SKYWARNEWS

NATIONAL WEATHER SERVICE
STATE COLLEGE, PA

SPRING 2013

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Can Climate Change be Beneficial?

John La Corte—Senior Forecaster

In a place named Narsaq in Greenland, the icebergs in Kayak Harbor continue to shrink as rising temperatures eat away at the ice that has been there for thousands of years. With the disappearance of the ice, so too is the shrimping industry disappearing as the tasty little crustaceans retreat north in search of cooler water.

As a result, the population of the southern Greenland town has been cut in half, down to just 1500 people in the last decade. With so many people losing their livelihoods, suicides have been on the rise.

Yet in the face of this depressing loss of their traditional lifestyles, new opportunities may be emerging from under the ancient ice. Vast deposits of minerals and gemstones may provide the basis of a new and lucrative mining industry as materials vital to the manufacture of everything from cell phones to electric cars are harvested. With an economy long reliant on economic support from Denmark to survive, the new mining industry provides the intriguing prospect of a Greenland that could eventually be self reliant.

So as the glaciers continue to retreat in the face of rising global temperatures, temperatures that are rising most rapidly in these northernmost arctic regions, the picture isn't necessarily entirely negative. Greenland will likely be forced to undergo a transformation from a society largely dependent on harvesting the riches of the seas to one that mines the riches out of the Earth. At least until the glaciers begin to return some time in the future.

Acknowledgements to Elisabeth Rosenthal — A Melting Greenland Weighs Peril Against Potential

What is Going on in Germany?

John La Corte—Senior Forecaster

"...Just a few years ago climate experts prophesied that Germany would no longer experience winters with ice and snow in the future. In the 1990s there had been an entire series of milder and stormier winters. [...] However, this trend has not been observed over the last years. [...] Climate experts prophesied in the year 2000 that winters with snow and ice in Germany would cease to exist."

Well not quite. Despite the global rise in temperatures that have been observed over the last several years, Germany has not shared in this trend toward the "more comfortable." In fact the last 5 winters (Dec-Feb) have been colder than normal, something never recorded before.

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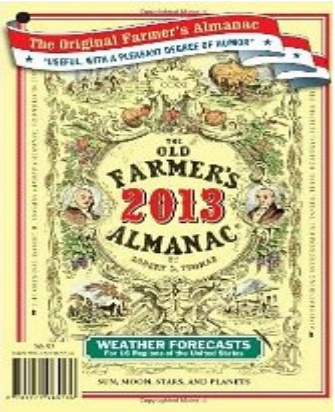
German Meteorologist, Dominik Jung (no relation to our own Pete Jung) and many of his colleagues are quite frankly stumped. Jung is a German Meteorologist and Climate Expert that is often quoted in the German media. While their climate prediction models continue to predict warmer than normal winters and summers, they have been stymied in their predictions of winter time temperatures for the last half decade.

While some skeptics point to this as "proof" that Global Warming is a hoax, a more realistic interpretation is that central Europe has been for some reason basking in a climatalogical anomaly while average global temperatures continue to increase. It also illustrates how far we have to go to increase the accuracy of climate prediction models and our understanding of the climate change problem in general.

Acknowledgements to P Gosselin — Meteorologist Dominik Jung Turns Skeptical After Germany Sets Record 5 Consecutive Colder-Than-Normal Winters!



Remember the Root Cellar? While today we live in the world of year-round produce at the supermarket, in the old days, a root cellar was as important to a home as a refrigerator is today. But what exactly was it? A typical root cellar was a room in the north corner of the basement that was vented to the outside to keep the air cool and circulating. Fruits, vegetables and other foods that needed to be kept cool were stored inside. Shelves often carried milk, butter and jars of preserves and crocks of salt pork while smoked meats hung from hooks in the ceiling. Barrels of homemade beer, cider and wine were often stored there as well. Gardeners used the area to store potted plants such as geraniums over the winter, and to force spring bulbs into early bloom.

The Old Farmer's Almanac— Winter 2013

The Sky is Falling!

John La Corte—Senior Forecaster

Meteors have nothing to do with meteorology other than sharing the common root word "meteor" which comes from the Greek word "meteoros" meaning lofty or high in the sky. So weather forecasters cannot be blamed for not foreseeing the recent extra-terrestrial visitor that crashed into the atmosphere and broke up over the city of Chelyabinsk in Russia on Feb 15th. The remarkable sight was captured on video as it ripped through the sky and exploded in a deafening crash that shattered thousands of windows, injured 1,500 people and caused millions of dollars worth of damage.

