

Study says ‘specific’ weather forecasts can’t be made more than 10 days in advance

November 7, 2019

Imagine someone telling you the weather forecast for New Year’s Day today, two months in advance, with exact temperature bounds and rainfall to a hundredth of an inch. Sounds too good to be true, yes?

A new study in Science says it’s simply not possible. But just how far can we take a day-by-day forecast?

The practical limit to daily forecasting

“A skillful forecast lead time of midlatitude instantaneous weather is around 10 days, which serves as the practical predictability limit,” according to a [study](#) published in April in the Journal of the Atmospheric Sciences.

Those limits aren’t likely to change much anytime soon. Even if scientists had the data they needed and a more perfect understanding of all forecasting’s complexities, skillful forecasts could extend out to about 14 or 15 days only, the 2019 study found, because of the chaotic nature of the atmosphere.

“Two weeks is about right. It’s as close to be the ultimate limit as we can demonstrate,” the study’s lead author [told Science Magazine](#).

The American Meteorological Society agrees. Their [statement](#) on the limits of prediction, in place since 2015, states that “presently, forecasts of daily or specific weather conditions do not exhibit useful skill beyond eight days, meaning that their accuracy is low.”

Beyond the limit

Although the American Meteorological Society strongly [advises](#) against issuing specific forecasts beyond eight days, popular weather vendor AccuWeather has, for years, churned out detailed predictions many days further into the future. It initiated 45-day forecasts in 2013, which it extended to 90 days in 2016 — and has been [heavily criticized](#) for it.

On Oct. 12 this year, AccuWeather even wrote a news feature headlining [specific snow forecasts](#) for major cities 30 to 90 days into the future:

“There will be snow on Thanksgiving or the day after in Chicago, Detroit and Green Bay,” AccuWeather wrote, while also calling for snow around New Year’s Day in Boston, Minneapolis and Salt Lake City.

AccuWeather’s long-range forecasting approach has elicited criticism across the meteorological enterprise for being overly specific and not communicating uncertainty.

“We just don’t have the data available to be able to do [what AccuWeather does],” wrote Beth Carpenter, a consulting meteorologist who owns and operates Thermodynamic Solutions. The forecasts, she said, are “not feasible and should not be trusted.”

We asked AccuWeather for its justification and goals for continuing to issue these forecasts, including the snowfall forecast. “Keep checking the AccuWeather forecast day by day out through 90 days,” responded communications director Rhonda Seaton.

Why does AccuWeather issue such forecasts if they are beyond the bounds of modern-day science?

“Personally, I think it’s marketing,” said Victor Gensini, an assistant professor of atmospheric sciences at Northern Illinois University, who specializes in long-range predictions of severe weather.

Gensini said that if AccuWeather is to claim these forecasts have value, it should prove it by objectively reviewing their accuracy and sharing the results, producing what’s known as a forecast verification. For example, the National Hurricane Center evaluates its forecast performance following each hurricane season, both for storm track and intensity projections, and [releases that information publicly](#).

“[AccuWeather] is only doing half of the work,” Gensini said. “It’s easy for anybody with social media or a large successful company to do long-range forecasts. ... I don’t take any forecast seriously unless there’s a verification that goes with it. If they show they are [accurate], we can start having that discussion.”

When put to the test by outsiders (see [here](#), [here](#), [here](#) and [here](#)), AccuWeather’s long-range forecasts generally showed no value starting between nine and 11 days into the future (in many cases offering less accurate predictions than historical averages would), right in line with what science says is the limit of such specific predictions.

Meteorologists outside the company, some of whom may compete with AccuWeather, said they worry that the mere issuance of the 90-day forecasts is damaging the credibility of the entire field.

“These long-range specific weather forecasts are hurting the weather enterprise,” wrote Beau Dodson, a meteorologist who operates his [own forecasting business](#). “This causes a loss of trust in meteorologists.”

How long-range forecasts can have value

Whereas the lines have been drawn as to the limits of highly specific predictions, known as “deterministic forecasts,” meteorologists have developed and continue to advance techniques for more generalized long-range outlooks expressed using likelihoods or probabilities.

You see this with seasonal forecasts, with phrases like “above-average chances of a cool winter” or “below-average hurricane activity is likely.” For example, the federal government’s [official winter outlook](#), released in October, called for above-average chances of a relatively warm winter for much of the United States, but it did not specify precipitation amounts and temperatures each day.

These probabilistic forecasts are an attempt to qualify the likelihood of something occurring. Thanks to a better understanding of how the ocean and atmosphere work, as well as increased computing power, researchers and forecasts have been able to improve these kinds of forecasts.

Gensini, for example, recently published [a study](#) in the journal Geophysical Research Letters explaining how his team was able to “anticipate the potential for an extended period of favorable severe weather conditions nearly four weeks in advance” leading up to this past May’s [historic tornado outbreak](#). His [forecast](#) was conveyed using probabilities.

The Washington Post is a customer of AccuWeather for weather services and forecasts in its print edition, for predictions no more than 10 days into the future.

Jason Samenow contributed to this report.