

# Mountain Rain or Snow: Citizen science

Understanding winter weather  
with Lynker Tech, DRI, and UNR



# Have you ever noticed snow falling when the air temperature is above freezing?

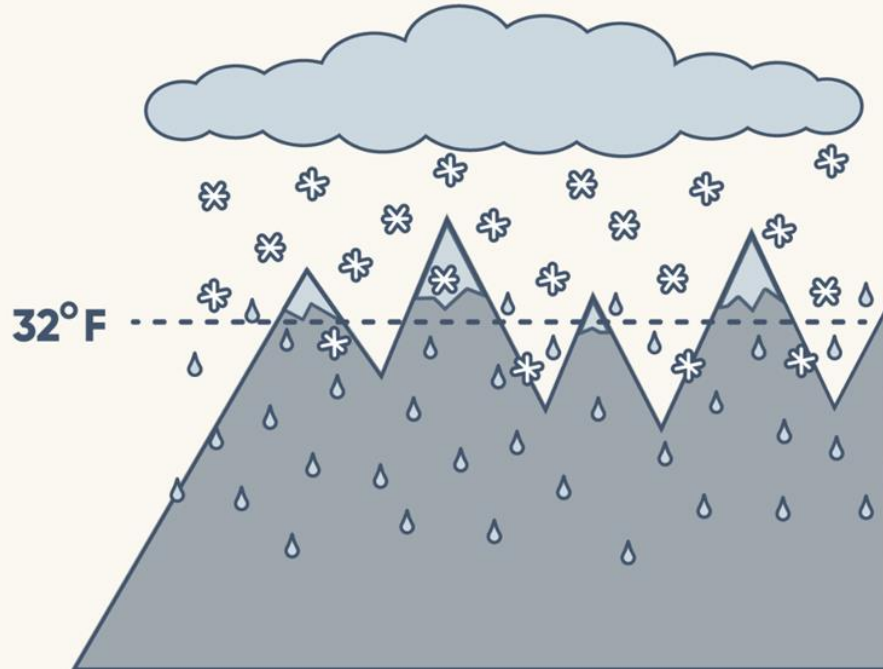
It's not just interesting - it poses a real challenge for hydrologists and water managers to estimate how much precipitation falls as snow in winter, and makes life difficult for weather forecasters!



Photo: Keith Jennings

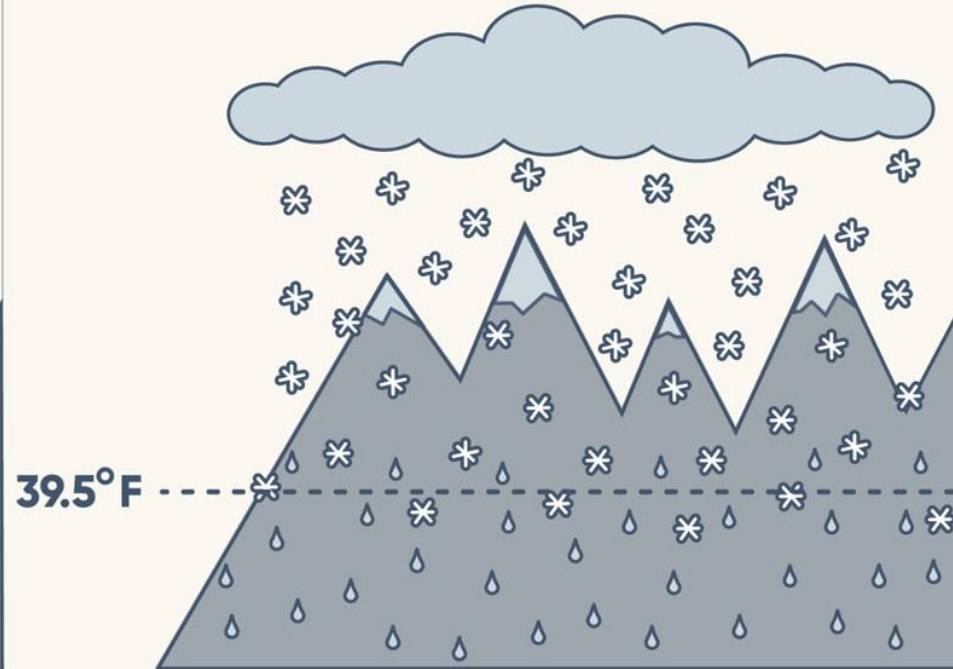
## High humidity

(such as the west side of the Cascade Range)



## Low humidity

(such as the rainshadow of the Sierra Nevada)



Graphic: Lindsey Funseth/DRI



The rain-snow air temperature threshold is primarily a function of humidity and elevation.

