



SKYWARNEWS



National Weather Service State College, PA

Fall 2012

“Working Together To Save Lives”

Summer in Review

John La Corte, Senior Forecaster

In case anyone is wondering, the recent string of warmer than normal summers continued this year. In fact, it seems like this is becoming an old story. Cooler than normal conditions have become a rarity over recent years, fueling the debate over whether or not Global Warming is the culprit. Figure 1 shows that we have had just three seasons in the last five years where our two official climate stations both had below

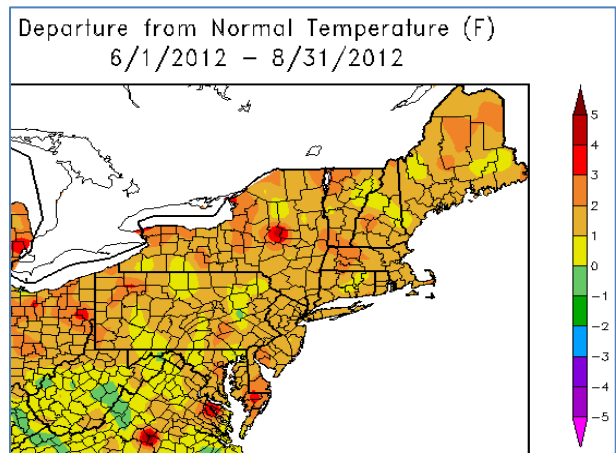


Figure 2. Summer 2012 Temperature Departure

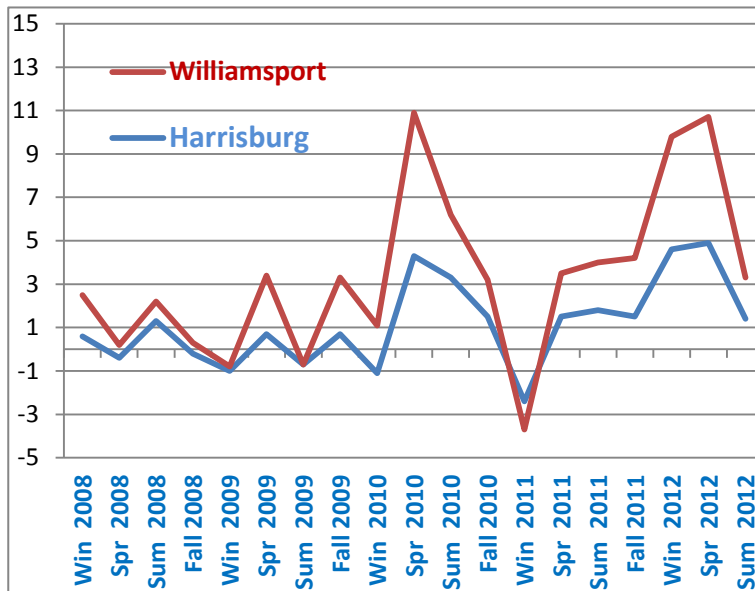


Figure 1. Seasonal Temperature Departures for Harrisburg and Williamsport Since 2008

normal temperatures, and two others where one of the sites was chillier than normal.

Precipitation-wise, the picture wasn't so decisive. We suffered through a very dry couple of weeks in July which seemed to exacerbate the warm conditions, but overall we had regions of above normal precipitation bordered by regions of below normal precipitation (Figure 3). The lower Susquehanna Valley ended up the wettest compared to climatology with amounts about 150% above normal overall.

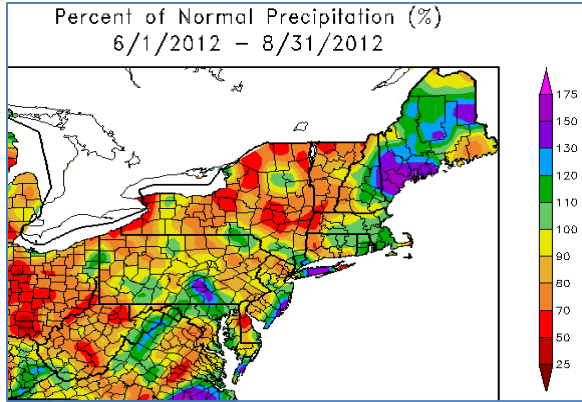


Figure 3. Summer 2012 Precip Departures

The biggest question for the upcoming months is if the warmth will continue? The recent development of an El Niño pattern has been factored into the long range climate model output by the Climate Prediction Center and the official outlook calls for a good chance of what would be our second consecutive warm winter. In fact Figure 4 shows that the entire northern 1/3 of the United States has a good chance of experiencing a warmer than normal winter.

