Has it been getting warmer in the Pacific NW & how will that affect plant/crop phenology?

A Degree-Day* Study

*1 degree-day occurs when the average daily temperature is 1 degree above a threshold temperature (like 41°F)
The daffodils were blooming as early as Valentine's Day (Feb 14th) this year!

Daffodils,
That come before the swallow dares, and take
The winds of March with beauty.
–William Shakespeare, The Winter's Tale

We will look at heat units through today
(Feb 28th as a reference)
Have these past 2 months been the warmest ever?

Is it part of a winter warming trend in the PNW?

Is global warming caused by humans releasing all this CO² into the atmosphere? (97% of Scientists think so...)

Can we forecast these anomalies to help growers adapt to these trends?
2015 is pretty much the warmest year since 1916!

Degree-days Jan 1 - Feb 28 Salem Oregon (KSLE)
1916 - 2015 (100 Years of data)

Feb 28, 1992 (closest year in 100 years [372 DD] – followed eruption of Mt. Pinatuba)

Feb 28, 2015 at 385 DD!
2015 is pretty much the warmest year since 1916!

Salem, Oregon 100 years of Temperature Data Jan & Feb
Date at which 372 DD Accumulated (reached on Feb 27, 2015)

April 27, 1955 (8 wks later than this year)

Every Year
9-yr Moving Avg
Linear (9-yr Moving Avg)
$R^2 = 0.56$

Feb 27, 2015
The most favored explanation for now, though, seems to be the extremely warm waters across the Pacific ocean...which can give rise to high pressure systems and hold them in place - D. Swain, Stanford Univ.
Many (many) studies linking Sea Surface Temperatures to future climate = one form of “teleconnection” or statistical correlation of climate anomalies at large distances

Progress during TOGA in understanding and global teleconnections associated with tropical sea surface temperatures

Kevin E. Trenberth, Grant W. Branstator, David K. Ngan-Cheung Lau, and Chester Ropelewski

Abstract. The primary focus of this review is tropical and especially the issues involved in determining the response of the atmosphere to tropical forcing associated with sea surface anomalies. The review emphasizes observed, seasonal, and atmospheric teleconnections.
Was Our Warmer-Than Normal Trend Forecasted well in Advance?

58% chance of above normal temperatures for Jan and Feb 2015

NOAA forecast on Nov. 21, 2014
Blended from:
- Sea Surface Indices & Models
- Numerical Models
- Statistical Models

We are saying that these forecasts are “increasingly skillful”
If we think of these as “climate forecasts” rather than “weather forecasts” they can be very useful, not only to plan for effects (such as early bloom or early pest attacks and so on), but to gauge the short term effects of climate change.

March 2015

April 2015

May 2015
New USDA NIFA ARDP grant project to “harvest” these forecasts for use in crop and pest decision support (OSU IPPC, WSU, Fox Weather LLC)

Localized forecast

For pest & crop models at uspest.org
Take-home Messages

- The recent warm temperatures are part of a general warming trend
- Crops have been blooming earlier over time (about 1 week per 4 decades on average)
- We can now begin to forecast short term trends (perhaps out 60-90 days)
- Growers can adapt and be better prepared

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<th>Avg.</th>
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DD accumulation on 2-26-15: 365. QA 92%

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<td>30-yr normal</td>
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Forecast using: NWS NDFD 7-day Forecast data

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