The Eight Most Commonly Asked Questions About Home Weather Stations

(and the answers)

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Home Weather Stations Guide

http://home-weather-stations-guide.com

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1. Introduction

More and more people are setting up weather stations at their homes, and why not? They are a relatively inexpensive way of keeping an eye on the weather, they help make weather easier to understand, and they can even be set to work monitoring conditions in your garden, pool or aviary.

We ask a lot from these sophisticated systems - we expect four separate sensors to record weather information and transmit it into our homes every few seconds, and we expect them to do it faultlessly.

But conditions are tough out there - it rains, it snows, it freezes, it blows a gale and it gets blisteringly hot. And then birds find the equipment makes a comfortable perch, and insects and spiders are very clever at finding an unsuspected entry to the inner workings.

So every so often something goes wrong, and many of us don't yet have the expertise in electronics or meteorology to correct the problem.

In most cases, home weather station problems are quite easy to fix, and it is also quite easy to reduce the chances of them happening again.

This isn't a technical manual - it won't tell you how to repair a sensor - and the theme is fixing the little things that can go wrong. The glitches that may be a little hard to detect, but are quite easy to set right.

Will all your questions be answered here? I hope so, but eight questions only covers the most common problems, and you may need to know more.

There are a number of useful resources listed in the final section, which should clear up any other problems you encounter.

So, let's move on and get that weather station working properly again.

2.1 I've Lost the Signal from a Sensor. What Should I Do?

Many problems with home weather stations can be traced to the power supply and particularly to batteries. Erratic communication or even total loss of signal from a sensor is the most common sign.

If this is a battery problem, there are three main causes

- The batteries are unsuitable for the outside conditions.
- The batteries have lost power
- The terminals are corroded or, if cables exist, there may be a problem in connections or wiring.

Unsuitable Batteries

Alkaline batteries and rechargeable NiCd or NiMH batteries struggle at low temperatures. Performance begins to decline a little below freezing (-5C or 23F) and they are pretty well dead by -20C (-4F). They also struggle at high temperatures.

Lithium batteries are much less sensitive, continuing to work down to -40C (or -40F). They tend to perform better overall, often providing better radio signal strength, and last longer. So although they cost more initially, they are a better buy in the long run.

Underpowered Batteries

If your batteries have been in place for a while, or you have experienced a series of cloudy days which may have affected solar cells, the batteries should be your first suspect. Even a small loss of charge may be enough to affect your weather station's performance, particularly if it is close to the limit of radio reception. Replacing them often fixes the problem.

Poor Connections

Whenever you replace batteries, check the terminals and any wiring. Corroded terminals, or any form of circuit problems, can be caused by moisture or insects. A regular maintenance program can be a bit of a drag, but water proofing battery compartments, combined with regular checks, will provide better performance and give your sensors a longer life.

Silicone, liquid tape and various precautions to direct moisture away from the electronics and power supply will prevent many problems, particularly with cheaper systems where poor design and poor weather proofing create many problems.

Restarting and Resetting After Battery Problems

Check your manual for the best procedure for restarting, but as a general rule of thumb, disconnect the AC supply, remove batteries from the console and remote and wait a few minutes.

Then install batteries in the receiver, connect AC, and reinstall the batteries in the sensor. Check your manual for reset buttons, synchronization etc, but give the receiver time to find the signal before doing anything more. These tasks often go better if you can take the time to make a cup of coffee, rearrange your sock drawer or do a crossword between each step in powering up. Weather stations seem to work better for patient operators.

Power interruptions

If your system allows it, set it up so that battery backup is available if you lose household power. Seriously consider including a UPS (Uninterruptible Power Supply) in your system - apart from providing back up power during an outage, it can also work as a surge protector.

If you need more information, check the **Resources** in the final section of this report

2.2 What Is the Best Way to Set Up My Anemometer?

Where and how to locate your anemometer and wind vane are probably the most difficult questions to answer when setting up your weather station.

If you were responsible for an official weather station, you would be looking for a site where the recording equipment could be located in an unsheltered area, 10 meters (about 33 feet) above the surface, that being the official standard.