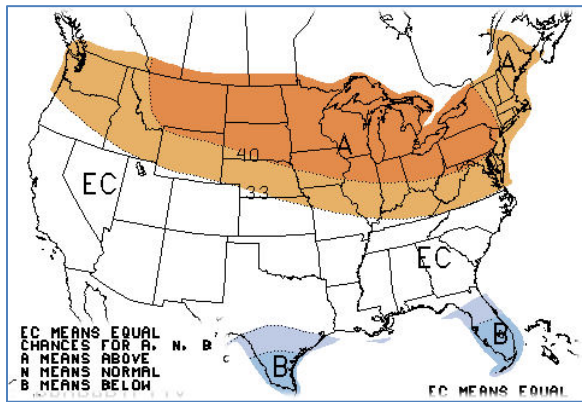


Figure 4. Winter 2012 Temperature Outlook

The expected winter precipitation doesn't show nearly as coherent a signal. Figure 5 shows that with the predicted El Niño winter pattern, the area from the California eastward to the Gulf and Southeast Atlantic coastal states should expect an increased likelihood of being wetter than normal.

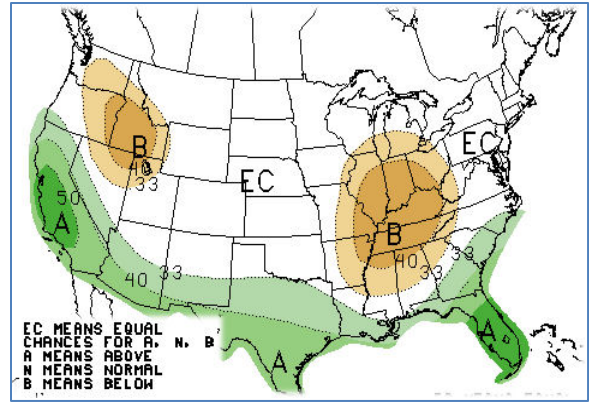


Figure 5. Winter 2013 Precipitation Outlook

Much of the Tennessee and Ohio Valleys favor drier than normal conditions, while locally we have what is known as "Equal Chances". What this means is that the local signal under this pattern is too weak to be predictable.

Of course no seasonal outlook would be complete without considering what The Old Farmer's Almanac expects for the region. They have been making forecasts for the United States since the 1790s. They claim an accuracy rate of over 80% and have become a revered part of weather forecasting lore. This year their outlook differs from the Climate Prediction Center's, calling for a cooler and drier than normal winter for our part of the world.

As usual, whatever unfolds over the next several months, we will be here bringing you daily updates and will talk about it all again in the upcoming Spring newsletter.



Hydrology Update

Charles Ross, Service Hydrologist

Hello fellow weather enthusiasts. First I wanted to thank everyone for all the help you give us by providing timely rainfall and flooding reports to our staff. Your help is much appreciated and critical for our staff to do their jobs.

As a quick reminder, we are looking for significant rainfall totals, generally greater than 2 inches of rain from a storm or locally intense rain, such as 1" in 60 minutes or less. If you see or hear of flooding, please inform us. We like to know when it started and your location.

As for flooding impacts, we are interested in significant water on roads or intersections, especially if a stream or river is out of its banks. If you hear of road closures, flooded basements, damage to structures, mudslides or water rescues please share that information with us. And with winter approaching, please report any ice jams immediately.

Finally, I'm working on compiling a list of known and repetitive flood locations. If you know certain areas near where you live that are particularly flood prone please share them with me. It would be helpful to have the township or town that the flooding occurs in as well. If you have any pictures, that would be welcome as also. My email address is Charles.Ross@noaa.gov.

Thanks again for taking the time to help us, and have a great Fall!

Join us on Facebook and Twitter

John La Corte, Senior Meteorologist

Our office has entered the world of social media! Over the last several months we have unveiled our Facebook and Twitter pages, so now you can follow us more easily than ever.

