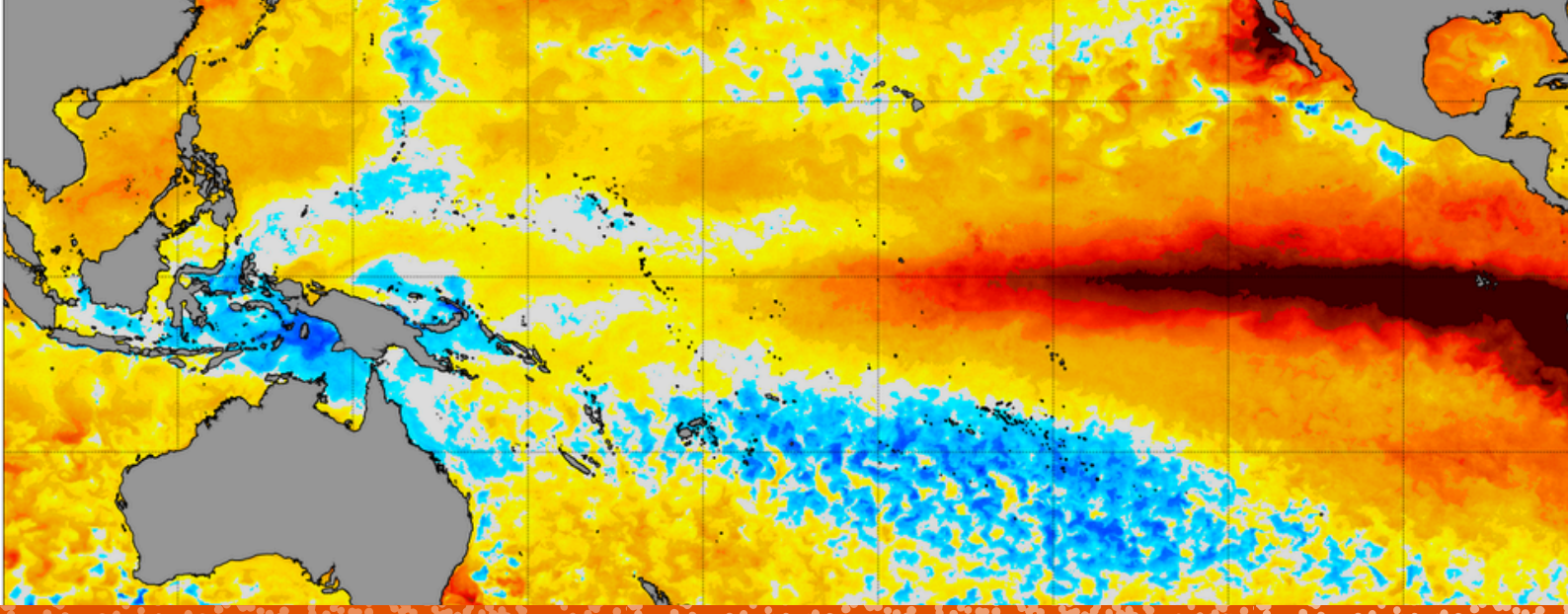


NOVEMBER 2026 | ISSUE 8

HELLO SUPER EL NINO, HOW ARE YOU FEELIN'?

COMMUNITY SNOW OBSERVATIONS NEWSLETTER

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AN EVENTFUL WINTER AHEAD, POTENTIALLY.

By: Katreen Wikstrom Jones

Since the first El Nino forecasts were coming out in the spring, I've been watching the monthly weather webinars, put on by the Alaska Center for Climate Assessment and Preparedness with anticipation. For ski conditions in coastal Alaska, El Nino usually means lots of snow up high, but you might have to hike for it. The last 'super' El Nino occurred in 2015-2016 and I remember clearly how the grass was green outside the office building in Anchorage in mid February. For the contiguous United States, El Nino winters typically bring warmer temperatures to the north and more precipitation to the southern and eastern parts of the country, but exactly where and when large snow storms will occur is difficult to predict. On October 15, NOAA issued their 2026-2027 winter outlook for the United States, and the previously forecasted strong El Nino seems to continue on its course to reach historic levels.



Great powder skiing reported across the country during the last 'super' El Nino (Source: OpenSnow)

Whether you should invest in that expensive resort season pass this year or plan a backcountry hut trip is a hard call to make. Historic trends of temperature and precipitation show to favor certain parts of the country during strong El Nino winters. At CSO we're lucky to have a weather expert onboard to tell us more--read about El Nino in this newsletter on p. 18!

In this newsletter we'll look at last year's low-snow season in retrospect; ambassador Matt Scragg writes about the hydrological impacts of a low snow year (p. 10) and ambassador Mike Styllas shares his observations from a 'weird' winter season on Mount Olympus in Greece (p.5). But we'll start this newsletter by highlighting some of the best days of last winter (p. 3)!

For team news, Dave and Zach are spinning up another winter season with equipment installs (p. 7), field measurements and improvements to the data streams and modeling through our grant from the U.S.Bureau of Reclamation (p. 15).

Gabe and myself had the pleasure to attend the International Snow and Avalanche Workshop (ISSW) in Whistler, Canada, where we presented on various snow remote sensing and avalanche modeling projects that we're leading in Alaska. Gabe is resigning from his position at the Alaska Division of Geological & Geophysical Surveys in November and will continue full-time at the University of Alaska Fairbanks, where he'll continue conducting research on the ever-changing cryosphere (snow being a hot topic!).

We hope you enjoy this newsletter! If you have any comments or questions reach out to us directly at : **communitysnowobs@gmail.com.**

Follow us on Instagram **@communitysnowobs** and on X **@communitysnowob**

BEST OF WINTER 2025-2026

Tyler Miller

(Above) The snow was far from hero status, but a stable pack let us explore steep lines on every aspect. This day took us up the NW Couloir of the Hobbit King, Alaska, where a bulletproof ice lens made for some entertaining climbing and a short rappel back down to skiable snow. From there, we opened up turns on the big apron pictured here, with Crown Jewel in the background and the Pika Glacier below.

(Right) Mornings on the Pika followed a familiar routine: wiggle out of a cozy sleeping bag into the −15°F air, cook breakfast, scarf it down before it froze to the plate, and "slide" our feet into frozen ski boots for another day in the mountains.





Sarah Sallade

(Above) Team Sallade skinned up Tverrfjellet on the last day of our trip to Tromsø Norway. Great weather, good snow and lots of laughs!



Matt Scragg

(Left) Mandatory yoga before the ski down near Summit Lake, AK.

Ethan Shaw

(Below) In a bad winter for the white stuff across nearly all of the American West, it was a strange climb past 7,000 feet in the western Wallowa Mountains in mid-February 2026 (on the heels of the great "Snow-Killer Ridge" of January): thumping upslope over plenty of bare grass and pinestraw, then cramponing among cliffbands only lightly—and sketchily—skimmed over by patchy snow. The snowpack up in the high timber below the summit knobs might've been well below average, but it was still a pleasure to reach its crusted drifts and finally feel I was getting into the teeth of winter (such as it was). Under the close supervision of ravens, I combined grabbing CSO measurements with surveying for the Adventure Scientists/Whitebark Pine Ecosystem Foundation's Tracking Whitebark Pine project: a fun community-science "twofer," despite the grim, snow-lean context.



A "WEIRD" SNOW SEASON IN GREECE

BY: MIKE STYLLAS, AMBASSADOR

In early June 2026, I clipped into my skis on Mount Olympus and moved towards one of the classic mid-season couloirs that descends from 2650 down to 1800m... Not bad for Greece, where the winter was delayed and overall poor. This couloir has several small vertical steps that even in March made us take off the skis and deviate from the rocky parts. At most extreme situations they required small rappels. Instead, me and my good friend and committed snowboarder George Sporos, found ourselves skiing through one of the deepest , "velvet like" early June snowpacks I have seen on Olympus in more than 25 years. Not much avalanche debris from the surrounding steep cliffs, vertical steps nowhere to be seen. And this happened in a period when Greece's mountain snow is undergoing profound changes. A recently published study led by Konstantis Alexopoulos; a fellow Greek snow hydrology researcher based in Cambridge's Scott Polar Institute, and member of the *Community Snow Observations* network, reconstructed snow cover across ten of Greece's highest mountain massifs between 1984 and 2025. The results show that the Greek mountain snow-covered area has declined dramatically over the past four decades, with losses particularly pronounced at the beginning and end of the snow season.