# How can we improve estimates of winter precipitation phase?

## By keeping our eyes on the sky.

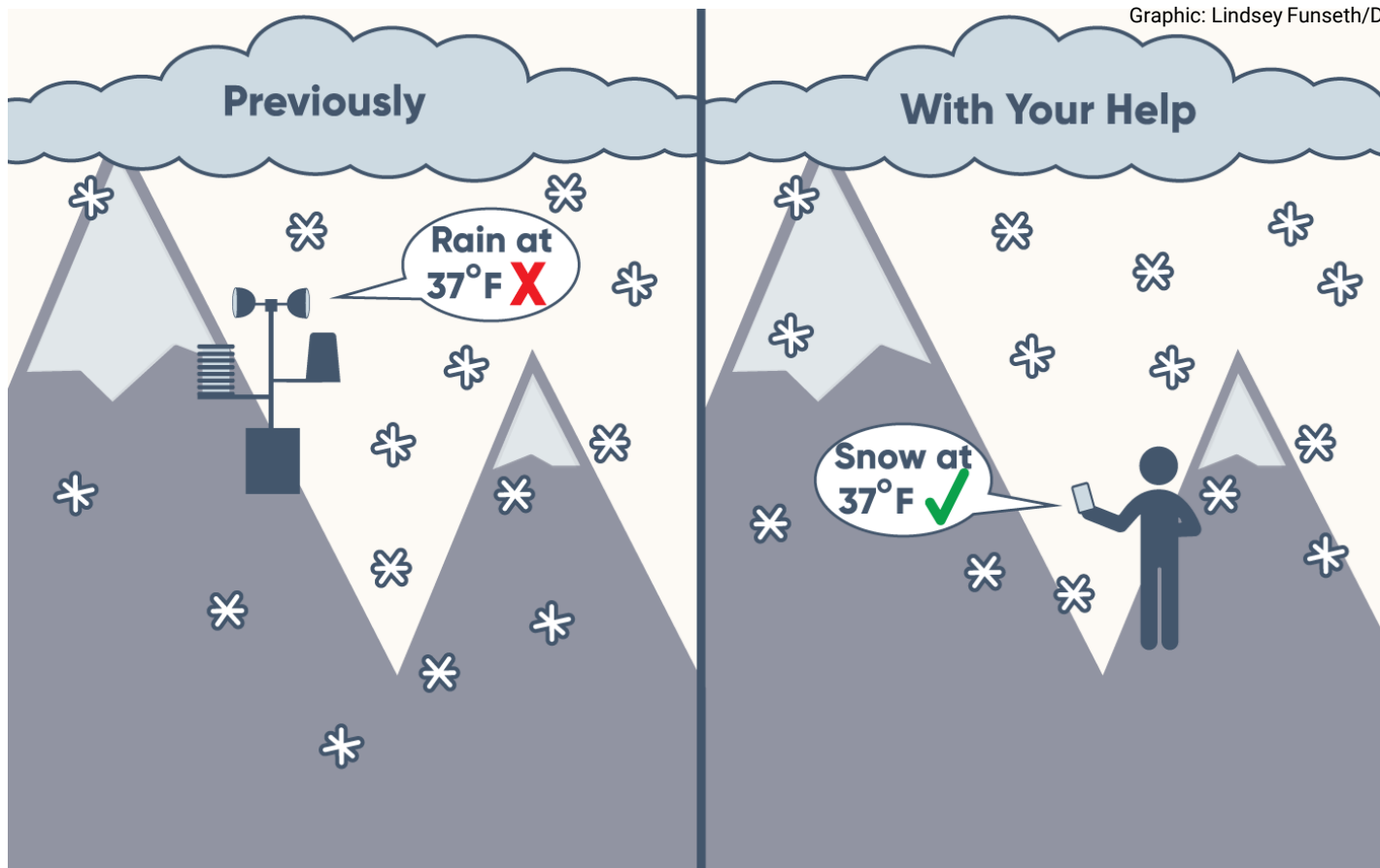


Wait... what is precipitation phase? Precip can fall as a liquid (rain, mixed) or as a solid (snow).



Photo: Gareth Blakemore

This brings us to the goal of Mountain Rain or Snow: ground-based observations of precipitation phase.



Together, we can help reduce inaccuracies in estimating precipitation. We will determine the rain-snow air temperature threshold which is used by hydrologic models.



