OSU researchers studying warm-water mass off West Coast

By Diane Dietz
The Register-Guard

EUGENE (AP) — Oregon State University scientists are looking for a link between the California drought, climate change and a mass of warm water lingering in the Pacific Ocean off the West Coast.

The events may be without connection — but the blob and the drought, which is troubling Oregon, too, have one thing in common: They are extreme.

In recorded history, California hasn't seen a dry spell as severe as the past four years.

The mass of warm water in the ocean — hundreds of miles wide and about as long as California — has average temperatures that are five degrees to seven degrees warmer than normal, Washington climatologist Nick Bond said.

"We're in, if not uncharted territory, pretty near it. It is an extreme sort of thing," he said.

OSU scientists are joining with others at Oxford University, who work with scientists from the Royal Netherlands Meteorological Institute and the University of Melbourne in Australia to examine extreme weather and to determine their connection, if any, with climate change.

The teams are relying on the excess computing power of 30,000 home computers volunteered by their owners – and they're looking for other would-be citizen scientists to join in.

Bond identified the mass of warm water — seen as a red-orange pool on climate maps — in late 2013, and it has persisted since.

"We can keep track of sea surface temperatures quite well by satellites," Bond said.

While the images were telling one story, anecdotes from the ocean — of marine ecosystem disruption — came trickling in.

Seabirds called Cassin's auklets starved this winter off Washington and Oregon.

Northwest fishers reported strange species in their nets, skipjack tuna or ocean sunfish, which would be more likely along the coast of Baja, California.

Last fall's run of Fraser River sockeye salmon veered north around Vancouver Island. The Canadian fishery had a banner year and the U.S. fishers went home with empty holds.

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Scientists are documenting an unprecedented West Coast-wide marine algae bloom this year. The bloom poisons shellfish, causing authorities to shut down harvests.

In mid-June, thousands of red crabs washed ashore in Southern California.

In each case, researchers wondered about whether the warm-water mass was a factor.

Air temperatures can fluctuate up and down rapidly, but change comes more slowly to the ocean, Bond said.

"There's so much thermal inertia that a seven-degree anomaly is very large," Bond said. "Once you get the water so much warmer — or so much colder — than normal, there's some persistence to it."

The OSU scientists are working with counterparts around the globe to speed up research on extreme weather events — flood, blizzard, drought, heat waves, wind storms — to better determine the likelihood that any event is associated with climate change.

The science is difficult because extreme events occur naturally also.

Think about a baseball player on steroids, said Phil Mote, director of the Oregon Climate Change Research Institute at OSU.

The player might hit 50 home runs in a season, begin taking steroids, and then the homers jump to 70 per season.

"You can't say any particular home run was because of steroids, but you can say overall the odds have gone up," Mote said.

The scientists use massive statistical analysis, running hundreds of climate scenarios, to try to determine the probability that a given extreme event was connected with human-caused climate change.

In the past year, the answers to specific questions have emerged as probably yes, and probably no.

Participating groups of researchers found that a 2013 heat wave in Australia was probably related to global warming, but another research effort determined that extreme rainfall in Colorado in the same year was probably not.

Most recently, the researchers plan to test the connection between the California drought and the warm-water mass by comparing massive amounts of oceanographic and climate data for an 18-month period — December 2013 to May 2015 — and then compare it with similar 18-month stretches, beginning in 1981.

The scientists tweak variables in the computer models and run them over and over to see what happens.

They will ask, for example, whether there would be a California drought if they removed the influence of the warm water from the calculation.

This requires analyzing staggering amounts of data.

The OSU scientists estimate that they would need three super°computers to do the job, unless they could enlist the help of thousands of volunteers with idle space on their home computers.

For the past dozen years, the Oxford group has done projects using the idle power of the "citizen scientists" they drafted. The technique is called distributed computing.

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Volunteers download a program, and then the rest is largely automatic. The home computer loads a project, then does the analysis when it's not otherwise occupied and then communicates the results the next time the computer connects to the Internet.

"We can do hundreds if not thousands of simulations with the help of the volunteers we're hoping to recruit," Mote said

Mote said he volunteered with his MacBook Air. He normally uses only a fraction of its power.

Volunteers can go to a Web page and see the data graphed in real time, Mote said.

Eventually, the OSU researchers will analyze the patterns, calculate the probability that events are connected and publish their findings in a peer-reviewed journal, Mote said.

"We hope to have enough results within the next couple of months to write a paper and submit it this fall," he said.