

# The Catch

## COCORAHS - SNOW AND OTHER WINTER REMINDERS

FORT COLLINS, CO — Tuesday, December 7, 2010

Good evening.

First, a warm welcome to all the CoCoRaHS newcomers over the past few weeks. It has been great to see dozens of new volunteers signing up in northern New England and quite a few out in California and other parts of the country as well. Gradually we keep filling in the gaps.

If you are new to CoCoRaHS and have not been contacted and need any help getting started, just let us know.

### **Climate variety**

Tonight it is as cold in Florida as it is here in northern Colorado. Good luck to all you Florida farmers trying to save your crops. We're pulling for you.

Last year this time we had already totaled over 40" of snowfall here in Fort Collins, CO, but this year there's been almost nothing. Meanwhile the mountains to our immediate west are getting one snow after another. Last year they could scarcely buy a good snow. The lake effect snows have been piling up the last few days in places like Buffalo, New York and surroundings. But other nearby places have been missed. And it was great to see that my home town of Royal in east central Illinois had a wonderful snow this past weekend of around 7" (sadly there are no CoCoRaHS observers there) -- and the snow fell straight down with no wind -- quite unusual. Furthermore, 5 days have passed and the ground is still fresh and white. In my youth, I would have been thrilled! It's this wonderful, endless variety of daily weather changes and year-to-year variations that keeps life interesting and somehow caught my attention when I was only 5 years old and I've never lost interest since. Many of

you share some of the same feelings and experiences. Some people think we're crazy, but it's a good crazy -- I think.

### **Calendars -- Please -- Pretty please**

I have some good news and some bad news. The good news is that nearly 600 of the first-ever CoCoRaHS rain gauge calendars have found new homes. The bad news is 2400 have not and there are only 3 weeks left before 2011.

Would you please consider purchasing a calendar to help support and sustain the CoCoRaHS network. Quite a few folks have told me that the calendar is just too expensive. I understand and I really wish I could send every CoCoRaHS volunteer a calendar as a small token of appreciation for all the help this year with rain and snow measurements. Quite frankly you deserve it. But there are just too many of us and it would cost over \$100,000 to send everyone a calendar (Yikes!!).

The minute you see one of these calendars and hold it in your hand, you'll realize this is a something special. The photos that we volunteers helped send in are nothing short of spectacular -- a combination of nature and the odd things that happen with a plastic rain gauge perched outdoors. Maybe we'll try this again, but as I look at the calendar it's just hard to imagine that we'll ever do much better.

So please think about ordering one. Better yet, don't think about it -- just do it. \$13.75 isn't that much all things considered and It will help CoCoRaHS a lot.

Here is the direct link to order a calendar and have it shipped to your home or as a gift to someone else.

<http://www.weatheryourway.com/cocorahs/cal2011coco.htm>

If you'd prefer, this is also an opportunity to make a donation to our annual "Five for CoCoRaHS" campaign. For a donation of \$30 or more we'll send you a calendar.

<http://www.cocorahs.org/Content.aspx?page=2010yearend>

## **Snow times**

OK, back to what CoCoRaHS is all about -- tracking precipitation. There is no way around it. Measuring snow is not as easy as measuring rain. Going outside to take measurements at this time of year is more a chore than a pleasure for some of us -- cold, dark, slippery -- and did I mention it's dark and cold? But knowing how much snow fell and how much water it contains and how much older snow and ice is still on the ground from previous storms matters to a lot of us. There are very, very few sources of snowfall and snow water content data, and CoCoRaHS is helping a whole lot.

Here is a "brief" summary and reminder about how to measure snow. It's almost identical to the message I sent out this time last year, but consider it a reminder -- optional reading but useful if you're uncertain about how to do the measurements and reports.

Also, as you consider the prospects of snow and the challenges it presents -- and how cold, dark and potentially slippery it can be at 7 AM -- please keep in mind that you are a volunteer. You may want to measure snow but you don't have to. All of us are a little older than we used to be and it just isn't worth risking a slip and fall just to get a snowfall or ice measurement. Of course your data are appreciated, but your health is more important. So don't take any unnecessary risks. A reasonable option for some of us is to bring our rain gauges inside and let the younger and more agile observers carry the team for the next few months. Then, when the rains come back next spring, you can start reporting again.

## **Measuring snow and ice -- a quick review (well, not too quick)**

As the snow has been flying, so have the questions about how to measure it. Many of you are doing this for the first time (thanks!!). So it's time for our annual "Snow Measurement Review". The best thing to do first is to take a look at the daily precipitation entry form and make sure you know what each item means. Once you have that figured out, then you can confidently measure and report winter precipitation.