# What is the goal of Mountain Rain or Snow?

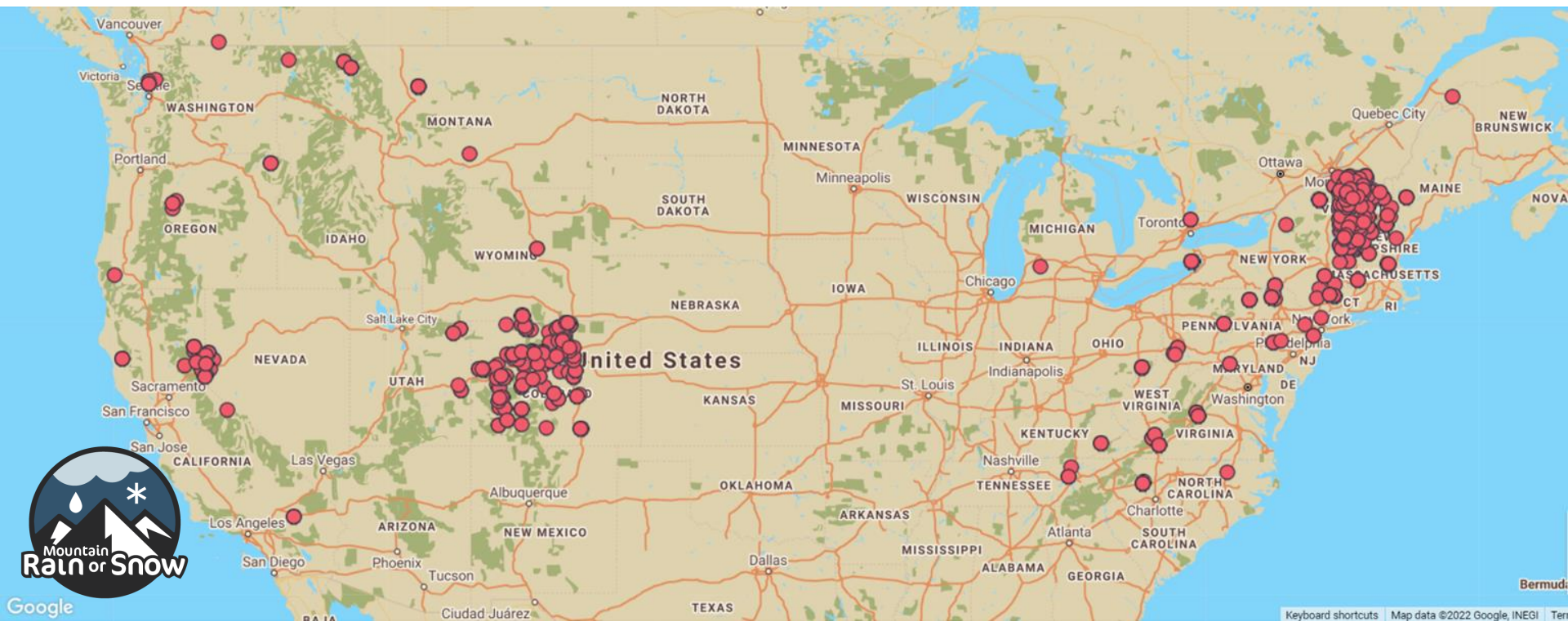
Improve the prediction of snow accumulation and rainfall with real-time observations of winter weather.

Scientists use temperature thresholds to determine where and when a storm will transition from rain to snow, but if that threshold is off, it can affect our predictions of flooding, snow accumulation, and avalanche hazard.

