

Prepare for cooler temperatures? Another opinion

LAST SUMMER I had the privilege of speaking to attendees at an STMA Meeting in Cincinnati and I imagine that some were caught off guard by the predictions I shared in my presentation discussing turf management in a changing climate, especially with regard to drought potential and our cooling planet...yes, I said "cooling."

You've certainly heard the non-stop stories about warming, record heat, melting ice, polar bears moving to the south pole, etc. but the fact is that we're not seeing anything that we haven't seen before on our planet...and even much worse.

The warming, such as it was over the past 200 years, correlates well with solar and ocean cycles but very poorly with carbon dioxide. CO₂ has been increasing steadily (also normal and expected), but temperatures have been up, flat, and down during that time and since 1998 we have observed no warming...there have actually been periods of global cooling in the past decade.

However, the real surprise (for some) is coming in the next 5 to 10 years and we need to prepare for the changes now.

Let me lay out my case and then you can decide. I have been observing weather and climate for nearly 30 years as a professional meteorologist, and before that for an additional 10+ years as a young weather lover who would rather be out in a powerful storm than hiding from it (though hiding is the smart thing to do!). In the past 20 years I have taken a special interest in climate patterns and climate change since it started making headlines (as "Global Warming"), and in that time I not only learned that the entire movement was politically motivated, but that throughout history our planet has survived extremes that we can only imagine, and those extremes will return in good time. I won't go through all of the science here since that would take many pages of text and graphics (otherwise known as a book) and honestly, you didn't pay for a class in meteorology so let's keep it simple.

Figure 1.

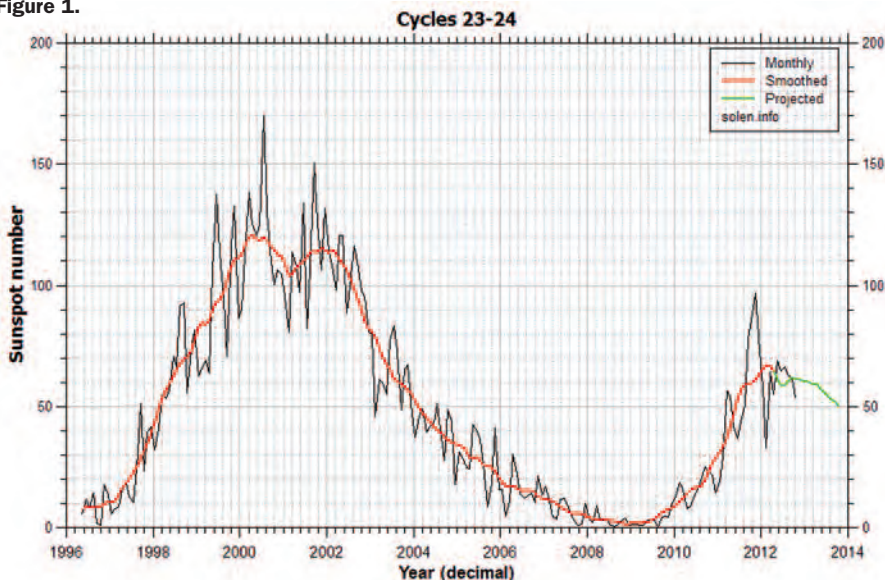


Figure 3. Composite Temperature Anomalies (F) Dec to Feb 1971-72 to 1978-79 Versus 1950-1995 Longterm Average

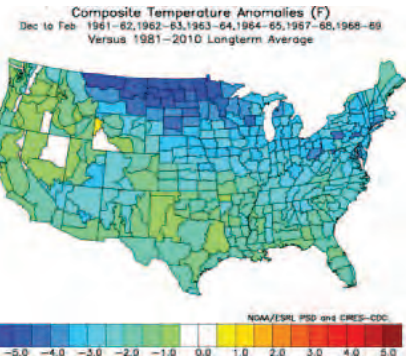
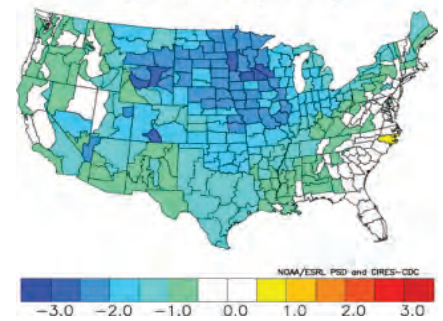
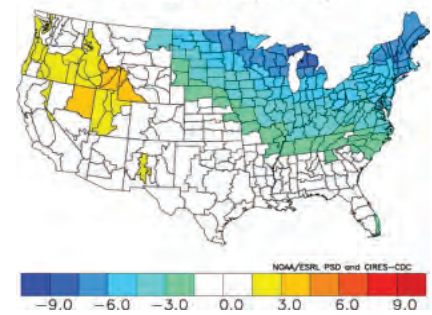
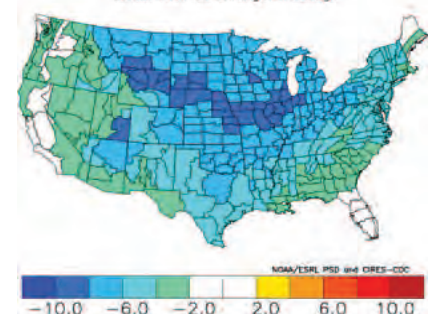


Figure 4.