Unlike most of the mountains in Greece, spring 2026 on Mount Olympus presented a pronounced anomaly... Heaps of snow!

My trip to Olympus combined one of my annual late-spring ski tours with snow sampling on the Plateau of the Muses. Over the past years I have been particularly interested in Saharan dust.



Dust outbreaks are a familiar feature of Mediterranean mountain snowpacks, and this spring Greece experienced several intense events, with cities like the capital Athens literally turning orange. K. Alexopoulos and colleagues working in the Pindos Mountains observed conspicuous Saharan dust layers in the snow, followed by rapid disappearance of the remaining snow cover as the summer approached.

Was it dust, or the higher elevation and morphology of Mount Olympus with many high plateaus, or a combo of these factors?

Regarding the Saharan dust, I expected to find similar layers on Mount Olympus and sample them for the usual geochemical and isotopic analyses. Instead, a snow profile approaching 2.5 m depth revealed surprisingly little visible dust. Beneath a mid-to-late May surface layer containing some dust and lots of snow algae, much of the deeper snowpack was remarkably clean.

And that raised a clear question:

Could differences in Saharan dust deposition patterns alone help explain why late-season snow sometimes persists so differently between Mediterranean mountains?

An increasing number of studies in the Alps, Pyrenees, even Utah and Colorado have proven that aeolian dust dark particles deposited on snow reduce its reflectivity and can enhance absorption of solar radiation, causing faster melt and glacier retreat. But Mediterranean snowpacks are a bit more complicated.

Air temperature, snowfall, wind redistribution, slope exposure, shading, dust deposition and proximity to the sea all interact within days and several times within the season. A single unusually snowy spring on Olympus cannot isolate these effects.
And here is precisely why Community Snow Observations (CSO) become valuable.

Long-term satellite records reveal the larger trajectory: Greek mountain snow is becoming increasingly ephemeral as the Mediterranean region warms. Field observations add another scale of information. Snow profiles, dust layers, snow-depth measurements and even observations made during a ski tour can help us understand why individual mountains and individual years depart from the regional, long-term pattern.
For me, this is also what makes CSO observations so valuable. Mediterranean mountains remain poorly represented in conventional snow monitoring networks. Connecting observations made by scientists, mountaineers and backcountry travelers with satellite records and modelling can help fill that gap and we are working towards this direction.

Our early June smooth turns on Mount Olympus were therefore more than an unexpectedly good ski day. They were a solid sign that ongoing climate change does not remove variability. Against a background of rapidly declining snow cover, unusual seasons still occur, and understanding them may reveal processes that become increasingly important as Mediterranean snowpacks increasingly shrink in time and space with profound impacts on groundwater resources and coastal waters quality and productivity.
So perhaps the question is not quite something like: In Dust We Trust?
It is: ***how much does dust matter, and how can CSO from the mountains help us find out?***



Mike Styllas tracking Saharan dust in a snowpit on Mount Olympus, Greece.



Mount Bachelor weather station install

BY DAVE HILL

With funding from Oregon State University and on-site support and collaboration from Mt. Bachelor, CSO member Dave Hill recently re-installed an electronic snow pillow at the West Village base area at Mt. Bachelor. In addition to this pillow which measures snow water equivalent (SWE), sensors for snow depth (Hs) and air temperature (Tair) were added this year. These data will directly benefit the CSO project, currently funded by the U.S. Bureau of Reclamation, that looks at strategies for assimilating data into snowpack models.

Snow depth (Hs) is one of the easiest things to measure and, in fact, that is why it is the measurement that CSO has focused on for so long. Using an avalanche probe to measure Hs takes just seconds. Measuring Hs around the clock at a single location is helpful as well since you can then document all of the changes throughout the season due to precipitation, compaction, melt, and other processes. Ultrasonic snow depth sensors transmit acoustic waves from a sensor that is typically mounted on a tripod or some other elevated location. Knowing the speed of sound and the amount of time it takes for the signals to travel from sensor to snow surface and back to sensor allows for a quick estimate of the height of the snow surface!



Erica Gorey and Jackson Hawkins show off the finished installation of the Sommer USH-9 snow depth sensor and the SSG-2 electronic snow pillow. .

Since the speed of sound in air is a function of the temperature of the air, it is necessary to also be measuring temperature. So, most acoustic snow depth sensors have built-in temperature gauges as well. An added benefit for people who like to recreate in the snow is that data on air temperature will tell you things about the snow quality, avalanche hazard, and more.

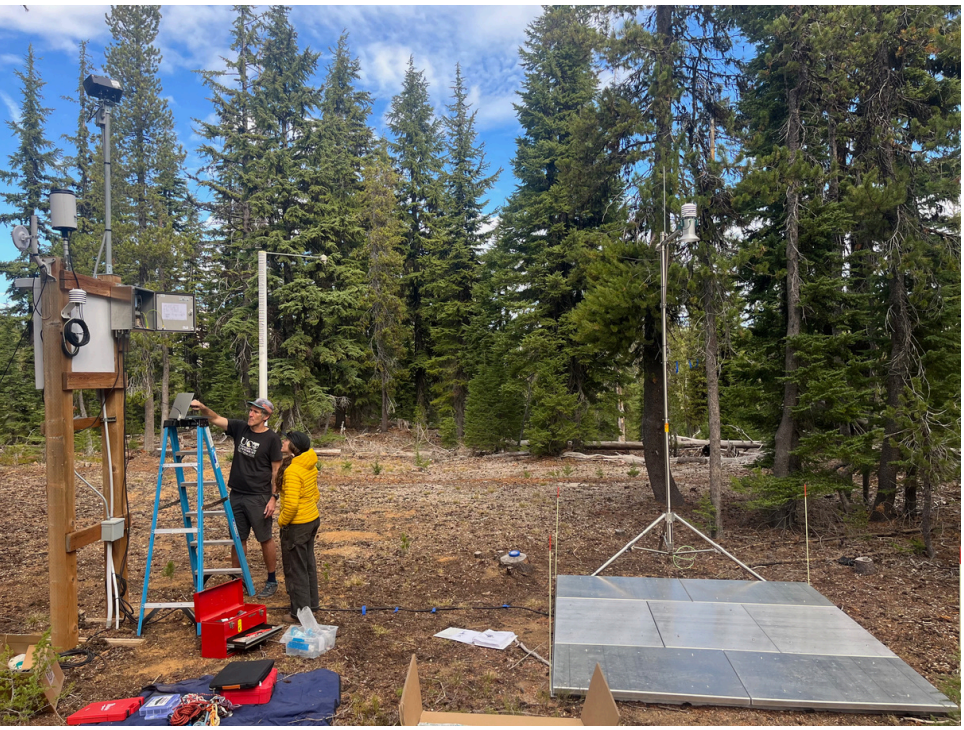
The snow water equivalent (SWE) tells you how much water exists in your snowpack and is related to the density of the snow. SWE is extremely important to water managers who need to think about allocating water use in summer months. SWE is also relevant to snow safety personnel since a wet, heavy snowfall event adds a lot of weight to a slope and can contribute to triggering avalanches. Many of the snow pillows in the USA are large, flat, fluid-filled bladders that register pressure increases as the snowpack builds above them over the season. The instrument installed at Mt. Bachelor instead uses electronic load cells to sense the weight pressing down on the device. One advantage of this system is the speed and ease of installation and recovery.



The Sommer SSG-2 electronic snow pillow is a collection of aluminum plates that overly a collection of load cells that constantly log weight. Bottom line...it's a very large, very expensive bathroom scale.

All of the data from these sensors will be used, along with measurements from CSO participants, to study how snowpack models can be improved. In addition, all of the data will be served up in real time through the Central Oregon Avalanche Center's website. The avalanche centers across the country are constantly improving the ways in which they collect and distribute environmental data to the recreational and professional winter communities.

It turned out that we installed this station right in time for snow – only a couple of weeks later Mt. Bachelor received its first dump of snow!



Our project is grateful to be able to tie into 120V power from Mt. Bachelor and data are uploaded four times a day via the cellular modem in our electronics box.



Ladders are always better (and safer!) with a friend. Erica Gorey and Dave Hill finalize installation of an ultrasonic depth sensor above the electronic snow pillow.



Changing hydrologic fluxes and implications for hydropower in Alaska.