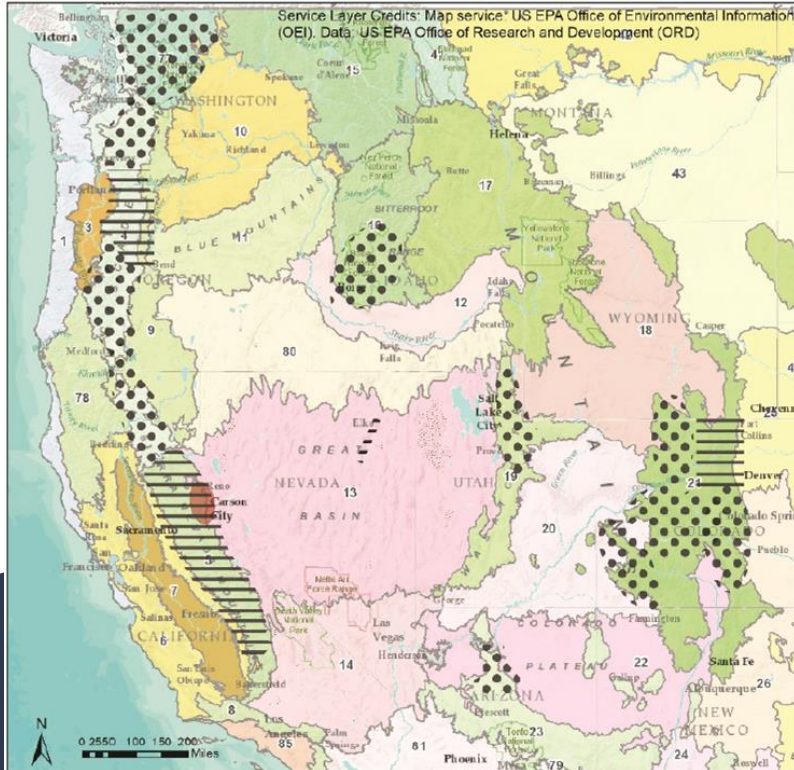




# Participants join us from all over the continent.



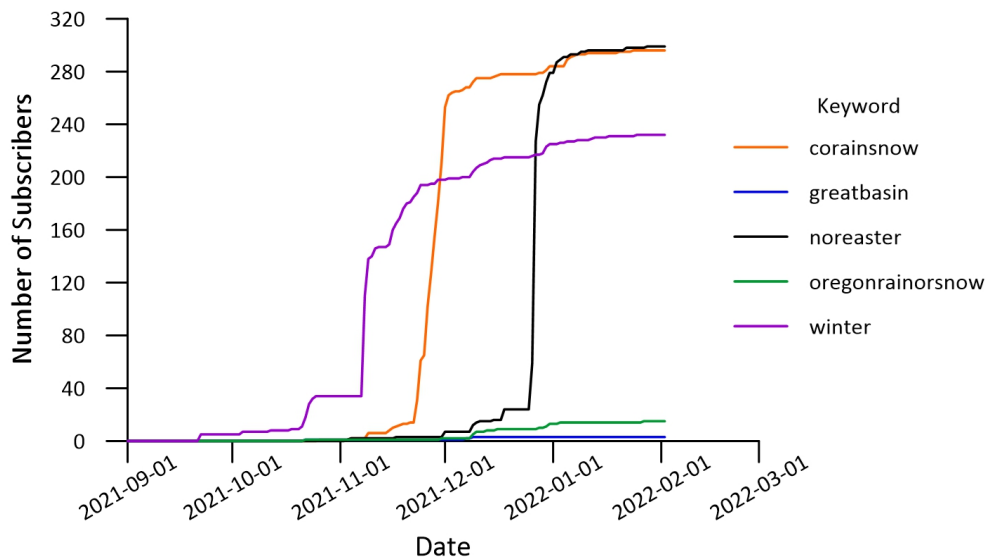
# Our goals: More mountains!





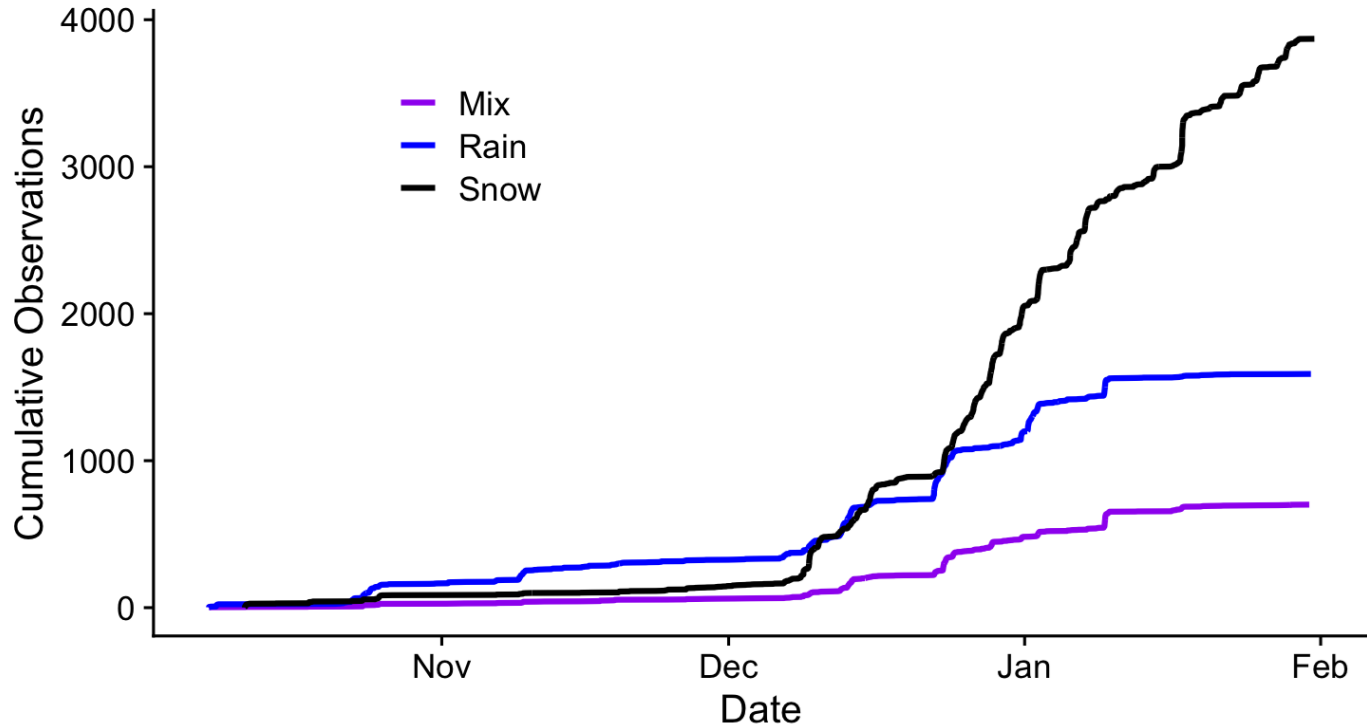
# Get started! Sign up via text: 855 909 0798

Region	Keyword
California/Nevada	WINTER
Colorado	CORainSnow
Northeast	NorEaster
Oregon	OregonRainorSnow
Great Basin	GreatBasin