While invading our skies on the same day that the much heralded Asteroid 2012 DA14 sped by the Earth on a path that actually caused it to pass within the orbital planes of our geo-synchronous satellites, the two space visitors arriving on the same day was a mere cosmic coincidence according to astronomers who assure us that the two objects approached the Earth from entirely different parts of the cosmos. Taking its orbit into account, researchers conclude that the Chelyabinsk meteoroid originated from an Apollo-class asteroid. Apollo asteroids are well-known near-Earth asteroids that cross the orbit of Earth. Around 5,200 Apollo asteroids are currently known, the largest being1866 Sisyphus — a 6 mile-wide monster that was discovered in 1972.

The Chelyabinski meteoroid was estimated to weigh as much as10,000 tons (yes—20 million pounds!) and was traveling as fast as 42,000 mph! Scientists estimate the energy of the blast at between 450 and 500 kilotons, the size of about 30 Hiroshima bombs, or more than the energy from all the weapons used in WWII. People 30 miles away investigating the bright light were knocked off their porches! If the same meteoroid hit in Manhattan or Los Angeles, the damage and death toll would have been much worse, so fortunately meteor strikes are quite rare.

Perhaps the most interesting aspect of the meteoroid was the vast amount of high quality footage of it that resulted. It seems Russians have a problem with corruption, both from the police and fellow citizens who routinely engage in automobile related fraud. To protect themselves from crooked law enforcement and scam artists claiming to be hit by cars, many Russians installed and use dash-cams to capture and record their trips, in theory to deter the unscrupulous among them. At any rate, what we got was some amazing documentation of perhaps the rarest of all cosmic events, an actual meteoroid crashing to the Earth.

Do these meteors make my equator look fat?

Scientists estimate that tiny meteoritic bits add up to 80 tons of material falling on Earth from outer space each day!

The Winter in Review

John La Corte—Senior Forecaster

Now that March is here, we take stock of the "traditional winter" which runs from the beginning of December to the end of February. For the second year in a row, the region enjoyed a warmer than normal winter, though many would feel it has been long cold and snowy, probably because last year was so anomalously warm and remarkably snowless. Figure 1 shows the seasonal warmth which was almost without exception warmer than normal from the Ohio Valley to the Mid Atlantic states all the way to northern New England. In Harrisburg, the winter average temperature was 34.4 degrees which was 2.2 degrees above normal. Williamsport was similarly mild with an average temperature of 31.5 which was 2.3 degrees warmer than normal.

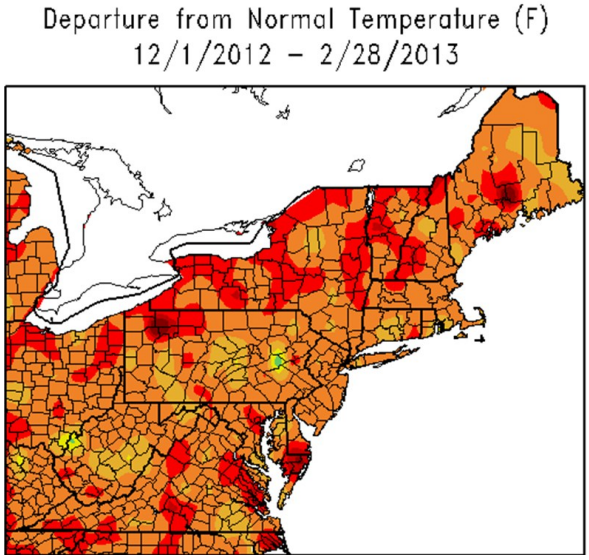


Fig 1. Temperature anomaly for the winter Dec 2012-Feb 2013

While we experienced above normal warmth, it was wetter than average over almost all of the local area, while a precipitation deficit was observed from parts of Virginia up through eastern Pennsylvania into much of New England.

