

## **Become a Weather Guru by John C. Matylonek**

Getting "skunked" is no fun. Getting "blown out" or rained on, the wind shifting or being too light has often caused many to reassess their commitment to the sport. Indecision about our week's priorities can drive our friends and family crazy. Much of this frustration can be eliminated if we are able to plan or eliminate a potential flying day. This article will help you predict the weather so that you can plan safer, more regular and consistent flying trips. It may even save your marriage.

The GATHER model (see December 2005) requires we collect all the information we can about flying site and the day's conditions before we fly. Our sport depends on effective prediction of the weather. Ideally, we are amateur meteorologists first, pilots second. First, we determine if the day's weather makes safe flight possible. Second, we assess if the conditions will exceed our personal or rated limits and comfort zone. Third, we use our knowledge of local weather and it's interactions with the site to maximize our performance. This article is about the first step and some of the second.

### **GATHER information**

The first point in the GATHER mnemonic requires we "Get all the information about the site and weather conditions". This information comes from three sources: 1) Local pilots 2) Site Guides & General flight plan documents and 3) Official weather prediction products.

Textbooks, internet tutorials, and articles like this one provide the background information for you to understand and interpret the information from these sources. In particular, this article is best read in conjunction with a simplified conceptual model of weather dynamics located at <http://www.oregonhanggliding.com/> under 'links'. Also, many of the examples of the weather tools described in this article can be found under the "weather" at the same site. A recommended reading list of the weather theory with direct links can found at the same site above.

A consistent plan for gathering specific weather information can be extremely useful. By sticking to the same procedure, one can gauge the accuracy of official predictions to the actual weather. A consistent plan or "recipe" allows you to "test" local associations of weather for patterns that are true for your local site. These patterns begin to provide a much more detailed prediction of flyable weather than any official weather report. For instance, a particular wind speed, pressure gradient between locations, and nature of the clouds at some location(s) near you can sometimes be used as indicator of what is happening at the flying site. Used in conjunction with general weather knowledge, real experience at the site, local phenomena and your rated personal limits, you can begin to refine your ability to accurately predict a good flying day. Not to mention, become more reliable with your friends and family about your priorities.

## **Local wisdom**

Local pilots have the most experience with any particular site. They can provide accurate information, especially if they have years of experience with flying and predicting a site's weather. If you don't have such a mentor, get one. Contacting members of the local club, tagging along on someone else's judgment or participating in the club's email forum can provide much of what you need to know about what makes a site flyable. In some cases, these sages can tell you, by looking at the sky, when the site is "on". We, too, want to get to this level of discernment. But, we need to be truly interested in the weather and exercise observation as much as we can. **You must know what specific conditions to look for while using the weather prediction recipe presented here.** At some point, taking responsibility for your own weather judgment will ultimately making you a safer and more independent pilot. In fact, successful prediction is enormously satisfying and makes for fun competition! You get to say I told you so or better yet, yell; "It's no good!" flying above the late-coming pilots. But don't get your ego all wrapped in it. There is always an element of chance in our predictions. This is what this article is about – increasing the "luck" of our independent judgment to predict when it's flyable or even soar-able.

## **Site guides and general flight plans**

Most site guides provide basic information you need to fly. They can be used to eliminate sites from consideration during obvious 'wrong' conditions. Sometimes they strongly recommend or require a local sponsor to be present - reinforcing the point on local wisdom. Some site guides are extremely detailed and well written, more akin to a generalized flight plan. These may even optimize your flight. I hope more of these are written and are provided on club websites. The archiving of flying site and weather wisdom is essential to keeping the sport alive in some areas. Besides supporting your local instructor and mentors this is the only way to progress the art. A list of site guides and general flight plans is provided at the end of this article.

## **Publishing mediums**

Television, newspapers, radio, phone services and the internet have all the weather tools we need to predict a potential flying day. Depending on where you are located, you may use one or another tool based on convenience. For instance, your home computer connected to a fast internet connection provides the most convenient and comprehensive source of information. These tools may depict forecasts and observations in a text-based, voice, a graphical or a real image format. NOAA and corporate weather services provide almost all the links to these sources. On the road, we use radios to tuned to NOAA weather frequencies and cell phones to get information from general aviation flight service stations, automated airport weather stations and other pilots. USHGA chapter clubs and instructor/school websites often have customized weather pages with links to

culled from various sources. In particular, the strategy described in this article is designed to work with the weather links at <http://www.oregonhanggliding.com/weather.shtml>

## **Structure of weather information**

Official weather information is comprised of two kinds of products - forecasts and real time observations. Forecasts are simply extrapolations based on interpretations. Because of this, they are subject to change if some factor in the prediction does not pan out. Observations are actual conditions at various sites - it's the real world, not an imagining or extrapolation of the weather. It is important to make this distinction because many forecast tools - especially the graphical ones, have a real world look to them, as if they represented the actual weather. The following structure is explicitly linked and made obvious in the weather page found at <http://www.oregonhanggliding.com/>. Go ahead and get on the web and follow along.

