Obtaining Weather Information for Legal Cases

Having been involved in numerous weather-related legal cases for more than 20 years, I have observed a number of issues that recur often that you should be aware of when reviewing weather information in lieu of using an expert or prior to retaining one.

1) **The Weather Underground** – Be Careful!

   The Weather Underground, run by the University of Michigan has become a leading source of weather information on the Internet. It has been my experience that many attorneys are using this website to take an initial look at weather conditions. You should be aware that the real time and past weather data linked there is comprised of both amateur, backyard weather stations and official National Weather Service airport stations. When viewing data from amateur stations please keep in mind:

   i. **The wind data is usually wrong.** This is because many amateur stations are not properly situated. An anemometer is supposed to be installed at a height of 10 meters above the ground with no interference in the wind flow from surrounding buildings or trees or in the case of a roof-mounted unit, the roof below. Few amateurs have an ideal location to install their instrumentation.

   ii. **The precipitation amounts may be significantly off.** Again, being able to properly locate the rain gauge (which should be separate from the anemometer) is a problem for many amateurs. The rain gauge should not be in a wide open area nor significantly elevated (for example, on a rooftop). It also shouldn't be blocked or influenced by nearby trees or structures. The ideal location is in an open spot, surrounded by trees where the height of the trees does not exceed twice the distance from the gauge. Again, this is not possible for most amateurs.

      a. The tipping-bucket gauges used in most amateur weather stations are known to produce errors during heavy rainfall, when the rain comes down hard enough to fall into the gauge while the bucket is already tipped from a previous accumulation of rain.
      b. Gauges that do not have a heating element are useless during frozen or freezing precipitation events.
      c. Precipitation errors increase during strong winds.

2) **ASOS stations** (Automated Surface Observing Station)

   The modernization of the National Weather Service during the 1990's resulted in most of the weather stations in their network that were manned by human observers becoming automated. Some of the issues that you may encounter when looking at data from an ASOS station include:

i. The station may only report trace amounts of snow even when significant snow is falling.
ii. The station's precipitation-type sensor may not be able to tell what kind of precipitation is falling and instead report "UP" (unknown precipitation).
iii. The sky condition sensor (ceilometer) frequently reports different conditions than a human observer would, only can see up to 12,000 feet, and cannot see what is happening near the horizon.

3) **Snowfall Reports** on National Weather Service Statements May Be From the General Public and Not Entirely Accurate.

i. Snowfall amounts are routinely issued by the National Weather Service via a "Public Information Statement" (PNS). These lists typically contain observations from trained observers, ham radio operators, and the general public, so the accuracy can and does vary. The National Weather Service does do some quality control (QC), but some inaccurate observations get integrated into the permanent record archive.
ii. The National Weather Service's cooperative observer network generally has better quality reports than the public at large, however most stations only report conditions once per day and usually around 7:00 A.M.-8:00 A.M.

4) **NEXRAD** (Next Generation Radar)

The implementation of the National Weather Service's Doppler radar network has resulted in timely and sometimes life-saving information about severe weather that was not available before. In addition to being able to pinpoint the location of tornadoes (even some that haven't touched down), analyze wind speed, direction, and patterns, and determine likely precipitation types, it is also capable of estimating rainfall amounts. These estimates can be fairly accurate at times – especially for locations close to the radar, but should be taken with a grain of salt. There are a number of factors that can throw these estimates off including but not limited to hail contamination, distance from the radar, and windy conditions.

5) Certification of Weather Records

The National Centers for Environmental Information (NCEI - formerly the National Climatic Data Center) is the only national source for certified weather records. Certification can increase the likelihood of the records being admitted in court, however I have used uncertified records while testifying in court numerous times as they are "routinely used in the course of business" for me. You should bear in mind that although some quality control (QC) is applied to the data that is certifiable the certification does not guarantee accuracy. The certification only guarantees that the data originated from the NCEI. There are many sources of data that contain errors and inaccuracies due both to issues listed here and other issues that are certified by the NCEI and admitted in court. There are also regional climate centers that will certify data but the same issues exist.

i. **Certification costs** at the NCEI have recently increased to $116 per 40 pages, not including shipping. Before ordering multiple months of certified data keep in mind that certification of 161 pages of data now costs $580 plus shipping. In addition, there is a cost per publication ordered.
ii. **Not all useable data is certifiable.** Some sources of data cannot be certified even though they have value. Examples include reliable, private weather stations and Department of Transportation reports (also iii. below).
iii. **Astronomical data** such as sunrise, sunset, and times of twilight can be obtained from the U.S. Naval Observatory. This data however, is based on calculations, not observations, and is not certifiable. It is usually quite accurate though, and I have used it numerous times when testifying as an expert in court.

6) Newspaper Articles

If you are going to cite newspaper articles in your weather-related case I would recommend backing up any important facts with reliable, secondary sources of information. Social media sources can be even more dubious.

Storm Names: The only storms that have names that are officially recognized are tropical systems whose names appear on recurring lists (until they get retired) that are generated by the World Meteorological Organization (WMO). In the United States these names are released by the National Hurricane Center (NHC). The Weather Channel and some local television stations "name" winter storms however this is just a promotional gimmick.

The best way to determine what the weather conditions were on a past date is to interpolate reliable information from in/near and around the point in question. When possible, it is best to not rely completely on a singular source of data unless both the source is reliable and very close to the point in question. This is a field known as forensic meteorology. I have been practicing it for over 20 years. Contact me for a free, initial consultation the next time you have a weather-related case.

Bob Cox has been a forensic meteorologist for over 20 years and involved in over 1500 weather-related, legal cases. He was a professional broadcast and operational meteorologist for 25 years from 1989-2014. He has presented the weather on four different television stations and thirteen radio stations. He graduated from Lyndon State College (VT) with a degree in meteorology in 1989. You can reach him at (888) 248-9347. His email address is bob@coxweatherservices.com and the website URL is www.coxweatherservices.com.