BY: MATT SCRAGG, AMBASSADOR

As a hydrologist I often get asked ‘So what exactly do you do?’, and after many attempts at trying to answer this, I’ve defaulted to ‘I count water’. The follow up question is usually ‘for what?’.

(Cover image) ‘Counting water’ near Seward, Alaska.

I manage the Alaska Geological & Geophysical Surveys' Hydropower Program. As a state science agency, we are tasked with collecting and analyzing data related to geology, natural hazards, water, and energy. For me, that means quantifying the amount of water available for hydroelectric generation. I work with public, private, and university partners to promote the 'right' hydro projects, and I provide objective hydrological data to other state departments and the public.

I grew up in the Southwest, and for most of my life I drank water that traversed hundreds of miles through concrete-lined canals from the Colorado River and its tributaries. While construction of the Hoover Dam (1936) and Glen Canyon Dam (1964) were technically successful in terms of power generation, negative impacts to the Colorado River system resulted. Recent drought and record-low snowpacks continually strain the delicate system and jeopardize future electric generation potential. In my early career I witnessed monumental dam removals on the Elwha (2012) and Klamath (2024) Rivers, which were aimed at re-establishing Pacific Northwest salmon habitat. Keen to the mistakes of large 20th-century hydro projects in the Lower 48, I've taken a unique perspective into new hydro projects in Alaska. This approach can be summarized as "community-focused, fish-forward, and science-backed".



Blue Lake Hydropower near Sitka, Alaska.

Alaska is unlike any other state in terms of energy. On Southcentral Alaska's primary electric grid, the 'Railbelt', most generation comes from natural gas - about 80%. The second largest source is hydropower - at nearly 20%. In Southeast Alaska, timber and gold booms of the early 1900's led to rapid deployment of hydropower. Today, cities like Juneau and Sitka are electrified almost exclusively by water. Outside of the Railbelt and Southeast, most of Alaska's rural communities rely on stand-alone diesel microgrids. Alaska is the nation's sixth largest oil producing state. Despite this, rural Alaskan's pay some of the highest fuel prices in the nation. Residential electricity rates often exceed $1.00 per kilowatt-hour, versus a national average rate of about $0.18. People pay thousands each winter to heat their home with diesel and $10+ for a gallon of unleaded fuel is not unusual. The 'right' hydropower projects can offer a solution to the energy challenges faced by so many communities in Alaska.

It's no secret that global hydrologic flux patterns are shifting. Severe drought, more frequent and intense storms, and record-low snowpacks are all too common headlines in the western Lower 48. For Alaska, shifting hydrologic fluxes look a bit different. A recent study by UC Boulder and partnering agencies found that increasing temperature, precipitation, and soil moisture were all correlated with increasing flows throughout each of the nine Alaskan river basins included in the study (Blaskey et al., 2023).

From my own research and conversations with folks across the state, I've deduced that Alaska is generally experiencing warmer, wetter conditions. For hydropower, this means more water is available to produce electricity. With historic science backing forecasted near- and long-term water supply, we can make informed decisions about the viability of potential new projects which have the potential to offset costly diesel generation. Paired with knowledge of past mistakes, we can work with communities to develop new energy strategies. I've been fortunate to be involved with one such project located in the pristine waters of the world's largest wild sockeye salmon fishery, Bristol Bay.

Nushagak Electric, a not-for-profit utility cooperative, supplies power to the Bristol Bay hub city of Dillingham. After nearly a decade of environmental studies, Nushagak recently submitted a Draft License Application to the Federal Energy Regulatory Commission (FERC) for the Nuyakuk River Hydroelectric Project. The proposed run-of-river project would not include a dam or reservoir; instead, the project would divert no more than 30% of the river's natural flow around a 28-foot-high series of waterfalls, pass it through a turbine, and return it to the river downstream of the falls. As proposed, the project could supply most of the annual electricity to Dillingham and four surrounding native villages. Inception of the project was not

without pushback. Salmon fishing is the backbone of the region's identity and economy. Using decades of historic data, as well as recent sampling and sonar surveys of fish passage, Nushagak has, in my opinion, demonstrated that the Nuyakuk project is both economically and environmentally sound. Modern fish-friendly turbines and regulated diversions during the migratory season can prevent disruption to upstream adult salmon escapement and downstream smolt outmigration. The aforementioned UC Boulder study (Blaskey et al., 2023) found that monthly average flow in the Nuyakuk River has increased by as much as 18% per decade between 1960 and 2019, and models show that diverting some of that water to run turbines may actually improve salmon passage.



Nuyakuk Falls. Photo from Nushagak Electric (2026).

Compounding studies on hydrology, fisheries, and other cultural and environmental values gave Nushagak the confidence to pursue licensing for the Nuyakuk, stating “This Project represents the best opportunity to remove the world's largest remaining wild Sockeye salmon fishery from its dependence on fossil fuels and onto a baseload renewable that will provide regional power to an entire region genuinely in need if they are to persist for generations to come” (Nushagak, 2026). Changing hydrologic fluxes can bring a myriad of water management challenges, though they can also present new solutions. ‘Counting water’ is more than just a data point. For projects like the Nuyakuk, it becomes a way of understanding the balance between energy, ecosystems, and the communities that depend on both. As a hydrologist, my role is to understand how changing water regimes reshape that balance, and to help ensure that the water we count today continues to support the people and ecosystems that depend on it tomorrow.

References

Blaskey et al. (2023). Increasing Alaskan river discharge during the cold season is driven by recent warming. https://doi.org/10.1088/1748-9326/acb661

Nushagak Electric and Telephone Cooperative (2026). Draft License Application for Nuyakuk River Hydroelectric Project (P-14873). https://www.nuyakukhydro.com/documents-library/

NEWS UPDATE ON THE USBR PROJECT

BY ZACH BUTLER AND DAVE HILL

The United State Bureau of Reclamation (USBR) research project has just passed its one-year mark, and we have some exciting results to share. The main takeaway is that combining snow observations from community scientists, in-situ weather stations, and airborne lidar can significantly improve how well we predict snowpack, and in turn, how much water will be available downstream.

As a reminder, the goal of this project is to explore how snow information can be incorporated into snowpack models to improve their performance and accuracy. We're working with two kinds of data. The first is point data, meaning snow measurements taken at a single location. These come from Community Snow Observations (CSO) volunteers and automated Snow Telemetry (SNOTEL) stations. The second is gridded data, which provides a spatial map of snow across the landscape. For us, this comes from light detection and ranging (lidar), a laser-based instrument flown over mountain snowpacks on an airplane. Each type of data has its own tradeoffs, and the biggest one is cost. Lidar flights are expensive, while point data from CSO and SNOTEL are lower cost. Additionally, point data has high-temporal resolution but low spatial-resolution, while the gridded data has high spatial-resolution and low temporal-frequency.

So far, our results show that both approaches, point and gridded snow data, meaningfully improve our ability to represent snowpack.

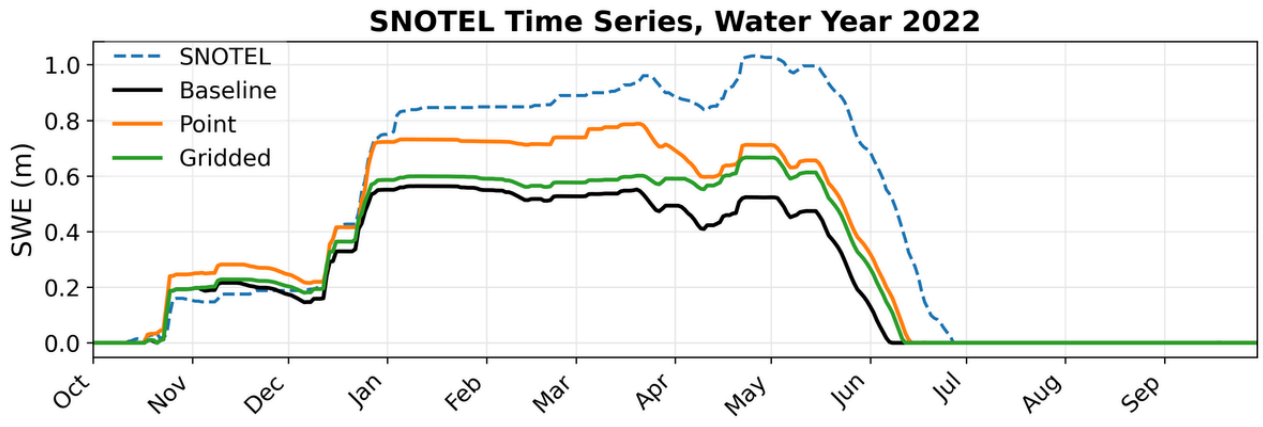


Figure 1. Comparison of modeled SWE from three computer model simulations for water year 2022.