Our Facebook page can be found at:

<http://www.facebook.com/US.NationalWeatherService.StateCollege.gov>

and our Twitter page can be found at:

<http://twitter.com/>

Once you get to the main Twitter page, use the search box and enter "@NWSStateCollege" to find us.

We welcome your input on both pages, especially reports of significant or severe weather. You also can post pictures and video of what you see as well, which will be of great help to us in our forecasting and verification programs. If you post pictures or video, we ask you tell us where and when they were taken, be as descriptive as possible.

Lastly, when using Twitter, we suggest you use "hash tags". These are a special formatting technique that will allow us to search for and view your posts. The two hash tags we use and search for are #pawx and #nwsstatecollege. An example Tweet might be "**#pawx we have 1 inch hail here in Yourtown and it started at 1PM**". Twitter posts have a 140 character limit so you have to be succinct!

We look forward to seeing your reports!



The Call to Action and Threat Perception

Mike Dangelo, Senior Meteorologist

One of the buzz-phrases currently flying around meteorological circles is “Threat Perception.” This phrase is central to the core mission of the National Weather Service: To issue forecasts and warnings to protect life and property. The reason for our interest in threat perception is our goal to successfully convey the danger of a weather event to the public through our warnings and various outreach activities. But, threat perception is a socio-psychological process.

The most obvious weather threats to public safety are tornadoes and hurricanes. So it stands to reason that the more-recent socio-psychological research on reaction to warnings has focused mainly on reactions to tornado and hurricane warnings. However, lightning, flooding, heat –related illness, and wind damage from severe thunderstorms are other incidents which also pose grave and frequent threats to public safety. In fact, heat-related illnesses are historically the most deadly of all these threats. See: http://www.nws.noaa.gov/os/hazstats/resources/weather_fatalities.pdf

Weather warnings issued by the NWS contain information on both the dangers which are expected, and what actions people may take to lessen the chances for them to be injured or killed, and may also help them to reduce the possibility of damage to their property. The information we provide in the warnings comes in bite-sized statements known as “Calls to Action.”

For example: “THE SAFEST PLACE TO BE DURING A TORNADO IS IN A BASEMENT. IF YOU ARE IN A SCHOOL OR MULTI-FLOOR BUILDING THE SAFEST PLACE WILL BE AN INTERIOR ROOM OR HALLWAY. MOVE TO A PLACE OF SAFETY IMMEDIATELY. ”

For decades, the NWS has included these statements in our warnings. One of the first training classes I had twenty years ago when I started my career in the NWS was a course on how to compose warnings which convey the risks to the public and – just as importantly – to give them information on how to protect themselves.

But, the warnings and the Calls to Action they contain will only help people stay safe if the warning:

- 1) is received in advance by those who will be affected,
- 2) accurately conveys the dangers posed by the weather at that time, and
- 3) leads to some protective action by the people in danger.

Through the warnings the NWS issues, we and our media partners can supply parts 1 and 2 above. What action the person will take is ultimately up to them or to a caregiver. The decision on what the person does is the bridge between the first two parts and part 3 (action) of an effective warning.

Sometimes the action needed is just a cautious course of action like: not staying outside in a thunderstorm, not driving through water flowing over a road, or to keep as cool as possible during hot weather, etc. However, at other times the action required may be more immediate and drastic like: taking cover in the basement when in the path of a tornado, or

evacuating or sand-bagging around your property before the river overflows its banks.

The recent studies have determined that response to a warning can be divided into six general but perhaps complex steps (not in a specific order):

- 1) Understanding the warning
- 2) Believing the warning is credible
- 3) Confirming the threat
- 4) Personalizing the threat
- 5) Determining whether protective action is necessary
- 6) Determining whether the protective action is feasible

Threat perception is really the combination of the first four of these steps.

While each step in threat perception is important, studies show that people may receive the warning in plenty of time to keep themselves safe, and believe that the warning comes from a credible source, but they may wait for multiple warnings, or search for more information to lead them to believe the threat to be personal. People will not take protective action if they do not perceive a personal threat.

For example: A person may hear the warning on the radio, but wait for a siren, or check the TV for more information; or view radar on the internet; or even call a friend; or all of the above. Worse yet, even though they heard that there was a tornado warning in effect for their location, they may even wait for personal confirmation of the threat (to see the tornado coming) before acting. This is because people feel the need to confirm the threat in order to tip the scale toward protective action. Perceiving the threat may take them additional

time, or it may never come to fruition, and could lead to indecision or indifference.

