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Tracking El Niño's Impact

Though El Niño has yet to pack the one-two punch meteorologists predicted, it is giving researchers such as UC Santa Barbara professors Ed Keller and Keith Clarke a glimpse into how California's coast might look a century from now.

With a Program Development Award from California Sea Grant, a team is tracking El Niño's influence on the state of beach and cliff erosion in Santa Barbara County, where higher sea levels and storms are expected to simulate future climate conditions. The investigators will quantify the extent of these coastal changes as a result of both the expected El Niño storms during the winter of 2015-2016 and the resultant rise in sea level.

"It's like we're looking at 50 to 100 years of California sea level rise," said Keller, a professor in the Department of Earth Science. "We're looking into a crystal ball of what the future will be like. So far, El Niño conditions have raised sea level 8 to 12 inches at our seven study sites, which range from Coal Oil Point Nature Reserve and coastal cliffs in Isla Vista to the open shores of Goleta Beach Park and Leadbetter Beach.

According to Keller, the temporal window provided by El Niño, while comparatively short, will serve as an important surrogate for what sea level is likely to resemble in future decades. "Project results will assist predictions of what will occur as sea level rises 8 inches or more along the coastline of California during the 21st century," he said.

The UC Santa Barbara group, which includes investigators from earth science, geography and marine science, is using high-resolution airborne LiDAR (Light Detection and Ranging) data from 2006 and 2009-2011, as well as new terrestrial LiDAR data, to measure erosion from beaches and sea cliffs. The researchers will then develop a slope-change model for sea cliffs to anticipate future erosion impacts. The information, which will be shared with the U.S. Geological Survey, will allow for coastal property owners and urban planners to anticipate infrastructure damage in the future.

In a tandem effort and with assistance from Keller, graduate student Paul Alessio is teaching undergraduate students in earth science, environmental studies and geography how to collect and process terrestrial LiDAR scans. The class will continue for two years during the ongoing study, providing students with valuable skills and experience.

Other El Niño projects being supported by California Sea Grant Program Development Awards include an examination of obstructed flow in coastal wetlands in the San Diego area and the monitoring of changing conditions for shellfish in Tomales Bay north of San Francisco.

The California Sea Grant College Program, which funds marine research, education and outreach throughout California, is part of the National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.