But most of us will not have access to a perfect location, and will have to compromise with small yards, large trees, and houses which block the prevailing wind. If you wish to create something close to the official standard you will find some help here, but what follows is more for the enthusiast who wants to know what's going on around him, but is unwilling or unable to spend the time, energy and resources needed to compete with the pros. Well at least not yet.

So what follows provides a guide to setting up a reliable wind recording system that should suit your situation but will not involve too much cost or effort in either set up or maintenance.

At Ground Level or on the Roof?

Your answer to this question will probably depend on how much open space you have in your yard, or alternatively whether landlords, other apartment dwellers, or even local authorities will accept strange contraptions on the roof.

There is really not that much difference in the material and equipment needed no matter where you go - it's more a question of whether your anemometer support is attached to part of your house or is free standing or fence supported in your yard.

- The real questions here are whether everything will have to go on the roof, or just the anemometer and wind vane? This will depend on your weather station. If the wind recording equipment has its own transmitter, or comes with a long enough cable to reach a single combined transmitter, usually included in the temperature sensor, then you should be able to retain easy access to the rest of your weather station.

  If the separation distance is too far, then everything may have to go on the roof. Access for cleaning, maintenance, battery changes etc will be more difficult, and at times even dangerous.

- Will you need install a lightning rod, or ground the equipment, or both to protect your house and instruments. Find out more about this question on the section on **grounding.**

- What sort of supports do you have, or will you need, to set up your anemometer and wind vane securely?

  Chimneys, air vents, and house walls are all possibilities, as are tripods anchored to the roof. But keep in mind that what goes up must also come down for repairs and maintenance.

What You'll Need

First up, you won't need to reinvent the wheel, and you shouldn't need to thrash the credit card. Radio enthusiasts, fence builders, plumbers and, surprisingly, bird lovers have all been there before you, even if some of them were thinking horizontally while you need to think vertically.

If you look through the weather forums you will find a huge range of ways of supporting an anemometer, from living trees through to flagpoles to PVC piping. But for strength and ease of assembly four methods stand out, provided you are not aiming for great heights.

- A well anchored 4x4 post. This can either be a stand alone structure to which the anemometer is attached, or it can form the support for a lighter mast. The secret here is to make sure the bottom end is deeply buried - even cemented in. Burying the bottom 3 or 4 feet should provide enough support for 12 or more feet above ground, even to the point where it will support a ladder.

- A radio mast from RadioShack or similar supplier. These come in 5 or 10 feet lengths which can be interlocked. If properly supported at the base, they provide a light and inexpensive support for your anemometer.

- Fence top rail from Home Depot and probably other hardware stores. They come in 12 foot lengths and can be nested and clamped into each other.

- Walmart has a telescopic mast in their pet supply section - it's designed to support a birdhouse, and will extend to 15 feet. This makes maintenance very easy. **Telescopic Poles** of this sort, which have the additional advantage of providing easy access to the top by collapsing the telescopic sections, can also be found at Amazon.

With appropriate bolts, clamps, straps and so on, plenty of which are available from hardware stores, it should be no trouble assembling and installing your anemometer. The only other thing to remember is to install it with the direction arrow pointing north. Check the instructions in your manual to find out how to do this, and use a compass to find magnetic north.

Finding North

You don't need to be super accurate with this part – most wind directions are given to the nearest 22.5 degrees (NNE, SSW etc). But since most online weather stations post results in degrees, you may need to allow for magnetic declination - the difference between true north, as used on maps, and magnetic north as shown by a compass. You can find out what this is at your location by submitting your latitude and longitude here; http://geomag.nrcan.gc.ca/apps/mdcal-eng.php.

Conclusions

So there's a thumbnail sketch about how to get your anemometer up and transmitting. The main thing to keep in mind is to get your home weather station up and running as quickly and as easily as possible. Do your best with locating the anemometer, but remember there'll be plenty of time to improve and tweak in the future, so don't feel the need for perfection just yet.

With that in mind, it is certainly worth considering a relatively low-key set up where all sensors are in the same general area. For instance, a well buried post (4x4 or larger) can form a sturdy base for a mast carrying your anemometer and wind vane, and provide an ideal location for the rain gauge and temperature/humidity sensors, particularly if the top of the rain gauge is level with or above the top of the post. This type of set up is ideal for a reasonable sized backyard without too many tall trees.

