PROG'D PRECIPITATION

Plenty of pilots peruse the Prog Charts with only the vaguest sense of what they really mean—especially when it comes to forecast precipitation. Here's what you need to know.

While areas of precipitation don't equate a significant hazard to an IFR pilot, they do identify hotspots for concern. Convective turbulence, wind shear, icing, reduced visibility and low ceilings all tend to be found in and around areas of precipitation. So it's important to understand how to use precipitation forecasts.

Precipitation forecasts come in two flavors: instantaneous and accumulated. Tune into The Weather Channel and you'll likely see mostly the latter. Accumulated precipitation forecasts are valid over a range of time, say three or six hours. Time-smeared forecasts such as these have their advantages, but you can't tell if the precipitation is forecast to reach the surface all in the first hour, last hour or scattered throughout the time period. That can be a disadvantage, especially if the time frame is larger than your entire flight.

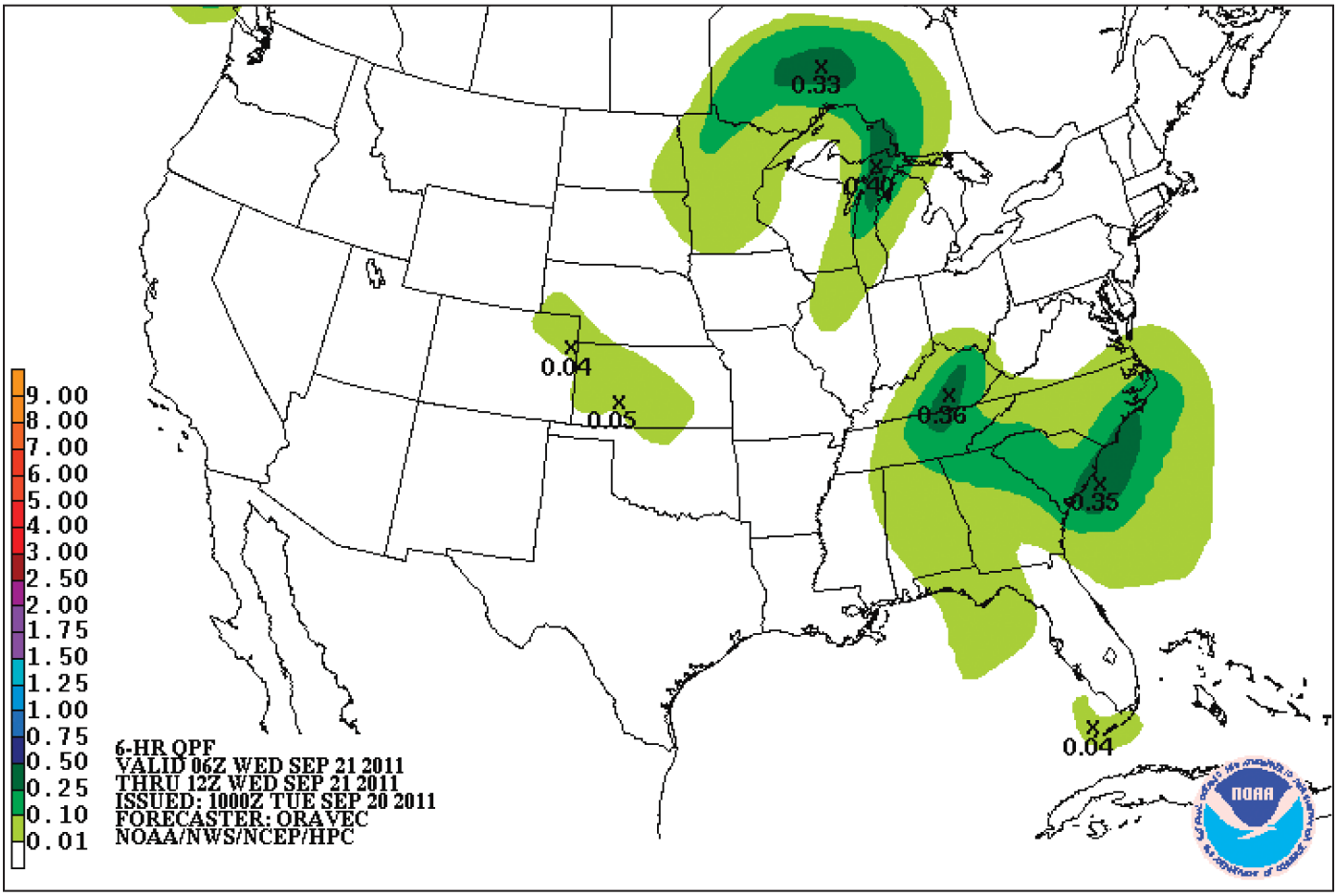
An example of such a forecast is the Quantitative Precipitation Forecast (QPF) issued by the Hydrometeorological Prediction Center (HPC), which describes the quantity of precipitation in inches (liquid) that's expected to reach the surface within the valid time period.