As SkyWarn Spotters, you can help the NWS in our mission. You can help people you know. So, here is your Call to Action: Please help the people around you to learn of the NWS and our work to keep them safe. Urge them to have multiple means to receive weather watches and warnings in advance. Help them to understand the dangers of each particular weather situation, and what they can do to stay safe. These steps could help them to appropriately perceive the weather threat, and make a quick decision to take the safest action.

How Did We End Up With Punxsutawney Phil?

John La Corte, Senior Meteorologist

Ever wonder how February 2nd became known as Groundhog Day? It seems that the modern Groundhog Day has its origins in the Old World with an ancient celebration of the midpoint between the Winter Solstice and Spring Equinox. What began as the Christian celebration known as Candlemas eventually became better known for the folklore associated with the changing of the seasons.

German settlers to Pennsylvania brought with them this folklore. In Europe they observed hibernating hedgehogs (some sources say badgers) which generally woke up for a time from their winter nap in early February. According to the lore, when the hedgehog peeps out of his winter quarters and sees his shadow, he returns to hibernate for another six weeks. But if the day is cloudy he remains out, as the weather will be mild. Well hedgehogs are not native to North America but groundhogs

are, so the industrious Germans decided to use our local furry equivalent.

Apparently it is normal for the animals to awake for a few days in late winter and begin wandering around. The males tend to set up territories, fend off other males and begin to court the females (I wonder where they get flowers in February?)

The earliest American reference to Groundhog Day can be found at the Pennsylvania Dutch Folklore Center at Franklin and Marshall College: *February 4, 1841 - from Morgantown, Berks County (Pennsylvania) storekeeper James Morris' diary... "Last Tuesday, the 2nd, was Candlemas day, the day on which, according to the Germans, the groundhog peeps out of his winter quarters and if he sees his shadow he pops back for another six weeks nap, but if the day be cloudy he remains out, as the weather is to be moderate."*

According to the National Climatic Data Center our modern day tradition originated in 1886. The editor of the local newspaper, The Punxsutawney Spirit wrote, *"Today is Groundhog Day and up to the time of going to press the beast has not seen its shadow."* The groundhog was given the name "Punxsutawney Phil, Seer of Seers, Sage of Sages, Prognosticator of Prognosticators, and Weather Prophet Extraordinary. For his debut performance: he didn't see his shadow thus an early Spring was forecast. Gobbler's Knob



became the accepted location of this now legendary event the next year.

Of course we don't really believe groundhogs (or woolly caterpillars or squirrels gathering nuts) can really forecast the weather. In fact, all one

has to do is look at the calendar and notice that the astronomical spring arrives less than 7 weeks after February 2nd regardless of if the chubby little rodent sees his shadow or not. But it's all good fun and gives folks a reason to have a party in the middle of the winter.

Expected Winter Precipitation and Temperature Departures over the Northeast U.S.

Barry Lambert, Senior Meteorologist

It's been a while since residents of Pennsylvania have experienced a prolonged cold and very snowy winter. The question now is "Will we see a continuation of these fairly tranquil and snowless winters this year, or does Mother Nature have a cold, harsh trick up her sleeve?"

We set out to examine what the primary large scale factors will likely be over the next several months, and try to define their role in dictating the jet stream pattern and related sensible weather.

The following link shows the NWS Climate Prediction Center's 3 month temperature and precipitation outlook for December 2012 through February 2013.

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=3

The first of the CPC maps which depicts temperature departures, indicates that much of the northern U.S. stands to see better than equal chances for above normal temperatures, with the highest probability from the Mid-Mississippi River Valley, east to the Mid-Atlantic States. There is no strong signal for precipitation to depart from normal across the Northeast U.S.

This anticipated, large scale weather pattern coincides with a well-defined El Niño event over the equatorial Pacific. Figure 1 shows what a

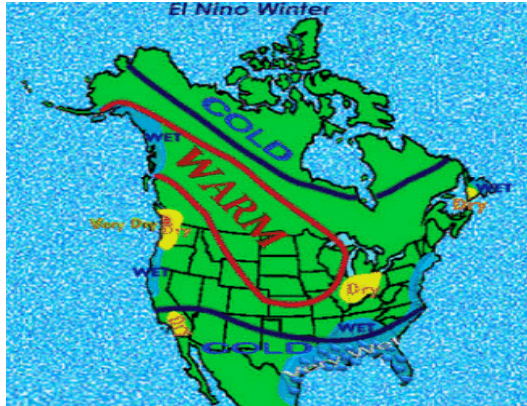


Figure 1. Typical Winter Weather across North America during an El Niño.

typical winter looks like across the US with El Niño in progress.