Whenever you add elevation to your house or property, you add to the risk of lightning strike. The section on **grounding** should answer your concerns.

There are many ways of improving or tweaking your system which are beyond this article. A good source for some clever ideas are the weather forums, and I have listed a couple of good ones in the Resources section at the end of this report.

2.3 The Frozen Anemometer Blues, or Why Has My Wind Speed Recorder Stopped Turning?

Assuming that total equipment failure can be ruled out, there are two common reasons for wind speed data to be interrupted - power problems and freezing of the rotating part of the anemometer.

The first problem is covered elsewhere - tired batteries, batteries operating out of their temperature range, or loose or corroded connections are usually the causes. When this happens the anemometer will usually continue to turn in the wind, but the wind speed will be wrong, impossible, or just not recorded.

The second problem is most likely due to ice around the junction between fixed and rotating parts, frequently following a period of freezing rain. Other causes may be debris getting caught in the narrow gap, while insects or spiders can create temporary havoc in the turbine anemometer used in some La Crosse weather stations.

But let's consider ice. Freezing rain occurs when supercooled rain hits any object which is below freezing, including anemometers. The rain freezes almost instantaneously, and is very effective at stopping movement.

Less likely is freezing of water which has accumulated around the junction between rotating and fixed parts.

Restarting the Anemometer

Not always easy. If you can't wait for nature to take its course, and direct access to the anemometer is difficult or dangerous (as it most likely is in freezing conditions), try sending a hot cloth, or one soaked in windshield washer fluid, or both (but be very careful) up to the anemometer on a pole, and drape it around the frozen area.

As I said, not always easy.

Some have tried hitting it with a stick or throwing rocks at it, but with mixed and often expensive results.

Prevention and Minimization

Best done during maintenance, there are several ways to reduce the likelihood of your anemometer freezing.

Firstly, if your anemometer is a light color, painting it black will help to speed up the melting of any ice.

Secondly, a good clean to remove any accumulated gunk will help.

Next, application of a silicone spray and/or a product like RainX, used on windshields, will do a lot to prevent rain sticking to the surface.

Do all of these, but the best method of all is to makeup a small skirt which covers the junction between the rotating part and its support. Some have used duct tape, but anything flexible and waterproof will work.

Fasten the narrow end of the skirt above the junction, with the skirt itself extending over the junction to a little below it. This simple part will stop water running down from above, and prevent rain falling directly on to it.

2.4 Do I Need to Ground My Home Weather Station?

Grounding refers to providing a path for electricity, and in particular lightning, directly to the ground so it doesn't damage your house or belongings.

It is a real concern with weather stations, because ideally at least the anemometer should be elevated above any sheltering effects on the wind such as trees and roofs. It becomes the local high point, and the most likely lightning target.

So let's review what you can do to ground your equipment and minimize the effects of lightning strikes.

An Important Disclaimer

The suggestions in this article should never be regarded as professional advice. Lightning is dangerous, and you should consult or employ a qualified electrician before undertaking any work designed to minimize or prevent lightning damage.

A Word on Lightning Risk

The risk of a lightning strike is not particularly high, but its consequences can be devastating. Risk varies from state to state, Florida carrying the highest, and also varies with location and exposure. So if you live on a bare ridge top in Florida or nearby states, keep your fingers crossed.

The risk may be low, but so are the costs of minimizing or preventing lightning strike damage.

Weather Station Options

For accurate results, your wind measuring sensors should be reasonably elevated and unaffected by shelter from trees or roofs. This makes them a great lightning target.

Here's what you can do.

- If you have a lightning conductor, installation of your anemometer on the roof will be reasonably safe, provided that it's highest point isn't higher than the top of the conductor, or at too great a distance away.

- If you have no lightning conductor, or if the anemometer is installed on your roof at some distance from an existing conductor, you can ground it by attaching a metal rod to the top of the mast and running a strong (say 1/8th inch diameter) copper wire from it to earth.

