

FORECASTWATCH.com

**Response to Akron Beacon-Journal Article
"Partly off, chance of accuracy? Must be a forecast"**

*By ForecastWatch.com, a Service of Intellovations, LLC
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Introduction

On November 15th, 2005, the Akron Beacon-Journal printed an article titled “Partly off, chance of accuracy? Must be a forecast.” In it, Paula Schleis revealed the results of a two-month study of local weather forecasters and the national forecasters Accuweather, The Weather Channel, and the National Weather Service. ForecastWatch is in the business of calculating the skill and accuracy of weather forecasts for meteorologists, businesses, and individuals. Every day, ForecastWatch calculates the skill and accuracy of over 40,000 weather forecasts from Accuweather, The Weather Channel, and others, for over 800 locations within the United States and Canada.

One of the over 800 locations we compare against is KCLE, the weather observing station at Cleveland Hopkins International Airport. This is the verification station that was used in the article. We were able to compare the accuracy numbers presented in the article for Accuweather, The Weather Channel, and the National Weather Service with our own audited results. Unfortunately, we don’t currently collect or calculate the accuracy of forecasts from local meteorologists. ForecastWatch focuses on the forecasts of the national and international weather forecasting companies like Accuweather, CustomWeather, and The Weather Channel.

Overall, the article was reasonably accurate. The accuracy numbers for high temperature and precipitation accuracy were generally close to the calculations of ForecastWatch. However, low temperature accuracy, primarily for the short-term forecasts, differed notably, and later in the report we will explain why we believe the paper’s calculations were incorrect.

High Temperature Accuracy

The article stated that the study was conducted from “mid-August through mid-October.” Paula Schleis confirmed that the dates used for the article were August 16, 2005 through October 20, 2005 inclusive, and these are the dates that are used for comparison with ForecastWatch. In Table 1, you can see the comparison of high temperature accuracy calculations between ForecastWatch and the Akron Beacon-Journal article.

Forecaster	Article (1-3 days)	ForecastWatch (1-3 days)	Article (4-5 days)	ForecastWatch (4-5 days)
Accuweather	80%	80%	53%	57%
The Weather Channel	75%	81%	57%	58%
National Weather Service	75%	77%	63%	64% (4-day only)

Table 1. High Temperature Accuracy Calculation Comparison

For three out of the five direct comparisons, there is close agreement. We are in agreement with the article for Accuweather’s and NWS’s one- to three-day out accuracy (80% for both, and 75% versus 77%, respectively), and The Weather Channel’s four- to five-day out accuracy (57% versus 58%). Most of the one or two percentage point differences could be attributed to slightly different comparison (Ms. Schleis noted that they did not collect data for seven or eight days of the study due to unavailability), or rounding differences for the percentages. However there are three issues that stand out and need explanation.

The first is the discrepancy for The Weather Channel for one- to three-days out. While the article listed 75%, we calculated 81%. Maybe they were accidentally lumped with NWS but should have been lumped with Accuweather in the graph?

The second is Accuweather’s four- to five-day out accuracy, which the article lists as 53%, versus our 57% calculation. Could this have been a transcription error in the article?

The third, and most serious error, is the calculation of the National Weather Service’s four- to five-day out accuracy calculation. The article stated that they used the forecasts from the websites of the television stations and weather forecast providers. For the NWS, that means weather.gov. And while the NWS provides a seven-day text forecast, it doesn’t list specific temperatures. The detailed “Forecast at a Glance”, which does provide specific temperatures that would allow a “within three degrees” comparison, only goes out to the next four days. ForecastWatch’s four-day out accuracy calculation for NWS during the period was 64%, comparable to the 63% listed in the article, which points to the article only using NWS’s four-day out forecast for accuracy calculation. This is not a fair comparison with the other providers, which also added the five-day out forecast, and should have been noted in the article.

Low Temperature Accuracy

While there was general agreement between the article and ForecastWatch on high temperature accuracy, with the exception of a few small errors, there is not so much agreement on low temperature accuracy. Low temperature accuracy calculation is trickier than it first appears. It is tricky enough that for ForecastWatch’s first year of operation (2003), we did not offer low temperature accuracy calculations. It took us some time to work with meteorologists and our systems to get it right.

Why is low temperature accuracy calculation hard? It is because of the inherent difference between the way forecasts are presented and actual temperatures are recorded. The high temperature forecast is usually presented as the afternoon high. While there may be occasional days where the high for the day isn’t in the afternoon, it is generally agreed that the high temperature forecast is for the day for which it is forecasted.

However, the low temperature forecast is usually presented as the “overnight low.” If the low temperature forecast is shown next to Tuesday or Tuesday night, is it for Tuesday or Wednesday, because half of “overnight Tuesday” is Wednesday. It is even more complicated because temperature actuals are given for the 24-hour day. So an actual low temperature observation for Tuesday isn’t the low temperature for “overnight Tuesday”. Because the low temperature of the day usually occurs right before sunrise, the actual low temperature observation is the “morning low”. Since the low of the day usually occurs in the morning, the “overnight low” will usually occur the next day. Therefore, in general, a low temperature forecast for “overnight Tuesday”, should be compared with Wednesday’s low temperature observation, not Tuesday’s.