Figure 2 shows the complex precipitation picture that was observed during our winter months,

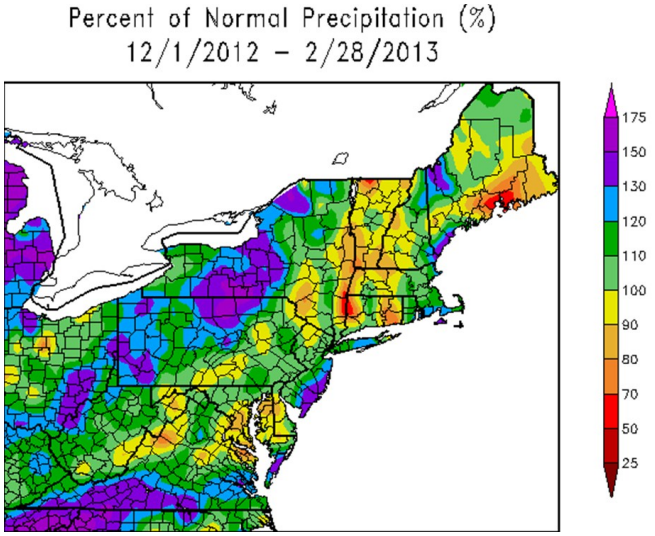


Fig 2. Precipitation departures for the winter Dec 2012-Feb 2013

Snowfall departure maps do not exist at this time, but we do know that snowfall ranged from very near normal at Williamsport (25.3 inches, -.9 inches) to more than a foot below normal at Harrisburg (12.2 inches, -12.2 inches). Recall that last year was even less snowy with both Harrisburg and Williamsport observing less than a foot of snow for the entire winter.

How did the seasonal forecasts work out this year? Well not too bad for the temperatures which were predicted to be above normal over much of the northern part of the nation from the Rockies eastward. The only areas where the forecast did not work out were southern Texas and Florida where the expected cooler than normal winter ended up being the opposite. The precipitation pattern was less uniform, with the area in the Ohio valley that it was expected to be drier than average ending up being wetter than normal. Otherwise the precipitation forecast worked out pretty well.

With Summer not too far away, as we always do we look forward to see what the future may hold. The Climate Prediction Center feels pretty strongly that we will have a warm summer over almost all of the lower 48 states, while the precipitation forecast has less predictability and thus shows "equal chances" in most areas, meaning there is no skill in trying to determine whether precipitation will be above, below or near normal. These forecasts can be seen in figures 3a and 3b. Whatever happens, we'll see you in the Fall to sum it up.