While it's useful to know what a typical El Niño does to the weather pattern, do you know what defines an El Niño? The following are some details that describe an El Niño/Southern Oscillation (ENSO) episode.

First, lower than normal pressure is observed over the eastern tropical Pacific and higher than normal pressure is found over Indonesia and northern Australia. This mean sea level (MSL) pressure pattern creates weaker than normal near-surface equatorial easterly winds and as a result, we observe warmer than normal water pushed toward the central and eastern portion of the basin

During these warm ENSO episodes the normal patterns of tropical precipitation and atmospheric circulation are disrupted. The abnormally warm waters in the equatorial central and eastern Pacific enhance cloud cover and rainfall across that region, especially during the northern hemisphere's winter and spring seasons.

Coinciding with these ENSO events, reduced rainfall is seen over Indonesia, Malaysia and across northern Australia. The normal circulation during winter and spring, highlighted

by rising air, cloudiness and rainfall over Indonesia and the adjacent western Pacific, with sinking air over the equatorial eastern Pacific, becomes weaker than normal. During strong El Niño episodes this pattern may actually reverse.

The greater heat transfer from the ocean to the atmosphere over the tropical central and eastern Pacific during warm episodes, significantly affects atmospheric circulation features, such as the configuration of jet streams across the sub-tropics, and also throughout the temperate latitudes of the northern hemisphere. The jet streams over the eastern Pacific Ocean are observed to be stronger than normal during warm, ENSO episodes.

So, you may ask, "What's in store for us this winter here in Pennsylvania?" The answer ultimately rests on just how strong and persistent the present El Niño episode will be over the next several months.

Throughout a warm ENSO episode in a northern hemisphere winter, mid-latitude low pressure systems are typically stronger/deeper than normal across the eastern North Pacific, which helps to bring abnormally warm air northward into western Canada, Alaska and the far northern portion of the lower 48 states. Storms also tend to become anomalously strong near the U.S. Gulf and southeast coasts of the United States, which results in cooler and wetter than normal conditions over those areas. Occasionally, some of these intensifying areas of low pressure take a left turn, and move northward up the Mid Atlantic Coast, hammering the Central Appalachians and Northeastern United States with heavy snow and gusty winds, followed by a brief cold snap.

Here is an excerpt taken from the CPC's most recent (early September 2012) El Niño /Southern Oscillation (ENSO) Diagnostic Discussion –

“Most of the dynamical models, along with roughly one-half of the statistical models, now predict the onset of El Niño beginning in August-October 2012, persisting through the remainder of the year. The consensus of dynamical models indicates a borderline moderate strength event (Niño 3.4 index near +1.0°C), while the statistical model consensus indicates a borderline weak El Niño (+0.4° to +0.5°C). Supported by the model forecasts and the continued warmth across the Pacific Ocean, the official forecast calls for the development of most likely a weak El Niño during September 2012, persisting through December-February 2012-13 (see CPC/IRI consensus forecast)”.

We have some reason (here in early October) to depart from this general forecast of the long range weather pattern for the upcoming winter. Although Nino 1+2 regions still have slightly warmer than normal near surface water, the area of most anomalously warm water has been shifting steadily west, with signs of a weak La Nina (cooler than normal waters across the equatorial eastern Pacific) developing.

You can hit the red animate button at the upper right of the image in the following link, and note the recent cooling trend to the near surface waters between 100W and 140W longitude.

<http://www.pmel.noaa.gov/tao/jsdisplay/>

A more detailed explanation of what El Niño is and what the Climate Prediction Center looks at to make their forecasts, along with charts and figures can be found at:

<http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml>

In summary, details of specific snowfall amounts and distribution here in Central Pennsylvania will obviously depend on the frequency, intensity and exact track of significant east coast storms and Alberta Clippers. The potential for a developing La Niña complicates the long-term seasonal outlook.

Still, this winter season could be shaping up to be quite active and snowy here in the northeast U.S.

