

## Please tell me the weather next month!

By Dr. Alan K. Betts

*Climate Prediction: Global Carbon Emissions Could Peak as Early as 2020*



Much of the northeast is experiencing drought this summer. It is patchy because a lot of summer rain comes from scattered

thunderstorms. Despite periods of drought and heavy rain, our garden here in Vermont is growing well this summer. In part, this is because I have watered the whole vegetable garden twice and a few crops more frequently. There has been one unexpected but delightful change in our local ecosystem, perhaps because of the warm winter, as well as the dry weather. This spring and summer there have been so few mosquitoes that weeding is a delight, and it is a pleasure to eat dinner on the lawn in the evening. It is such a contrast from some recent years, when I wore a net over my head in the vegetable garden.

Last month I visited the European Weather Centre in England, which provides the best ten-day forecasts for the planet. For 30 years, I have worked with scientists there to improve the modeling of the transfer of heat and water from land to atmosphere, since this affects the weather. Computers have improved so much that these forecast models can calculate changes in pressure, temperature, wind and precipitation every hour everywhere on the globe for points that are only 5-10 miles apart for one to two weeks ahead.

So now I am asked, "Weather forecasts have become pretty good for even next week, but what I really want is a forecast for the next two months, so I can make plans for my work, my crops and my vacation." This is a much more difficult modeling challenge. Every day, we measure the state of the atmosphere with surface weather stations, weather balloons and instruments on perhaps a hundred satellites, and all this data goes into models for the global weather, running continuously on some of the largest computers available. One hundred forecasts may be run out for the next two weeks. For the first few days, they are very similar, because they remember the measurements they started from, so we know with some certainty what the weather will be. But as complex jet-streams and storms develop, the hundred forecasts spread apart, and after two weeks we cannot be sure what will happen.

When we run fifty forecasts for the coming season, these too spread out a lot within a month. The earth does have some long term memory, the energy stored in the oceans, and the moisture in the soil that came from last month's rain, the snow cover in winter and ice in the Arctic that keeps temperatures below freezing by reflecting sunlight. These do influence the weather patterns for months. But the global jet stream patterns that strongly influence weather can change every week, so it is harder to predict their pattern a month ahead. However, the seasonal climate of the earth seems more predictable than our models. Scientists are studying whether the links between stratosphere and troposphere play a role.

So, seasonal forecasting still needs improvements in our models. The official three-month outlook for August to October from NOAA is that the northeast will be warmer, but precipitation will be average. The corresponding seasonal forecast from the European Weather Centre is that the northeast will be warmer and drier than average. If this is correct, our drought will continue.

On the energy front, it is clear we need a carbon tax on fossil fuels to nudge the energy system to become more efficient, and accelerate the development of renewable energy resources. In Canada, this helped the economy of British Columbia, and Alberta is now following the same strategy. But on our national front, one political party drifts still further into a fantasy world, where devastating the planet's climate and ecosystems to satisfy its financial sponsors will somehow save America's ego.

Yet despite establishment resistance, the stunning speed of renewable energy development with the rapid fall of the prices of solar panels and lithium batteries is accelerating change. Global carbon emissions could peak as early as 2020, so keep pushing for goals that will bring us a sustainable future.

*Dr. Alan Betts of Atmospheric Research in Pittsford, VT is a leading climate scientist. Browse alanbetts.com.*

August lilies. Photo: Alan Betts.

## VERMONT CLIMATE SCIENTIST RECEIVES GLOBAL ENVIRONMENTAL AWARD

Dr. Alan K. Betts Receives the First Bert Bolin Global Environmental Focus Group Award

Alan K. Betts is the first recipient of the Bert Bolin Award/Lecture of the AGU Global Environmental Change Focus Group. He will present this lecture at the 2016 American Geophysical Union Fall Meeting, to be held 12-16 December in San Francisco. The award recognizes an earth scientist for his or her ground breaking research or leadership in global environmental change through cross-disciplinary, interdisciplinary, and trans-disciplinary research in the past 10 years.