In Figure 1 above, we compare snowpack data from a SNOTEL station with three computer model simulations. The 'baseline' (black line) shows how the model does with no help. The differences between this simulation and the data are largely due to the fact that mountain precipitation is very difficult to get right! The simulation with gridded lidar data (green line) included shows a positive improvement. The simulation with point CSO/SNOTEL data (orange line) included shows even more improvement, which is a great outcome! Depending on the water year and the geographic location, the relative performance of including gridded data or point data changes. The take home message is that both types of data are valuable in terms of improving what we know about where and when the snow is.

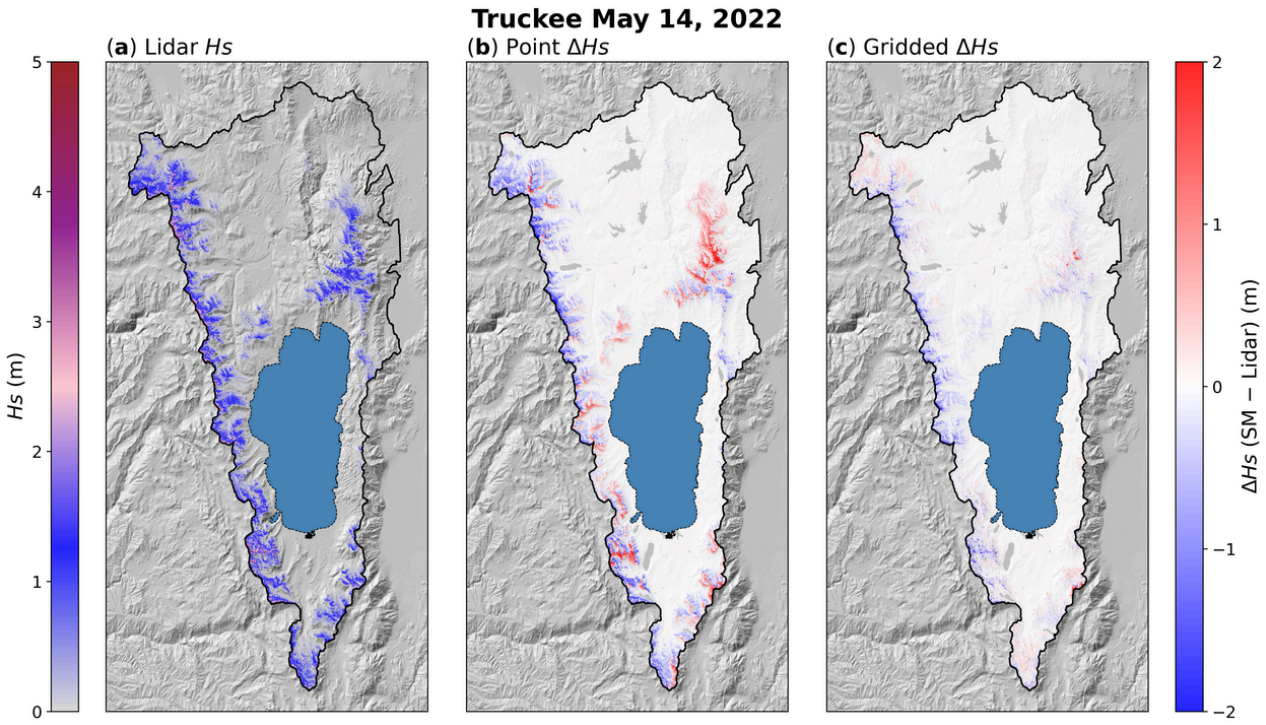


Figure 2. Comparison of modeled SWE using three different approaches over the Lake Tahoe domain on May 14, 2022.

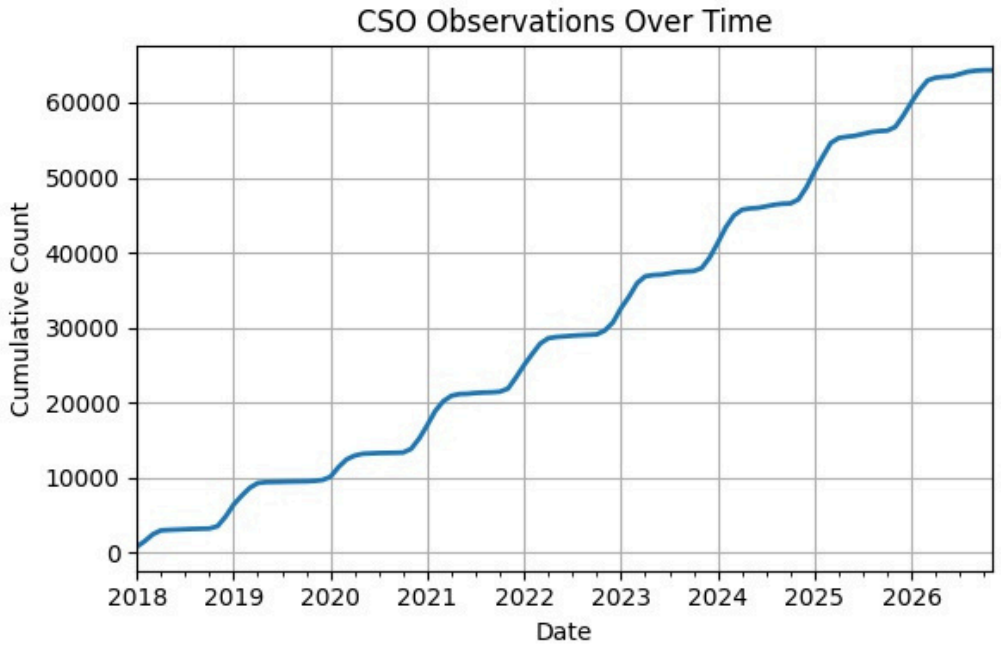
In Figure 2 above, we show an example of snow results over a whole domain, in this case, Lake Tahoe. The panel on the left shows the observed snow depth (Hs) on the day of a lidar flight. The other two panels show the difference (Δ) between observed and modeled snow depth for the cases where we include point data (b) and gridded data (c) in the simulations. Both simulations show good improvement over the case where we don't include data. Again, sometimes lidar data is better and sometimes the point data is better.

In short, your CSO measurements remain vital to this work and we encourage you to continue submitting observations. These measurements provide valuable, on-the-ground information that improves our ability to predict snowpack and water availability, at a fraction of the cost of other monitoring approaches. We're continuing to evaluate these methods this winter across our three study areas: Lake Tahoe (California/Nevada), the Upper Deschutes (Oregon), and the Blue River (Colorado).

SEASON STATS 2025-2026

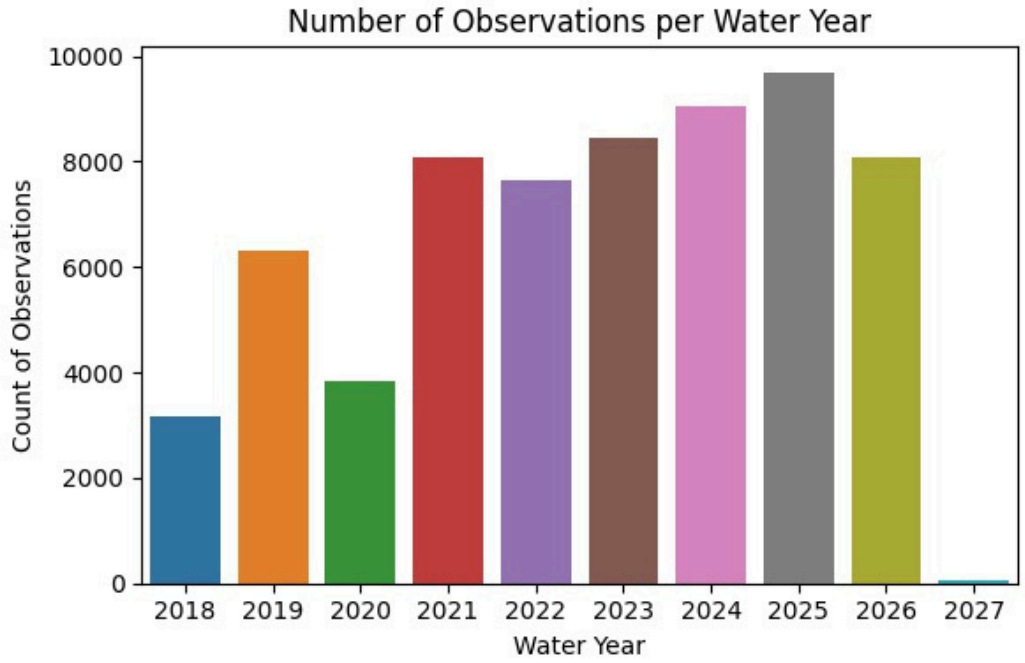
BY DAVE HILL

With a dry and warm 2025-2026 (thankfully) in the rear-view mirror and with several places across the US already registering the first snows of 2026-2027, it's worth a look back at how CSO participation fared this past year, and over the duration of the project. Unbelievably, it has been 8 years since CSO started off, with initial funding from NASA.