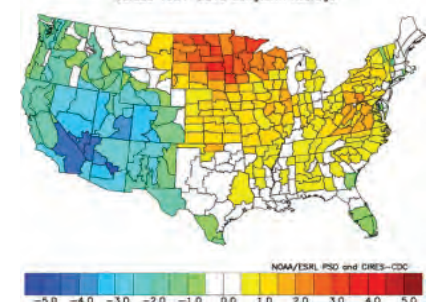
Composite Temperature Anomalies (F) Feb 1918, 1962, 1963, 1968 Versus 1981-2010 Longterm Average



Composite Temperature Anomalies (F) Jan 1918, 1962, 1963, 1968 Versus 1981-2010 Longterm Average



Composite Temperature Anomalies (F) Mar 1918, 1962, 1963, 1968 Versus 1981-2010 Longterm Average



WHAT DRIVES CLIMATE?

The two biggest drivers of climate are the sun and the oceans, with numerous smaller influences (geography, land use, volcanoes, cloud cover, ice and snow, etc.) and if you can predict trends for those two elements you can make a pretty solid forecast for months and years ahead...but you won't find those forecasts on TV or online. Like any specialized skill it takes years of analysis and research along with an abstract, unquantifiable "feel" for weather and climate cycles. That's where my passion for weather from a very young age helps. So what am I seeing?

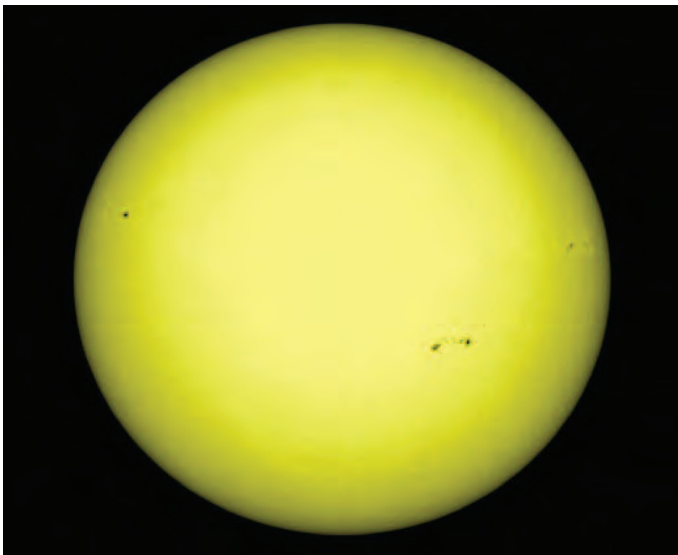
The sun is currently at the peak of Solar Cycle 24. The average person has no idea that the sun has cycles, but it does. It has an 11-year cycle (on average) that features an energy peak in the middle with two periods (valleys) of lower energy output on either side of the peak (see Fig. 1).

Experts in astronomy and solar physics have been tracking solar cycles since the 1700s, and like everything else in nature they have observed a significant range in the strength of each cycle. The sun's output is anything but stable or consistent and forecasting the strength of future solar cycles is difficult at best, but much has been learned about the sun in recent years and forecasts are getting slowly better.

The current cycle, Solar Cycle 24, is the weakest in the past 100 years and likely one of the weakest in the past 200 years based on the number of sunspots showing up on the earth-facing side of the sun. While there are numerous ways to measure solar output, the only way to compare solar activity now with solar cycles since the 1700s is to count sunspots, and based on that...and knowing that we are able to see more spots now because of high-resolution satellites and telescopes...we're in a rather weak cycle comparable to what we saw in the late 1700s leading into the early 1800s...the latter part of the Little Ice Age. Cycle 25 (starting after 2020) is forecast to be even weaker. Figure 2 is a recent image of the sun with a few sunspots from the Solar Dynamics Observatory.

Since the sun is the primary driver of climate, even small changes in solar output impact our weather and climate cycles. A weaker sun

Figure 2.



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means less energy reaching our planet (less heating), but studies show that a weaker sun also encourages more cloud development (which enhances cooling). That process is complicated and it's more than I am going to cover here, but numerous studies have confirmed the effect.

Here on earth the Pacific Ocean basin is currently colder than normal and the Atlantic Ocean milder but is slowly trending colder. The oceans warm and cool during broad cycles (oscillations) lasting 15 to 30 years and the last time we had both oceans cooler than normal was the 1960s through about 1976. Do you recall the cold, snowy winters and cool summers from that time? If not, Figure 3 is a few maps showing winter temperature departures. The greens and blues are below normal temperatures

Combine a weaker sun with colder oceans and we get the ideal setup for long-term cooling (10+ years), and if, as experts suggest, future solar cycles continue to be weak (which is

what we saw during the Little Ice Age), planetary cooling can last (with brief interruptions) for centuries. That doesn't mean non-stop ice and snow, but it does lead to shorter growing seasons, later frosts and freezes in the spring and earlier cold in the autumn and the potential for some brutal winters.

