

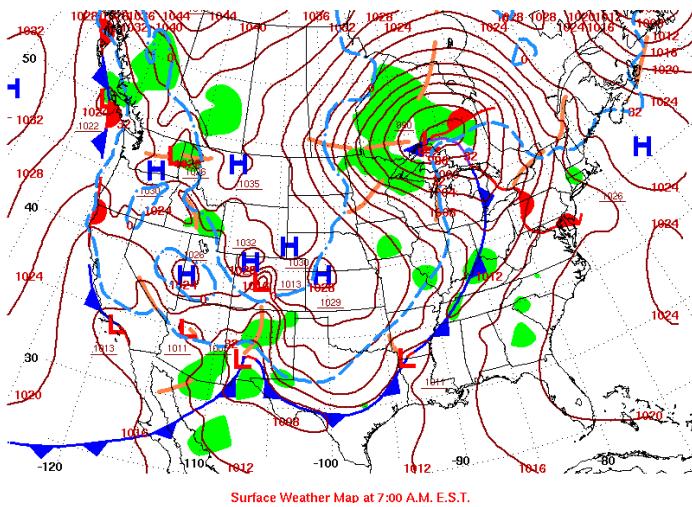
Colorado CoCoRaHS

Because Every Drop Counts!

January 2014
Volume 2, Issue 1

A CHILLY DECEMBER-RRRR

December 2013 will be remembered as one of the coldest in a long time for some parts of Colorado and the nation. A strong blast of air straight out of the Arctic moved into the lower 48 states during the first week of the month, which set the stage for a cold stretch of weather in the days that followed.



Surface Weather Map at 7:00 A.M. E.S.T.

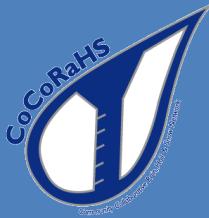
The 5 a.m. (MT) surface weather map for December 5, 2013. (Prepared by the National Centers for Environmental Prediction, Weather Prediction Center)

Cold air is heavy and dense compared to warm air; therefore, it likes to sink into valleys. When that happens, the air can literally stay trapped for days and even weeks until it either slowly erodes away or a wind pattern helps to scour it out. In addition to the original cold, several reinforcing surges of cold air came down throughout the month, which contributed to making 2013 end on a very chilly note.

One place where cold air got trapped was in the Grand Valley of western Colorado. The city of Grand Junction posted their second coldest December on record with an average temperature of just 15.8 degrees; that's 12.7 degrees below normal. Grand Junction recorded 10 nights with temperatures below zero, with the coldest being -11 degrees on the 5th and 10th. Snow early in the month that stayed on the ground played a role in keeping temperatures so chilly.

Another very cold spot during December was Alamosa, with an average temperature of 7.3 degrees. You might be saying to yourself, "isn't Alamosa always cold?" Yes, but they were still 10.6 degrees below normal for the month. In fact, temperatures fell below zero on every night during December except two. Alamosa sits in the San Luis Valley of south-central Colorado, where cold air is known to get trapped; but there was another factor at play which set the region up for a colder than normal December, even without the arctic blast. They picked up a heavy snow during the last part of November with a decent water content, which contributed to their below normal month. Deep, wet snow provides an additional cooling factor, especially on a clear night with light wind, which helped lower their overall air temperature for the month. It's the perfect recipe for bitter cold!

While much of Colorado was cold during December, Grand Junction and Alamosa stick out as two of the colder spots as compared to the normal temperature.



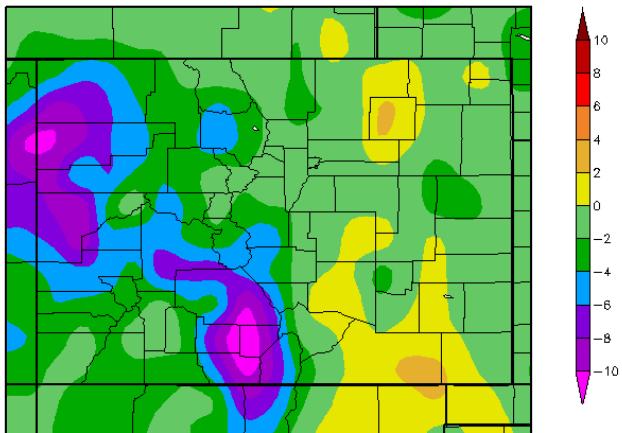
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Many cities set new record lows during the arctic blast that hit in the first week of the month. In the height of the cold some high mountain valleys of northern Colorado fell into the 30° below range. But despite the extended period of chilly temperatures, there were still a few locations east of Interstate 25 that ended the month with temperatures just slightly above normal, all thanks to the power of the wind! A wind with a westerly direction (W, NW or SW) is called a downslope wind, meaning it blows down the eastern side of the mountains and onto the plains. When this happens, the descent of the wind compresses the air, a process called compressional warming. The result is temperatures respond by going up; sometimes in a very big way! The scenario can bring quite a contrast with warm, dry and windy conditions east of the Continental Divide, with just the opposite west.