The 'stair-step' time-evolution of participation seen in the figure above makes sense when you realize that the majority of our observations come from the northern

hemisphere. Quiet periods over the summer and early autumn are followed by busy periods with participants out on their skis, boards, snowshoes, and snow machines. The program has been remarkably steady since its inception, with general growth from season to season. Another useful way to look at the data is when it is grouped by 'water year.' A water year runs from October 1 of one year, to September 30th of the next year. For example, the period October 1 2025 - September 30 2026 is a water year, and it is referred to simply as the 2026 Water Year or WY.



The bar plot in the second figure above shows CSO participation grouped by water year. WY 2020 is a clear outlier due to COVID keeping most people indoors and out of the backcountry. WY 2027 is only one month old, which explains why that bar is so small. And, despite the terrible snow season of WY 2026, there was only a 10% reduction in observations, which is actually a remarkably good result. It is worth noting that observations in a low year are just as valuable, or even more so, than observations in a normal year. Getting snow 'right' with computer models is a challenge in all cases and the 'end member' cases of very dry and very wet seasons are very important in helping us learn how to best help the models. So, cross your fingers for a remarkable 2026-2027 (WY 2027 if you were paying attention!) and enjoy your time outside in the snow.

2026-2027 LIDAR CAMPAIGN IN OREGON

BY DAVE HILL

As part of the CSO project funded by the United States Bureau of Reclamation (2025-2028), the CSO team has contracted with NV5 Geospatial (see Figure 1 for the interior of their aircraft) to conduct a total of four LiDAR surveys. The first, in September 2025, was a 'snow off' flight that provided a high accuracy baseline survey of the elevation of the ground surface. Additional flights (March 2026, February and April 2027) will capture the elevation of the snow surface. By differencing a snow-on and a snow-off a fvery high spatial resolution (1-2 meters) is obtained.

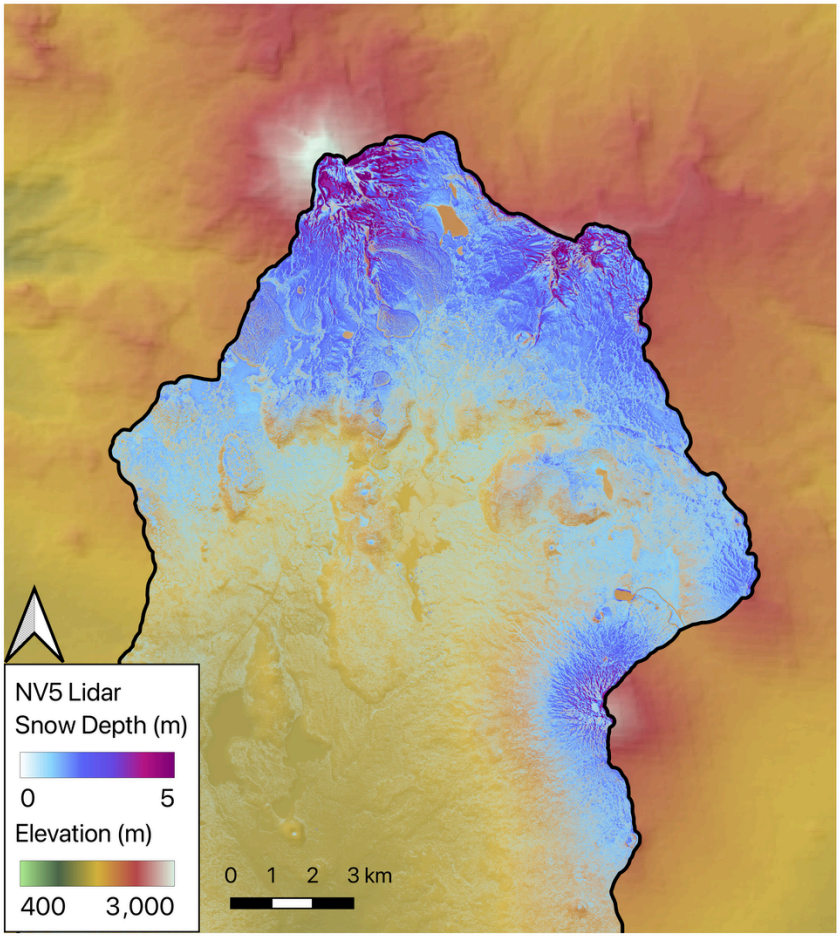
Given the poor Oregon snowpack in 2025-2026, it was touch and go in terms of whether or not a suitable snow-on flight was possible. Luckily, in the middle of the month, a clear weather window appeared and the flight was successful. In the picture below, you can see the Three Sisters (foreground), Mt. Washington, Three fingered Jack, Mt. Jefferson, Mt. Hood, and even Mt. Adams (in Washington!).



(Left) View inside the aircraft.
((Right) Three Sisters in the foreground, Mt. Washington, Three Fingered Jack, Mt. Jefferson, Mt. Hood, and even Mt. Adams (in Washington).

The data from the March 2026 flight are shown in the final figure below. The green-to-brown colormap shows the elevation of the ground surface for all cells that had no snow cover. The black line is the boundary of the LiDAR flight, which corresponds to the Upper Deschutes watershed. Finally, the white-to-purple colormap shows the depth of snow observed on grid cells that were covered that day.

These data are then used by our computer models to 'correct' the model and help steer it back to what is called the 'ground truth.' LiDAR data are helpful since they are so extensive and high-resolution, but they are very expensive. Our current studies are showing that CSO data can often be just as helpful to snowpack modeling as LiDAR data are, which is a great success for community science! See you out on the snow in 2027.



Lidar-derived snow depth from the March 2026 acquisition over the Upper Deschutes watershed. The black outline depicts the boundary of the survey area.

SNOW & AVALANCHE WORKSHOPS

At the time of writing, members from the CSO team have already attended several snow and avalanche workshops (or "SAWs" as they're called) this fall, including Colorado Snow and Avalanche Workshop (CSAW), California SAW and Bend SAW, and there are more to go! At these events we have the opportunity to either present about our on-going research and/or table a booth to promote the project. Conversations at the booth often result in fruitful new collaborations and engaged new participants, excited about contributing snow data. It is ALWAYS worth our time to be there and it is always a good time to learn new things and get stoked for the up-coming winter. The SAW season lasts for a couple of months in the fall, starting at the end of September going into mid November. The format, duration, and size of these SAW events all vary, but if you live close to one of them, please be sure to consider attending. Fees are usually very modest and the funds typically help to support local and regional avalanche centers.
A complete listing of these events, with links to their individual web pages can be found at: https://www.americanavalancheassociation.org/events.

