

Climate cycle shift may accelerate West Coast sea level rise

Lauren Morello, Environment & Energy Publishing, 5-3-11

Changing wind patterns could accelerate sea level rise along the West Coast, new research suggests.

The cause is an apparent shift in a climate cycle called the Pacific Decadal Oscillation, or PDO, said researchers at the Scripps Institution of Oceanography.

The climate pattern cycles between two phases every few decades, driven largely by changes in broad-scale wind patterns. Each phase produces its own recognizable fingerprint of sea level rise and sea surface temperatures along the West Coast.

Since the mid-1970s, the PDO has been in a "warm" phase, in which winds drive the upwelling of cold water from the deep ocean to the surface close to the shoreline.

But now it appears to be flipping into a "cool" phase, in which that upwelling of cold water will weaken, leaving surface waters warmer.

"Right now, it looks like the patterns in the wind stress over the North Pacific are in the process of going from the prevailing pattern that has occurred since the mid-'70s to the one that was occurring before that," said the new study's lead author, geophysical oceanographer Peter Bromirski of the Scripps Institution of Oceanography.

It's that change that could affect sea level rise along California and the rest of the United States' Pacific Coast, the new study finds.

Based on their analysis of wind stress patterns and data collected by tide gauges, Bromirski and his colleagues conclude that the PDO's current warm phase has suppressed sea level rise along the West Coast during the past three decades.

Going from warm to cool phase

The global average rate of sea level rise stood at about 2 millimeters per year during most of the 20th century before increasing to 3 millimeters per year during the 1990s, a trend that other studies have suggested is related, at least in part, to climate change.

But the West Coast has bucked that trend. There, the pace of sea level rise has remained steady since about 1980.

The new study suggests that will change when PDO flips from its current warm phase into a cool phase. Then, sea level rise will accelerate.

But determining whether the Pacific Decadal Oscillation is flipping into a cool phase will take several years of careful observation to see whether the shift in wind patterns persists.

"It could be that we're just going through a down-cycle in the current [warm] regime, and everything is going to flip back and maintain pretty much the way it has been," Bromirski said. "Or we could actually be going through a shift."

The study has been accepted for publication by the *Journal of Geophysical Research -- Oceans*.