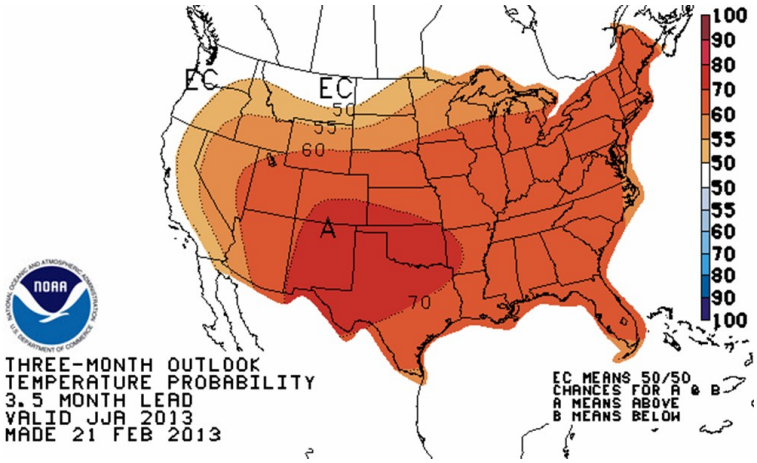


Fig 3a. Seasonal temperature forecast for the summer Jun-Jul 2013

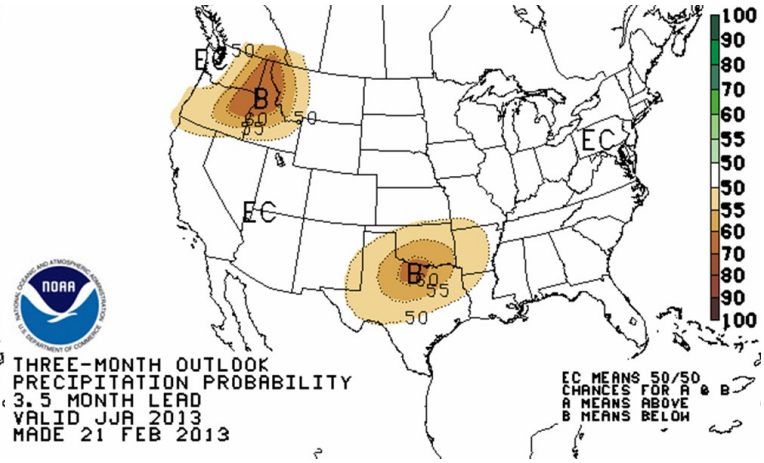


Fig 3b. Seasonal precipitation forecast for the summer Jun-Jul 2013

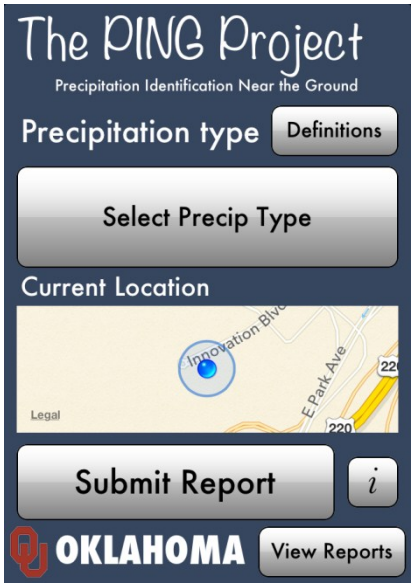
The PING Project—Help Needed!

Elyse Colbert—Meteorologist Intern

New technology has made radars even more accurate at determining precipitation types. But, as you may already know, radars cannot see close to the ground. As a result, the radar can only tell us what type of precipitation is occurring a couple thousand feet or more above the ground. In order to improve precipitation type accuracy, the National Severe Storms Laboratory (NSSL) is conducting a research project to compare radar data with ground-based reports.

This is where you come in! Any time precipitation or hail is falling in your area, you can report it to the Precipitation Identification Near the Ground (PING) Project in one of two ways: via the PING website or through a new mobile app. To report via the website, visit http://www.nssl.noaa.gov/projects/ping/ and click on the "Report Hail" or "Report Winter Weather" buttons on the homepage (highlighted in orange below). Then, just fill out the form and click submit. To report via the mobile app, search for and download the mPING app from the Apple App Store (for iPhone) or the Google Play store (for Android). For your convenience, there are also links to the apps on the PING Project website. Then, just open the app, select precipitation type, and click submit.

Website Interface



Mobile Interface

You can report as often or as little as you like. Each report you submit will help NSSL develop new precipitation detection technologies for the future! For more information about the PING project, visit their website at http://www.nssl.noaa.gov/projects/ping/ or check out the NOAA news article at http://www.noaanews.noaa.gov/stories2013/20130206_mping.html.

Monitoring the UV Index

David Martin—General Forecaster

While spring is a great time to engage in outside activities, it is also a time to urge caution. Aside from the dangers of insects, snakes, and lightning, there is the also the danger of too much sun.

Since the early 1980s there has been an increase in public awareness about the dangers of being out in the sun too long without proper protection. This in part has been due to the discovery of the damaging effects of UV (ultraviolet) radiation and the thinning of the ozone layer, which was discovered in 1982.

Ozone is an isotope of oxygen and is most common in the upper atmosphere. This is referred to as the "ozone layer". A large hole in the ozone layer was noted in 1980, which is normally at a maximum in the winter months. It is believed that the use of chlorofluorocarbons (CFC's) and other damaging gases exacerbated the ozone hole problem. While these have been largely regulated out of use since the late 1980s, it will likely take many decades to repair the damage done.

We know that while sunlight is necessary for life on Earth, too much sun can be harmful. Specifically it is the UV part of light spectrum that does the most damage. We know we have been overexposed to UV radiation when we experience a sunburn. More serious effects of UV damage manifest themselves in the form of wrinkles or even skin cancer. Ozone blocks much of this UV (ultraviolet) light from reaching the Earth's surface and helps protect sensitive plants and animals from these harmful effects. While the ozone reduction is highest at the Earth's poles, reductions have been observed at other latitudes as well which make additional education and protection necessary. The ozone layer so far has been reduced by about a 10 percent across the mid latitudes in the winter, and about 5 percent in the summer.

The Environmental Protection Agency (EPA) and National Oceanographic and Atmospheric Administration (NOAA) have come up with a UV Index and now provide UV Index forecasts. The scale runs from 0 to15. The index would normally be around 0 at night...and upwards of 15 in the tropics in the summer. Ozone forecasts are also made daily and are available to the public. People living in mid-latitudes are usually most sensitive to UV radiation in the spring, after a long winter of low sun angles and low exposure. So as we start to enjoy warmer weather, observe caution as outdoor activities increase.

When viewing a UV forecast, an index of 6 to 7 would represent a high risk and people should limit their sun exposure between 10 AM and 4 PM, and use a sun screen of 30 SPF of higher. An index of 8 to 10 would be very high risk, with the same precautions as above, but even less exposure to midday sun. An index of 11 or higher is rated as an extreme risk.

