Using Volunteer Science to Monitor Precipitation

NRCA Student: Hannah Krause[1]

Partners: Community Collaborative Rain, Hail, and Snow Network and Mr. Goodman, Science Teacher[1]

[1]Kingswood Oxford School, West Hartford, CT

Natural Resources Conservation Academy

Conservation Ambassador Program

INTRODUCTION

The monitoring and collection of precipitation data is vitally important for climate research, community planning and health, as well as weather prediction and basic education. In this study, daily precipitation rates have been monitored using a weather station to share data with the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS), a network of volunteer weather observers. In addition, this data will be compared with historical normals for the Hartford area. The National Weather Service draws on the measurements provided by CoCoRaHS volunteers as part of their weather analysis. The more that individuals record precipitation levels in their areas, the more data can be provided and used by the National Weather Service and other organizations to increase measurement accuracy. The goal of this study was to collect daily precipitation data, which includes rainfall, snowfall, and snow water content, to contribute to data in the central Connecticut area. By uploading the data daily to the CoCoRaHS website, the study is providing timely results. The collected data is also being compared to previously recorded precipitation levels in the CoCoRaHS database.

The Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS), a community volunteer organization established in 1998, has participants in 50 states. Connecticut was the 45th state to join in 2009. Volunteers of all parts of society (children, adults, educational groups, etc.) are encouraged to participate. The CoCoRaHS goals are: to provide accurate and timely precipitation data nationwide for a variety of end users, to increase the amount of true data available throughout all regions of the country, and to encourage an interest in the exploration and awareness of local and national weather. Many community professionals use CoCoRaHS data including the National Weather Service, the USDA, utility companies, engineers, and meteorologists. (https://www.cocorahs.org/)

RESULTS

Data collecting began on October 3, 2020 and was done on a daily basis. The total amount of precipitation recorded at this weather station through January 31, 2021, was 20.01 inches.

Project Component 1

- The Connecticut area had moderate drought conditions entering into the fall season this year.
- Overall, this climate decade has been wetter than the climate normal.

The figure on the left is of the rain gauge prior to collection. The middle photo shows the weather station collecting snow, and the image on the right illustrates how the snow was melted indoors. Once the snow was melted, the water measuring tube was used to measure the total amount of water.

MATERIALS AND METHODS

Project Component 1

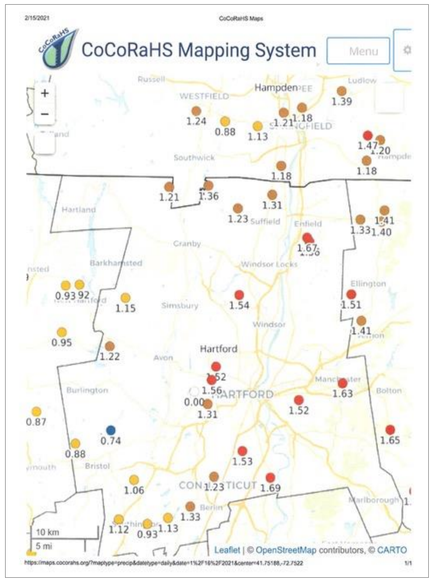
The different types of precipitation were measured using an All Weather Rain Gauge (all volunteer members of CoCoRaHS are required to use this specific gauge). This gauge is attached to a post and is a few feet off of the ground and away from any overhangs. It catches water in the measuring tube with a barrier around it to catch any precipitation if more than an inch falls. In the case of snow, the inner measuring tube was removed and snow was then collected inside the gauge. Once the snow was melted indoors, the level was measured and recorded.

For measurements, the precipitation levels were recorded daily at 7:30 am and submitted to the CoCoRaHS website, where it would be added to the previously collected data from this station. Data has been recorded daily beginning October 3, 2020.

To measure the amount of snow, a white board was placed on level ground and a measuring stick was used to record the inches/feet of snowfall.

The station is located at 41.75188 Latitude and -72.7522 Longitude, which is in the town of West Hartford, Connecticut.

The top picture is from the set-up process of the rain gauge and the figure beneath it shows an example of the collection of the data.



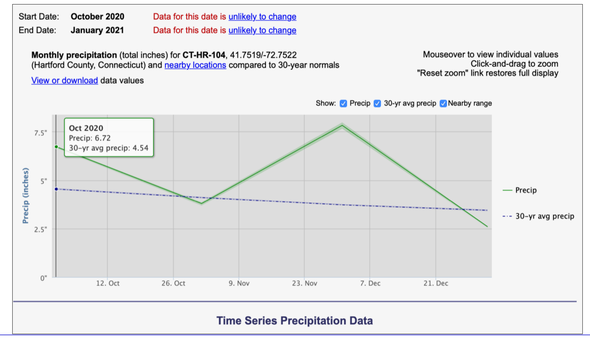
A map of recorded data from the CoCoRaHS database. The station number is CT-HR-104.

DISCUSSION

Project Component 2

Climate normals are a reference created from the average of 3 decades of weather data. 2021 marks the start of a new weather decade as climate normals are being updated this year. This means that a selection of the data from previous years will be replaced by the data from this past decade. CoCoRaHS data contributes to the norms.

Time (Monthly)	Precipitation Norm (1981-2010) (Inches)	Recorded Data (Inches)
October 2020	4.54	6.6
November 2020	4.1	3.81
December 2020	3.72	6.89
January 2021	3.44	2.71



The chart (top) illustrates the collected data and compares it to the precipitation norms.
The graph represents a comparison between the collected data (green) and the precipitation norms (blue).

CONCLUSION

Although Connecticut entered the fall season in a drought status, this year was actually wetter in comparison with the climate norms. The December data is an example of this: the climate norm was 3.72 inches and the recorded data was 6.89 inches. This data was collected through CoCoRaHS and illustrates the importance of using volunteers to contribute data to the creation of the climate norms.

REFERENCES

Goble, Peter, and Steve Hilberg. Community Collaborative Rain, Hail & Snow Network, 12 Jan. 2021, cocorahs.blogspot.com/.

Murdock, Zach. “Drought Conditions Continue to Worsen across Connecticut, despite Last Week's Heavy Rain, Officials Say.” Courant.com, Hartford Courant, 5 Oct. 2020, www.courant.com/breaking-news/hc-br-stage-3-drought-conditions-20201005-tsrgnpcdxzeylif25nsbu6kynq-story.html.

CoCoRaHS Climate Portal, cocorahs.nacse.org/result.php.

ACKNOWLEDGEMENTS

Thank you to CoCoRaHS for the resources to complete this project.

Thank you to Mr. Goodman for helping me put together my project, as well as helping me edit it.

Thank you to Dr. Cabaniss for the opportunity to develop my interest in this project.