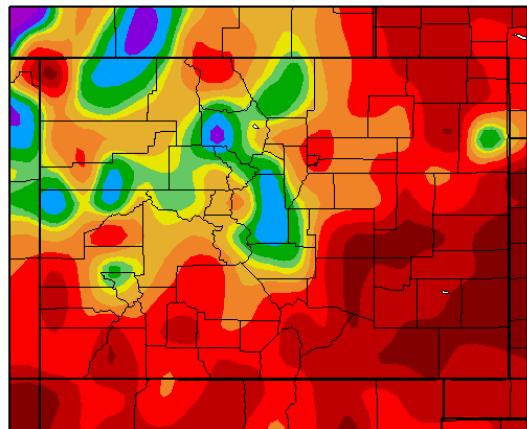
Departure from Normal Temperature (F)
12/1/2013 – 12/31/2013



Generated 1/11/2014 at HPRCC using provisional data.

Regional Climate Centers

Percent of Normal Precipitation (%)
12/1/2013 – 12/31/2013



Generated 1/11/2014 at HPRCC using provisional data.

Regional Climate Centers

DECEMBER PRECIP NOT VERY GENEROUS TO COLORADO

December is historically a pretty dry month east of the Continental Divide, but it can sometimes be very wet elsewhere. The month can bring dry, fluffy snows and even heavy, wet snow. There is not a simple formula to figure out the snow to water ratio. Temperature plays a big part in what the snow water content will be, as well as the source of the storm. As you can see from the map above, there were a few places in the state that exceeded normal values of moisture, but overall, it was pretty quiet. Northwest Colorado was the beneficiary of above normal precipitation, mainly during the last half of the month, all thanks to the jet stream, which set up in a favorable northwesterly pattern, and brought them a lot of heavy mountain snow.

Grand Junction was one of the places where it was wetter than normal during December. They picked up 0.96" for the month, which was 0.37" above normal. Much of the snow



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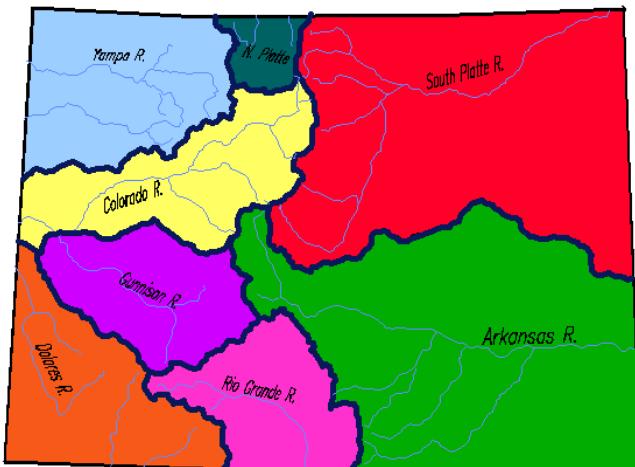
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that fell early in the month stuck around due to the temperatures being so cold. The city reported measurable snow on the ground of 4" or greater on 28 days during December.

MOUNTAIN SNOWPACK

It's the time of year where we'll start to pay close attention to the mountain snowpack, which is crucial to the water supply for not only Colorado, but many in the southwest United States. So far, 6 of the 8 basins are running right about where they should be, with northwest Colorado above normal. We could use more snow in Southwest Colorado, where the Rio Grande and Dolores River basins are running roughly 75 to 85 percent of average. It's always a good thing when the season gets off to a strong start, but a few of the most important snow accumulation months lie ahead.



Colorado is divided up into 8 major river basins.

DECEMBER FUN FACTS FROM AROUND COLORADO

*As of 12 pm, 1/16/2014

- 1,080 stations filed at least one daily report
- 782 stations reported at least half of the month
- 370 stations filed a report every day
- Wettest station: CO-RT-22 (Clark 0.7 NW) with 3.43" of precipitation and 38.5" of snow
- Driest station that reported all 31 days: there were multiple stations (mostly all in southeast Colorado) that reported 0.00" for the month
- 85 stations filed a multi-day accumulation report
- 892 stations reported measurable snow (greater than a Trace) during December with the most being 54.5" at station CO-RT-43 (Steamboat Springs 1.9 E).

