SPRING 2023 | SKYWARN NEWSLETTER

THE KEYSTONE CROSSWIND

National Weather Service
State College, PA

What's inside?

SUMMER SAFETY CAMPAIGN

Building a Weather-Ready Nation

The Summer safety campaign runs annually from June 1st to September 1st.

See below for outreach resources.

- Social Media Plans: https://www.weather.gov/wrn/summer-campaign-sm-plan
- Infographics: https://www.weather.gov/wrn/summer-infographics
- Videos: https://www.weather.gov/wrn/Videos

AMISH SUPPORT INITIATIVES AND OUTREACH AT NWS STATE COLLEGE

by Meteorologist John Banghoff

Lancaster County, PA is home to the largest Amish settlement in the United States. During the growing season, NWS State College receives thousands of calls a day from Amish and Mennonite (Plain Community) farmers from Lancaster County and several other settlements across the forecast area. In order to better serve this group, NWS State College has been working to better understand their needs and expand our services to their communities. Warning Coordination Meteorologist Jonathan Guseman and Forecaster John Banghoff recently attended a Farm and Family Safety Day in Lancaster County, Pennsylvania, setting the stage for many future outreach events.

Jonathan Guseman teaches weather safety at the Farm and Family Safety Day.

At this event, which was held at a local fire department, NWS State College set up a booth with several activities and outreach materials. Children and parents particularly enjoyed guessing the name and purpose of each instrument on a weather station, touching the plasma ball and learning about how lightning works, and watching a tornado in a bottle demonstration. Jonathan and John distributed weather safety flyers for lightning, flooding, and tornadoes, which were originally created by the Weather Awareness for a Rural Nation (WARN) Team.

Jonathan Guseman and John Banghoff staff an educational booth at the Farm and Family Safety Day in Lancaster County.

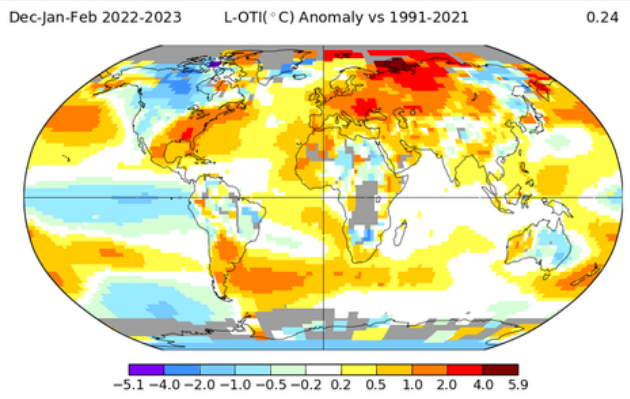
This event also provided an opportunity to work toward closing the warning reception gap for the Plain Community. NWS State College passed out information on how to sign up for Pennsylvania's emergency notification system, AlertPA, so that those who have a landline can receive a voicemail when a Warning is issued for their location. We were also able to show a sample of a NOAA Weather Radio designed specifically for the Plain Community. We look forward to continuing to connect with this community in the future and are grateful for our partnerships with local agencies, the WARN Team, and other NWS offices committed to serving this vulnerable community!

John Banghoff and Jonathan Guseman demonstrate how a weather station works at the Farm and Family Safety Day in Lancaster County.

A REVIEW OF THE WINTER OF 2022-2023

by Meteorologists David Martin and Michael Colbert

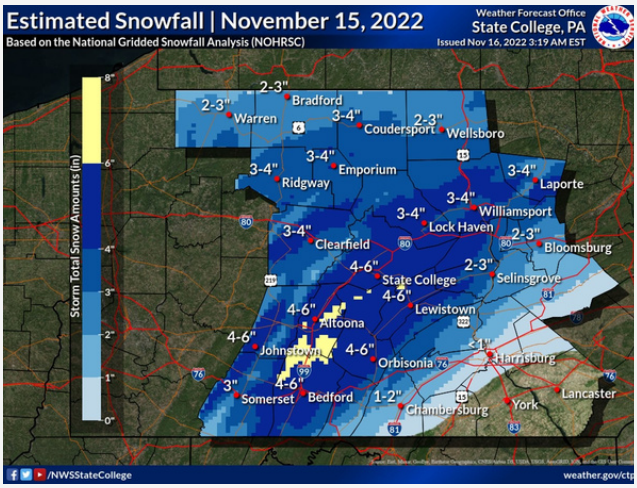
Temperature and precipitation at the surface are largely controlled by upper level trough and ridge patterns, which act to steer airmasses around the world. For very cold air to move into our region during the winter season, we typically need these steering currents to allow cold air masses to sit over the northern latitudes of Canada, and then an upper trough, or dip in the jet stream, to develop over the eastern US and steer the cold air masses south toward our latitude. If, however, an upper trough develops over the western US, cold air tends to settle into the western and central US, while a ridge in the jet stream develops over the eastern US, steering warmer air northward from the Gulf of Mexico. This is exactly the type of pattern that set up during the autumn months in 2022, and with only a few brief exceptions, persisted through the winter. The result was a cold and snowy winter season for the western US, and a very mild winter season over the eastern US with minimal snow.