Here are a few tips for each of the entries we make on the CoCoRaHS "Daily Precipitation Report Form"

### ***"Rain and Melted Snow"***

That is the water content of the precipitation that has fallen in your gauge -- rain, snow, freezing rain, sleet or any combination. You'll need to

remove the funnel and inner cylinder if frozen precipitation is expected. Otherwise, the funnel clogs up and the snow spills out (bummer)! Or worse yet, water will collect in the inner tube, freeze and then crack the tube and you're out of the CoCoRaHS business. Not good.

After snow and ice have accumulated in your outer cylinder, then you will need to MELT it so you can pour that water and measure the content in the inner cylinder (just like rain). A quick way is to add a measured amount of warm water to melt the snow -- AND REMEMBER to subtract that amount from the total to get the correct reading. Some people use their microwave -- but I've seen a few distorted melted gauges. They're ugly.

Another way to measure is to WEIGH your rain gauge outer cylinder. Weighing is much quicker and easier -- if you happen to have a good kitchen or laboratory scales that reads to the nearest whole or half gram. We describe that method in a message sent in late 2008.

[http://www.cocorahs.org/Media/docs/TheCatch\\_2008-12-30.pdf](http://www.cocorahs.org/Media/docs/TheCatch_2008-12-30.pdf)

There are situations where your gauge will not catch and accurately measure the moisture from snow. Wind driven snow (traveling nearly horizontally) may deflect around and over your gauge and not land inside. If you feel that your gauge measurement is not accurate, mention this in your observation notes. Then take a core sample as described below and use that value instead for your daily precipitation amount.

### ***"Observation Notes"***

Measuring snow can be tough, but if you can describe briefly the weather conditions you've observed it will help us interpret your data. If your snow observation is problematic, just describe it in your notes. Here is an example from an observer in South Dakota last year: *"Bad blizzard in progress. Emptied gauge at noon on Wednesday before precipitation turned to snow, had 0.27" then. Got all our pickups stuck. Power out and on generators. Snow depth an estimate only. Drifts are so variable it's hard to know what is average."* So while this observer may not have made a precise measurement, we had a good idea of what was going on. Here's another from eastern Colorado: *"This is one of the only times we have had no wind so could get a really good measurement."* Your remarks are worth a lot. Don't hold back.

### ***"Depth of new snow in inches to the nearest tenth"***

If possible, have a snow measurement surface planned ahead of time in an area of your yard where the snow typically lands and stays reasonably level. Having a white board or white plastic surface (called a snow measurement board) in a representative area makes it easier to measure

the accumulation of new snow to the nearest 0.1". If you only have a ruler that shows fractions (1/8, 1/4, etc.) then convert the readings to decimals. 1/4" for example should be reported as 0.3" (or 0.2" if it's just slightly less than 1/4). We have a fraction conversion table under "Things to know about Rain, Hail and Snow".

<http://www.cocorahs.org/Content.aspx?page=snow>

Mark the spot where you placed your snow measurement board with a flag or pole so you don't lose it when it snows. The "Depth of new snow" is the amount of snow and/or ice pellets (sleet) that fell and accumulated during the past 24 hours. Remember to report the maximum accumulation of new snow that was observed prior to melting, settling or redistribution by the wind. There is a great example of this in our online snow measurement training slide show. Getting a good measure of the maximum accumulation may require doing a quick measurement during or immediately after the snow ends and not waiting until the next morning. The snow might melt or settle overnight. If all the snow melts as it hits the ground and never accumulates, then report T (for "trace"). If it snowed but you did not have the chance to measure it, then please type in NA (for "not available") and add appropriate explanation in the "Observation notes" section.

***"Melted value from core to the nearest hundredth"***

This is a helpful but optional field. If you are concerned that the amount of moisture in the gauge was too low due to wind or other factors reducing your gauge catch, or even if you're just very interested and curious, then collect a core sample of the new snow from a representative location where the snow accumulated uniformly. Melt (or weigh) the sample to measure the water content. It is fascinating to see that the moisture collected from the core measurement can differ from what was in your gauge -- and sometimes by a lot.