  The best earth is a metal grounding stake driven sufficiently far into the ground to reach the damp soil zone. Wire and stakes are usually available at hardware or RadioShack type stores, but seek qualified advice before doing this yourself.
  Also make sure the grounding stake doesn't accidentally damage wiring, water or gas lines.

- If you have the space and there are no problems with neighbors, landlords or other interested parties, set up your anemometer on a mast separated from your house. Grounding is still advisable, but your house is no longer at risk, particularly if you are using a wireless weather station.

Other Reasons for Grounding

For the same reason that a car can generate a static electricity charge, plastic components of weather stations can develop a charge in dry windy conditions. Usually this is no big deal, but it may interfere with radio or cable transmission. A small wire leading to earth will reduce this problem.

Static electricity can also develop in cables if they are loose and moving in the wind. It can be eliminated by keeping the cable tight and attached well enough to prevent movement.

Other tips on **power supplies** and **installation of anemometers** can be found elsewhere in this special report, while more information on lightning can be found at http://www.home-weather-stations-guide.com/lightning.html

2.5 Why Isn't My Rain Gauge Working?

Once you have your home weather station set up and running well, any problems that arise are most likely to come from your rain gauge.

After all, it has to collect the rain, measure it in a finely balanced tipping bucket, and get rid of the water. Then it basically shuts down until the next shower.

If your rain gauge stops working, the most likely reason is underpowered batteries, and you can visit the **Batteries** section to check that out.

But don't go just yet, because there are plenty of other possible causes that should be investigated first. And fixing most of them won't affect your wallet.

Mechanical Problems

The rain gauges on all but the most expensive weather stations work on a tipping bucket principle. Rain enters the bucket, which tips and empties once a known weight of water has accumulated. Then the second bucket starts filling and the process is repeated. Each tip is recorded and converted to an amount of rain.

Depending on the model, the amount of rain corresponding to each tip of the bucket is between 0.01 and 0.04 inches - 1 to 4 points or 0.25 to 1.0mm. Because of the way it is collected, the actual water in the bucket is more than this, but its weight is very small - less than 1/10th of an ounce.

So the buckets and the rod that they pivot on need to be in perfect order.

If your problems occur shortly after you have set up the station for the first time, get a spirit or bubble level and make sure that the rain gauge is perfectly horizontal, both front to back and side to side.

If the gauge has been working well but has suddenly stopped check for

- Corrosion or icing up of the pivot rod. Clean it thoroughly, and try to minimize or prevent water accumulating around it. Also make sure the drainage holes aren't blocked.

- Insects, spiders, or even frogs.

Birds, Bees and Falling Leaves

Birds love weather stations, and particularly rain gauges. They usually make nice elevated perches with a good outlook. But rain gauges are open at the top, and they are quite effective at collecting bird droppings, insects, and drifting leaves and pine needles. Any or all of these can affect the recordings or stop the gauge from working.

A few small modifications can almost totally eliminate the problems, supported by occasional checking.

Entry of unwanted material can be reduced by covering the entrance with insect screening mesh or similar material, perhaps weighted slightly in the middle to minimize rain water being held in the mesh.

Birds can be discouraged by arranging wire or fishing line around the top of the rain gauge, with the aim of making the potential bird perch insecure or uncomfortable.

Snow and Hail

While not an equipment problem, the conversion of frozen precipitation to a rainfall equivalent is a significant concern in many areas. Rain, hail, sleet and snow all contribute to the annual precipitation total.

This subject is discussed in more detail in the section on **Measuring Snow**, but there are several ways of approaching the problem.

There are basically three ways of recording snow, and they can be adapted to the less predictable hail.

- Use a heated rain gauge - snow is melted in the gauge and recorded as rain equivalent. Separate records of the actual depth of snow in each fall should also be kept.

- Measure each snow fall and calculate its equivalent in rain. Depending on the wetness of the snow, between 7 and 12 inches of snow equals one inch of rain. To avoid duplication, the rain gauge should be covered during the peak of winter when snow is expected to be the main or only form of precipitation.

- Take a representative core sample of each snow fall using a measuring cylinder or flask, and melt and measure the water equivalent. The tipping buckets in the rain gauge could be used to do this, but if the diameter or area of the entrance to the sampling cylinder is different to that of the rain gauge some adjustment to the amount of rain equivalent will need to be made.