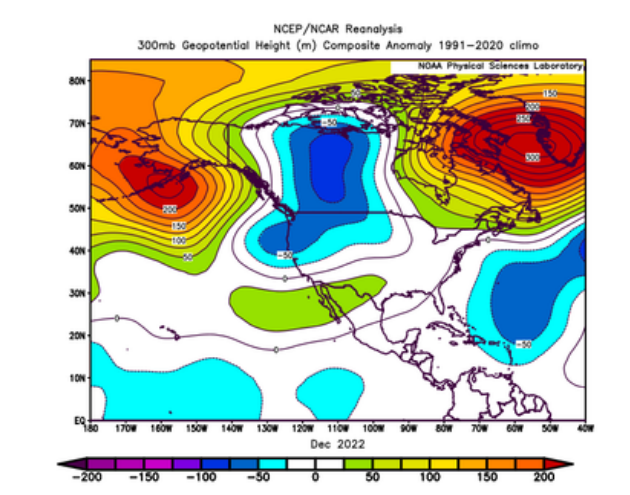
Global Temperature Anomalies (C) for December-January-February

Although the upper trough/ridge pattern resulted in temperatures being above normal for the month of November, there were a couple of early season snow events. A heavy wet snow occurred during the afternoon and evening hours of Tuesday November 15th, making for slick travel across central Pennsylvania. Some of the heavier snow amounts (up to 5 inches) fell between State College and Altoona.

Lesser amounts fell across the southeast part of central Pennsylvania. Numerous traffic problems were noted across the region.



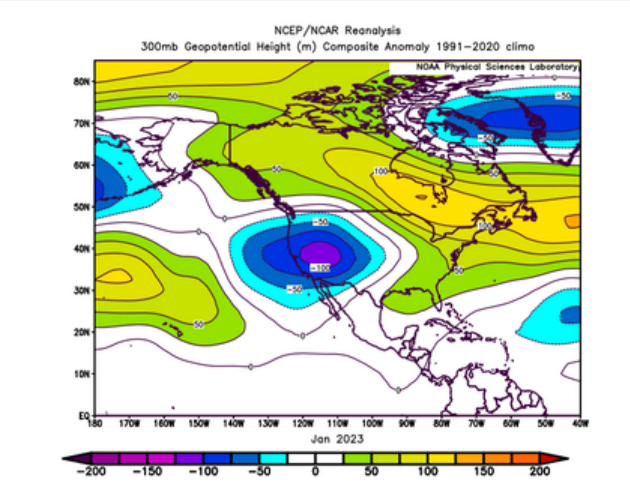
Several days later snow squalls occurred during the afternoon hours on Friday, November 18th. Abnormally cold air followed for the weekend, which resulted in nearby Buffalo, New York receiving heavy snowfall. By Thanksgiving, mild temperatures moved back into the area with most of the snow gone by then.



Dec 2022 300mb height anomaly

In December, the eastern ridge relaxed to allow a few cold airmasses to spill into our region. Most notable was the arctic blast that much of the nation experienced just before Christmas. Across central PA, a wintry mix occurred during the first part of Thursday, December 22nd. Mild temperatures moved into the area during the second part of the day, before temperatures crashed on Friday, December 23rd. The temperature at Pittsburgh International Airport fell from 40˚F at 5:51 AM to -5˚F by 3:51 PM that afternoon. Many locations were near zero degrees, with gusty winds resulting in wind chills between -20˚F and -40˚F.

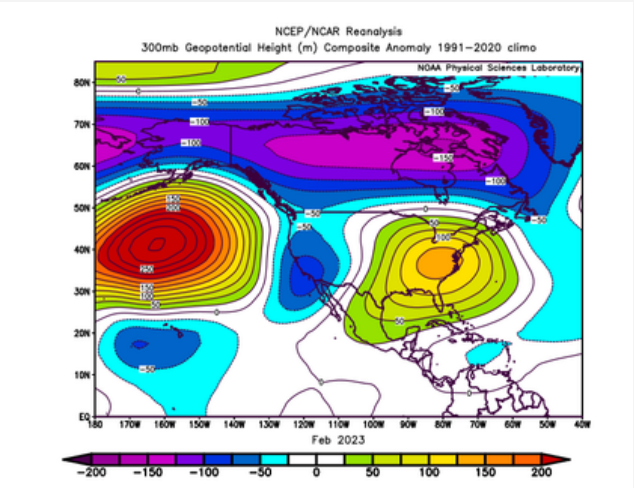
Cold weather continued into late Saturday, with many locations recording their coldest Christmas Eve afternoon high temperatures on record. Temperatures moderated some for Christmas Day. Once again nearby Buffalo, New York had to deal with many feet of snow.