Catch us next year at one of these events! Stop by for a conversation, and if you're lucky you'll walk away with some swag--if you promise to measure snow! *Blink blink.*



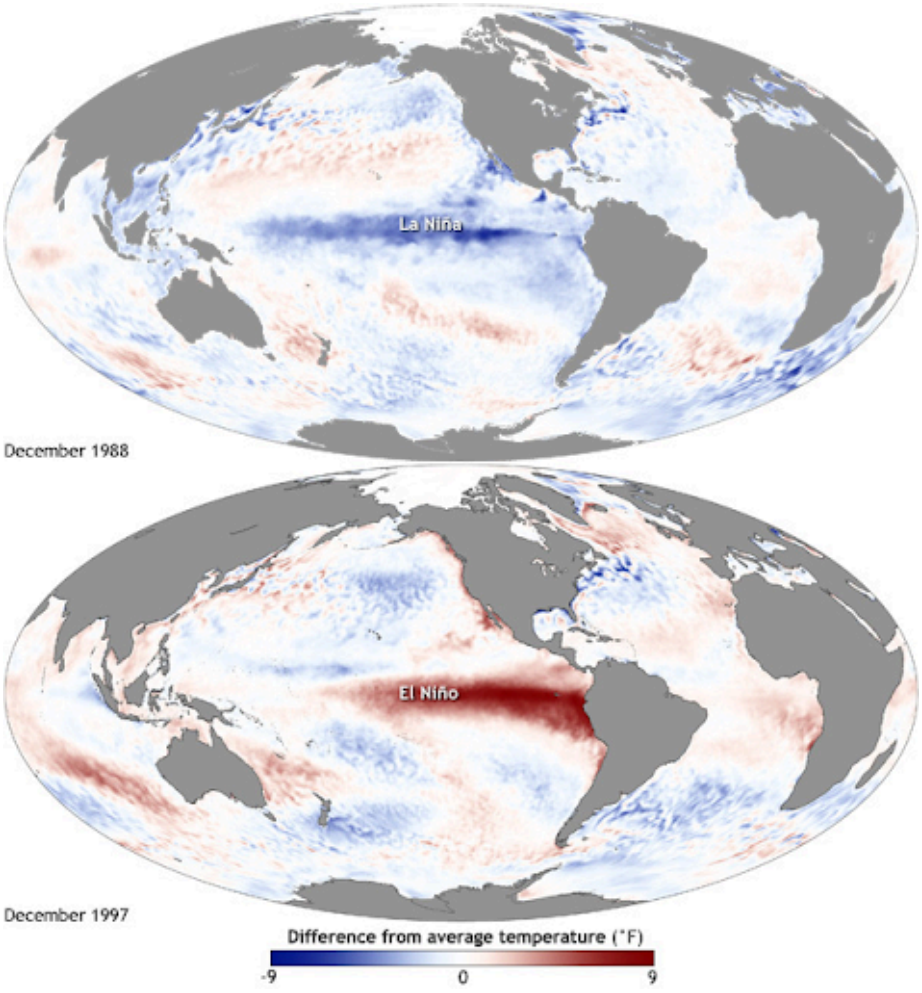
The CSO table getting cleaned out at the Colorado Snow and Avalanche Workshop in October, 2026. Photo: Gabe Wolken

El Niño

And what that could mean this winter...

BY ZACH BUTLER

Many of us in the western United States want to forget about last winter's below-average snow season, but it is time to start thinking about this winter!
As most of you have probably heard, we are heading into an El Niño winter. This is not just your average El Niño winter though, we are forecasted to head into a "Super El Niño". As a meteorologist, I thought the term "Super El Niño" was just a media term to get us excited and scared for a very strong and potentially dangerous El Niño. But after some quick research, I found there is actual science toward the term "Super El Niño"!



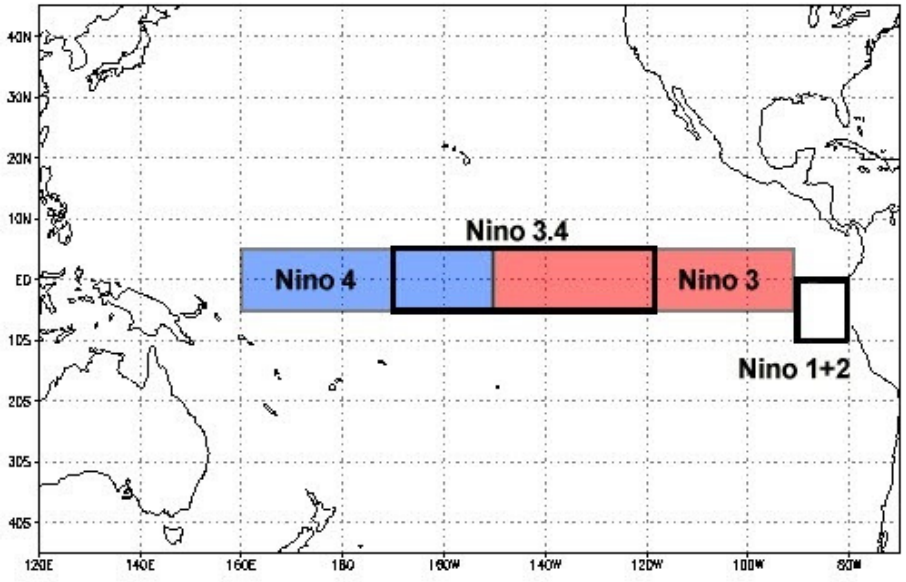
Maps of sea surface temperature anomaly in the Pacific Ocean during a strong La Niña (top, December 1988) and El Niño (bottom, December 1997). Maps by NOAA Climate.gov, based on data provided by NOAA View.

A Super El Niño is when sea surface temperatures (SSTs) are greater than 2°C above average in the Niño 3.4 region, which indicates very warm ocean temperatures.

Brief Overview of El Niño

A review of El Niño reminds us that it is part of the larger El Niño–Southern Oscillation (ENSO) ocean oscillations where La Niña is the opposite phase. El Niño brings warmer than average Pacific Ocean equatorial temperatures and La Niña brings cooler than average Pacific Ocean equatorial temperatures.

As mentioned earlier, El Niño is primarily determined and defined by the Niño 3.4 region. This region is most representative of ocean temperatures across the equatorial Pacific, and this area is most often used for ENSO conditions.



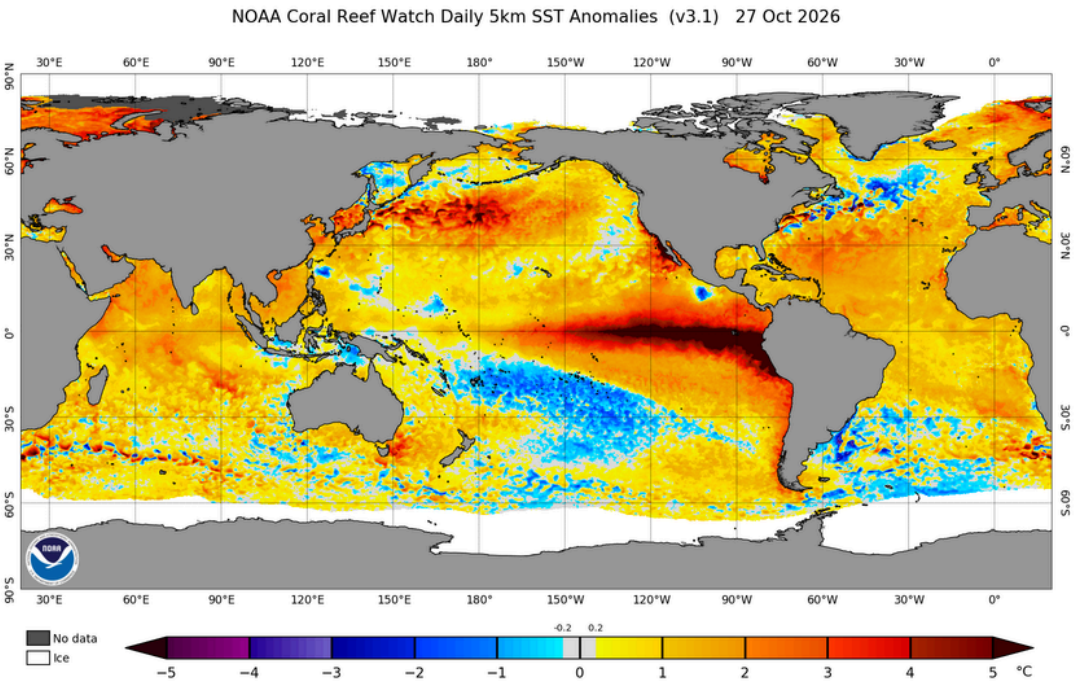
The Niño SST monitoring regions in the tropical Pacific (Niño 1+2, 3, 3.4, and 4). Niño 3.4, outlined here, is the standard region used to define and track ENSO conditions.