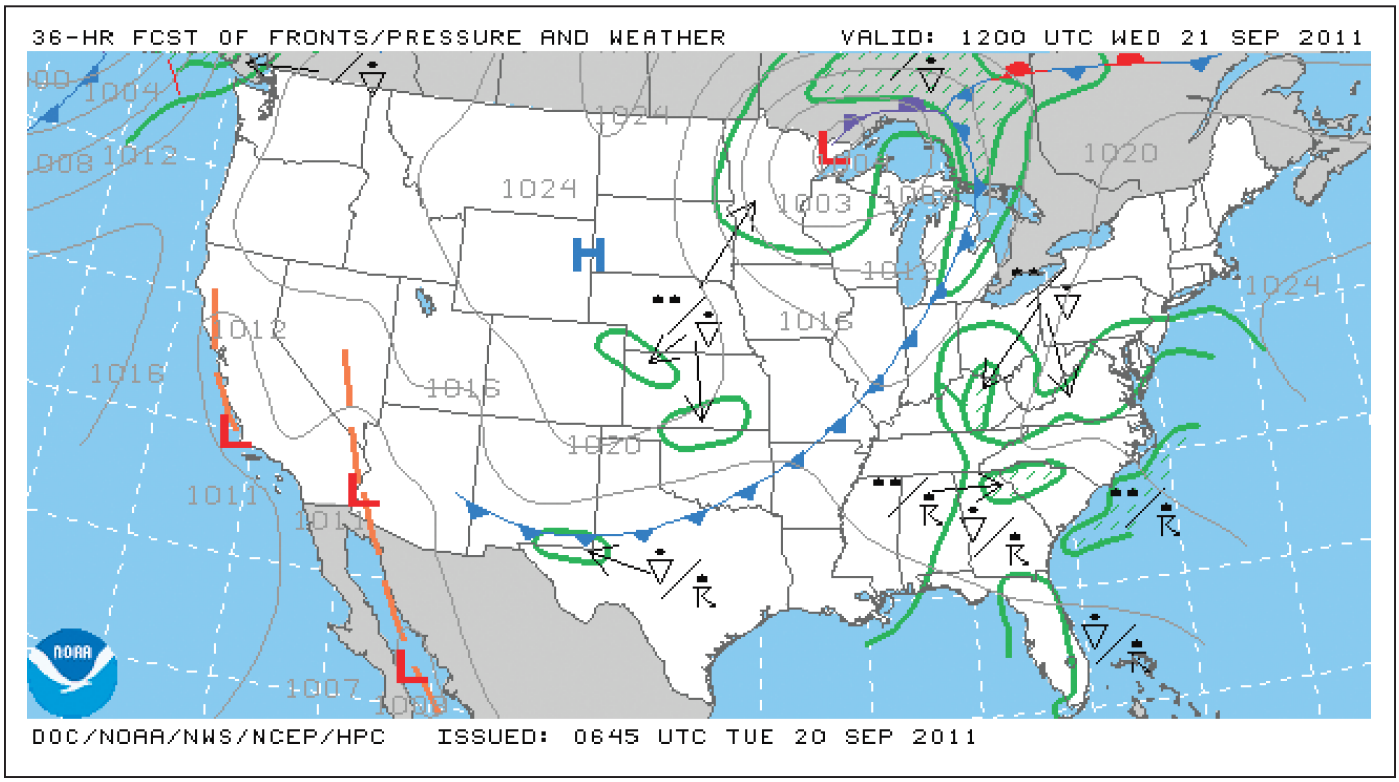
Then there are forecasts that predict precipitation coverage valid at a specific time, like 1200 UTC. This is instantaneous precipitation. Forecast instantaneous precipitation is included on Prog Charts, such as those you find on the Aviation Digital Data Service website, better known as ADDS. Many pilots use, but many also misunderstand, exactly what the chart is predicting.