Jan 2023 300mb height anomaly

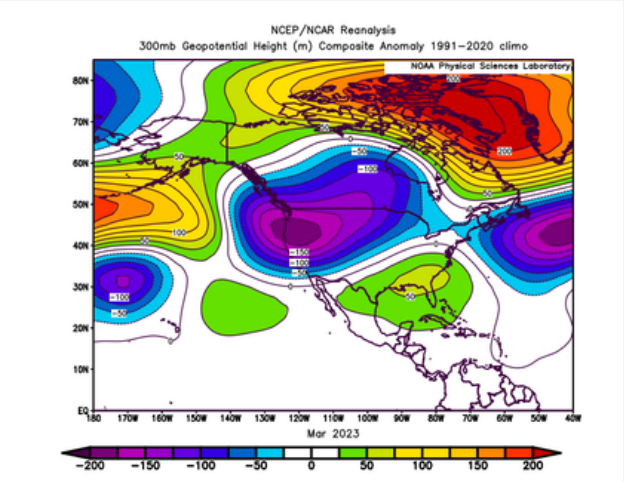
Many days in January had the feel of early Spring. While a lot of cloud cover was noted, the average temperature for the month was still between 8 and 10 degrees above normal. Very little winter weather was noted during the month. The mean temperature for January in Harrisburg was 39.7 degrees. Only 1950 and 1932 were warmer. The mean temperature for 1950 was 39.8 degrees, while the mean for 1932 was 42.5 degrees.

The mean temperature for January at Williamsport was 37.5 degrees. This was warmer than the mean temperature of 36.3 degrees in 1950. Only 1932 was warmer, with a mean temperature of 40.2 degrees.



Feb 2023 300mb height anomaly

The warming trend continued into February as the ridge built over the eastern US. Temperatures averaged 6 to 9 degrees warmer than normal for the month. State College, PA observed 2 days in February with high temperatures of 70˚F or higher. This has only happened 3 times in the 130 year climate record for State College - the other two times were Feb 2017 and Feb 2018. Like January, little winter precipitation was noted.



Mar 2023 300mb height anomaly

In March, a blocking high over eastern Canada allowed for cold air to slip into the northeast US, resulting in several abnormally cold days. However, average temperatures still ended up being about a degree above normal. The average temperature in Johnstown for March was lower than the average temperature in February by 0.6 degrees. For only the 2nd time in its 114-year history, Harrisburg did not see any measurable snow in the months of February and March. The only other time this happened was in 2020.

In April, while it was wetter than normal across portions of western and northern Pennsylvania northward into western New York; drier than normal conditions persisted across the southeastern part of the Keystone state. However, much of the precipitation deficit in the southeast was made up by heavier rain in the last few days of April.

For the entire cold season (Oct 2022 - Apr 2023), Harrisburg recorded only 5.9 inches of snow, which is 2nd-lowest (the lowest on record is 5.1 inches in winter 2019-2020). Williamsport observed its 18th-lowest snow amount on record, measuring 19.9 inches (the lowest on record was 7.0 inches in the cold season of 1988-1989).

SUMMER WEATHER SAFETY

by Warning Coordination Meteorologist Jonathan Guseman

While most of us love getting outdoors in the warm summer months, the weather can at times have other plans that should force us to stay inside out of harm's way. That doesn't mean we can't make outdoor plans, but rather that we need to know what weather threats to be aware of and what to do if they occur near you.

Let's take a look at some of the most common summertime weather hazards in central PA:

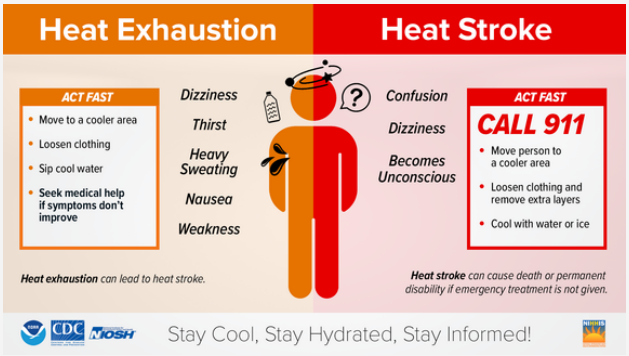
Lightning

Lightning strikes can result in death or serious injury. If you hear thunder or see lightning, take shelter in an enclosed building or a hard-topped vehicle with the windows up.