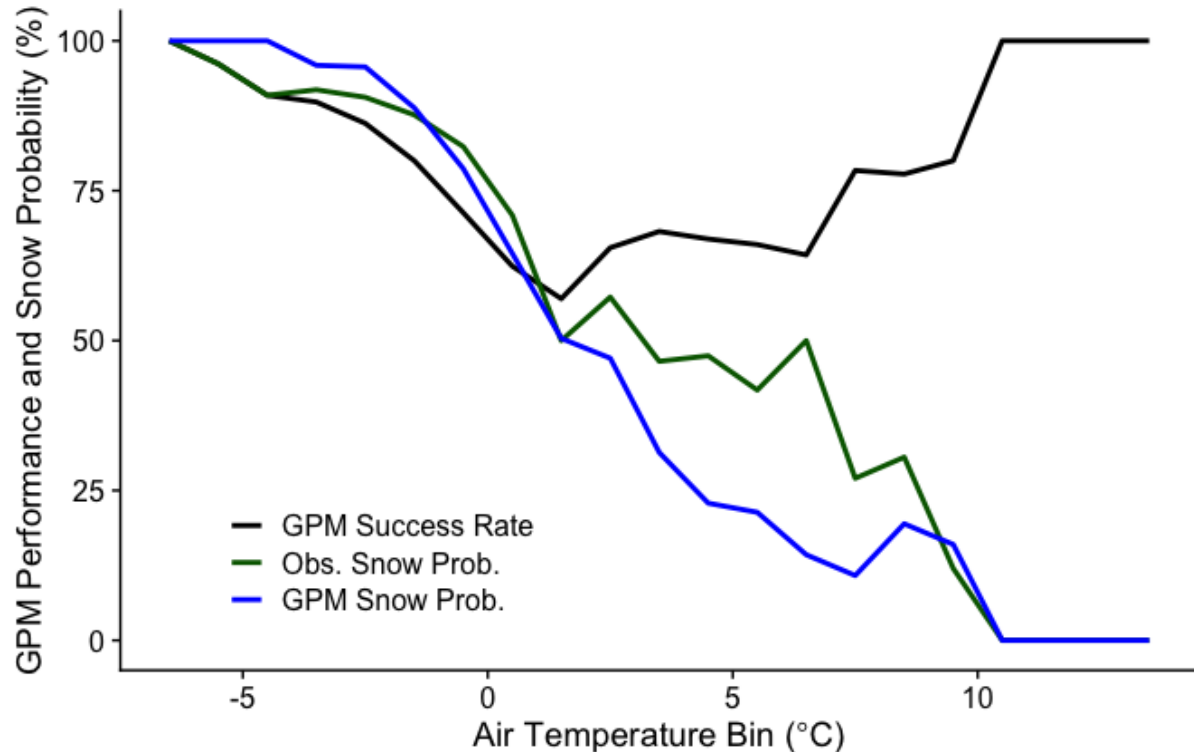


You'll receive the link to open the app in your browser, and easy instructions to participate.

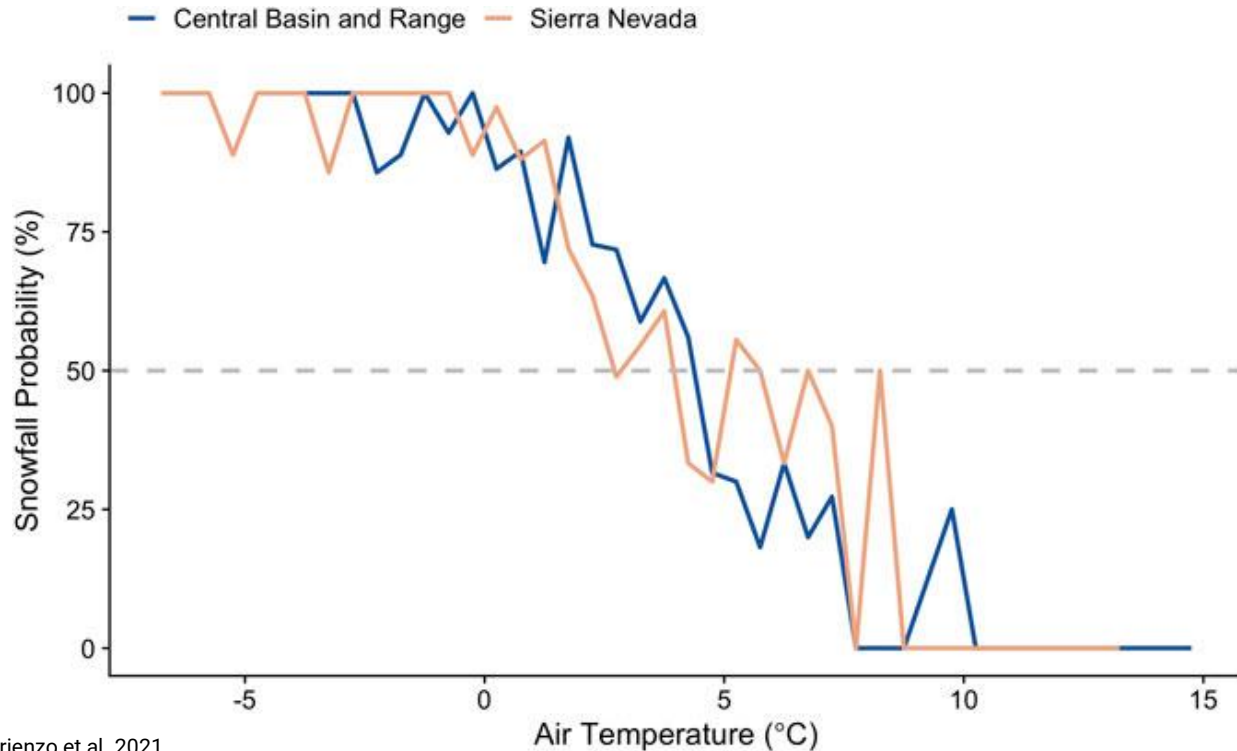
# What have we seen so far this season?



