Because every drop counts!
What Is CoCoRaHS??

“CoCoRaHS is a grassroots, non-profit, community-based, high-density precipitation network

made up of volunteers of all backgrounds and ages . . .

. . . who take daily measurements of “just precipitation” right in their own backyards”
We just measure precipitation!

Rain

Hail

Snow
Once trained, our volunteers collect data using low-cost measurement tools ...
and report their daily observations on our interactive Web site: www.cocorahs.org
Our aim is to provide the highest quality data for natural resource, education and research applications.
WHY CoCoRaHS?

Five Important Reasons
1) Precipitation is important and highly variable

2) Data sources are few and rain gauges are far apart

3) Measurements from many sources are not always accurate (especially snow)

4) There is almost no quantitative data being collected about hail
5) Storm reports can save lives
Who uses CoCoRaHS Data?

- National Weather Service
- Other Meteorologists
- Hydrologists
- Emergency Managers
- City Utilities
  - Water supply
  - Water conservation
  - Storm water
- Insurance adjusters
- USDA—Crop production
- Engineers
- Scientists studying storms
- Mosquito control
- Ranchers and Farmers
- Outdoor & Recreation

- Teachers and Students
  - Geoscience education tool
  - Taking measurements
  - Analyzing data
  - Organizing results
  - Conducting research
  - Helping the community
Who Sponsors CoCoRaHS?

The National Oceanic and Atmospheric Administration
Colorado State University
USDA
US Bureau of Reclamation
National Weather Service Local Offices
Individual Contributors
As well as many others
In this section we will:

a) Explain what **we will need from you** before you **become an observer**

b) Explain **what you will need** before you can participate
a) What we will need from you before you can participate as an observer:
A completed application form (on-line or paper)

Your location – so we can produce accurate maps. Just having your address may not be good enough. We have to pinpoint it just as close as we can.

Your willingness to receive CoCoRaHS e-mails (spam blocking off)

Your commitment to collect accurate scientific data

info@cocorahs.org
cocorahsqc@msn.com
nolan@atmos.colostate.edu
b) What **you will need** before you can participate as an observer
### #1

A sincere desire to help study and learn about storms

### #2

Training
(In person or on-line)

### #3

**A unique station number and name**
(we will assign you one)

Station Number: CO-LR-368
Station Name: FCL 3.4 SW
4. A CoCoRaHS “4-inch” rain gauge installed in a good location

5. A login ID and password to enter data
#6

**Hail pads**  
(some states may not be participating)

#7

**Internet or telephone capabilities**

The ability to gather accurate data and transmit it in a timely fashion
SECTION TWO:

Setting Up Your Equipment and Observing Precipitation

In this section we will:

a) Show how/where to place your gauge and hail pad

b) Explain how to measure rainfall

c) Illustrate how to observe hail

 d) Show how to measure snow depth and water content
a) Placement of your rain gauge

Location is the key to good data!
PlACES **not** TO PLACE YOUR GAUGE

The #1, all time worst place to put your rain gauge is to leave it in the box!

Using your gauge to hold up your gutter downspout is not a wise choice either!
Avoid placing it under trees or any structure.

Although convenient, the deck is still too close to the house.
Also avoid placing your gauge near:

- Sprinklers (both big and small)
- Steep slopes (a bit exaggerated)
- Animals (dogs, birds, etc.)
- Mountain lions?
And finally avoid anything that would artificially increase or decrease your gauge catch.

Such as a solid fence, which can cause updrafting during strong winds, reducing your gauge catch.
Ideal placement of your gauge

Photo by M. Suedukum
Distance from obstacles

• In **open areas** strive to be **twice as far** from obstacles as they are high.

• In **developed areas** strive to be **as far** from obstacles as they are high.
Distance between Trees

Ideally, place your gauge equidistant from the nearest trees
Height above the ground

In open areas place the gauge top approx. 2 feet off the ground

This is to improve gauge catch by reducing wind speed

In developed areas place the gauge top approx. 5 feet off the ground

This is to improve gauge catch by reducing the impact of nearby obstacles
LEVEL and BEVEL

Make sure your gauge is level

Bevel the top of the post to reduce rain splashing into the gauge.
Hail Pad Placement
Where should I place my hail pad?

When you’ve found a good place for your rain gauge, that should be good enough for your hail pad as well.
Elevate and Attach

The pad must be horizontal.
It is best, but not necessary, to elevate the hail pad.
It should also be firmly attached so that . . .
. . . it doesn’t blow away!

“When last seen, our hail pad was headed north at 3rd and Elm”
Spraying the pad

If you have trouble with birds, lightly spray paint the hail pad surface with a dull color*

* Bright Orange may not be the best choice . . . but it may keep hunters from shooting your pad.
Write the direction the pad is facing on the pad’s back.

This example shows an “N” for North.
b) Measuring Rainfall
When should we read our gauges?