Precipitation recording in areas where both snow and rain can be expected can be a challenge, but as always the weather station is there to serve you, not the other way around. The correct method is the one that suits you best.

Conclusion

All the mechanical problems with rain gauges can be overcome by care during the set up phase, and regular maintenance. They do require more attention than the other sensors, which suggests that careful thought should be given to their location and ease of access.

Maybe the roof is not the best site.

The **weather forums** frequently discuss questions such as these, and links to two good ones are included in the Resources section at the end of the report. Many rain gauge problems can be traced to their initial installation, and the Resources section will help you follow that up if necessary.

2.6 What Is the Best Way to Measure Snow, and How Do I Convert It to a Rain Equivalent?

If you live in an area where snow falls every winter, you've probably wondered about the best way to record it. How do you measure a fall, and how do you relate it to rainfall to arrive at an annual precipitation total.

It does cause some head scratching, but there are a number of ways to include snow in your weather records.

The first thing to keep in mind is that the total amount of precipitation, converted to rainfall, is the most important measurement. While snow is significant in many ways, weather and climate statistics are based on total precipitation, and the amount of snow is of secondary importance.

In fact, several breeds of weather software don't even include a slot for snow. Similar remarks apply to hail - less common than snow, harder on weather stations, but still needing to be converted to a rainfall equivalent.

Recording Snow
Before you can convert snow to a rain equivalent you will need to know how much there was. Sounds pretty simple, but there are a few wrinkles to be smoothed out.

- Snow doesn't always stay in the same place. It falls, but may then be picked up by the wind and moved somewhere else. If the wind is strong, the result may be an irregular cover ranging from almost bare ground to thick drifts around fences, walls, trees and cars.

- The thickness of a snowfall changes with time, by compaction under its own weight and also by melting or sublimation (the transition from ice to water vapor without a liquid phase).

- And snow has many forms, from light and fluffy to wet and slushy, each of which convert to different amounts of melt water.

Now although the rainfall equivalent of snow is the most important thing to record, we still need to know just how much snow fell. So can it be measured directly?

Like many weather questions the answer is yes and no, but so far no-one has come up with an automatic way of recording both snow fall and rain equivalent.

Many manufacturers of home and commercial weather stations can provide a heated rain gauge, usually drawing its heat from a small light which is switched on in winter. These work well most of the time, but a heavy fall can clog the gauge, while the heat of the bulb may evaporate some of the water. And you still need to record the thickness of snow on the ground.

The opposite method to that is to remove the funnel and measuring cylinder or tipping buckets from your rain gauge and just use the open container to collect the snow.

You can then record the amount and melt it down to a rain equivalent. This works well, particularly in calm conditions, but like the previous method, is not very reliable if the snow is windblown.

The third main method is to forget about collecting anything in the rain gauge - cover it over and just concentrate on the thickness of snow.

To convert the snow back to its equivalent in rain, you again have three choices, depending on your need for accuracy and the way your weather station is set up.

- Measure the snow fall and convert the thickness back to a rain equivalent using a simple conversion factor. One inch of rain is roughly equal to 10 inches of reasonably dry snow, 7 inches of wet snow, and somewhere between 10 and 20 inches of really light snow, although significant thicknesses are unlikely because of compaction.

- Take a core sample of snow -just push the open end of a flask or measuring cylinder down into the snow to the base of the most recent fall; hopefully it will stay in the flask. Measure it, melt it, and record the amount of water using the same container. Do this a number of times, and you should be able to come up with a pretty accurate average conversion figure (see above) for that type of snow.

- Take a core sample as in the second method, melt it down and transfer it to your rain gauge. The advantage here is that the amount will be automatically recorded. But unless the cross sectional area of your sampling tube is the same as the top of the rain gauge, you will need to adjust the amount.

It all depends on what you want out of your recordings. If you are keeping records or your weather station is live on the net, you will have plenty of opportunity to add or edit data through your software program, and since there is no way both snow and rain equivalent are automatically recorded you will need to do some editing no matter what.

But it's your weather station, and you can do whatever suits you best.