### **Forecasts**

Forecasts are separated into long term (10-15 days), intermediate term (5-2 days) and short term (2 - 1 day) scales. These scales are transformed into increasingly detailed bi-weekly, daily and hourly forecasts. Forecast locations can usually be specified to a zip code (which can hard-linked to your club website).

- 1) NOAA general forecasts
- 2) Computer simulation models
- 2) General aviation forecasts
- 3) Corporate weather services, such as the Weather Channel or Intellicast.
- 4) Flight service stations

### **Observations**

Observations are real-time (or very near) actual weather data. Since weather systems move in a consistent way, we can use observations to make our own forecasts and check if the forecast is panning out. Observations are global, regional, local and site specific. These area scales roughly match the forecast time scales. However, it's up to you to determine the actual timing between observations and a specific locations. Just as in forecasts you will see the weather change quickly during transitional seasonal weather, requiring much scheduling flexibility in your plans. Sources of observations include:

- 1) Automatic weather observing stations (AWOS) at airports
- 2) Infrared, Water Vapor and Visible light satellite images
- 3) Marine weather buoys
- 4) Private weather stations
- 5) Web Cams
- 6) Pilot reports
- 7) Personal direct observation

## **The Prediction Recipe**

**Determine the limiting factors** of the site that will eliminate its' flyability. These include precipitation probability, wind direction, wind speed, temperature, lapse rate, tides, visibility, and crop & field conditions. Determine what is extreme, moderate or weak at your site.

This first point must take in account your personal and rated limits. Learn the technical descriptions of common weather terms to determine the magnitude or extent of weather. For instance, "rain" means consistent and pervasive precipitation over a wide area. "Showers" means isolated cells of precipitation. Adding "few" to the term scatters the showers even more. For rain, the accompanying percentage determines the chance of rain depending on how saturated the cloud is and how likely rain it is to persistently fall. Here, in Oregon, a forecast of showers with less then 50% chance of precipitation is a great forecast. Often, the squall lines just come and go and we get the flying in between the brief down pours.

Wind direction, speed and lapse rate can be the most important detail of a site. A novice site can become an advanced site with a just a little change in these factors. The shape and character of the site, nearby terrain creating rotors, the day's maximum lapse rate can affect their gust and switch-ness factors. Sometimes, a slew of factors must synchronize to make a flight possible. For instance, Cape Lookout, a world class coastal site on the Oregon coast, requires smoother W to NW winds from 3-17 mph, moderate clouds heights and low tides for a land-able beach area. Here is where the limiting factors concept really works. If the tides are high we can't fly so we can stop analyzing the other requirements and make other plans. To students with the right mind-set, these vicissitudes can be fascinating and makes a coincidence in factors even more valuable. We get to fly!

**Use global and regional forecasts days away from the potential day** to determine the likelihood of one of these factors exceeding the site's limits. If even one extreme condition is heading your way and will exceed a limiting factor, make other non-flying plans. Simple and dominant weather systems are easier to predict than multiple competing systems. On the west coast, if a large blue-sky high pressure cell is encroaching inland on Washington and Canada, we can eliminate stellar flying conditions for the next week or so. Competing systems of high and lows requires more dependence on actual observations to determine which system is "winning".

**Increasingly depend on regional and local observations as the day and hour of flight approaches.** If the weather system is moderate, increasingly depend on regional and local observations as the day and hour of flight approaches. Use AWOS and other automated wind speed indicators from your computer or telephone. Your task is to see that the weather is remaining within the moderate zone. You want to make sure that your weather forecast is behaving itself, especially in the light of your specific site requirements. Note if the weather forecasts predict a trend in wind direction and speed

within the time of your potential flight. Just before the potential day or hour, determine the trend of the factors. You certainly don't want to start the flight if the winds are to change and exceed your personal limits.

**Be extra vigilant when factors are more complex or marginal but show promise.** The presence of "competing" systems of weather (during seasonal shifts) requires more dependence on real-time observations closer to the date and hour of flight - before a final decision is made. Make sure your last act is to use an observational tool before heading to the site - to make sure a limiting factor does not exist, the site is "on" or the expected trend is still happening. If you see a big rain blob on radar heading your way, you don't have to jump at an launch site cell phone call that its'; "soar-able right now". But, learn the timing of systems to catch the opportunities.

**Gauge the success of your prediction** by associating your weather observations with what actually happened at the site. This may mean inquiring how other pilots did if you did not make it the site. Record it in your weather diary or long term memory.

## **Conclusion**

The pilots that get the most airtime have a persistent interest in weather dynamics and prediction. They are extremely motivated to check the daily and weekly weather in detail using a strategy born from experience, study and an expert gambler's instinct. In particular, the ability to extrapolate general trends from isolated observations will begin to refine your intuitive abilities and think in terms of probabilities. For some people, this runs counter to how they would prefer to think. They would rather have a guaranteed method of determining when it is flyable so that an appointment can be made with fun. Often times this leads to all or nothing thinking or over dependence on other's judgment. In the first case, they miss many good flying days or disregard a developing trend. In the second, they don't grow as independent pilots. Keeping an eye on the weather will keep your intention pure and motivation high to fly.

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