Some TV stations display maps of these UV forecasts. The public also can get UV Index forecast from the NOAA web site - www.noaa.gov. From this website, you can get UV Index forecasts in table form for the following day for many cities across the country. The forecast is also available in map form (figure 1).

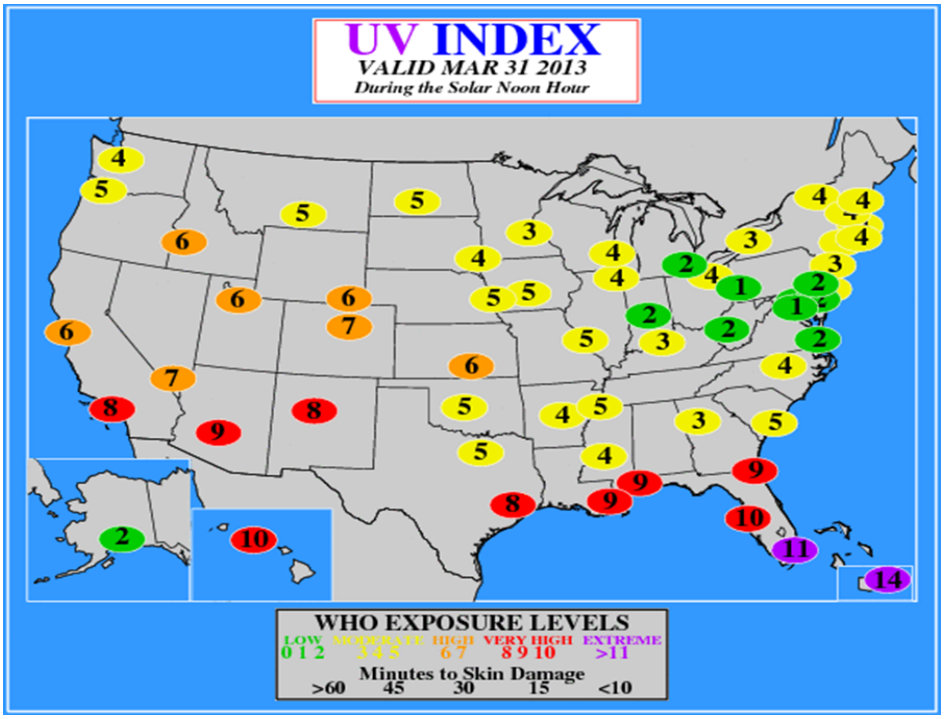


Figure 1. UV index forecast map

So as we head toward summer, take care, enjoy the sun but don't be overexposed to it!

The Dangers of Summer Heat

Mike Dangelo—Senior Forecaster

One of the top weather-related killers every year is Excessive Heat. An average of more than 100 people die each year in the United States due to heat-related causes. The most insidious thing is that this deadly phenomenon is most likely to kill people right in their homes. Most of the heat-related deaths in 2011, the latest year for which data is available, were in a permanent home. Also, 170 out of the 206 documented heat-related deaths in 2011 were people age 50 and older.

The human body normally self-regulates the temperature through sweating. The sweat droplets on the skin evaporate. This evaporation takes energy to do. The energy for evaporation comes from the heat of the skin surface. The skin cools just a bit as the heat energy is used to evaporate the sweat. The danger of heat exposure is that the body becomes so hot that normal heat-regulation becomes insufficient.

Heat waves are most-deadly in urban areas. Many of the victims are found in homes which do not have air conditioning. Therefore, it is important to check on neighbors and relatives who may not have air conditioning. Many elderly folks have trouble getting around, which can make it difficult for them to find a cooler place to be. While it may be difficult to persuade people to leave their home, a trip to an air conditioned mall for some window shopping may be a helpful and life saving suggestion. Fans and cool baths may also help keep a person's body temperature cooler.

For those who are able to avoid the heat, it is important to recognize other potentially dangerous situations. Examples of these situations are those who must work outside, like construction workers, police officers, fire fighters, and even lifeguards. Children should also be watched carefully for heat illness since they may not recognize the symptoms of heat-stress. Children should never be left unattended inside automobiles. More than 30 children die each year in cars due to elevated temperatures. People exercising may suffer from heat-related illness if they lose too much fluid to produce sweat sufficient to cool the body down from the elevated temperature. Taking breaks from the heat by going inside - or even to shade – may help just enough to keep their body from overheating.