2013 and 2014 will be transition years with signs of the cooling, but a fair number of warmer periods as well. After 2015 we'll see a more dramatic shift to colder patterns. I also expect a decrease in hurricane activity overall, but more intense, east-coast favored storms for the next decade. We'll still have the occasional Gulf Coast hurricane, but the east may be the target more often. Did you know that it has been a record-shattering 7 years since a major hurricane (Category 3 or stronger) hit the United States? I try not to use this often abused phrase, but "we're overdue" for some big hurricanes hitting the nation.

Check out the Figure 4 temperature departure maps. They show past years with similar

patterns to today, so you're looking at what those years were like and what I expected from January through March 2013.

For the Midwest I predicted above normal snowfall and a periods of bitter cold in January and February. There was also an increased potential for Midwestern blizzards. The rough winter may be followed by an unusually active tornado season in the spring, something we witnessed a number of times in the 1960s and 1970s (the 1965 Palm Sunday Outbreak and the Super Outbreak of 1974)...the last time we saw similar solar and ocean cycles. If you think we have had some wild weather in recent years, buckle-up...the bumpy ride has just begun.

Keep your eyes on the sky and enjoy the changing weather! ■

Rich Apuzzo is chief meteorologist for Skyeye Weather LLC, www.skyeyeweather.com.

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of the industry she never realized existed and is now very passionate about sports turf management and plans on working it into her consulting business.

David Plascencia:

- EcoTech Services, Inc. Glendora Project Manager/Water Conservation Specialist/ Landscape Designer

- Manages water conservation programs for public water agencies. Projects include: irrigation audits, weather/ET-based central control system irrigation retrofits; high efficiency nozzle retrofits; drip conversions; and native/drought tolerant landscape designs and installations.

- Showcase projects have been integrating ET Water Central Control system at Mountain View School District in El Monte, Designing the landscape for Walnut Valley Water Districts Pump Station, and he is currently designing a 5,000 sq. ft. conservation garden at Ledesma HS in El Monte.

Danielle Booth received the CANER Scholarship and the Street Tree Seminar Scholarship and was accepted by Cal Poly Pomona to begin fall 2013. At her current place of employment, she was promoted from recreation supervisor to recreation specialist.

Joel Balsiger was offered a position as a sports turf manager at a local private high school. Unfortunately, he had to end up de-

clining the position due to the possibility of transferring to Oregon State University. Joel has been an outstanding student here at Mt. SAC. He has been taking care of the turf plots and Dr. Kent Kurtz Memorial Stadium for the past year now, and doing an excellent job. His attitude is positive and he has a tremendous work ethic.

Kelly De La Peza has been involved with the design and installation of several landscape projects with Fleur Nooyen. Kelly is a full time mom and a part time student who has sacrificed an incredible amount of time to explore turf management as a career.

UNIVERSITY OF CONNECTICUT

Dr. Jason Henderson, assistant professor, reports on UConn's graduating turfgrass and soil sciences students in 2013:

Baccalaureate Degree Students (4-yr): Ryan Carey, Burning Tree CC, Greenwich, CT; Brian Conlon, Greenwich CC, CT; Ryan Gauvain, owner/operator Oak Hills Landscape and Design, Litchfield, CT; David Gunn, second assistant superintendent, Seawane Club, Hewlett Harbor, NY; Nicholas Jennings, undecided.

Jeremy LaClair, graduate school; Wayne Lagasse, assistant superintendent, Fox Hopyard GC, East Haddam, CT; Elliot Linstrum, grounds crew, Boston Red Sox; Thomas Martel, undecided; Anthony Minniti, The Creek

(private golf course), Locust Valley, NY.

Raymond Platt, Hampshire CC, NY; Jordan Wells, undecided; Gregory Zlotnick, construction and landscaping, CT.

Associate of Applied Science Degree Students (2-yr): Billy Hamilton, employed in the Green Industry (employer unknown); Jake Provencher, employed in the Green Industry (employer unknown); Eli Desrochers, undecided.

MINERAL AREA COLLEGE (MO)

Chad Follis, horticulture instructor: "I actually don't have any students heading from our community college to the workforce. The graduates are all transferring on to 4-year schools. Over the summer they will be working on internships and none of them had a problem finding internships in turf."

PURDUE UNIVERSITY

Across both semesters (students get out of sequence or need an extra semester), we have averaged 11 per year for the past 10 or so years. That is different than our "enrollment" which has been as high as about 90 10 years ago.

May 2012 graduates in the Purdue University College of Agriculture were fortunate to experience greater success in the employment market. Ninety percent of the May graduates had gained employment or were continuing their education as of February 15, 2013. This