7:00AM is preferred

Between 5:00AM and 9:00AM is OK

Other times are accepted, but they will not appear on CoCoRaHS Maps.
Reading your rain gauge

• Reading the rain gauge is easy but accuracy & consistency are important.

• Here are the most common situations you may encounter when reading your gauge.
Your most common observation

It is important to know that it did NOT rain. Please report zeros!

... will be zero, (0.00), nada, nothing, zilch!
Trace "T"

When only a drop or two wet the gauge record a "T" for Trace
Between “T” and “one tenth” of an inch

That’s 0.04 or four hundredths
The surface of the water in the gauge looks curved. How do I know where to read?

As water fills up the measuring tube, a curved surface is formed called a meniscus. This meniscus is formed by the surface tension of a liquid in contact with the sides of the tube.

Always read the bottom of the meniscus, when making your daily rain measurements.
A nice soaking rain

This is “one half” inch it’s . . . NOT 5.0, nor 0.05, but 0.50
(kind of like 50 cents out of a dollar)
A good rain

The inner tube holds 1.00 inch
DECIMALS

Getting the decimal point correct is ESSENTIAL.

There is a large water difference between 0.40 inches and 4.00 inches.
Water! Water! Everywhere!

When more than an inch of rain falls the precipitation will overflow into the outer cylinder. The whole gauge has a capacity to hold 11 inches.
To measure greater than one inch...

Pour out the first inch from the inner tube and write it down.

Now pour the remaining water into the funnel & measure using the inner tube.
Continue until all of the water has been measured. Make sure you keep track of your amounts along the way.

Then add up all of your measurements:

1.00 inch + 0.97 inches + 0.88 inches + 0.92 inches = 3.77 inches

Total = 3.77”
c) Observing Hail
Three steps in Observing hail

#1

As hail is falling

Fill out your CoCoRaHS Hail Report Card. After the storm is over attach it the back of the pad.
#2 Fill out an on-line hail report

Submit an on-line hail report as soon as you can

Your report goes right to the National Weather Service and it may help them in issuing a “Severe Thunderstorm Warning”.

Severe Thunderstorm Warning

NATIONAL WEATHER SERVICE PLEASANTON, WI
246 KB NOT FOR JUL 25 2006

...A SEVERE THUNDERSTORM WARNING REMAINS IN EFFECT FOR SOUTH CENTRAL PLEASANT COUNTY UNTIL 410 PM CDT...

AS 346 PM CDT...NATIONAL WEATHER SERVICE DROPS A STORM CONTINUED TO INCREASE AND DROPS A REPORTED COMPLETE golf ball size hail...AND DAMAGE TO TREES EXTENDING UP TO 60 MPH. FUTURE STORMS...
#3

Drop off or send in your hail pad

Drop off your hail pad and pick up a new one at one of our drop off locations in your community (see the Web site for locations)
d) Measuring Snow
If snow is anticipated . . .

Remove the **funnel** AND **inner tube**, otherwise snow will clog the funnel.
There are two ways in which snow is measured:

1. Liquid water content
   - From the gauge
   - From a core sample

2. Depth of snow
   - 24 hour snowfall accumulation
   - Existing snow depths
Measuring liquid water content from your gauge

CoCoRaHS

Snow Network
If you live in a protected area many times you will have an accumulation of snow on the rim of your gauge.
How do I know what to measure and what not to??

Take your snow-swatter and tap gently on the rim of the gauge.
What falls in gauge we measure

We will disregard the snow that lands outside the gauge.

Go ahead and clear away the snow from the gauge.
Melting snowfall

Add some warm water to the inner cylinder

Notice that you have two cylinders
Carefully measure your tap water before adding to outer cylinder.

Be sure to measure to nearest hundredth of an inch.
Add the warm water to the snow sample

Pour water directly into sample

Allow sample to completely melt
Measure the liquefied snowfall sample

Pour snow sample into smaller tube

Remember “Every drop counts!”
Carefully read to the nearest one hundredth of an inch
Remember to subtract the amount of warm water that you’ve added to the tube.

Reading of 0.79 inches of water minus 0.50 inches of water added gives a final reading of 0.29 inches.
Measuring liquid water content from a core sample
Your gauge may not always give an accurate measure of snow water content. Wind deflects snow around the gauge and wet snow may stick to the rim. Therefore a “core sample” may be necessary.
First find a representative location

The location should have not drifted, melted, or blown clear

“This looks like the best place!”
Steps to cutting a sample

Place gauge upside down and push down into the snow.

Clear snow from around the gauge.
Capturing the core

Slide

Lift

Flip

Slide snow-swatter under gauge

Carefully lift and get ready to flip the gauge

Bring the sample inside to melt
Snow Cores in deeper snow

Push down

Turn

Pull
In wetter snow, the core will come out as one piece.
Record your measurement

Enter your data on the precip sheet . . . or using the CoCoRaHS Web site
www.cocorahs.org
Again, there are two ways in which snow is measured:

1. Liquid water content
   - From the gauge
   - From a core sample

2. Depth of snow
   - 24 hour snowfall accumulation
   - Existing snow depths

Now let’s look at the second way — Depth of Snow
What is Snowfall?