We Need Your Reports Year-Round

Bill Gartner, General Forecaster

As we head toward the colder months, when thunderstorms occur less frequently, we still need to hear from you. Your spotter reports help us to monitor ongoing winter storms, determine the need for possible changes to advisories and warnings, and provide real-time snowfall totals to the public, news media and other partners, and other NWS offices. Your reports are also used to verify our watches and warnings, as well as to prepare storm summaries and **snowfall total** maps of winter events. So even if you are not able to call in reports during a storm, but can give us a post-storm total snowfall, we'd still love to hear from you when the storm is over.

Please report the following:

Snow:

- When snow accumulation reaches 3 inches
- When snow accumulation reaches 6 inches
- Storm total after the snow ends (also water equivalent if possible)
- If snow is falling at the rate of more than 1 inch per hour

Ice:

- Any occurrence of or accumulation of freezing rain
- Accumulation of ice of ¼ inch or more on trees or wires

Other:

- When forecast winter precipitation differs

significantly from observed (i.e. snowing with no snow in forecast, sleet...when only snow is forecast...)

- Any other significant weather occurrence/oddity (i.e. flooding due to snow melt/ice jam, damage from strong winds not associated with a thunderstorm)

And, remember thunderstorms that produce wind damage and flooding rains are still possible even in winter.

*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, the third selection under the Current Hazards header. Then scroll down to the bottom half of the new page.

Update Your Spotter Contact Information

Bill Gartner, General Forecaster

Have you moved recently? Gotten a new phone number? Please help us to keep your contact information up to date. From time to time we call our spotters when significant weather is in their area to provide us additional ‘ground truth’. Thus it is important to keep your contact information current. If any of your contact information (name, phone number/s, addresses, etc.) has recently changed, please let us know.

Also, if you *no longer wish to be a spotter or no longer wish to receive SKYWARNEWS*, please drop us a note.

Finally, if you would like to be notified via email when a new issue of SKYWARNEWS is posted to

our webpage, send us your email address, if you have not already done so. If your email address changes be sure to let us know. You wouldn’t want to miss the next issue or SKYWARNEWS would you?

Send an email or ‘snail mail’ note to us at one of the addresses below. Thank you!

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

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Where is All the Polar Ice?

John La Corte, Senior Forecaster

To those who follow weather and climate stories closely, you know that over the last few years much has been written about global warming and climate change. One of the stories that have surfaced repeatedly lately is the shrinking of the Arctic ice cap.

Once again this year Arctic sea ice shrunk to record low levels (Fig 1). By mid-September, the ice had finally stopped disappearing, but by then ice only covered about 1.3 million square miles, which is about 24 percent of the Arctic Ocean. The previous low was in 2007 when the ice shrank to 29 percent coverage.

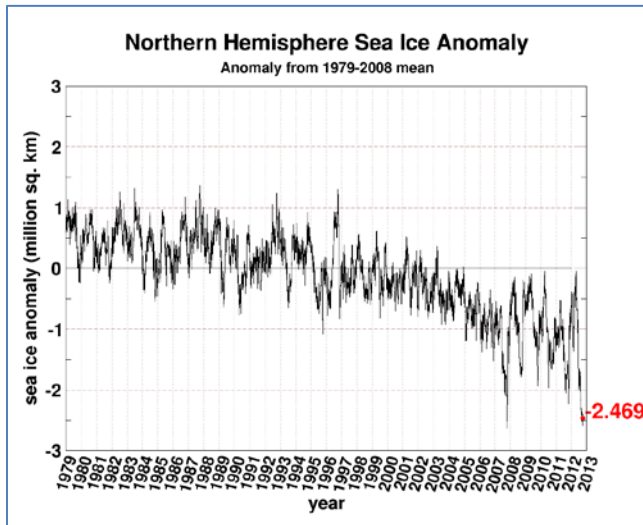


Figure 1. Arctic Sea Ice Anomalies

Figure 2 shows how far below the 30 year average the ice cover was as of mid-September when it began its annual rebound.