El Niño has been shown to affect atmospheric conditions around the globe but has the most effects across North and South America. El Niño can bring increasing chances of 'extreme' weather with areas of above average temperatures as well as increasing the chances of floods and droughts in certain areas.

El Niño Forecast

As of late October 2026, SST anomalies in the Niño 3.4 region exceed +3°C, and forecasts project further warming to +3.5°C by December.

El Niño conditions are forecast to continue strengthening over the next few months and typically peak by December or January. For reference, the strongest El Niño on record occurred in 2015-2016, with a peak 3-month Niño 3.4 anomaly of +2.6°C. This winter's Super El Niño is forecast to break that record by a large margin.



SST Departures (°C) in the Tropical Pacific reported on October 27, 2026.

What this could mean for this winter

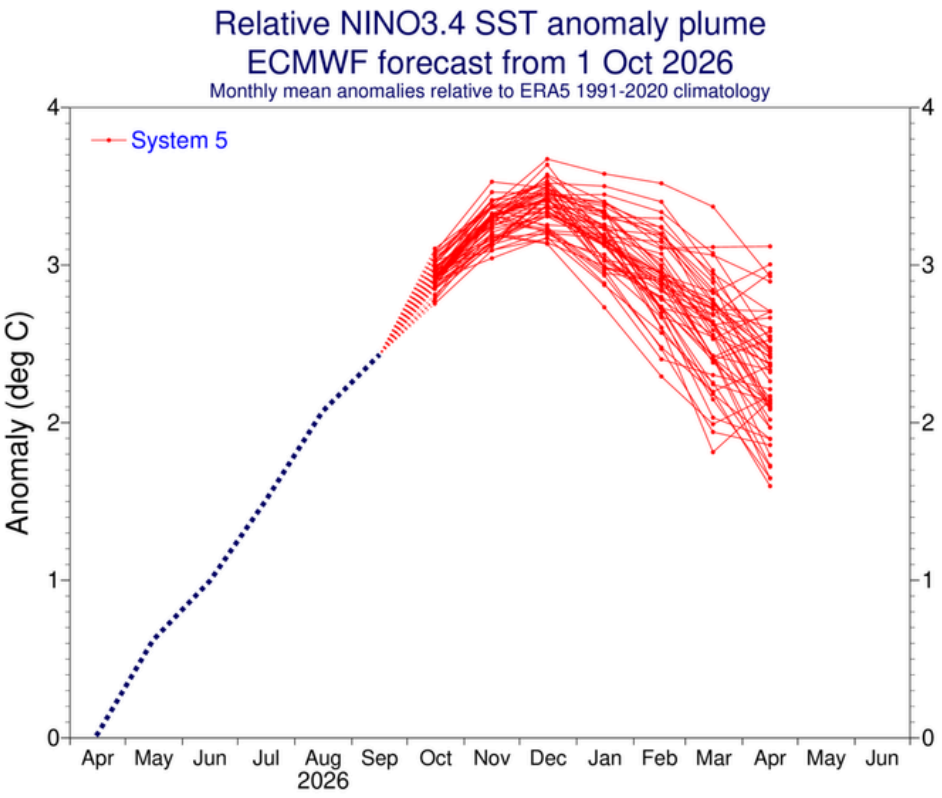
Effects from El Niño are already being felt. Parts of Central America are seeing drought and warm conditions, while the Atlantic hurricane season has been very quiet, a benefit of El Niño conditions. Additionally, the monsoon in the Southwest US has been active this summer into the fall, partly due to El Niño is less direct.

For the upcoming winter in North America, El Niño most often brings above-average precipitation to California and the Southwest, with above-average temperatures across the northern US.

El Niño often causes a strong jet stream to develop across the subtropics and this can bring heavy precipitation to California and the Southwest US. These types of storms often have atmospheric rivers (ARs) associated with them, bringing heavy precipitation for long periods of time.

A key question with these ARs is where they make landfall in California. In 2015-2016, the previous strongest El Niño on record, the ARs largely missed Southern California. This led to a relatively 'average' season across the region.

However, this was just one year, and when considering other historical El Niño years, there is still a strong signal for above-average precipitation and above-average snowfall. Past Super El Niño events, such as 1982-1983 and 1997-1998, brought heavy precipitation and heavy snowfall across many areas in the western US.



ECMWF (Euro model) forecast of monthly Niño 3.4 SST anomalies (relative to 1991–2020 climatology), issued August 1, 2026. Each red line is one ensemble member; the plume points to a peak anomaly of roughly 3.0–3.7°C in November–December.

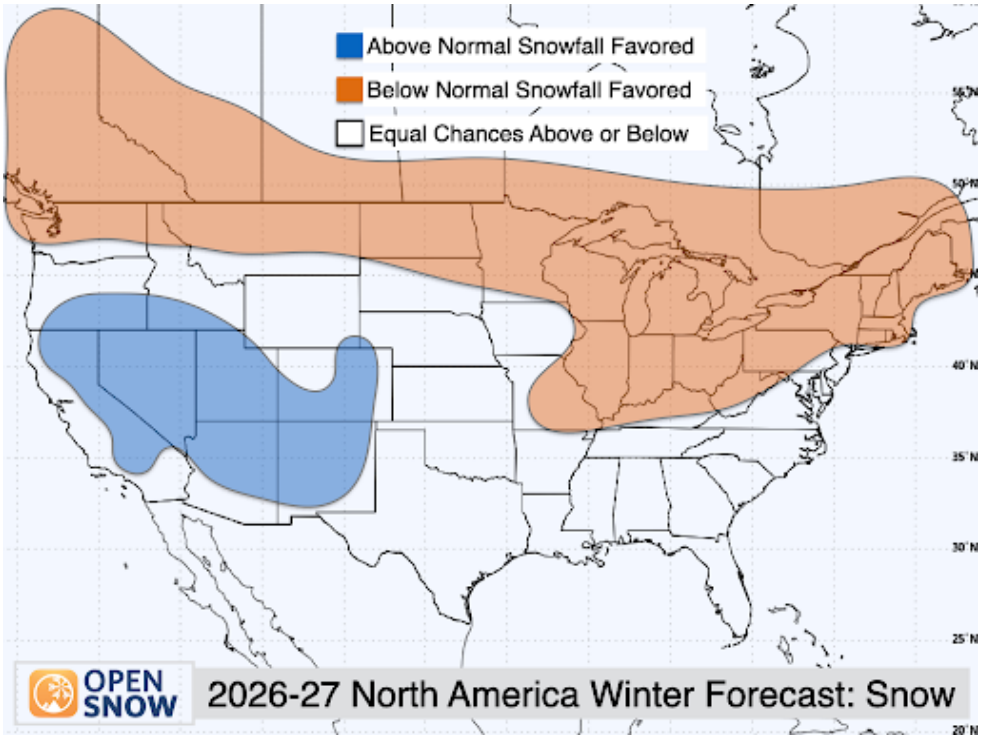
Other strong El Niño conditions, even if they are below the Super El Niño 2°C threshold, have most frequently brought heavy precipitation and heavy snowfall to California, the Southwest, and other western US states. This can include southern Idaho/Oregon, Utah, and Colorado, but these areas can see more variable weather with El Niño.