***"Depth of total snow in inches to the nearest half inch"***

The total depth of snow is how much is still on the ground at your scheduled daily observation time. This can be new snow, old snow, or a combination of both. For example, if there was an inch of old snow on the ground yesterday, then it snowed 3" new, but that snow settled to just 2" by your regular observation, then your total depth would be 3". Keep in mind that your total depth will likely be different than your New Snow unless new snow has just fallen on previously bare ground and has not had time to melt or settle. If the snow depth is uneven (and it often is) then take an average of several measurements, or find a measurement location that is representative of the average snow depth in your area. For example, if your front yard and back yard are the same size, and the

average depth in your front yard is 2" but in the back yard is 6", then report 4" for your total depth.

REMEMBER, our computer automatically enters NA for your total snow depth. So if there is any snow on the ground be sure to type in the amount to the nearest half-inch (or whole inch if that's easier). If there is some snow remaining on the ground, but more than half the ground is bare, then type in T.

***"Melted value from core to the nearest hundredth"***

This last data entry field is optional but very useful, especially to hydrologists and structural engineers. It is the water content of the total snow (the sum of both the new and any remaining old snow) on the ground, at your scheduled time of observation. This measurement is typically called SWE, which stands for "Snow Water Equivalent". This is the amount of water that would soak into the ground or run off into streams and rivers if that snow and ice were to melt quickly. Take a core sample of the "total snow" in a representative location, and either melt it or weigh it to obtain the water content.

For areas where deep snow accumulates, the measurement of SWE is cumbersome at best but very important. Also, taking core samples of the snow day after day may eventually leave your yard or measurement area pitted with holes and disturbance. Starting last year we began "SWE Monday" where we encouraged observers to take that special measurements just once a week. That's easier and provides a better data set. If, however, you live in areas where snow accumulation is less frequent and reliable, then take this measurement and report any day of the week.

***For more information about measuring snow?***

For more thorough instructions and explanations go the CoCoRaHS website: [www.cocorahs.org](http://www.cocorahs.org) and you will find a training video, a slide show and written instructions to help you. If you need additional help, then please contact your CoCoRaHS local coordinator and ask. Please make use of the CoCoRaHS website to view maps and reports of recent and past snow events so that you can see all the great data that you and our other volunteers are helping to collect. We can all learn a lot by examining our data and comparing to others in our areas.

Measuring snow is tricky, especially if it's melting or being blown around by the wind. Don't be frustrated, perfect measurements may be impossible. But use your head, check your data, and you'll do very well.

Some frequently asked questions about measuring snow and some common problems.

Many observers try to enter their measurement of new snow into the "Rain and Melted snow" column. For example, if they measured 2" of new snow they try to type in 2.00" for the daily "rain and melted snow" amount. Don't do it that way :-)

***What do I report for my new snow amount when the snow has been melting or settling?***

If there is only 2" of new snow left when you do your 7 AM measurement, but you know there was closer to 4" there yesterday before the melting and settling began, then report 4.0" for your new snow amount. For the total depth of snow on ground, report what you measure at 7 AM -- in this case, 2.0" (assuming the ground had previously been bare)

***What if I get freezing rain? How do we measure that?***

Freezing rain is precipitation that falls as rain but then immediately freezes on contact with the ground and/or elevated surfaces. The frozen moisture is called "glaze". Report freezing rain just like rain -- it is NOT SNOW. But you'll need to melt the ice to get an accurate reading. Be very careful on the ice.

It is very, very useful to report the thickness of the ice that accumulates on branches or wires. This is called "ice accretion" or "coating". An elevated aluminum strip could be used for measuring freezing rain accretion. Use your measuring stick to measure the vertical depth of ice accretion on the surface of the aluminum strip. If a metal strip is not available, other common metal surfaces can be used such as metal mailboxes, metal fences, and metal railings. Measure the vertical depth of accretion atop whichever horizontal surface(s) you use. Exposed tree branches will suffice, but remember to measure the ice accretion, or vertical depth of the ice from the edge of the branch outward. If one side of the branch has a greater thickness of ice than another side, simply take an average. Once you have taken measurements from five or so different surfaces, take an average of all of your measurements, and report it in tenths of an inch. Enter that amount in the "Comments" section of your report. This type of quantitative information about ice buildup has not been measured at most weather stations. It is extremely useful data for a wide variety of applications.

***What if we receive rain and snow on the same day? Then what?***

Mixed or changing precipitation types are common in some parts of the country. Report both the rain and the water content of snow that landed in your gauge as your daily precipitation amount. Then measure the amount of new snow that accumulated (prior to melting) and report that as your daily snowfall amount. If you can, take a core sample of the snow to get the water content of snow. Then you can infer how much fell as rain and how much fell as snow.

