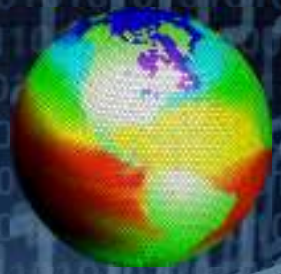


StatWeather Institute

STATWEATHER

Asthma Triggers and Extreme Temperatures

Speaker: Ria Persad, Founder and CEO

Climate and Respiratory Health @The Collider, Asheville, NC – Nov. 9, 2017

Who is StatWeather?

- **StatWeather specializes in long-range weather forecasting: post-15 day, intra-seasonal, seasonal, and year-ahead weather outlooks and climate trends.**
- **StatWeather uses a proprietary model based upon artificial intelligence, data mining, pattern recognition, and statistics.**
- **StatWeather caters to the energy industry, including risk management and trading, utilities and load forecasting, and industrial demand response.**

Recognition

- 2017 and 2016 Award for #1 Company in Client Services (FL) by AEI
- 2015 Global Data Provider of the Year by Energy Risk
- 2015 Platts Global Energy Awards “Rising Star” Top 10
- 2015 Platts Global Energy Awards “Lifetime Achievement” Top 7
- 2015 Top 4 “Most Innovative” Small Companies by AdvisorTV
- 2014 Google “Top 40 Female Entrepreneurs”
- 2014 International Renewable Energy Award to Founder
- 2013 Newcomer of the Year Award – Energy Risk
- 2013 Energy industry vote as #1 North American Weather Forecaster - Energy Risk
- Prominent media coverage through *Forbes*, *The Wall Street Journal*, *Reuters*, *Renewable Energy World*, and others

What is the **StatWeather Institute**?

- As StatWeather built out its suite of data products, only half of its technology developments were commercialized to its energy customers. This target market required temperature- and precipitation-based products, while other offerings in the fields of drought, hydrology, ocean weather, and decadal climate trends remained in-house under research and development.

- With the onslaught of Hurricanes Harvey and Irma which hit the United States in Fall of 2017 and heightening climate change affecting global patterns, StatWeather's founders have inaugurated a new 501(c)(3) organization, the StatWeather Institute.

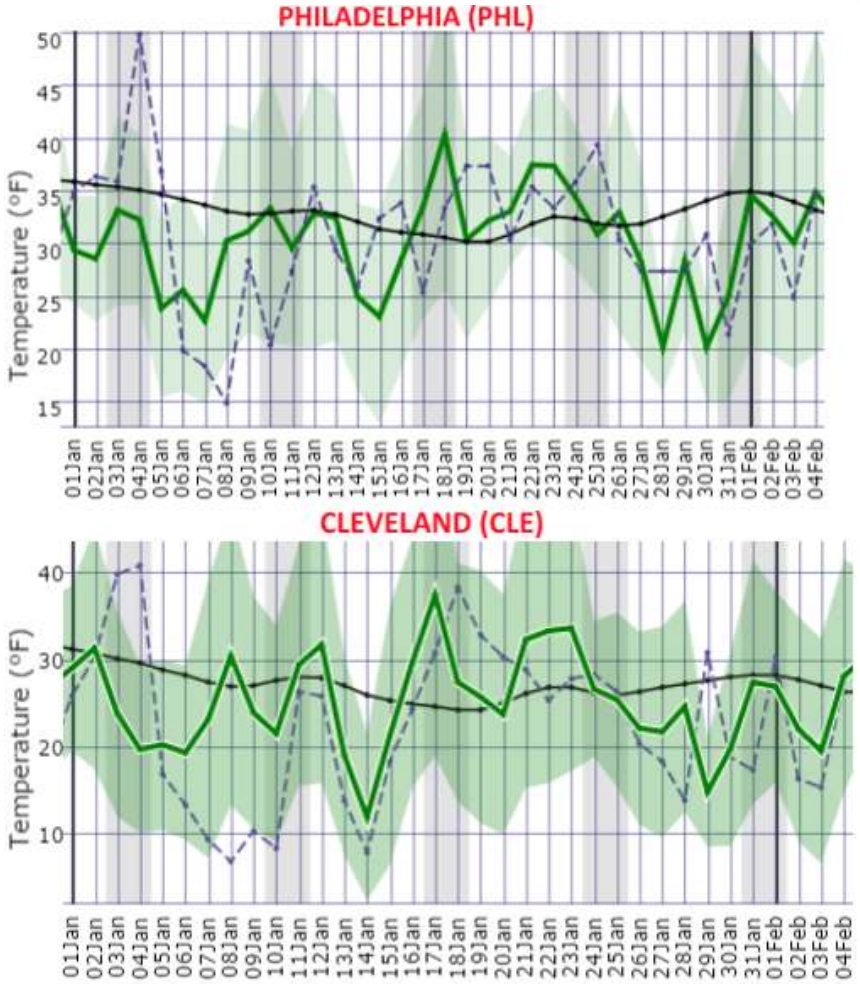
- This new non-profit will license the "other half" of StatWeather's prediction suite in offering the world the first-ever long-range, 2-year-ahead drought and hydrological prediction suite, 10-year-ahead climate trend predictions, and long-range ocean weather (tropical weather such as hurricane prediction) offerings in a humanitarian effort made freely available to the global public through the internet.

