



STORIES IN THE SNOW

DRI.EDU/STORIES-IN-THE-SNOW

Every snowflake has a “story”—that is, the shape of the crystal tells us something about atmospheric conditions when it was formed, and how the crystal formation took place. Thus, using a smartphone to collect images of freshly-fallen snow crystals across the region during a storm event can provide valuable scientific data to ground-truth ongoing research. It also provides a valuable educational opportunity for students to contribute to real research and learn more about the climate patterns in our region.

Temperature, humidity, the nuclei around which snow crystals form, and how a snowflake falls, all determine the shape of snowflakes, so observing these shapes gives us direct insight into the atmospheric conditions in which the snowflake formed. Citizen scientists can help solve the mysteries that remain as to why some shapes form!

PROJECT GOALS:

- Engage students in the Tahoe Basin in inquiry-based learning on the basics of climate science and snow science
- Employ an innovative approach to citizen science for STEM education
- Increase situational awareness and awareness of winter natural hazards
- Increase direct participation in science processes by involving students in helping to collect important scientific data

CITIZEN SCIENCE FOR REAL-TIME EDUCATION & RESEARCH

This program involves students across the region in real scientific research. In this project, students become citizen scientists as they collect important snow science data in real-time. To engage our young people in inquiry-based learning on pressing water issues, students will be leaders in collecting important snow science data in realtime. It will improve their understanding of the weather and climate phenomena that affect us every day.

To support classrooms in this effort, DRI's team of STEM experts will prepare special training materials to engage students and their teachers in science-based, hands-on, active learning related to the topic. Once data is collected, DRI's WeatherMod team will help to analyze and aggregate data related to tracking winter storms and identifying patterns in snowfall.



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HOW IT WORKS:

1. Educators and students are provided Snowflake Image Capture Kits, training, and educational materials.
2. When a storm is approaching, classrooms are informed so they can choose a time to snap pictures of snowflakes.
3. Classrooms upload their images into the database with their location stamp, the temperature, and wind direction.
4. We provide ongoing support for educators through direct contact and social media communities.



STAY IN TOUCH!

Sign up for the Stories in the Snow newsletter to receive updates about the project, information about how to support citizen science, and more.

<http://bit.ly/storiesnewsletter>



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WHAT IS CITIZEN SCIENCE?

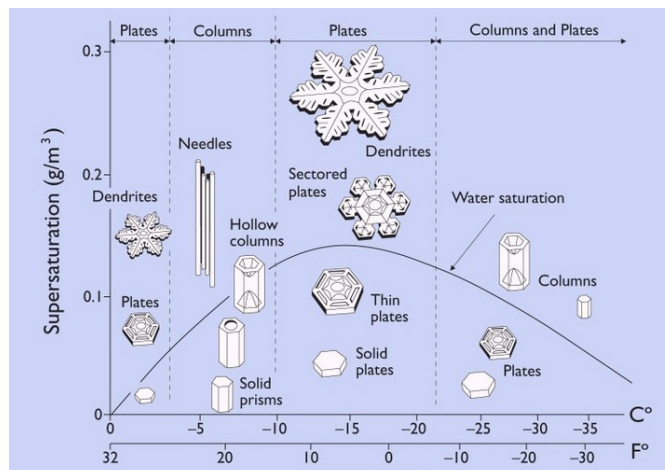
In essence, citizen science involves the public in scientific inquiry and research to answer real-world questions. There are a variety of ways to do this. The researchers leading this project have defined important questions to answer through the collection of ground-based snow crystal observations, and we will train educators and classrooms to be citizen scientists in this process. Through the experience, students will learn about important atmospheric science phenomena in our region.

THE SCIENCE UNDERLYING STORIES IN THE SNOW

Citizen scientists' real-time ground observations of fresh snow crystals will be collected and analyzed by researchers to match the image data with temperature, wind speed, wind direction, and visibility (customized for each location) as well as location, time, and date.

Researchers will use the student observations to ground-truth a variety of scientific research topics, including matching the snow crystals to the snow observations, using radar to observe snow crystals, comparing ground observations of crystals to radar data, validating weather models, associating crystal structures with avalanche frequency, and validating cloud seeding. The shape of the crystals can even indicate where the storm originated, such as over places like Hawaii or Asia.

Data will be publicly available on a freely accessible web portal, including data from other sources that will enhance STEM educational tools such as surface observations (wind, temperature, pressure, and precipitation), satellite data (cloud height, cloud temperature, and optical depth of clouds), and radar.



Credit: PBS.org

BENEFIT OF THIS PROJECT

For students, direct engagement in citizen science will open doors for STEM in the future, and we hope that this curiosity and engagement will also result in lifelong stewardship of the land and the important resources on which we depend.

Scientifically, this project establishes precedents for the uniqueness of its approach to data collection. "Crowd-sourcing" ground observations of snow crystals is not being done anywhere else in the world. Snow initiation is a weak area of atmospheric research, and this may provide insights to help fill these knowledge gaps in snow science.



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