Measuring Snow

Those of you who have been paying attention will have noticed that I've remarked on recording the thickness of snow, but haven't suggested how to do it. Well here goes.

Firstly, the standard for snowfall records is to record the thickness of the fall in six hour intervals - OK if you're home but not very helpful if you have to be at work. You can only do your best.

Secondly, if you have more than one fall in a season, and the old snow is still lying around when the new lot arrives, you will need to separate the new snow from the old.

Measuring the total thickness and subtracting the old amount to work out the thickness of the latest fall is inaccurate, and will underestimate the new snow. This is because the older snow will have compacted or melted between falls.

So how do you get around this?

Firstly a graduated snow stick is a useful tool - just a stick or a post calibrated in centimeters or inches. This can be a permanent fixture in a part of your yard where the amount of snow is unlikely to be affected by wind, or it can be portable. Keep in mind the effects of compaction if old snow is still around.

If you want to get a bit more high tech, a web cam focused on a snow stick will record before, after and during views, and may even allow you to record in six hour intervals. You mightn't even have to go outside!

A more accurate way is to use one or more snow boards - not the sporty ones, but a white board or piece of plastic about 1.5 ft or 45 cm square. Place this on top of the last snow, and measure how much snow has fallen on top of it to find the latest figure. If you have several of these around your yard you can obtain an average figure which will be more accurate than a single reading.

Snowboards also make it very easy to collect accurate core samples of just the latest fall. Clean them off when you've finished, and they'll be ready for the next dump.

Conclusion

Well that's a lot of words about what seems to be a simple subject. Worthwhile records of snowfall take a little planning and time, but when you get down to it, the whole process is probably only going to take a few minutes. And you were probably starting to get bored with being stuck inside anyway.

PS Treat hail the same. If you can get a measurement of thickness, you can work on a conversion factor of 1" of ice equals 0.9" of water. But that's unreliable, because not only does most hail have holes or trapped air bubbles, but there is plenty of air between the hailstones when they cover the ground. The best way is to take a sample of known thickness, melt it down, and measure the height of the water in the same container.

2.7 Why Are My Temperature Readings Too High?

Many people have found that daytime temperatures from their weather station are consistently higher than temperatures from nearby weather stations, or from an analogue thermometer, particularly on fine sunny days.

It is almost certainly caused by overheating of the temperature and humidity recorders, either from being in direct sunlight or from being affected by reflected or radiated heat. It affects home weather stations from the lower part of the price range, because most of the more expensive ones come with an inbuilt heat shield.

The problem most commonly arises when even the best site for the sensors is sometimes exposed to sun, or receives reflected heat from a nearby wall. Some heat sources may be less obvious - a temperature sensor set up under the eaves may still be affected when the roof heats up.

The problem may not be immediately obvious. A well shaded sensor in summer may be exposed in autumn as the angle of the sun changes with the seasons

And an accurate air temperature is important - so many other things are calculated from it - relative humidity, dewpoint, wind chill, heat index and so on. So while minor errors in wind and rain records are not critical, an erratic temperature recorder is a real problem.

Fortunately it's very easily fixed, and any improvement will improve your weather records. All that is required is a reflective cover for the temperature/humidity sensor that keeps the sun or reflected light off but still allows air to circulate.

Here's a link to a home made pagoda type screen; http://www.ruralgeek.com/wpblog/?page_id=70. It may be a little over engineered but you'll get the idea, and the fan, while useful, isn't entirely necessary unless you are after even more accurate temperatures.

This particular design may be a bit more intricate than you'd like, but it gives you an idea about what you can do with a few plastic plates, some threaded rod or wire, a little time, and very little money.

The essential parts of this type of screen are ventilation openings at the top, base, and between the plates.

But even simpler shields are possible, and quite effective. Any piece of white plastic will do the trick - ice cream containers, bottles, PVC piping - virtually anything. Just cut it to size, leaving the bottom and top open for ventilation, and attach it so it shields the sensors, and you have made a significant improvement to the accuracy of your records.

Now you won't win any design prizes with something like this, but if you would like something a little smarter and more effective, check out the better weather forums in the Resources section at the end of the report. You are only limited by your imagination and ability as a handyman.