December 2013 Top 10 Snow Totals Colorado CoCoRaHS Stations		
Station	Name	Snow
CO-RT-43	Steamboat Springs 1.9 E	54.5
CO-CF-5	Buena Vista 8.9 NNW	50.2
CO-GN-18	Crested Butte 6.2 N	47.5
CO-RT-25	Steamboat Springs 1 SE	43.1
CO-RT-50	Steamboat Springs 1.8 SSE	42.7
CO-RT-16	Steamboat Springs 1.1 E	41.8
CO-RT-28	Steamboat Springs 0.6 NNW	40.8
CO-RT-22	Clark 0.7 NW	38.5
CO-RT-52	Steamboat Springs 2.5 N	37.8
CO-SU-6	Silverthorne 2.1 WSW	37.3



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HAIL REPORTS DURING DECEMBER

There were no reports of hail by CoCoRaHS observers during the month in Colorado.

SIGNIFICANT WEATHER REPORTS

There were five significant weather reports during the month of December from CoCoRaHS observers. Four of them had to do with snow, and one was for high winds northwest of Golden.

- Wind is blowing extremely hard, heavy chairs blowing around, branches from trees snapped off. Damage to wooden fence. Snow is blowing hard enough to make it so that the road is not visible (CO-JF-411). The report was filed on December 9th at 5:49pm.

We love to see significant weather reports! They go to the National Weather Service in real time and are helpful to forecasters.

DROUGHT IN SOUTHEAST COLORADO

Southeast Colorado continues to suffer from horrible long-term drought. It's so dry that just about any strong wind that moves through the area creates horrible dust storms, also known as haboobs. In the past 4 to 6 weeks there have been several reports of dust storms that reduced visibility to zero and left everything in its path covered in a layer of dirt. Sometimes, the dirt even covers things inside of homes!

MORE ABOUT HABOOBS

http://www.noaa.gov/features/02_monitoring/haboobs.html



A Christmas Eve haboob, between Las Animas and La Junta. Pictures were taken by Diana Conyers and submitted to the Pueblo Chieftain newspaper. While it was crossing the highway, she says the visibility was zero and there were tumbleweeds everywhere!



COLORADO WEATHER HISTORY

Question: What place in Colorado is known as the coldest place during winter?

Answer: Taylor Park Dam, northeast of Gunnison, where the average January temperature is -8°F and the low falls to zero or lower about 90 days each winter season!



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OBSERVER SPOTLIGHT

This month we feature one of the newer observers in the Denver metro area. He is Mike O'Malley, CO-DN-196!



Why did you join CoCoRaHS?

I joined CoCoRaHS because I've always been fascinated with weather. I get to put a cool gauge in the back yard and see exactly how much precipitation I get at my house. Knowing that my measurements would be useful to meteorologists is exciting.

What have you learned from measuring precipitation?

Precipitation is extremely localized. DIA is just a few miles away and my measurements are often much different than theirs. In the recent September floods, I received much less rain than neighborhoods just a couple miles away, while getting more rain than DIA.

Has being a CoCoRaHS observer made you more aware of climate?

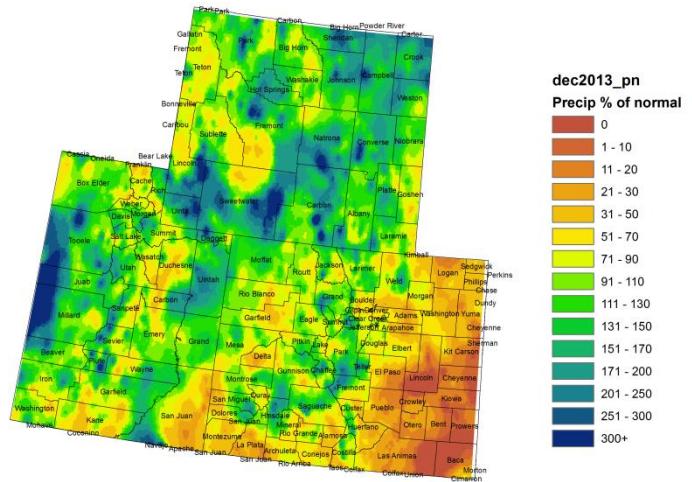
Yes. Looking at my measurements and seeing all the daily zeros is a good reminder that we live in a dry arid climate and that water is truly a precious resource.

REGIONAL DECEMBER PRECIP

This is a view we haven't shown you before in the CoCoRaHS newsletter. It's a product created by the Colorado Climate Center for the Upper Colorado River

Regional Drought Early Warning System.
The following map shows the December
2013 precipitation as a percentage of
normal. The difference between this map
and the state map earlier in the newsletter is
this one uses CoCoRaHS data in addition to
other sources

Colorado, Utah and Wyoming December 2013 Precipitation as a Percentage of Normal



Summaries are created weekly and can be viewed at the following website.

<http://climate.colostate.edu/~drought/>