People who become heat-stressed usually develop symptoms before the condition becomes life-threatening. Cramps, general weakness, fainting, excessive sweating, or worse yet, lack of sweat, usually precede the most-severe form of heat-related illness: Heat Stroke. Heat Stroke is a medical emergency where a person has a severely elevated body temperature (usually 106 degrees or higher). If someone exhibits the signs of Heat Stroke, like hot dry skin, a rapid pulse, or even unconsciousness, summon professional medical help immediately. They will need to have their skin cooled immediately, and brought to a hospital.

The National Weather Service issues Excessive Heat Outlooks (on a national scale) and Heat Advisories, Excessive Heat Watches, and Excessive Heat Warnings (on the local scale) to alert people to weather conditions which will create an elevated risk for heat-related illnesses to occur. Outlooks and Watches are issued when Excessive Heat (Heat Index of 105 degrees or more) are possible in the next few days. Heat Advisories are issued when the Heat Index is expected to be 100 degrees or greater. A Heat Advisory means that the danger of heat-related illness is imminent or occurring, but usually confined to high-risk groups. Excessive Heat Warnings are issued when a Heat Index of 105 or greater is imminent or occurring. At these temperatures and humidities, the danger of heat-related illnesses extend to the entire population.

To lower your risk of developing a heat-related illness take care to:

- Stay cool inside air-conditioned places,
- Wear light clothing,
- Drink plenty of water,
- Exercise when the temperatures are cooler (in the morning and evening),
- And stay out of the sun as much as possible.

Again, remember to keep a watchful eye on those people who have a higher risk of developing heat-related illness, like the elderly, children, workers who are outside for extended periods, and those with other health problems. And lastly, don't forget pets, they can overheat too!

Update Your Spotter Information

Bill Gartner—General Forecaster

Please help us to keep your contact information up to date. While we hope to get a report from you when severe weather occurs, from time to time we call or email spotters to investigate significant storms. Thus, it is important to keep your contact information current. If any of your contact information (name, phone number/s, addresses, etc) has changed recently, please let us know. Send an email or 'snail mail' note to us at one of the addresses below.

email: william.gartner@noaa.gov

U.S. mail:
William Gartner/Skywarn Spotter update
NWS/WFO State College
328 Innovation Blvd, Rm #330
State College, PA 16803

If you are not sure if we have the most up to date information on file, go ahead and send us an email or note with your current information and we will verify it.

Please note that your personal information (address, phone #, email mail address, etc) is NOT shared with or given to anyone outside of the NWS (unless your permission is gained first) and is used only to contact you in the event of severe weather, send you SkywarnNews, or communicate important program changes.

SkyWarn Training Classes now in Session

If it has been a while since you attended a SkyWarn training class, the Spring and Summer months are a good time for a refresher. This is the time of year when they are offered most often. Check our web page at the following link for an up-to-date list of classes across central Pennsylvania.

- http://www.erh.noaa.gov/ctp/safety/skywarn/CurrentTalks.php
- Be sure to register for the class by following the instructions on the page.

Warm season reporting criteria:

For your convenience, a list of reporting criteria is available on our web page, www.weather.gov/statecollege. Click on "**Send Us Reports**" in the left-hand column. It is the fourth selection under the **Current Hazards** header.

- **Tornadoes or funnel clouds** (be very wary of look-alikes; watch for rotation)
- **Wall clouds**, especially if they are rotating
- **Hail** of any size (Please be specific with regard to size when you call)

Quarter-Size (1") and larger is severe!

Other sizes/descriptions to use for hail:

* Pea 0.25 - .375 inch
* Small marble 0.50 inch
* Penny 0.75 inch
* Nickel 0.88 inch
* Quarter 1.00 inch (15/16")
* Half dollar 1.25 inch
* Walnut/Ping Pong 1.50 inch
* Golf ball 1.75 inch
* Lime 2.00 inches
* Tennis Ball 2.50 inches
* Baseball 2.75 inches
* Large Apple 3.00 inches
* Softball 4.00 inches
* Grapefruit 4.50 inches
* Computer CD/DVD 4.75 - 5.00 inches

- **Wind Gusts** (40 mph or greater; specify whether estimated or recorded)

  large branches downed (specify diameter of branch)

  Trees/power lines downed

  Structural damage to buildings (roof, windows, etc.)