- Based out of Asheville, NC, home of The Collider and NOAA NCEI

- Website: **www.statweatherinstitute.org**

Knowledge Domains

- Machine learning (Artificial Intelligence)
- Bayesian neural networks
- 150 years of historical databases (Thank you, NCEI, a great contributor!)
- Complex analytic dynamics
- Parallel processing-high performance computing
- Probabilistic, high-resolution, daily long-range forecasts



Last Winter, StatWeather forecast 40-75 days in advance (Green is the forecast; blue is the actuals)

ASTHMA TRIGGERS

- More intense, more frequent, and longer lasting heat waves in North America impacting breathing and pollen counts (allergic reactions)
- Drought periods impacting breathing due to extreme dry conditions
- Cold waves and fronts which also irritate the breathing pathways
- High winds during storms impact air particle travel and breathing
- Lightening strikes, thunder, and rain can break up pollen making it easier to inhale
- Volatility can trigger irritation and asthma flares

Can Extreme Events Be Predicted Season-Ahead Using Data Mining?

The answer is YES!

- Using a methodology such as StatWeather's, the signatures of upcoming extreme weather events can be discerned in the forecast data.
- The key is verification and transparent statistics that the customer can use for risk management in a probabilistic setting.
- These metrics can then be used to predict the probability of asthma triggers being present

20 Extreme Weather Events: *How Did StatWeather Do?*

EVENT	PERFORMANCE	SOURCE
1. Warm Winter 2011-12	3 months ahead - accurately predicted mild winter; forecast did not change.	Seasonal maps publicly posted on internet.
2. Hot Summer 2012	2 months ahead - accurately predicted one of hottest summers on record and 75% of heat waves within a 3-day window.	Data evaluated by quants of 4 investment banks/trading floors, then investigative coverage in press (*Energy Risk*).
3. Hurricane Sandy in Fall 2012	30 days ahead – accurately predicted Nor'easter and detects signals for Sandy 18 days prior to GFS model.	Customers watched in real-time; documented in *Energy Manager Today*.
4. Mild Winter 2012-13	3 months ahead – accurately predicted mild Winter; correctly forecasts 70% of cold snaps within a 3-day window 30 days ahead. Drought forecast verifies 1 year ahead for 80% of U.S.	Customers received raw data and verifications. Documented in *Energy Risk* and *Agriculture.com.*
5. Cold Spring 2013	3 months ahead – accurately predicted extreme cold in March and Spring east of Rockies.	Verified by *Platts*.