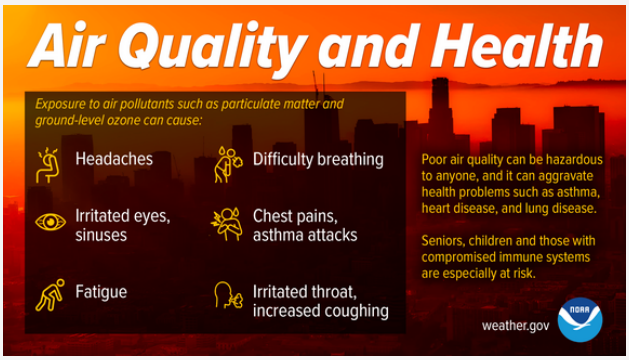
Each year in the United States, thunderstorms produce 20-25 million lightning flashes that strike the ground, killing an average of 20+ people and injuring hundreds more - often in devastating and permanent ways.

Heat

During hot and humid weather, your body's ability to cool itself is challenged in ways you may not expect. When your body heats too rapidly, or when too much fluid or salt is lost through dehydration or sweating, you may experience a heat-related illness. Stay Weather-Ready by learning the symptoms of excessive heat exposure and the appropriate responses.

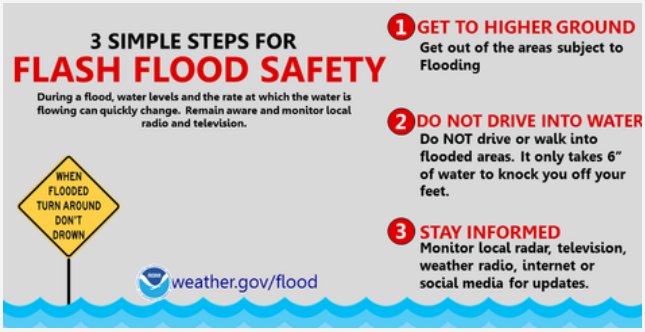


Outdoor exercise from gardening to team sports can help keep you heart-healthy and less at risk to poor air quality. But before you go out, check the air quality forecast to ensure you aren't doing yourself more harm than good



Flooding

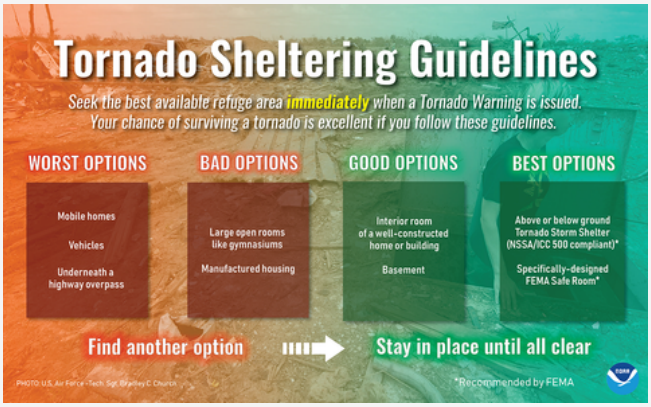
During a flood, water levels and the rate at which the water is flowing can quickly change. Get to higher ground. Do not drive or walk into floodwaters. It only takes 6 inches of water to knock you off your feet.



Play in the pool, not in floodwaters! Floodwaters can contain harmful chemicals and objects that could harm you or make you sick.

Tornadoes & Severe Winds

You know to take shelter immediately if your area receives a Tornado Warning or Severe Thunderstorm Warning. But what makes a good shelter? Take the time now to figure out your options and make sure you're Weather-Ready. weather.gov/safety/tornado



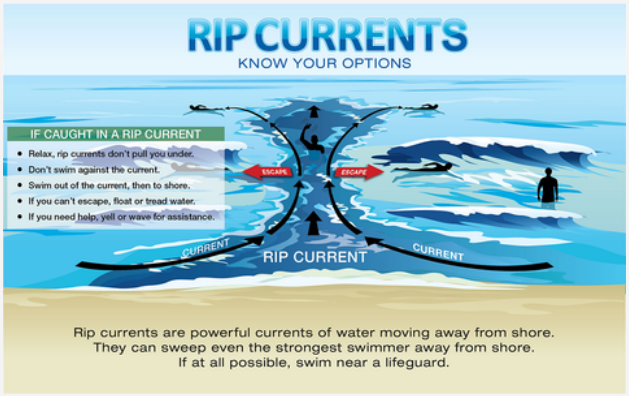
Severe thunderstorms (including tornadoes) can form quickly, day or night. Stay Weather-Ready by having a way to receive weather alerts any time of day. If you receive a Tornado Warning, get to shelter immediately.