- **Rainfall**

  1 inch or greater in an hour (NOT a 1"/hr. rate for 10 minutes)

  2 inches or greater storm total

- **Flooding**

  Streams/Rivers -- also, when nearing bankfull

  Street (when more than the usual poor drainage puddles)

Meteor Showers (and Meteors!) of 2013

Barry lambert—Senior Forecaster

The Chelyabinsk, Russia surprise meteor that occurred on Friday, February 15, 2013 (and coincidentally on the same day as the passage of asteroid 2012 DA14) was the most dramatic event associated with a space rock since the tremendous air blast over Tunguska, Siberia on June 30, 1908 that leveled 80 million trees over 830 square miles (Figure 1). That asteroid was estimated to be about 30 meters in diameter and weighing 617,300 metric tons (1.4 billion pounds!).

Fig 1. Trees blown down across Tunguska Siberia in 1908 from the air blast of a large meteor.

The recent February asteroid (Figure 2) was estimated to be about 17 meters in diameter, weighing about 10, 000 tons. It raced through the earth's atmosphere at a shallow angle of 20 degrees at a speed of around 42,000 mph and exploded around 12-15 miles above earth's surface. It originally came from the asteroid belt, but was totally unrelated to the highly advertised and much anticipated passage of asteroid 2012 DA14 later that day.

Fig 2. Dashboard camera photo of the Chelyabinsk, Russia meteor around 9:20 am local time on Feb 15, 2013.

Although another event similar to what occurred over Russia this year (and over 100 years ago) isn't likely during the rest of 2013, we'll still be treated to some rather vivid displays of "much smaller", celestial objects streaking through the night sky.

The following is a listing of the more noteworthy meteor showers that lie ahead for the rest of this year.

April 22, 2013 – Lyrids

This event typically contains bright meteors that often leave illuminated trails. They fall at a peak rate of around 10-20 per hour. This meteor shower can occur with as many as 100 per hour. The radiant from which this meteor shower emanates is within the constellation Lyra, which rises in the northeast sky late in the evening. The waxing gibbous moon will light up the nighttime sky until the very early morning hours this year. Fortunately, the greatest number of Lyrids occurs during the few hours prior to dawn.

May 5, 2013 – Eta Aquarids

This meteor shower contains a rather broad maximum, but the greatest frequency will occur just before dawn on May 5th. This year's Aquarids won't be affected much by the last quarter or slight waning gibbous moon. A frequency of 10 to 20 meteors per hour can be expected. The radiant for this meteor shower will be found in the east-southeast sky around 4 am local time. The extended peak to this meteor shower means that some could be seen a few days before (and after) May 5th.

July 29 and 30, 2013 - Delta Aquarids

Similar to the Eta Aquarids, this shower will favor viewers in the Southern Hemisphere, and the tropical latitudes in the Northern Hemisphere. The slight waning gibbous or last quarter moon will somewhat obstruct this year's Delta Aquarids. The meteors will appear to radiate from the southern segment of the sky, near the star Skat (Delta Aquarii). Although the maximum rate can reach 15-20 meteors in a dark sky, these rather faint meteors will have difficultly overcoming the interfering moonlight this year. The absence of the moon in 2014 will make next year a favorable one for viewing this mid-summer celestial show.

The Delta Aquarids don't have a very definite peak (like most other meteor showers), despite the dates indicated above. Instead, these medium-speed meteors ramble along fairly steadily during the period from late July through early August. The peak viewing time is usually an hour or two before dawn. The best time to see the Delta Aquarids this year may be in early August, when the dimmer light of the waning crescent moon will be less obtrusive.

August 10-13, 2013 Perseids

The Perseids stand a good chance of being the best meteor shower of the late Summer months of 2013 (and perhaps the best of the entire year!) given the earlier viewing time after midnight, and the fact that the waxing crescent moon will set during the evening hours this year. This timing of the "moonset" will provide dark skies for watching the Perseid meteor shower.

Moonset times are available from the custom calendar via this link - http://www.sunrisesunset.com/predefined.asp

The Perseids are typically fast and bright meteors. Their radiant lies in the constellation Perseus the Hero. Fortunately, you don't have to be familiar with the exact location of Perseus, since the meteors will appear in all parts of the sky. The Perseids contain a peak of 50 or more meteors per hour in a dark sky, and are considered by many observers to be the best meteor shower of the year. The Perseids tend to strengthen through the night and typically produce the most meteors in the wee hours of the morning, shortly before dawn. These meteors are bright and regularly leave behind persistent trains.

