

Virginia was cold in January, but globe was not

By David Malmquist

(February 20, 2014) Residents of Tidewater Virginia know that it's been a cold winter. Data from NOAA's National Climatic Data Center show that January 2014 ranked as the 12th-coldest January in the Commonwealth since record-keeping began 120 years ago.

The cold brought chilly waters and ice to large stretches of the Chesapeake Bay shoreline, with impacts to local oyster farmers as well as populations of speckled trout and other finfish. It also made some people question the validity of climate warming.

But “weather isn't climate,” says Professor Roger Mann of the Virginia Institute of Marine Science. Mann, a member of then-Governor Tim Kaine's 2008 Climate Change Commission, joins with other local scientists in noting that the globally averaged surface temperature during January 2014 was 1.17°F above the 20th-century average. That makes it the warmest January since 2007 and the fourth warmest on record. It is also the 347th-straight month of globally averaged surface air temperatures exceeding the 20th-century mean.

Dr. Bruce Wielicki, an atmospheric scientist with NASA's Langley Research Center in Hampton, says we need look no further than the western U.S. to understand that the East Coast's recent cold weather represents a short-term, regional episode rather than a long-term global trend.

“The cold we've seen in the eastern U.S. is tied to the dynamics of the polar vortex and the jet stream,” says Wielicki. “The vortex typically traps the cold air that forms during the months-long Arctic night, but when it breaks down as it has this year, polar air can dip into the southeast and up the East Coast.” “At the same time,” he says, “the West Coast gets really warm.”

Indeed, while many states east of the Mississippi River saw one of their 10 coldest Januarys last month, many western states were unusually balmy. California experienced its 2nd warmest January in 120 years of record, while Arizona had its 4th warmest January and Nevada its 7th warmest. Alaska experienced its 3rd warmest winter in 96 years of recordkeeping.

“All we're really seeing with these patterns is the variability of weather—some of its noise in time and space,” says Wielicki. “The globe as a whole is constrained by energetics—heat in versus heat out—that's where climate warming is very clearly going on.”



Virginia's cold, icy winter does not mean that global warming is not happening.

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Polar Warmth

Unlike the seeming novelty of a chilly winter in the eastern U.S., Alaska's recent warmth is consistent with both long-term trends and climate-models predictions. VIMS Professor Walker Smith, who has spent the past 30 years studying polar ecosystems, says that high-latitude regions are warming faster than anywhere else on Earth, with a 5° to 7°F rise in average winter temperatures in the Arctic and along the Antarctic peninsula during the last 50 years. The extent of Arctic sea ice has decreased by more than 40 percent since satellite records began in 1979, with the Arctic Ocean now projected to be ice free in summer by 2050 or sooner.

A modeling study by Smith and colleagues at Old Dominion University, scheduled for publication in next week's issue of *Geophysical Research Letters*, projects that global warming will cause Antarctica's Ross Sea—one of the few polar areas where summer sea ice cover has actually increased during the last few decades—to lose more than half its summer sea ice by 2050 and more than three quarters by 2100.

These changes, says Smith, will significantly impact marine life in what is one of the world's most productive and unspoiled marine ecosystems, where rich blooms of phytoplankton feed krill, fish, and higher predators such as whales, penguins, and seals.

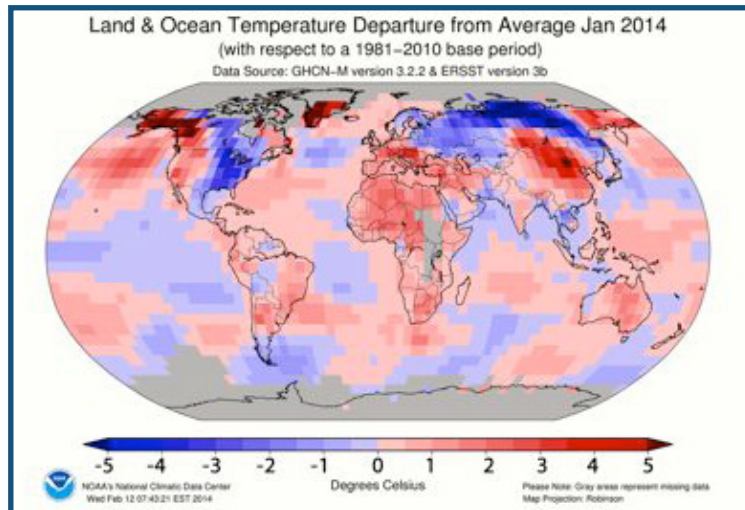
A hiatus in the new normal

Back in Virginia, Wielicki points out that winter 2014, though chilly, is much less unusual when viewed in the long-term. "People think this is a really cold winter," he says. "They kind of forget—we've gotten so used to being warmer—that if you go back and look at history it's not actually a very cold winter at all. It's what things used to be like in the '50s and '60s. We're kind of losing track of what normal is."

Wielicki attributes a recent hiatus in climate warming—global annual air temperatures have plateaued at an elevated level during the last decade or so—to a shift in the way our planet distributes the heat added by greenhouse gases. "Warming is still going on," he says, "we have observations in the ocean and from satellites to prove that Earth is still heating. But a lot of that heat is going into the ocean, instead of Earth's surface and atmosphere."

A warmer ocean concerns Mann, Smith, and other scientists at VIMS, as it contributes to the sea-level rise that threatens Virginia's coastal communities; stresses seagrass, corals, and other marine life; and will likely transform ocean food webs in rapid and unpredictable ways.

Another concern is what happens when atmospheric warming resumes and natural variability inevitably brings another unusually warm winter. "We'll hit a period when we start warming faster than we were," says Wielicki. "When you put natural variability on top of a long-term warming trend, what used to be a cold winter will just be a normal winter, and what used to be a mild winter will be very warm."



Global Warmth: Blended anomalies in land and sea surface temperature in degrees Celsius during January 2014. Red is warm and blue is cold. Image courtesy of National Climatic Data Center.