Rip Currents

Although not a hazard here in the central portion of the Keystone state, rip currents are extremely important to know about before you may head to the beach this summer.

Rip currents are powerful, narrow channels of water in the surf zone that move quickly away from shore. Moving at speeds of up to eight feet per second (or 5 mph!), rip currents can move faster than an Olympic swimmer. https://oceantoday.noaa.gov/ripcurrentscience/welcome.html

The United States Lifesaving Association (USLA) estimates that over 100 people die each year due to rip currents in the US. Break the Grip of the Rip®! weather.gov/safety/ripcurrent



More weather safety information can be found at https://www.weather.gov/safety/.

We hope everyone has a safe and enjoyable summer!

LATE SPRING AND SUMMER OUTLOOK

by Meteorologist David Martin

We had 3 years of La Niña, which would explain in part the type of winters we have seen in the last few years. The Climate Prediction Center (CPC) indicates we have since trended toward neutral ENSO conditions, and predicts a 62% chance of El Niño developing during May-July 2023. We will take a look at a couple of years that had similar conditions and how their summers turned out. 1932 and 1950 saw very warm temperatures in January and February. We will use these years as analogs to speculate about this summer season.

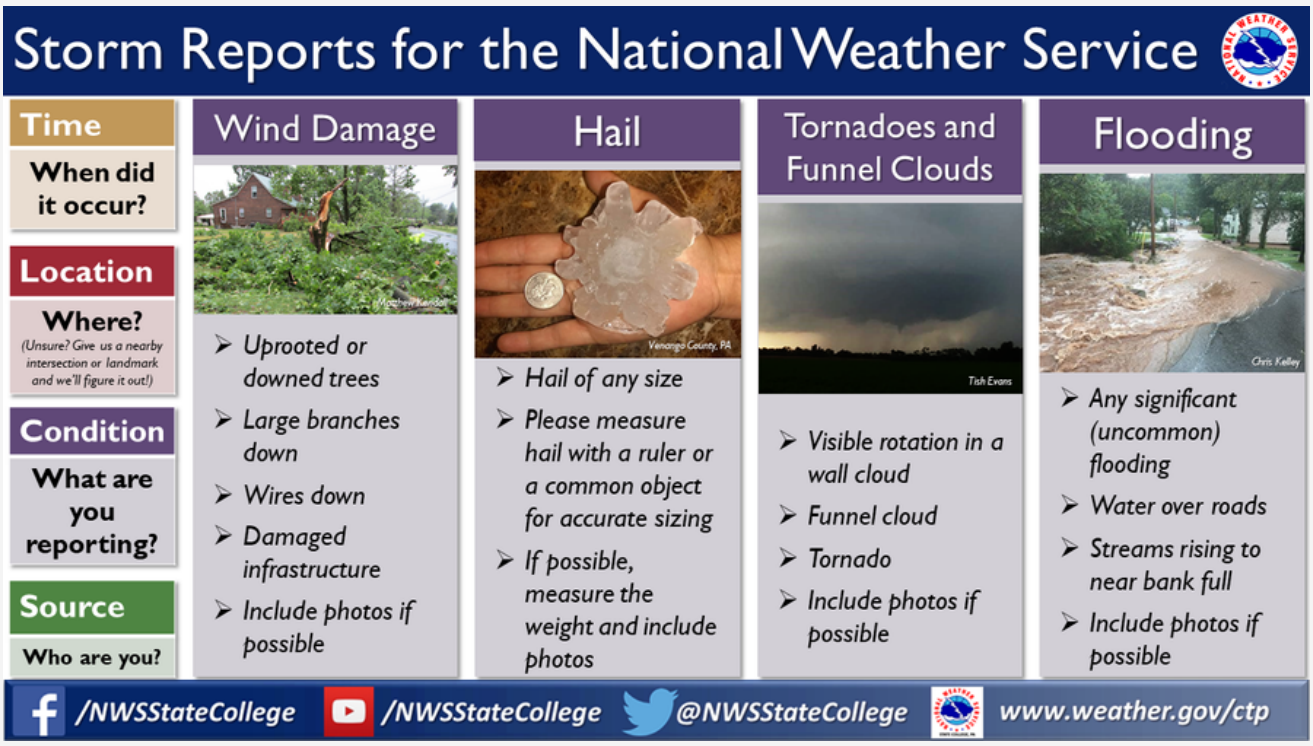
Looking back on June 1950 showed a split flow pattern at 500 mb across the western part of North America. An upper level ridge was off the west coast and over the southeast states. An upper level low was over northeast Canada. Very fast flow occurred across the northeast. This is similar to what we have seen at times this year. Conditions were drier than normal from New England, southward to the Mid-Atlantic States. However, flash flooding occurred across West Virginia. Overall June 1950 ended up being warmer over much of the country.