Page 13 shows a 36-hour Prog Chart. This includes an isobaric forecast (mean sea level pressure) as well as the expected location of major weather systems to include high- and low-pressure centers, fronts, dry lines and troughs. Lastly, a forecast for instantaneous precipitation is shown by solid green contours.

Take notice of the valid time depicted on this chart. This can be confus-

The QPF forecasts the total accumulated precipitation over a span of time, in this case, 0600-1200z. It says nothing about whether that precip will come in one downpour or six hours of drizzle.





Prog Charts like this include instantaneous precip—areas where it's likely to by raining or snowing at one moment in time. The type of precip is indicated by the symbols. Precip expected before or after the valid time is not shown.

ing to some pilots, especially if there's also an issuance time included. The issuance time is much less important. The key item to understand is that this Prog Chart is a snapshot in time similar to any NEXRAD or satellite image. In other words, every weather element depicted on this chart, including the instantaneous precipitation forecast, is valid at 1200 UTC on Sept. 21, 2011—not before or after.

Precipitation will not be reaching the surface everywhere within the green contours at 1200 UTC on Sept. 21, 2011. To make sense of this, the Prog Chart includes two distinct coverage levels, namely broken or scattered. Green hatched regions are areas where the precipitation should cover between 50 and 100 percent of the area.

There's one of these areas in northwestern South Carolina and east-central Kentucky. At 1200 UTC on September 21, 2011, better than 50 percent of this area should have some sort of precip. In other words, bring your umbrella. In scattered areas depicted by a solid green contour without hatching, the precipitation coverage is forecast to be between 30 and 50 percent.

An oft-missed fact is that hatched areas do not imply higher precipitation *intensity*. It's possible to have a hatched area of light precipitation. Intensity is depicted by separate symbols on the chart. For example, two dots is light rain; three dots is moderate rain; and four dots is heavy rain. Asterisks mean snow and commas stand for drizzle. An inverted triangle is showers, with a dot or asterisk on top for the type of precip expected.

A Prog Chart is a snapshot in time similar to any NEXRAD or satellite image.

