

Some scientists are describing 2015 El Niño as a monster climatic event

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With climatologists uncertain how powerful the impending El Niño will be, California residents need to be prepared for anything from light showers — which this UC Irvine student takes in stride — to serious deluges. Credit: Steve Zylius/UC Irvine

But will it be as powerful as similar conditions in the early 1980s and

late 1990s? Will it deliver much-needed rain to California's aquifers and snow to its mountains? Does the intensity of this year's event have something to do with global climate change? The scientific community – as well as the public – is asking these questions and more, but answers are elusive.

Climatologists are having difficulty predicting what will happen because this year's El Niño is unlike any other. The intense ocean warming we are witnessing now is an unprecedented second El Niño in a single year. The first, in the central Pacific Ocean, flared up and died down months ago. And our current El Niño is overlapping a huge mass of warm water extending from Alaska to Baja California known as the "Pacific blob."

"This year there's a battle between the Pacific blob and a strong traditional El Niño. It's a different phenomenon. We can't use past events to help us predict what's going to happen," says University of California, Irvine climatologist Jin-Yi Yu.

Technically speaking, El Niño is an increase of tropical Pacific sea surface temperatures by 0.5 degrees Celsius or more for at least three months. Historically happening every two to seven years, it has effects potentially felt around the Pacific basin, from drier conditions in Australia and Indonesia to increased rainfall in the southern United States. Atmospheric scientists use the acronym ENSO (El Niño Southern Oscillation) when discussing the phenomenon.

Experts had been getting pretty good at predicting El Niño events, Yu says: "The '82-'83 one was a big wake-up call for the [scientific community](#), because we realized how strong the impact could be. From 1982 to 1997, the year of the next big El Niño, we were able to learn a lot, and we developed computer models that could tell us if another one was coming up to a year before it happened. It was a very successful story in the scientific community."

But as the 21st century has progressed, experts have found it harder to predict both the onset of such conditions and their impact on North America. "We noticed that the El Niño model prediction skill dropped in the early part of the century, but we didn't know why," Yu says. "It turns out that what we've observed in the past 10 or 15 years is another type of climate phenomenon. It looks like an El Niño, but it's different from the one we used to know."

The traditional type originates in the eastern Pacific Ocean along the South American coast. Time-lapse maps would show the warmer water extending to the west along the equator and moving up toward North America.

In contrast to this classic El Niño, the past decade and a half has seen similar but weaker conditions forming in the central Pacific instead, at the intersection of the equator and the international date line. These newly observed El Niños don't affect the weather in California to the same degree as the eastern Pacific ones. They frequently die down, and they've consistently delivered less rain to the southern U.S. Yu says the prevalence of this new type of El Niño may even be a factor contributing to California's ongoing drought.

In March, the National Oceanic & Atmospheric Administration did project a central Pacific El Niño. Like others before it, this one was weak and short-lived, lasting only from April to June. Through the first half of 2015, it appeared that an emerging trend of inconsequential El Niño events was holding fast.

But this year is different. It's the first return of an eastern Pacific El Niño since 1997-98. "We're having a rare double event, a central Pacific El Niño followed by an eastern Pacific one," says Yu, who's credited with identifying and naming the two varieties in a 2007 research paper. "The question now is whether the earlier central Pacific El Niño has

made the current eastern Pacific event stronger or weaker. ... We just don't know."

Compounding scientists' uncertainty is a third large-scale climate phenomenon called the Pacific blob, an area of warmer-than-normal water along the North American coast from Alaska to Baja California. Swimmers and surfers in California have been enjoying more temperate ocean water later in the season this year, and some unfamiliar marine life has been found near the shore. Warmer ocean water also affects the atmosphere.

"The Pacific blob has been in place for quite some time, and people believe that's why we've been having this drought for so long," says atmospheric scientist Gudrun Magnusdottir, chair of UCI's Department of Earth System Science. "Warmer ocean water tends to put a ridge of high pressure in place, and that diverts storms that could potentially deliver water to drought-stricken areas."

Yu says the addition of the blob to the mix is another reason why climatologists seeking to predict what this year's El Niño might bring can't extrapolate from the 1997-98 event.

With his powers of prognostication diminished, Yu is forging ahead on a new line of inquiry – what's behind the general shift from eastern Pacific to central Pacific El Niños. "If it were because of global warming, I think the traditional form of El Niño would be gone forever or would only come back occasionally," he says.

But Yu doesn't think the switch can be attributed to global warming. "I argue that it's due to something that happened in the Atlantic Ocean," he says. Yu is referring to the Atlantic Multidecadal Oscillation, a roughly 80-year ocean warming and cooling cycle that has cascading effects throughout the world.

"In the last 10 to 15 years, the Pacific Ocean is more a slave to what's been happening in the Atlantic. So I believe the change in El Niño that we're seeing is not due to global warming – although I cannot exclude that possibility. El Niño's location change will switch back by nature itself. At some point, it's going to come back to the eastern Pacific. That, I project, is still a decade or more in the future."

Yu says it's still important to diligently track El Niño conditions. Only by doing so will we be able to manage water resources, protect infrastructure and prepare for flooding if this or future El Niños bring significant rainfall to California.

Provided by University of California, Irvine

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