Forecaster	Article (1-3 days)	ForecastWatch (1-3 days)	Article (4-5 days)	ForecastWatch (4-5 days)
Accuweather	45%	62%	50%	50%
The Weather Channel	39%	62%	45%	54%
National Weather Service	48%	55%	46%	43% (4-day only)

Table 2. Low Temperature Accuracy Calculation Comparison

I believe that the calculations of low temperature accuracy in the article reflect that error. Table 2 shows that our calculations for low temperature accuracy for short-term forecasts are significantly higher than the article’s. However, there is more agreement for the long-range forecasts. This is because the farther out the forecast is, the less timing differences matter. WOIO’s accuracy percentages in the article also confirm this. WOIO’s accuracy is far higher than other providers. This is because WOIO’s web forecasts list the morning low for the day of the forecast, which would match the way the low temperatures are being compared. Unfortunately, the other providers list the overnight low for a particular forecast day, which needs to be matched to the next day’s morning low temperature observation.

While low temperature accuracy does tend to be somewhat less than high temperature accuracy in the months of the study, it isn’t as different as the article seems to show. We believe that the article incorrectly calculated low temperature accuracy. Beyond that, the issue with the National Weather Service’s weather.gov site not having a

five-day out forecast still exists. While the article implies that the accuracy calculation for the NWS is over both a four- and five-day out forecast, it is apparently only over a four-day out forecast.

Precipitation Accuracy

The article was correct when it stated “the issue of rain is more subjective”. ForecastWatch places precipitation icons and text forecasts into five categories: none, slight chance, chance, likely, certain/unspecified. We consider an observation of greater than 0.01” (one-hundredth of an inch) of precipitation to be a rain event. While the specific definitions used by the article and ForecastWatch may be slightly different, there was good agreement on the calculated accuracy, for the most part. Please see Table 3.

The percentages for ForecastWatch calculated accuracy are for icon precipitation versus precipitation observation. The differences between the article and ForecastWatch are most likely related to differences in what is considered a rain event. However, the same issue with the National Weather Service exists.

Forecaster	Article (1-3 days)	ForecastWatch (1-3 days)	Article (4-5 days)	ForecastWatch (4-5 days)
Accuweather	73%	75%	63%	71%
The Weather Channel	73%	76%	66%	68%
National Weather Service	70%	74%	59%	67% (4-day only)

Table 3. Precipitation Accuracy Calculation Comparison

Climate and Persistence Forecasts

The article also mentioned climate and persistence forecasting. Far from “old forecasting tricks”, these unskilled forecasting methods are useful to measure forecast skill, since creating these forecasts does not take any special effort. ForecastWatch also creates climate and persistence forecasts as part of its skill calculations.

The article noted that a persistence forecast for next day high temperature would have been correct 37% of the time, while ForecastWatch’s calculation is 38%. This is only a one forecast difference for the period (about 60 days), so the article did a good job. They also did a good job with the climate calculation. Their 40% matches our 38% very well.

Conclusion

While the article’s authors did a reasonable job calculating accuracy for their two-month study, there were several critical mistakes and errors that make drawing conclusions from the data problematic. The data as presented could mislead readers, or cause them to draw incorrect conclusions. The low temperature accuracy calculations are incorrect, and there are several other errors that should be corrected (NWS four-day out forecasts being compared to others four- and five-day out forecasts, the 75% versus 81% Weather Channel discrepancy, etc.).

ForecastWatch is in the business of calculating weather forecast accuracy. Should the Akron Beacon-Journal, or any other newspaper or publication wish to conduct weather forecast accuracy studies, we can help. In addition to keeping your reporters doing what they do best, you will give your readers accurate statistics that they can rely on and trust.

ForecastWatch has also created a consumer site; ForecastAdvisor (<http://www.forecastadvisor.com>), where visitors can view weather forecast accuracy statistics for their location, and get links to other forecasters’ weather forecasts.

About ForecastWatch.com

ForecastWatch.com has been helping meteorologists improve their weather forecasts for over two years. Created by Intellovations, LLC, a full-service technology consulting company, ForecastWatch.com provides weather forecast accuracy and skill information for over 800 locations within the United States and Canada. ForecastWatch.com has been used by meteorologists and companies whose business depends on the weather to:

- Evaluate weather forecast providers
- Improve decision-making where weather forecasts are used as input
- Improve weather forecasts by providing useful feedback
- Compare weather forecast providers
- Educate customers
- Improve the quality of weather forecast websites

ForecastWatch.com is the only company that provides ongoing weather forecast accuracy and skill information to meteorologists, utilities and energy companies, the agriculture industry, futures traders, and anyone whose reputation or business depends on being right about the weather. In 2003, ForecastWatch.com released the results of the largest public weather forecast accuracy study undertaken to that point. ForecastWatch.com's ongoing weather forecast accuracy information system has been used to perform custom analysis and reporting, and was instrumental in making this report possible.

About Intellovations, LLC

Intellovations' mission is to help you *"get it"*, to lead you, your team, your customers, your visitors, or your students to new discoveries, new knowledge, and the excitement that comes with it. Because with new knowledge and the joy of new discovery comes *better decisions, higher productivity, and more profit*.

We specialize in large-scale data collection and analysis, Internet-based software, and scientific and educational applications. We have experience building systems that have collected over 500 million metrics per day from Internet-based hardware, have created powerful desktop Internet-search products, and have used genetic algorithms and genetic programming for optimization.

ForecastWatch.com was featured prominently in O'Reilly's "Python Success Stories, Part Two". Intellovations believes that Linux, Python, Ruby, PostgreSQL and MySQL, PHP, Java, and JSP are powerful tools that allow you to maximize the utility of your technology investment, and often out-perform more costly alternatives. We know how to use these products to give you a technology solution that is more secure, performs better, and increases your return on investment.