Snowfall is the accumulation of new snow and sleet in the past 24 hours prior to melting or settling.
When do I measure new snowfall?

Your observation is normally around 7AM. Because snow melts settles and drifts it is wise to measure when the snow first stops.

The goal of reporting new snowfall is to report the maximum accumulation prior to melting and settling.
Measuring snowfall
Where to measure new **snowfall**

Measure newly fallen snow your **snowboard** if the snow has fallen and accumulated uniformly.
Snow measured under a tree

Notice that only 3.0 inches of snow has accumulated here.
Snow measured in the open

Where as 6.5 inches has fallen in the open
Angle of Measurement

Measure at eye level, as an angle will give you an inaccurate measurement.
After you have measured the snow on your board, clean it off and replace it on top of the newly fallen snow. Be sure to mark its location. Now you are ready for the next snowstorm.
In Windy Locations

If there have been strong winds and drifting you may have to take several measurements and compute the average.
Snow depth is the average depth of snow (including old snow as well as new) that remains on the ground at a particular time of year.
Reporting snow on the ground

On some days snow will only partially cover the ground. To record this take an average of both covered and bare areas.
If half the ground has 2.0” and half the ground is bare, report 1.0” as your total depth.

If more than half the ground is bare report “T” (trace) and mention the range of depths in your comments.
How do I measure Freezing Rain?

“Freezing rain” is rain that falls in liquid form but freezes on contact with a surface.

Do NOT report freezing rain as "Snow". Melt and measure the moisture that has accumulated inside your gauge and report that as your daily precipitation amount.

Report ZERO for your new snow amount (assuming that it all fell as rain, and no sleet or snow accumulated).

Report the total depth of freezing rain remaining on the ground at time of observation and enter that in the "Total Snow on Ground" column. Make a note in your comments section so that we know it’s freezing rain.
SECTION THREE: Reporting Observations

In this section we will introduce you to the Web-site and show you how to record your observations.
The CoCoRaHS Web site

www.cocorahs.org

Our Web site is informative and easy to use. Here's how to begin →
Recording your Daily Precipitation

After you login, the screen will automatically take you to the Daily Precip. Report.
Enter Your Report

Here you will enter the total precipitation measured in your gauge.

Record your measurement in hundredths (0.00)
Feel free to enter comments about the day's weather under "notes"
Submit your Report

Click “Submit” and your data is recorded on our site
To See Your Report on the Map

Go to your state page and then click on your county.
Your Report on our Daily Map

The amount of precipitation you entered shows up at your location on the map.
Upcoming Training Sessions in the Hoosier State

Important Notes:

All new observers must attend a training session, either a live session or a walk-in training session with a county coordinator.

All observers must use a Standard 4 Inch Rain Gauge for Daily Reports!

NEW ONLINE TRAINING IS NOW AVAILABLE AT THIS LINK:
http://www.agry.purdue.edu/climate/cocorahs.asp

Each CoCoRaHS State has its own page
Other Reports

- Hail Report
- Intense Precipitation Report
- Monthly Zeros
- Multi-Day Precipitation Report
- Daily Precipitation Report
Click here to access a Hail Report
Intense Precipitation Report

Click here to access the Intense Precipitation Report
Monthly Zeros

You can go back in and enter days of zero precipitation on one “simple to use” page.
Multi-Day Precipitation

You can even enter information after you’ve been away for several days.

I was away for a week and read the accumulation in my gauge when I returned.
Daily Precipitation Reports

View Data: List Daily Precipitation Reports

Station Fields:
- Station Number
- Station Name

Location: Colorado

Date Range:
- Start Date: 6/12/2006
- End Date: 6/12/2006

Precip Value:
- All Precip Values
- Operator

Search:

Search:

Showing 1 - 50 of 498 Records.

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<th>Time</th>
<th>Station Number</th>
<th>Station Name</th>
<th>Total Precip. in in</th>
<th>New Snow in in</th>
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In this section we will try to answer common questions asked by observers.
Do I have to be home everyday to participate in CoCoRaHS?

Answer: No. Report when you are able. If you are gone, you may leave your gauge outside and report a multi-day total when you return.

What if I don’t have a good place to put my gauge?

Answer: Few people have ideal locations. Do your best. Send site photos if possible to help interpret results.
What if it hails when I’m not at home?

Answer: We still would like your hail pad. Report as much info as you can find out from friends and neighbors.

Do I report morning dew that has collected in my rain gauge?

Answer: No. Dew is not precipitation, but you may note the dew in the comments.
How long is my commitment to CoCoRaHS?

Answer: Ideally, at least one season, but the longer you contribute, the more valuable the data become.
Thanks for joining us today!

You can find out more about the CoCoRaHS Network by visiting our web site or speaking with your local coordinator.
Just 5 minutes a day!

It’s easy and fun!

We’re Cuckoo For CoCoRaHS!

www.cocorahs.org