***Wouldn't it be helpful to have more than one gauge for winter measurements?***

Yes indeed. I actually have four outer cylinders to make snow measurement quicker and easier. I keep extra ones indoors. At 7 AM I go out to retrieve my gauge and replace it with a clean, empty cylinder so I don't have to go out again. I also have two extra cylinders for taking the core sample of fresh snow and the core sample of total snow on the ground. Then I bring them all in together and do all the measurements at the same time. Extra outer cylinders can be ordered online from WeatherYourWay.com for a reasonable price.

***I've heard that 10 inches of snow equals 1 inch of water. Is that always true?***

A typical wet snow or snow with dense, small crystals will often have between 0.80 and 1.00" of water for every 10 inches of new snow. But the "density" (water content) of snow can vary greatly. It is possibly in very dry, fluffy snows to get as little as 0.10 to 0.30" of water from 10" of new snow. Also, in extremely wet snows, values as high as 2.00" of water from 10" of new snow is possible. All you have to do is walk or drive in the snow -- or shovel it -- and you'll immediately have a good idea if the density is high, low or medium. That's why we take separate measurements of the snowfall accumulation and the water content.

***Can I just measure the snowfall and not worry about the water content?***

Some CoCoRaHS volunteers only measure the accumulation of new snow and the total depth of snow on the ground. We really appreciate also knowing the water content, since it can be so variable. If you do report only the snow depth, then remember to type in "NA" ("for not available") for the daily precipitation amount. If you report snow but you just leave the "Daily Precipitation" box blank (0.00") the computer will give you an error and you won't be allowed to report. So just type in NA for the "rain and melted snow" and then type in the new snow amount and the computer will be happy.



***Do I have to report if it didn't snow today?***

Knowing that it didn't snow is important. Please report your zeros if you can.

***If no new snow fell but there is old snow still on the ground, should I report that?***

Yes. Snowcover, even old snow, has a huge effect on the climate. Whenever you have old snow on the ground, try to report the average depth and the water content of that snow each day. While it is fascinating watching snow fall and accumulate, it is also very interesting watching it settle, melt and disappear.

***What if the wind is so strong that the snow is badly drifted?***

Wind-drifted snow is very difficult to measure accurately. Do your best to come up with an average accumulation of new snow -- and then take a core sample at a point with average accumulation to get a water content. Check the numbers to see if they appear reasonable -- and also mention your challenging plight in our "comments"

***What if it's too cold, slippery and I just don't feel like going outside?***

Well, that happens to the best of us, especially in these dark days of midwinter. The good news is that you're a volunteer. If you don't feel like it or if it's unsafe, don't do it. But if you can take winter measurements, I assure you they are appreciated. Very few weather stations are able to measure snow and ice so your CoCoRaHS reports are extremely useful.

Finally, don't forget to use the "Significant Weather Report" to send in reports of snow, sleet or freezing rain that you think might be significant to travelers, forecasters and anyone out and about in the winter.

If you really read all the way through all these instructions you are AMAZING. Good job.

**A grandson**

Last week our daughter gave birth to our first grandchild -- a cute little boy. I know that many of you are already grandparents, so you know the joy already, but it's a first for us. Thanks for letting me share our good news.

**The farm -- low priority these days**

Sorry I haven't shared much news from the farm lately. In this case, no news is good news. Things are pretty much put to rest and other parts of life are taking priority now. My wife did find the energy to make a big new compost pile today, so that's good. We're still eating fresh tomatoes that we picked the night of the first freeze back in October. They conveniently waited until Thanksgiving to ripen and they taste surprisingly good still. But they're on their last legs and won't last until Christmas. One of our barn cats got sick and died, but about that time a "friend" came over and dropped off another, so equilibrium prevails. I can hear Angel (the great Great Pyrenees) even as we speak fending off all potential nighttime 4-legged invaders. So the world is safe. She's doing well and has settled in with us now that our son works up in North Dakota and couldn't take her with him.

Finally, remember our (my) goal of reaching 10,000 daily reports back in late October. We fell short but we did come close. A few reports are still trickling in.

October 25, 2010. 9247 daily reports plus 403 multiday reports for a total of 9650

October 26, 2010. 9351 daily reports plus 273 multiday reports for a total of 9624

October 27, 2010. 9072 daily reports plus 226 multiday reports for a total of 9298

So we gave it a good run! Maybe next year.

Good night and best wishes at this festive but sometimes stressful time of year. Do well and I'll talk to you soon again.

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