# How will this help improve estimates of precip phase?



# Probability curves: 2020–2021 in the Sierra Nevada and Great Basin ecoregions

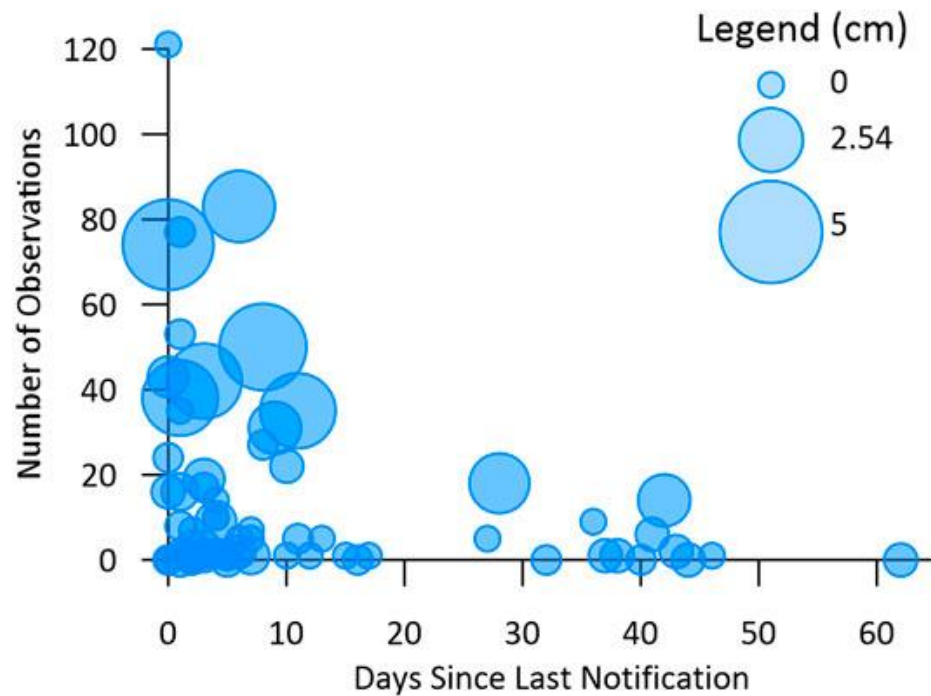


Source: Arienzo et al. 2021



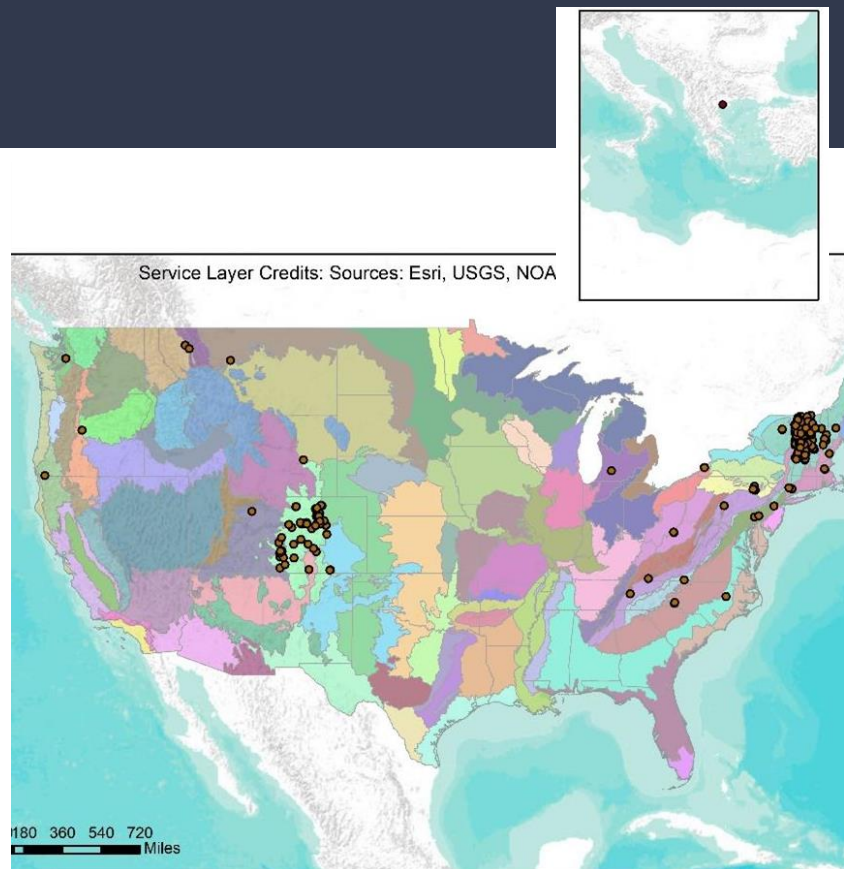


# The human dimension

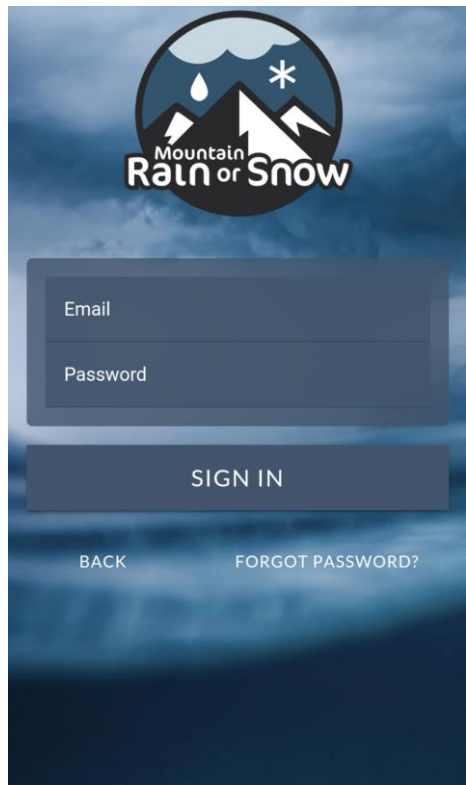


# Diversity of ecoregions

OID	US_L3NAME	Count_US_L3NAME
0		4
1	Arizona/New Mexico Plateau	1
2	Blue Mountains	1
3	Colorado Plateaus	19
4	Eastern Great Lakes Low lands	178
5	High Plains	22
6	Klamath Mountains/California High North Coast Range	1
7	Northeastern Coastal Zone	20
8	Northeastern Highlands	712
9	Northern Allegheny Plateau	17
10	Northern Piedmont	3
11	Northern Rockies	4
12	Northw estern Glaciated Plains	2
13	Northw estern Great Plains	1
14	Piedmont	7
15	Puget Low land	1
16	Ridge and Valley	4
17	Southeastern Plains	1
18	Southern Michigan/Northern Indiana Drift Plains	1
19	Southern Rockies	85
20	Southw estern Tablelands	3
21	Western Allegheny Plateau	7



# How to participate:




The image shows the login interface for the RainOrSnow app. At the top is a circular logo with a mountain, a raindrop, and a snowflake, with the text 'Mountain Rain or Snow' below it. Below the logo are two input fields labeled 'Email' and 'Password'. Under these fields is a large 'SIGN IN' button. At the bottom, there are two links: 'BACK' and 'FORGOT PASSWORD?'. The background of the screen is a dark, cloudy sky.

Ensure location services are enabled

Wait a second... it's an app with a web address?

Yes! RainOrSnow.app is a progressive web app, which means it's accessed through your browser

# How to participate:



Mountain  
Rain or Snow

Email

Password

SIGN IN

BACK FORGOT PASSWORD?

Location Found! 39.5719 , -119.8002

What is falling from the sky right now?

Send us updates in real-time whenever it's raining, snowing, or a wintry mix.

