Outflow boundaries in May!
“Dry” lightning is real but “Heat” lightning isn’t
Monsoon2023
.....not yet!
A blocking pattern “blocks” other weather systems

PW over 1” at 90th percentile

Tucson 0Z 5/17/2023
Tuesday 5PM launch
Snowmelt still happening in Colorado

Water Year Precipitation, October 2022 - April 2023
Averaged by Basin

Upper Basin still expecting inflow

Lower Basin almost complete
April 2023 was very dry

- Oct-Apr: 27th wettest = 8.56"
- Long-term WY avg: 12.26" = -3.7"
April 2023 was warmer
Short-term drought has improved
Long-term drought continues

Statewide precipitation above average (Oct to Mar)

Statewide temperature below average (Oct to Mar)

Arizona - 48 month SPEI
April 2023
Short-term outlook
Outlook first week of June
90% chance El Nino winter
<table>
<thead>
<tr>
<th>Year</th>
<th>Winter (prev Dec to Mar)</th>
<th>Summer (Jun to Sep)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Dry  ((La\ Nina))</td>
<td>Wet</td>
</tr>
<tr>
<td>2019</td>
<td>Wet  ((El\ Nino))</td>
<td>Dry</td>
</tr>
<tr>
<td>2020</td>
<td>Wet  ((Neutral))</td>
<td>Dry</td>
</tr>
<tr>
<td>2021</td>
<td>Dry  ((La\ Nina))</td>
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<td>2023</td>
<td>Wet  ((La\ Nina))</td>
<td>???</td>
</tr>
</tbody>
</table>

Wet or Dry based on above or below average.
Summary

- April warm and dry but May has already had rain and even snow
- Short-term outlook shows might stay cooler
- Delayed monsoon??
- El Nino expected in winter

New puppy Andes!
3 months
Husky/Cattle Dog
Looks like an Andean bear
Predecessor publication in 2017


https://lightningdev.umd.edu/aert/Safety.html
➢ Is it safe to use a mobile phone during a thunderstorm?
➢ Can rubber tires save you from a direct strike to your car?
➢ Are tents and small shelters safe during a thunderstorm?
➢ Is it safe to stand under a tree during a thunderstorm?
➢ Can rubber-soled shoes save you from lightning?
➢ Are passengers safe if lightning strikes a plane?
New Springer book

Cover photo by Greg McGown, Tucson
Chapter 1
The Scientific Basics of Lightning

Multiple strokes in a negative cloud-to-ground flash
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Oro Valley, Arizona
Arizona is the Lightning Photography Capital of the U.S.

Chapter 3

Kolb brothers
Grand Canyon National Park
Glass plate
Early 1910s

Chapter 4
When, Where, and How Much Lightning Occurs in Arizona

July, August, and September account for 89.8% of the year’s lightning in Arizona.
Chapter 5
Human Impacts, Damages, and Benefits from Lightning in Arizona

The fatality rate decreased by a factor of 75 from the 1920s to the 2010s

95-year history of lightning fatality rate in Arizona

Lightning safety
Wei Xu.
Chapter 6
How Lightning Detection Networks Were Developed in Arizona

Early antenna
Alaska, 1976

NLDN sensor
Yuma, 2021

Network Control Center
Tucson, 2019
Chapter 7

Lightning Research in Arizona

Interview with Krider

And so, we can see what kind of pulses made the return strokes and what kind of pulses made other things, and the other things you didn’t want obviously depending on a lot of what the source was—if it was a Xerox machine, which was a frequent problem.

"Xerox machines make pulses that look exactly like return strokes.”
This is the only known book summarizing diverse aspects of lightning and its research for one state or country.
New Springer book

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Thank you for attending the monthly Arizona weather and climate report!

Next report: June 15 at 10AM
Guest speaker: Mike Crimmons, UA, and the monsoon!