2.8 How Can I Get My Pressure Readings to Match Nearby Weather Stations?

This is a very common problem during the setting up phase. You follow all the instructions, then check your air pressure readings against a nearby weather station, only to find that they appear to be way out.

What's going on?

First some very basic facts. Air pressure measures the weight of a column of air, extending to the top of the lower zone of the atmosphere, known as the troposphere. In any one region, the top of the troposphere can be assumed to be at the same height over a large area. If this is constant, then higher points on the land's surface will have less air above them; - less air = less weight of air = lower air pressure.

But a key component of weather forecasting is the changes in air pressure with moving air masses and fronts, and to make any sense of this we need to have a common standard. So all local air pressures are recalculated back to the value they would have if the location was at sea level.

This basically means that for every 8.2 meters in extra elevation, 1 hectopascal or millibar (about 0.03 inches) needs to be added to the air pressure reading to convert it back to a sea level equivalent.

Most home weather stations will allow you to set a reference sea level pressure equivalent value, and all later readings will be based on that. All weather software programs also have this facility.

Now if you know your elevation you can make some calculations which will give a fairly accurate value. But there are a few wrinkles in the calculation method, and there is an easier way if you are reasonably close to an official weather station, particularly an airport.

On a calm clear day, preferably one where the weather map tells you that a high pressure cell is overhead, check the pressure data from your nearest airport (the local NWS website should have the info you need), and enter it into your system.

Compare the two values over the next few days, preferably in calm clear conditions during the middle part of the day, and if the two values continue to correspond your problems are solved. If not, continue to compare and adjust until they do.

Avoid exceptionally hot or cold days, times when the weather is changing or stormy, and windy days, all of which can lead to noticeable local pressure variations.

Depending on what you want from your weather station, you can continue to refine your base pressure value. Well calibrated air pressure readings are

necessary if your weather station is part of the official network, but from a personal point of view, it is the changes in air pressure that are important in understanding the weather, not the absolute values (as long as they are in the ball park). So there's no need to be worried if you can't manage a perfect match with another weather station.

After all, who's to say that **their** equipment is perfect?

3. Other Resources and Conclusions

I hope you have found the answers to your questions here. I realize that eight questions won't cover everything you want to know about home weather stations, but the big eight form a background to most things that may go wrong, or not start right, with a weather station.

There are several other aspects of weather station operation which can also be worrying.

Technical or performance based concerns can often be resolved at weather forums. Two very good ones are **WxForum** - http://www.wxforum.net/ and **Weather Watch** - http://www.weather-watch.com/smf/index.php**.** Both are very active and well run.

And there's also the support and service sections run by the manufacturers, although it is fair to say that quality varies.

Another group of problems relates to the resolution, recording range, and updating period of various sensors. Surprisingly it is not always the cheapest models that are the most restrictive. The first place to go is the specification section in your manual - it may be that you are expecting more of your equipment than it was designed to deliver.

And finally, many weather station problems can be resolved by careful thought about the location of the sensors and the receiver, or by extra weatherproofing and maintenance of your equipment. And that brings me to my website - check out the section on **setting up your weather station** - http://www.home-weather-stations-guide.com/weather-station-set-up.html.

As you might have guessed, I am fascinated by weather. Everything from observing and recording it to trying to get up to date with new technology, forecasting techniques and climate change. Of course I'll never keep up with the constant flow of information and research, but meteorology is such a vast field that there are always new and interesting facts and opinions to be found.

But on a personal level, weather can be understood best when you are involved in watching and recording it at home, and there is no better way to do that than with a home weather station.

Much of what I've learned is, or will be, incorporated in my **website** - http://www.home-weather-stations-guide.com/.

It is a growing website, which concentrates on home weather stations and how to get the most enjoyment out of owning one. It may also help you answer the most important question of all about home weather stations - which one is the best one for you? So if you think you might want to upgrade, or add to your system, you will find reviews of most of the available home and commercial weather stations there. After all, as someone on the forums said, he who dies with the most toys wins.

And finally, the site is still growing, so feel free to visit us often - you'll be very welcome. And if you have any questions, comments, good weather stories, or suggestions for topics for the website, please contact me at **mailto:graham@home-weather-stations-guide.com**