July 1950 showed a similar pattern. A slight shift westward led to a different outcome to conditions in July. This July was the coolest on record since 1925 across the east. Much of the country was cloudy, cool, and wet. August 1950 showed a similar pattern to July 1950.

Going back to June 1932 showed temperatures close to normal across the east, with a few spots below normal. Rainfall across Pennsylvania was close to normal. July 1932 showed cooler than normal temperatures across the northeast, including most of Pennsylvania. Rainfall was close to normal across Pennsylvania. August 1932 data showed temperatures about 2 degrees above normal across Pennsylvania. Most of the lower 48 were warmer than normal. Rainfall across the eastern states were a bit below normal, with Pennsylvania receiving 4 inches or less during the month of August 1932.

Also of interest was July 1976. Spring 1976 featured an end to a long duration La Nina event.

July 1976 was abnormally cold from New England, southward across the mountains to Texas. Dr. Greg Forbes noted how cold July 4th ended up here in Pennsylvania compared to forecast. Back then the only model was the LFM (Limited Fine Mesh). July 1976 was one of the coldest July's on record for some eastern cities.



THE CENTRAL PENNSYLVANIA LOCAL CHAPTER OF THE AMS AND NWA

by Meteorologist John Banghoff

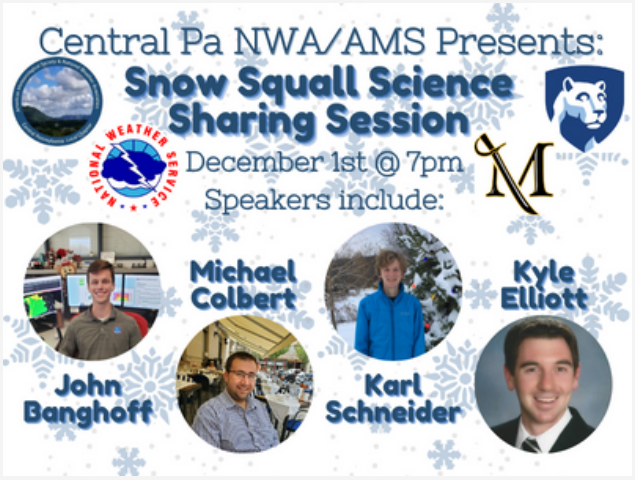
Central Pennsylvania is an epicenter of weather enthusiasts. Stationed in the heart of State College, PA is The Pennsylvania State University (PSU), with its world-renowned Department of Meteorology and Atmospheric Science, a National Weather Service Weather Forecast Office and River Forecast Center, AccuWeather, and a few other entities that round out a dense network of meteorologists. Since its launch in Fall of 2019 and through the pandemic, the Central PA AMS Chapter has established several traditions, expanded its membership, and been a nucleus for collaboration. Over the past year in particular, the Chapter has continued its traditions and branched out with some new and exciting activities that seek to increase involvement, foster community, support sharing of ideas, and broaden understanding of the vast diversity of the weather community.

A Chapter's traditions are what keep it moving forward, and our Chapter is no different. For the third year in a row, the group organized a Winter Seasonal Outlook "Jam Session", where PSU Professor Dr. Jon Nese, Prescient Weather Meteorologist Paul Knight, AccuWeather Meteorologist Paul Pastelok, and Millersville University Weather Center Director Kyle Elliott gave a forecast for Winter 2022-2023. Following the meeting, members of the group submitted seasonal snowfall forecasts as part of a competition. The winner will be announced later this month and receive a Nittany Lion Snow Globe!

In January, the local chapter hosted its third annual weather-themed "Year in Review." Penn State Graduate Student and Local Chapter Treasurer Luke LeBel reviewed Central PA weather, PSU Weather World host, Rob Lydick, reviewed United States weather, and AccuWeather meteorologist Alyssa Smithmyer reviewed weather around the world in 2022.