20 Extreme Weather Events:
How Did StatWeather Do?

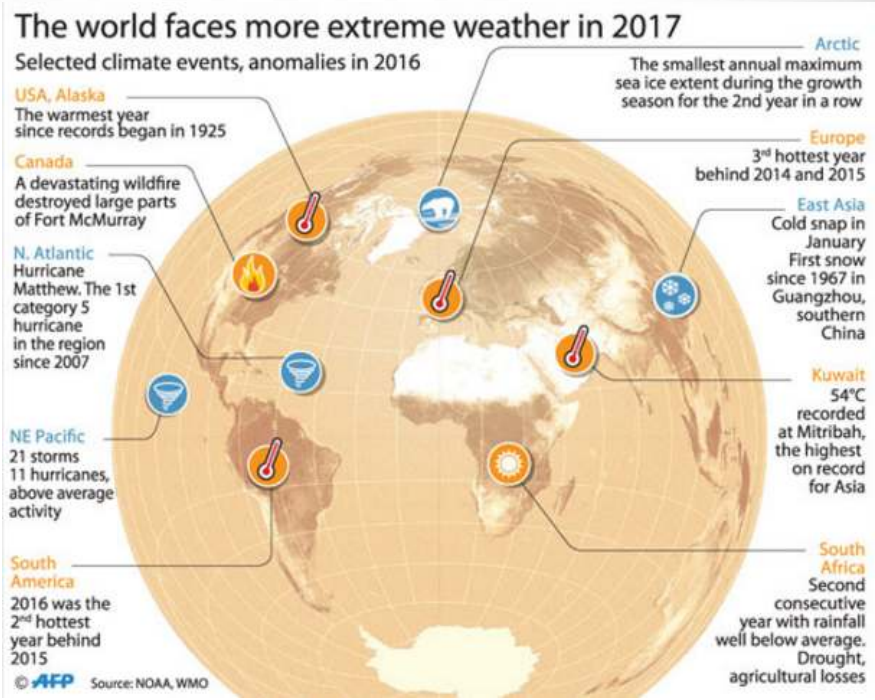
EVENT	PERFORMANCE	SOURCE
6. Summer 2013 / Drought	30 days in advance – every major heat wave forecasted to within +/-1 day of occurrence. 10-month ahead agricultural forecast verifies for 88% of the US.	Customer testimonials and all forecast data available; documented by *Energy Risk* and *Agriculture.com.*
7. Cold Snaps Fall 2013	60 days in advance – every significance cold episode forecasted within +/-2 day window.	*Energy Weather Summit* and *Platts*.
8. Polar Vortex Winter 2013-14	60 days in advance – 85% of all cold snaps predicted within 2 days of occurrence. Biggest cold event (first week Jan) forecasted to customers 75 days ahead. 3 months ahead – forecast issued for one of coldest winters on record east of Rockies and warmth in West and FL, which verifies.	Documented in press through *Reuters*, *Energy Risk*, *Energy Manager Today*, and *Forbes*.
9. Chilly Spring 2014	90 days ahead – forecast for sustained cold through March, which accurately verifies.	Documented in the press through *Reuters*.
10. Summer 2014	Independent tests show double the accuracy compared against European Model with double the lead time.	Independent verification through energy industry analysts.

20 Extreme Weather Events:
How Did StatWeather Do?

EVENT	PERFORMANCE	SOURCE
11. Fall 2014	60 days ahead – cold forecast for 1st week Oct and 3rd week Nov for natural gas demand verifies.	Documented by *ICAP*.
12. Winter 2014-15	3 months ahead – cold forecast for East/Midwest and warm West, which verifies.	Documented by *Energy Risk* and *Reuters*.
13. Summer 2015	3 months ahead – forecast for near normal Summer, cooler North and warmer South, which verifies. StatWeather makes landmark accuracy in calling 100% of heat events 30 days in advance within +/-2 days.	Documented by *Platts*. Customer testimonials for demand response industry. Awarded Data Provider of the Year by *Energy Risk*.
14. Fall 2015	3 months ahead – forecast for cooler trend transition into the East, which verifies.	Independent verifications through *Genscape*.
15. Winter 2015-16	3 months ahead – forecast for above normal U.S. overall, which verifies. December forecast for Eastern U.S. is biased too cool. Cooling trend for January correctly predicted. Winter forecast adjusts 30 days which shows warmer conditions.	Customer verifications and verification through *Platts*.

20 Extreme Weather Events:
How Did StatWeather Do?

EVENT	PERFORMANCE	SOURCE
16. Summer 2016	StatWeather predicts overall above normal summer as early as April. Summer ended up much above normal.	Customer briefings and public posts to social networks.
17. Fall 2016	September verifies per 60 days in advance.	Customer verifications.
18. Hurricane Season 2016	Forecast for significantly above normal tropical activity, has verified, with StatWeather estimating 16 storms (the season verified with 15 storms).	Forecast published through StatWeather social networks.
19. Record of 5 Hurricane Seasons + out of sample tests	80% of the time correct on forecasting either below normal, average, or above normal hurricane season activity.	Documented through *Energy Manager Today*.
20. Winter 2016-17	StatWeather forecasted below normal conditions starting November, with a slight break in cold in the South/Southeast. The major cold event (Jan 6th) was forecasted 60 days ahead.	Verification for November/December cold. Verification for ERCOT for January cold.



With the increase in extreme weather and climate events, risk mitigation is more needed than ever before!

Many thanks to The Collider and CASE Consultants for this opportunity to present.

To learn more, please go to
www.statweather.com and www.statweatherinstitute.com