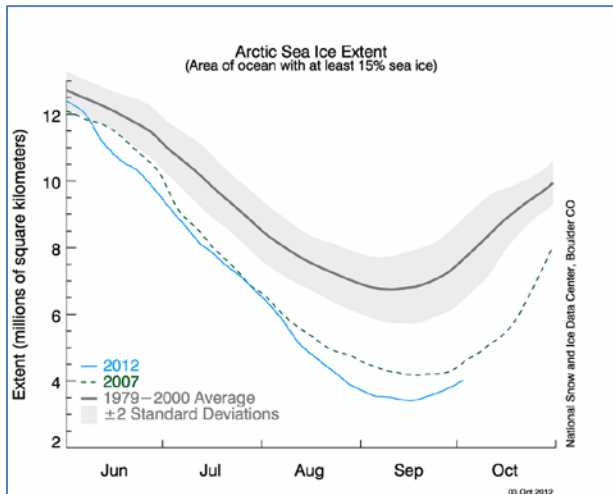


Figure 2. Arctic Sea Ice Extent

To get an idea of how much below normal the coverage is, notice on Figure 3 how much of the white area falls within the magenta line which denotes what the normal ice cover should be for this time of year. Satellite tracking of polar sea ice has been going on since the late 1970's. Back then sea typically melted back to about 50 percent coverage. The increase in melting has potentially large implications to the climate as a whole. Ice and snow, being white, reflect most

of the Sun's energy back out to space, limiting atmospheric heating. When the ice goes away, the darker waters absorb more energy resulting in a cycle of warming that works to further melt ice and snow. It's called a feedback loop.

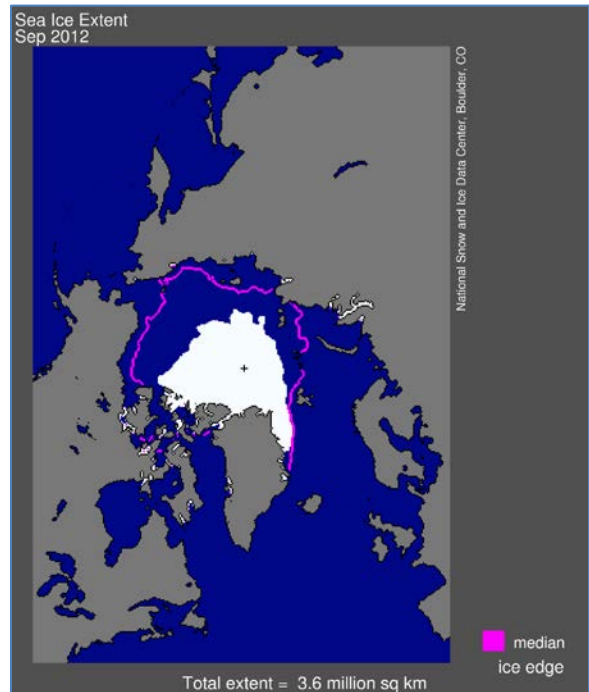


Figure 3. Arctic Ice Cover vs. Normal

Now while the ice has stopped melting for this year and the Arctic winter is fast approaching, each year the ice that reforms is thinner and more prone to melting the following warm season. Latest estimates are that the Arctic could be totally ice free in the summer as soon as 2020, something that has not happened in literally tens of thousands of years!

As we see the northern hemispheric ice rebound from record low levels, on the other end of the world Antarctic Sea ice has actually registered a 33 year high. On September 26 ice was estimated to cover 7.5 million square miles. That's slightly more than the previous record set in 2006. While that may seem impressive, the trends upward in the southern hemispheric

ice are dwarfed by the trends downward in the northern hemisphere. There are many reasons that the South Pole is reacting differently and more slowly than the North Pole, but at least one reason given is that the Arctic Ocean is relatively small, shallow and surrounded by land whereas the Antarctic is a massive ice covered continent surrounded by a vast expanse of deep ocean water.

The implications of this are complex, but at least one aspect of the governing geography has allowed for the Arctic Ocean to remain relatively sheltered and segregated from warm ocean currents which aided in keeping it largely frozen year round. The Antarctic in contrast is surrounded by ocean, and while the ice cap grows in the winter, it correspondingly melts in the summer. In fact, as much as 80 percent of the South Polar ice comes and goes each year.

That's what is happening and what has been happening, but experts still argue about why it's happening. While the debate for causes rages on, what seems evident is that the changes that are taking place are large and potentially very serious. From loss of habitat for wild life to migration of fishing areas to changes in vegetation or even invasion of damaging or disease carrying insect species, the changes are taking place and we cannot run and hide from them.



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