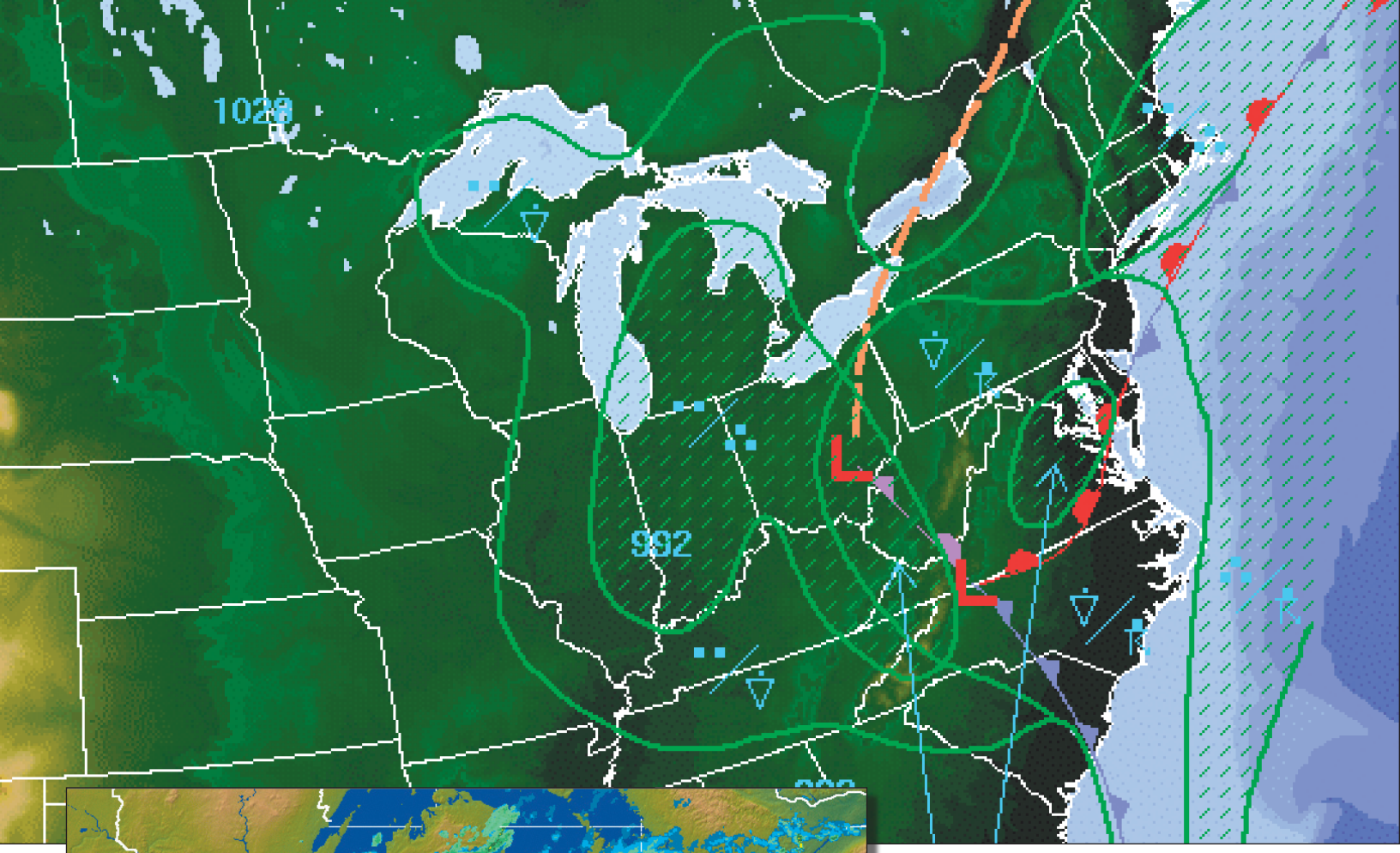
You can also estimate intensity by looking at the accumulated forecast. The QPF on page 12 shows the total precip for the six hours leading up to this snapshot Prog Chart.

How Useful?

Let's look at an example of what this means in practice. It's early in the morning and you are flying from Cleveland, Ohio, to St. Louis, Mo., in the early afternoon. You pull up the Prog Chart valid at 1800 UTC on Oct. 19, 2011 (page 14). Notice the hatched area of light to moderate rain that is expected in the Ohio Valley and upper Great Lakes. If your proposed route takes you through this area at 1800 UTC, it will be nearly impossible to avoid getting wet, assuming you are not flying over it at FL390.

The NEXRAD image at 1800 UTC shows where it actually ended up raining at that time. Overlay the green-hatched area on the NEXRAD image and you'll see that over 50 percent of the area is covered in rain.

So the Prog Chart did a pretty good job of predicting your airplane getting washed by Mother Nature. If you were planning the flight, you'd know IMC



The Prog Chart (above) predicts greater than 50-percent coverage in rain over much of Ohio at 0600Z. The NEXRAD from that time later proved it basically correct.

was a real possibility. On the other hand, areas without hatching mean that you have a good chance to avoid most of the rain altogether with small deviations, if desired.

The type of rain must be considered as well. There may not be much of an issue flying through a non-convective rain event, but if this hatched area depicted showers and thunderstorms, it would likely be a challenging flight with a high risk of dangerous convective turbulence. Over 50-percent coverage plus thunderstorms means a likelihood of several large, convective SIGMETs by the time that forecast becomes reality.

Here's one last important point: The temporal resolution of Prog Charts is fairly coarse. Forecasts are issued at 12-hour intervals on ADDS, and 6- or 12-hour intervals on the HPC website. In the first example, it's possible for an area of precipitation to be expected to develop after 0600 UTC (the 30-hour forecast) but dissipate before 1200 UTC (the 36-hour forecast) and therefore not appear on either chart.

However, if that were the case, the QPF would include some precipitation for the period between 0600 and 1200 UTC. This is a frequent occurrence during the warm season when precipitation from pulse thunderstorms can pop up between forecasts. That's one good reason to always look at both the instantaneous and accumulated precipitation forecasts to get the best understanding of the threat of precipitation.

Scott Dennstaedt is our weather-flying guru. His website is www.avwxworkshops.com and has many more weather workshops..