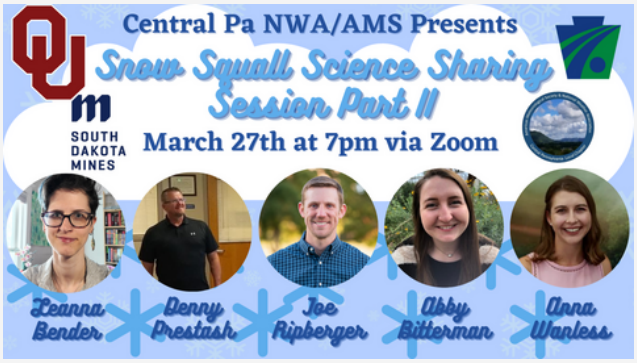
The Chapter is also committed to developing the next generation of meteorologists. For the third year in a row, the Central PA Local Chapter partnered with the Penn State University Branch of the American Meteorological Society (PSUBAMS) to put on a Speed Networking Event. Students rotated through 6 stations and got to talk with meteorologists from the public sector, private sector, academia, television, and graduate school.

With so many meteorologists in Central PA that span nearly all of the sectors of meteorology, the Chapter set a goal of visiting the various entities that employ meteorologists in the area. During the "Tour de Offices", members of the Local Chapter visited the National Weather Service, a local TV station, and AccuWeather. Additional stops on the Tour are planned for Pennsylvania Emergency Management Agency (with a baseball game afterwards) and Penn State University.



At the heart of the Chapter is a desire to share ideas and foster collaboration. Central Pennsylvania has emerged as a hub of snow squall research over the last several years. To showcase ongoing efforts and to discuss future goals, the Chapter organized two Snow Squall Science Sharing Sessions. The first focused on work being done by members of the Central PA weather community: NWS meteorologists John Banghoff (Chapter President) and Michael Colbert (Chapter Vice President), Penn State graduate student Karl Schneider, and Millersville University's Kyle Elliott shared updates on projects they've been working on ranging from snow squall forecasting and science improvements to radar detection and education campaigns.

Part two of the science sharing sessions was targeted toward external snow squall efforts. Dr. Joe Ripberger and Research Assistants Abby Bitterman and Anna Wanless from the University of Oklahoma, PennDOT Regional Traffic Management Center Coordinator Denny Prestash, and Leanna Bender, PhD student at the South Dakota School of Mines, provided compelling presentations covering topics about public perception of and response to snow squall warnings, use of variable speed limit signs to mitigate snow squall pileups, and a climatology of snow squalls across the high plains.



The Chapter is excited to continue its efforts to build community, foster sharing of ideas, and expand awareness of the many sectors in the weather community. The Chapter is open to any weather aficionados, whether you have a meteorology degree or not! Please Like us on Facebook, follow us on Twitter, and reach out to us via email at CentralPAAMSNWA@gmail.com if you'd like to be added to our email list.

Want to become a Skywarn Spotter?

Visit weather.gov/ctp/skywarn

Attend a training session

Watched a recorded training session? Let us know and we'll get you registered to be a spotter!

ctp.stormreports@noaa.gov (814) 954 6440

RARE ENSO SIGNAL MAY PROVIDE GLIMPSE INTO UPCOMING WINTERS 2023-2024 & 2024-2025

by Lead Meteorologist Matt Steinbugl

Since 1950, there have only been 3 occasions where ENSO conditions (measured via the Oceanic Niño Index or ONI) have transitioned from La Niña to Neutral to El Niño within the same year: 1976, 2006, and 2018.

This transition is particularly interesting because 2023 is forecast to follow a similar pattern shift from La Niña to Neutral to El Niño.

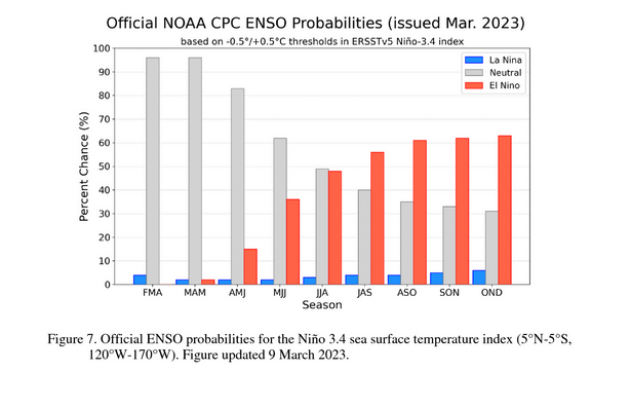
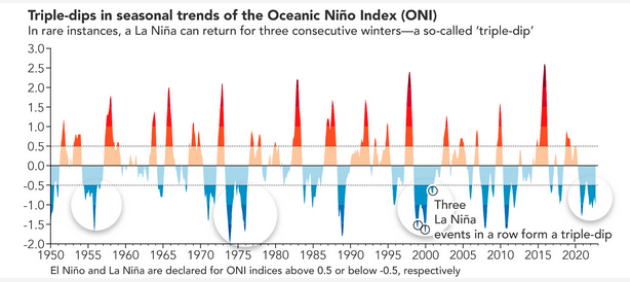


Figure 7. Official ENSO probabilities for the Niño 3.4 sea surface temperature index (5°N-5°S, 120°W-170°W). Figure updated 9 March 2023.

