric pressure. From June 13 to 14, System Wide Monitoring Program (SWMP) parameters showed a significant drop and then a rebound in barometric pressure, plus fluctuations in water depth readings. During this weather event, barometric pressure dropped from 1,010 millibars to 996 millibars. While water quality sensors are not sensitive enough to measure wave height by the actual tsunami itself, the event interfered with our depth readings. Normally, depth data will show a smooth tidal pattern over the course of the daily tidal cycles. In this case, the meteotsunami itself, plus the subsequent sloshing of water caused by the wave, was extreme enough that it causing small fluctuations or “noise.” This gave the depth data a “jagged-like” appearance. NOAA ocean sensors also recorded the event, and even generated a report about what had happened. See additional resources for more information on that report.

What makes this event significant or interesting to study? Tsunamis are commonly known to be caused by seismic activity. As this event has shown, dramatic changes in air-pressure can cause tsunamis to happen as well. It is important for coastal residents and shore visitors to know the signs and warnings of when a meteotsunami event may occur.

Additional Resources

Link to NOAA report: https://tidesandcurrents.noaa.gov/publications/NOS_COOPS_079.pdf

An Examination of the June 2013 East Coast Meteotsunami Captured by NOAA Observing Systems. 2014 Nov, NOS CO-OPS 079.



Image credit: Filosa Photography