October 7, 2013 Draconids

The radiant point of the Draconid meteors is near the head of the constellation Draco - the Dragon in the northern sky, which is the very reason why this meteor shower is best viewed across the Northern Hemisphere. The Draconid shower is quite the oddity, because the radiant point is highest in the sky as darkness falls. Unlike most other meteor showers, the Draconids are more likely to be viewed in the evening hours compared to the early morning hours. This shower typically contains a lower frequency of meteors, producing just occasional meteors in most years. In rare instances, the fiery Dragon Draco has been proudly produced hundreds of meteors in a single hour. This year's thin waxing crescent moon won't cast enough moonlight to significantly interfere with the show. Attempt to set aside your time to view this event at nightfall and during the early evening hours on October 7 and 8.

October 21, 2013 Orionids

The Orionids this year will occur during quite "unfavorable" conditions, as a result of a bright, waning gibbous moon. On a dark, moonless night, the Orionids would likely exhibit a maximum of about 10 to 20 meteors per hour. These fast-moving meteors occasionally leave persistent trains and bright fireballs, so there's a chance that you may see a few of the more prominent Orionids in the moon-drenched skies. The radiant of these tiny space objects rests in the Club of the famous constellation Orion the Hunter. You might be familiar with Orion's bright star Betelgeuse. The radiant to this meteor shower is just north of Betelgeuse. The Orionids typically have a peak during the wee hours before dawn.

November 4-5, 2013 South Taurids

The stream of meteoroids that fuels both the South (and North) Taurids is very spread out in time and "dissipated". The result is that the Taurids are very long lasting throughout most of the fall (September 25 to November 25) but usually don't display more than about 7-10 meteors per hour. On the bright side, the Taurids are legendary for their high percentage of fireballs – exceptionally bright and long-lasting meteors. The other, later Taurid shower – the North Taurids of November 11-12– should tack on a few more meteors to the mix. Luckily, this year's thin, waxing crescent moon will set during the early evening hours, leaving dark skies for the peak night occurrence of the South Taurid meteor shower. The South Taurids are expected to produce the bulk of its meteors during the wee hours on November 5. Just one bright Taurid meteor can make this quite a memorable event for you and your family!

November 17-18, 2013 Leonids

The full moon will make 2013 an unfavorable year for watching the Leonid meteor shower. Its radiant is from the constellation Leo the Lion. The famous Leonid meteor shower has produced some of the greatest meteor storms in history – with the most recent being in 1966. An astonishing rate of thousands of meteors per minute was observed during a span of 15 minutes on the morning of November 17, 1966. On that magical night in 1966, the meteors appeared to fall like rain from the clear, crisp late autumn night. Leonid meteor storms sometimes recur in cycles of 33 to 34 years. However, the Leonids that occurred around the turn of the century – while brilliant for many observers didn't come close to matching the tremendous shower of 1966. During most years the Lion turns out to be more of a pussy cat rather than roaring, and produces just 10-15 meteors per hour on a dark night. Similar to many meteor showers, the Leonids peak just before dawn. This year, the full moon will shine all night long, leaving no dark time for viewing the Leonids.

The monthly star chart to locate the radiant of each meteor shower can be found from this link -

http://www.telescope.com/content.jsp?pageName=Monthly-Star-Chart

Happy Star-Gazing!

As many of you know, over the last year we have established a presence on both **Facebook** and **Twitter**. This provides new and easier ways for us to interact with you. These social media outlets allow us to post updates that may pique your interest on the weather system or event of the day. Perhaps more importantly, they also allow us to hear from you in a more informal and robust fashion. We encourage everything from reports on the amount of snow or rain you have had to information on what is going on that may or may not be in the forecast.

Facebook allows for posts of varying lengths and is very friendly to graphical posts while **Twitter** is limited to posts that are no more than 140 characters in length, thus geared more to short precise information bursts that may or may not contain links to pictures or videos.

Using either platform, we look forward to hearing from you!

Remember when using **Twitter** keep messages short and concise (140 character limit). Because of this, abbreviations and punctuation may be used in such a way to keep the messages brief but still decipherable. A key characteristic of **Twitter** is the use of "hash tags". While not necessary, they are encouraged as they allow for easy categorizing and searching. Hash tags start off with the "**#**" (pound sign) character and help other **Twitter** users to find and procreate (re-Tweet) your information. An example we use here at the State College is **#ctpwx**. ***CTP*** is the "call sign" for our office and "**wx**" is the abbreviation for ***weather***. So a report may look something like **#ctpwx 4 inches of snow in your town and it's still snowing hard**. Another hash tag we search for is **#pawx** but these aren't the only ones. If you have a severe thunderstorm you may want to tweet something like #ctpwx #severethunderstorm in your town at the time. The idea is to fit as much information into that 140 character limit as possible and still be descriptive enough to convey what is happening and where.

find us on facebook

follow us on twitter