### CITATION

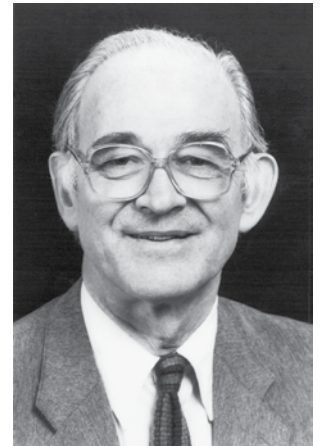
Alan Betts' research "has been transformative by providing a new understanding of one of the fundamental climate processes – land-atmospheric coupling and how it varies from the diurnal to monthly time-scale, with land cover, and how it may vary under environmental change. His environmental change leadership in Vermont has been exceptional. His writings, public talks and TV interviews dealing with weather, climate, climate change, energy and policy issues have fostered positive debate; as they both clarify the climate issues we all face, while encouraging readers and listeners to explore alternative, hopeful paths for themselves, their families and society," said Prof. Rong Fu, President, Global Environmental Change Focus Group at the University of Texas

### RESPONSE

"I am grateful to the AGU Global Environmental Change Focus Group for selecting me as the first recipient of the Bert Bolin Award.

"My work over the past forty years has covered a wide range of topics central to understanding the Earth's climate over land and ocean, and the coupling between the oceans and land-surface, the atmospheric boundary layer, clouds, convection and radiation across scales. Because I have worked as an independent scientist in Vermont for decades, this work would not have been possible without the support of so many across the globe. I would specifically like to thank Martin Miller, Anton Beljaars, Pedro Viterbo and Gianpaulo Balsamo (and the late Tony Hollingsworth) at ECMWF for

*Bert Bolin (1925-2007) a world leading climate scientist and science organizer. He is the man who got the world to agree on climate. Photo: simpleclimate.wordpress.com.*



thirty years of collaboration using data to evaluate and improve the physics of their analysis-forecast system. My recent work on land-atmosphere-cloud coupling over the Canadian Prairies that this award cites would not have been possible without the foresight of Ray Desjardins at Agriculture-Canada, and the generous support of other Canadian scientists. My understanding of the Amazon owes much to my Brazilian friends and collaborators, Maria and Pedro Silva Dias. Long-term support from NSF and grants from NASA made all this possible.

"My role as a climate advisor in Vermont owes a profound debt to the people of Vermont, who have deep roots in the land. They see what is happening to their climate, and have reached out to me, urgently seeking understanding and answers, as ongoing climate change is transforming the state. So for more than a decade, it has been clear that my research must address these critical questions; and translate all that we know, both locally and globally, into concepts that citizens and professionals can understand and apply to their work and lives." – Alan Betts, Atmospheric Research, Pittsford, VT.

*Green Energy Times would like to congratulate Dr. Alan K. Betts for this outstanding achievement. We are grateful for his work and proud that he is a local Vermonter. Betts submits a regular column in each edition of Green Energy Times.*

## UNBELIEVABLE PHOTO OF THE SOUTHERN CALIFORNIA WILDFIRE

BY JASON MARK | JUL 29 2016

Hieronymous Beach. That's what popped into my mind when I saw Rob Dionne's unnerving photograph, captured last weekend as he stood on the Santa Monica Pier. The sky choked with a cloud of brown smoke, the babel-like crowds in the foreground, the broodiness of the whole scene—all of it recalled the paintings of Hieronymous Bosch, the 16th-century Dutch artist who is best remembered for the dark allegories he created on canvas.

The sun-dampening smoke cloud came from the Sand Fire, a blaze in the Santa Clarita Hills north of Los Angeles that, since it broke out a week ago today, has scorched roughly 38,000 acres, destroyed 18 homes, and forced the evacuation of some 20,000 people. And that's the less dangerous of the two wildfires currently tearing through California right now. In Big Sur, the Soberanes fire is barely contained as firefighters contend with the rugged landscape of the Los Padres National Forest. Earlier this week, a bulldozer operator died in the course of fire-containment operations there.



The smoke cloud from the Sand Fire as seen from the Santa Monica Pier in CA. Photo Courtesy of Rob Dionne.

Fire ecologists are increasingly confident in their predictions that global warming is fueling wildfires in the American West as earlier springs, hotter summers, and drought combine to make fires more frequent and more intense. The "fire season"—an annual apocalypse once limited to the summer months—is now a year-round affair in some parts of the West.

That's worth keeping in mind as you take in this amazing pic. What you're seeing isn't some glimpse of dystopia to come. Rather, the smoke eclipse over Santa Monica is part of the new normal, an all-too-ordinary scene of life on this smoldering planet.

Source: Re-printed from Sierra Magazine. [http://bit.ly/CA\\_Wildfire](http://bit.ly/CA_Wildfire)