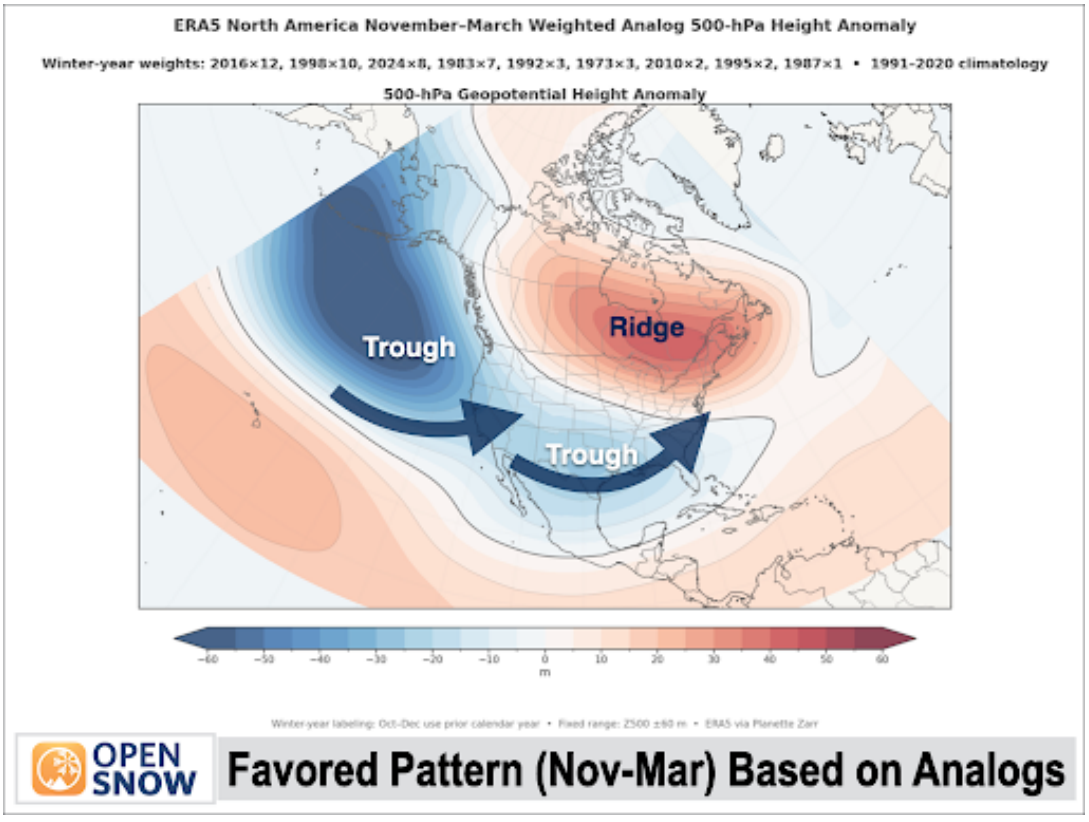
A big question and a variable part of El Niño forecasts is what this means for snowfall. Across past El Niño winters, above-average temperatures are the clearest signal, while precipitation is more variable. Above-average temperatures mean higher snow levels and less snow for lower elevations, even if there is above-average precipitation.

El Niño in the Pacific Northwest (PNW) and western Canada is more likely to bring warmer than average temperatures and drier-than-average conditions. This is more likely for northern portions of the PNW and into British Columbia. Oregon into Idaho can be more variable, depending on where the ARs impact California.

In the Eastern US, El Niño winters bring a lot of variability. Strong Nor'easters are more likely during El Niño, but these storms can also bring warmer air and limit snowfall. Therefore, it can be boom or bust in the East with El Niño.

A colleague of mine at OpenSnow, Alan Smith, did a lot of research with analog El Niño's and model data to compare what the forecast for this El Niño is most likely to mean for winter weather. I encourage you to check out his full 2026-2027 winter forecast preview and the graphics below.
-> 2026-2027 winter forecast preview





UPDATES FROM PROPAGATION LABS

BY GARRETT HARMSEN

At Propagation Labs, we're inspired by the power of community snow observations through the CSO project. The thousands of submissions each year are building a unique public dataset that's advancing both snow hydrology and avalanche safety research. While CSO is our longest running research partner, we want to make it clear that we are open to many types of scientific collaborations. To this end, we've made it even easier for scientists to access the Propagation Labs database. Our improved API now provides direct access to more than 15,000 public snow profiles, stability tests, and observations. If you're working on a research project and would like access, please reach out.
We're also encouraging more cracking and collapsing observations. These quick, geotagged records are critical for understanding exactly where the snowpack is unstable. The Utah Avalanche Center is already using this information in their snowpack stability modeling project, and contributions from observers in Utah are especially valuable.

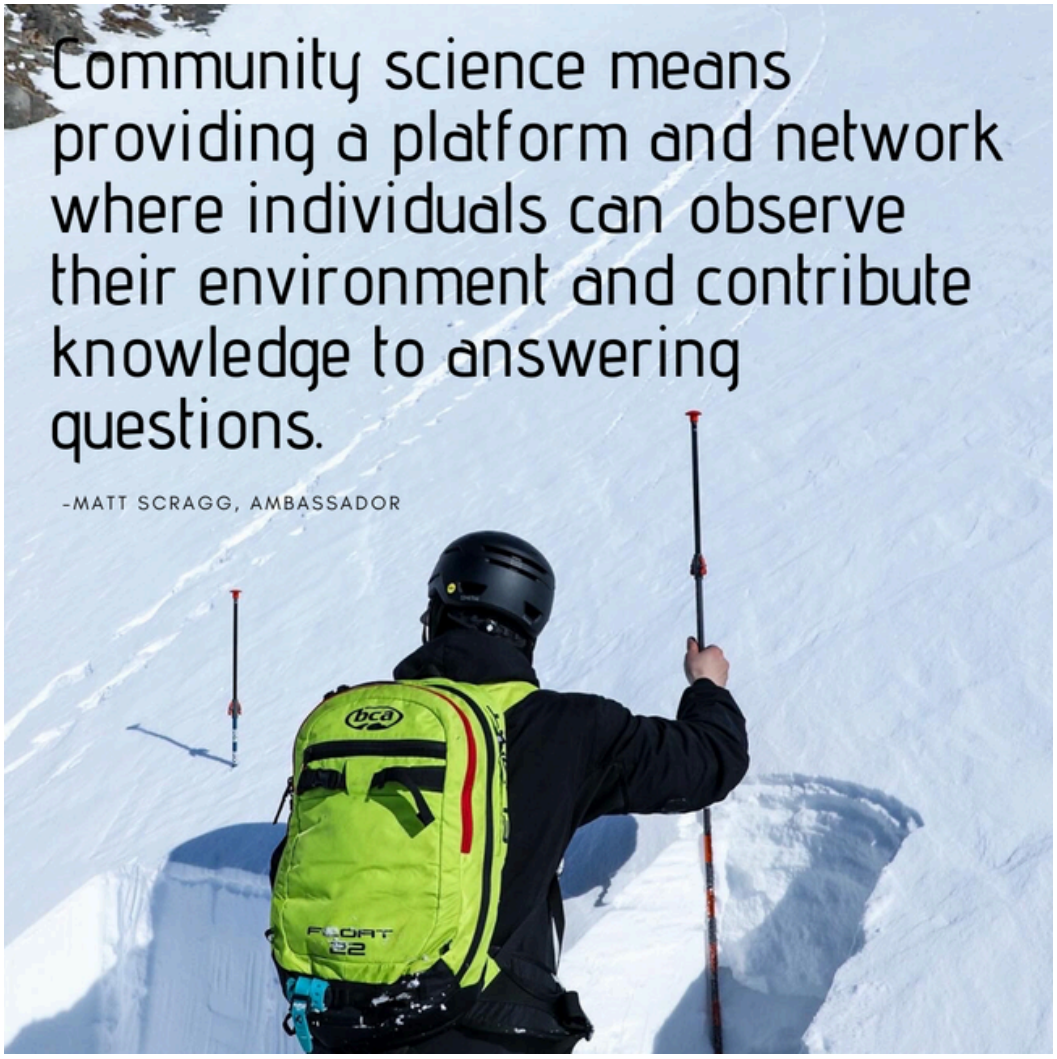
Outside of research projects, we've been focused on app improvements to make observation recording smoother and analysis more powerful, including:

- New Image to Pit functionality - take a photo of your notebook and the app with draw your profile!
- Improved API for research use
- Improved Voice to Pit functionality - Describe a profile in your voice and the app will draw your profile
- Improved snow visualization tools - see spatial and temporal trends in test results, snowpack characteristics, and stability indices
- Many other smaller improvements!

We're grateful to continue supporting the CSO community and look forward to deeper winter and many more observations!



Photos: Joe and Garrett skiing their backyard.



THAT'S A WRAP... AND NOW WINTER IS ABOUT TO BEGIN!

Dave installed the new snow pillow at Mt Bachelor right in time for the first snowfall of the year. Silverton, CO, and Mt. Bachelor, OR (among others) have already seen their first snow dumps. Hallelujah - the El Nino season has begun! At CSO we're welcoming this winter season with anticipation – not only for [hopefully] more snow than last year, allowing low-elevation ski resorts to remain open all season, but also with anticipation for a [hopefully] increase in CSO participation! Send us your obs – always – regardless of a big or low snow year. The data matters. We also hope you all will stay safe out there this winter, and not break a back shoveling.

Enjoy and happy winter season!

//Katreen, Dave, Zach & Gabe