What is even more interesting, is that 2023 follows a "triple dip" La Niña where La Niña conditions persisted for three consecutive winters. Other triple-dip La Niña's recorded since 1950 spanned the years 1998-2001, 1973-1976, and 1954-1956.

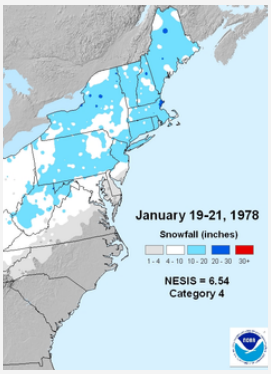


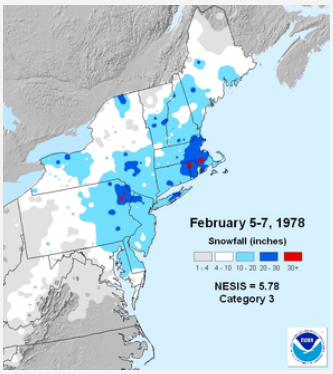
So what is the significance of these patterns? Let's connect the dots. 2023 not only follows the same ENSO transition pattern from La Niña to Neutral to El Niño, but also comes on the heels of a triple dip La Niña. This has only occurred 1 other time since 1950 and that year is 1976. So, we are going to use 1976 as a possible analog and examine the weather pattern during the following winters of 1976-1977 and 1977-1978.

It turns out the winter of 1976-77 was brutally cold in the Midwest, Ohio Valley, and Northeast U.S. It was the coldest winter on record in Indianapolis, Columbus, Cleveland, Pittsburgh and Philadelphia.

Specifically in central Pennsylvania, the winter of 1976-77 was very cold, ranking 7th coldest at Harrisburg, 4th coldest at State College and Williamsport, 2nd coldest at Altoona and the coldest winter on record at Bradford. The winter of 1977-78 was also very cold with many sites in central Pennsylvania recording a top-10 coldest winter.

While the winter of 1976-1977 was not abnormally snowy, the following winter season 1977-78 certainly was with 2 of the top 15 ranked storms (#10 and #15) on the NESIS





In summary, while not an official forecast, connecting the dots using the La Nina-Neutral-El Nino ENSO transition post a triple dip La Nina could provide a glimpse into what could be very cold and potentially snowy winters ahead in the next 2 years (2023-2024/2024-2025).

WHAT'S BUGGIN' DAVE? AN UPDATE ON TICKS, MONARCH BUTTERFLIES AND THE SPOTTED LANTERNFLY

by Meteorologist Dave Martin

In recent years, there has been a tendency for more extreme weather events. This may have an influence on insects, animals, and disease. In the last several newsletters I have written several articles on various subjects such as the decline of Monarch Butterflies and Lyme disease. I have also discussed chronic wasting disease (CWD).

UPDATE ON TICKS

Aside from the extreme cold just before Christmas, very little in the way of cold temperatures was observed during the winter season. Not only has it been rather mild so far this year, but quite dry across southern Pennsylvania. Ticks have been a big problem in the Keystone state in recent years; and given the trend with mild conditions in recent years, one should expect an active tick season.

Folks spending time outside should check for ticks upon coming inside. Putting clothes in the drier for 15 minutes should kill most of the ticks. Allow another 5 minutes for electric dryers. Also allow extra time for damp clothing. After drying the clothes, then one could wash them. The heat kills the ticks, more so than the water.

MONARCH BUTTERFLY UPDATE

Folks can help out by not destroying native milkweed. Monarch Butterflies need this plant to survive and breed. Spraying along hedge rows, roads, and trails often destroys the native milkweed plants. Planting flowers in general help butterflies, bees, and other helpful insects.

SPOTTED LANTERNFLY

The Spotted Lanternfly has been a problem in some parts of the Keystone state for nearly 10 years now. It is a good practice to check your car and other outside equipment for these pest, before leaving one spot and traveling to another. These lanternflies do significant damage to grapevines, black walnut saplings etc. If you see a spotted lanternfly, you can report it online here or call 1-888-4BADFLY.

Also of significance is moving camp fire wood from one location to another. Other harmful insects can spread this way. Significant damage to ash trees has occurred in recent years. See dontmovefirewood.org for more information on tree-killing bugs.