Rain Snow Mix

GPS Location: 39.5719, -119.8002

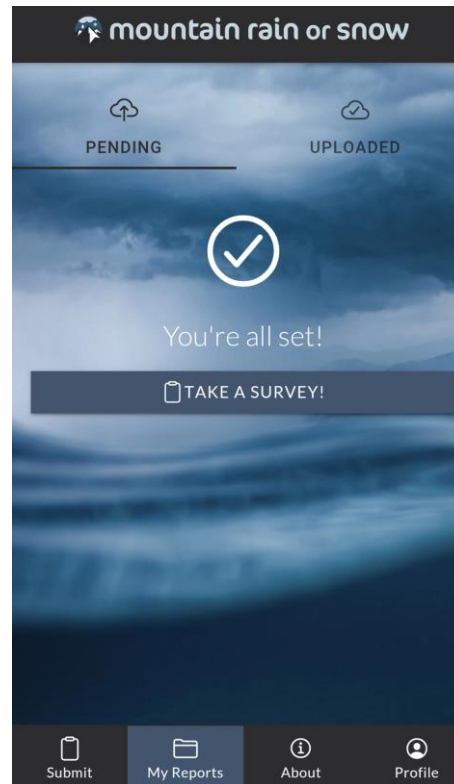
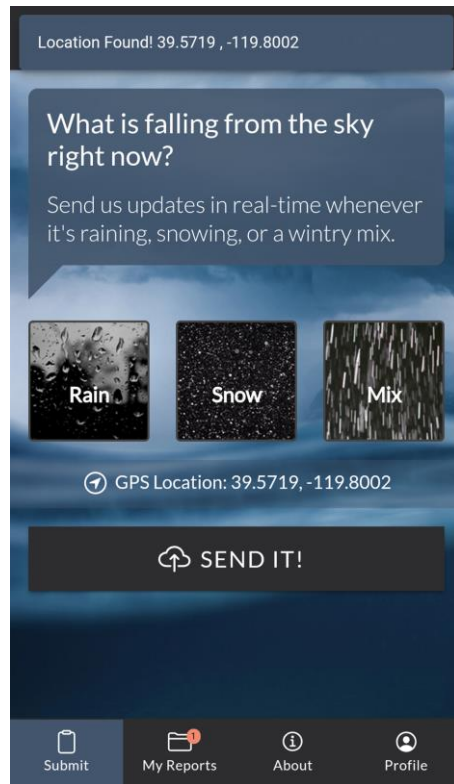
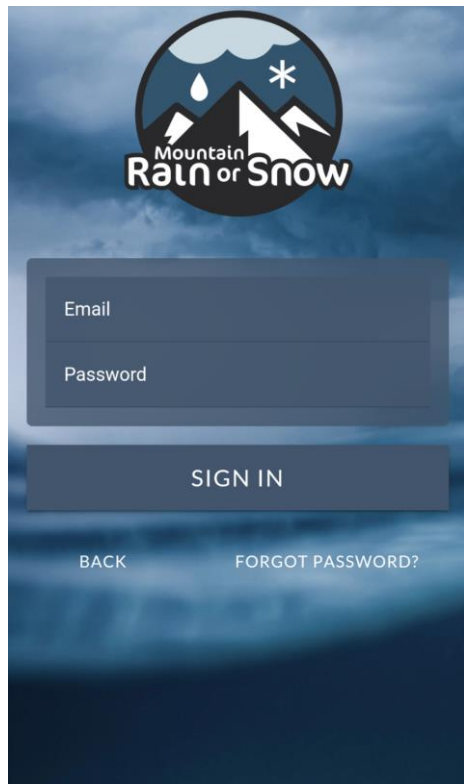
SEND IT!

Submit My Reports About Profile

If you have to think about it, it is probably mixed precipitation.



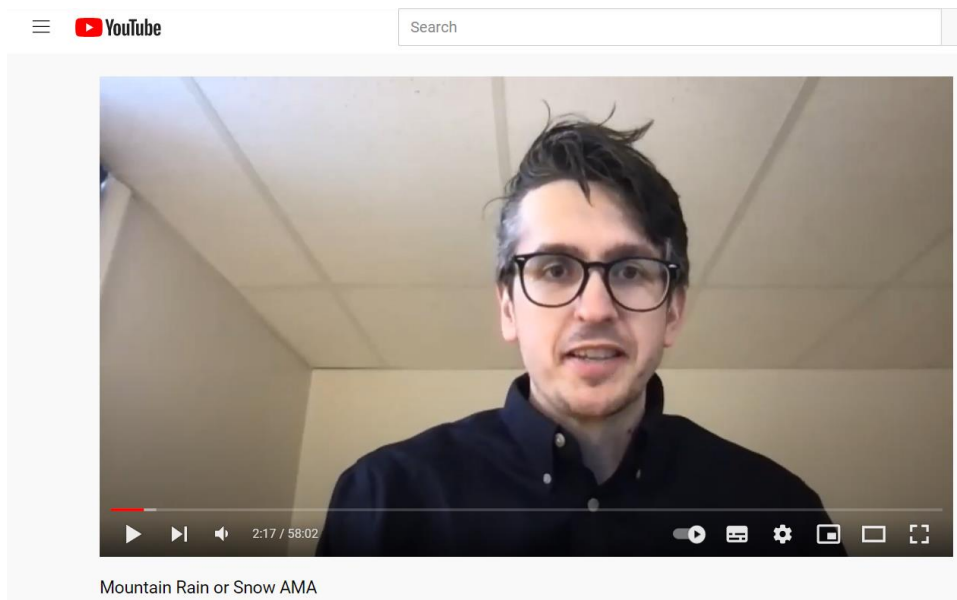
# How to participate:



Navigate  
using the  
tabs at the  
bottom

# Want to know more? Check out our AMA.

[bit.ly/MROS-AMA](https://bit.ly/MROS-AMA)



# Here's a recap on how to sign up.

Region	Keyword
California/Nevada	WINTER
Colorado	CORainSnow
Northeast	NorEaster
Oregon	OregonRainorSnow
Great Basin	GreatBasin



# Thank you!



**Keith Jennings**

Principal Investigator, Lynker. Lead on data analysis and research design.



**Graeme Aggett**

Co-Investigator, Lynker. Project management



**Brad Bates**

Co-Investigator, Lynker. Geospatial analysis, online dashboard.



**Anne Nolin**

Co-Investigator, University of Nevada, Reno. Lead on researching mountain snowpacks.



**Jessica Garrett**

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**Monica Arienzo**

Co-Investigator, Desert Research Institute. Lead on engagement analysis.



**Meghan Collins**

Co-Investigator, Desert Research Institute. Lead on engagement and communication strategy.



**Benjamin Hatchett**

Co-Investigator, Desert Research Institute. Assist with community engagement, data analysis, and observations.

