900 Year Old Tsunami Uncovered with Ground Penetrating Radar

A group of UC Santa Barbara geologists have used ground penetrating radar (GPR) to search for physical evidence of a large tsunami that pounded the Northern California coast near Crescent City some 900 years ago. They discovered the giant wave removed three to five times more sand than any historical El Niño storm across the Pacific Coast of the United States and estimated how far inland the coast eroded.

"We found a very distinct signature in the GPR data that indicated a tsunami and confirmed it with independent records detailing a tsunami in the area 900 years ago," explained Alexander Simms, an associate professor in UCSB's Department of Earth Science and the campus's Earth Research Institute. "By using GPR, we were able to see a much broader view of the damage caused by that tsunami and measure the amount of sand removed from the beach."

According to Simms, the magnitude and geography of that epic wave were similar to the one that occurred in Japan in 2011. Geologic records show that these large tsunamis hit the north western United States (Northern California through Washington state) every 300 to 500 years. The last one occurred in January 1700, which means another tsunami could happen any time in the next 200 to 300 years.

"Our analysis provides concrete evidence of just how far inland the coast was eroded," Simms said. "Any structures would not only have been inundated, they would have been eroded away by the tsunami wave." When a tsunami recedes from land, it removes sand and reshapes the coastline. In this case, the beach was eroded more than 6 feet down and more than 360 feet inland.

While the erosional scar can heal rather quickly, Simms noted, initially the coast is reshaped due to newly formed channels, cuts and scarps. Once the beach fills in, the coastline straightens and returns to what it looked like prior to the tsunami.

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