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Shifting into Autumn

IN THIS ISSUE

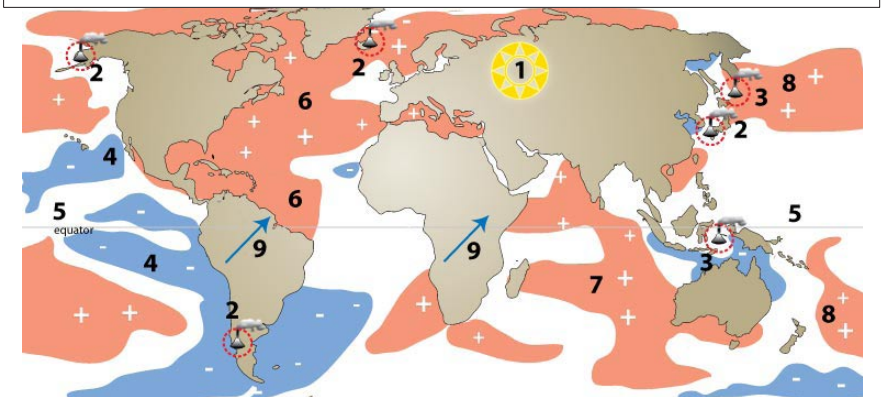
- Forecasters are divided on whether the Tropical Pacific will be neutral or have another La Niña. The central Pacific is currently cooling and the *Browning Newsletter* expects cool La Niña conditions to return by late autumn.
- Between the warm Atlantic and the volcanic debris in the polar air mass, expect more volatile Arctic air to bring severe cold fronts to the Northern Hemisphere.
- The Indian Ocean has entered a mildly positive phase of the Indian Ocean Dipole. This will slightly mute the impact of this winter's La Niña, bringing more rain to East Africa and less flooding to Australia.
- The warm conditions in the Atlantic are not only creating a hotter summer, but will also create a colder winter for the nations around its rim.
- The hurricane season will continue to be unusually active. Expect at least two tropical storms/hurricanes to hit the Gulf gas and oil patch.
- Texas and the Southern Plains will get rain in early autumn but not enough to break the drought. Winter will be dry.
- The US should expect a wet harvest season and a very cold and stormy winter.

SUMMARY

The factors that made summer extreme will persist and make this autumn volatile. The Pacific is cooling and will probably have La Niña conditions by late fall. This will affect grain harvests in many Northern Hemispheric nations.

It has been an extreme summer. The Northern Hemisphere has veered wildly, from record breaking heat in North America to the coolest summer in over a decade in England. Precipitation has been even more bizarre, with 100 year droughts in East Africa and Texas while China, India and the Midwest were deluged.

Natural Factors Shaping Summer's Weather



1 The sun is beginning a new solar cycle.

2 Large volcanic eruptions put climate changing debris in the stratosphere in 2010 and 2011.

3 Several volcanoes continue to have small and medium-sized eruptions.

4 Cool remnants of last winter's La Nina along the western coastlines of the Americas

5 La Nada, but tropical Pacific waters are beginning to cool.

6 Most of the Atlantic is unusually warm

7 The Indian Ocean Dipole is forming a weak positive.

8 The waters off of East Asia and Australia are warming (a cool PDO/IPO).

9 The high altitude Quasi Biannual Oscillation (QBO) winds are westerly.

FIG. 1

CONTENTS

This newsletter contains articles, observations and facts to support our contention that man is significantly influenced by the climate in which he exists. Our calculations show the climate, over the next term, will cause dramatic changes in our social and economic patterns.

We feel that the reader, attuned to the changes that are occurring, may develop a competitive edge; and, by understanding his now and future environment, can use the momentum of change to his advantage.

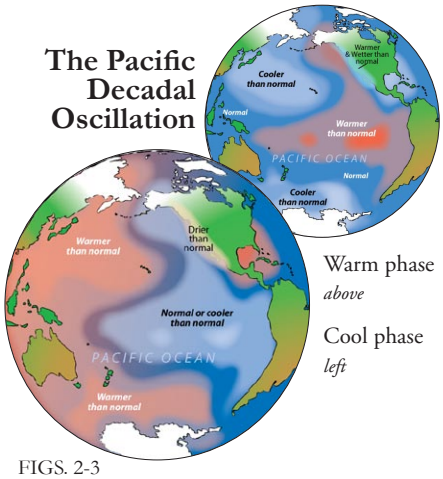
Unfortunately, autumn is shaping up to be just as extreme. Many of the factors that warped this past year's weather patterns are persisting. Look out!

The Return of La Niña

The single largest factor in shaping global weather is, not surprisingly, the world's largest ocean. Changing cycles in the Pacific can alter weather conditions around the world. Last winter's La Niña in the tropical ocean combined with volcanic debris to create extreme blizzards. The volcanic debris is still in the Arctic air mass. The big question is – will cooling volcano weather be joined by a strong cool La Niña?

As this summer evolved, the tropical Pacific warmed until, by early June, last winter's La Niña had faded away. The ocean temperatures were within 0.5˚C (0.9˚F) of normal. The neutral ocean, jokingly called La Nada (Spanish – the nothing), is continuing through August. However, even though the ocean temperatures are near normal, the ocean's wind patterns have remained unusual, still reflecting some of the aspects of a La Niña.

A La Niña during the cool phase of the giant PDO brings drought, as we saw last winter and during the 1950s.



FIGS. 2-3
The Pacific has trended toward a cool phase since 2006
© Browning maps

Part of this is because the El Niño/La Niña oscillation is not the only cycle in the Pacific. The Pacific is also dominated by a much larger, longer lasting cycle that involves the entire northern and tropical ocean. (Some claim it also involves the entire ocean – the science is rather new.) This cycle, called the Pacific Decadal Oscillation **(PDO)** is a long and complex shift of high and low pressure areas in the Pacific with accompanying changes in wind speeds and ocean currents.

Basically, the PDO is a shift of warm and cool waters in the Pacific. The complete cycle lasts 50 – 70 years, each phase lasting 25 – 35 years. In the current phase, the cool phase, eastern and tropical Pacific waters are cooler and the polar and western waters are warmer than normal. This phase is occasionally interrupted by warm El Niños and grows even more intense during cool La Niñas.

The cool PDO creates some of the same patterns as La Niñas. When a tropical La Niña occurs inside this larger pattern, the two oscillations reinforce each other. They create more extreme impact weather. For example, a La Niña normally brings dry weather to Texas. A La Niña during the cool phase of the giant PDO brings drought, as we saw last winter and during the 1950s.

The PDO occasionally warms during El Niños as we saw during the winter of 2009. However, it has been cool since last year and has been growing cooler all summer long. It is now much cooler than normal, almost 2 standard deviations from normal.

What this means is that while the tropical Pacific may be neutral in temperature, the tropical trade winds are remaining unusually strong. This shapes weather patterns throughout the tropics, which in summertime, can be felt in the temperate latitudes. The Japan Agency for Marine-Earth Science and Technology **(JAMSTEC)** describes this condition as a La Niña *Midoki* (Japanese for "similar but slightly different") They correctly predicted that it would continue to create some of the same weather patterns as La Niñas. We have seen this happen all summer, with flooding on the Yangtze River in central China and the continuing drought in Texas.

JAMSTEC also warned that this is an indication that the La Niña will return later this year and linger into 2012. They

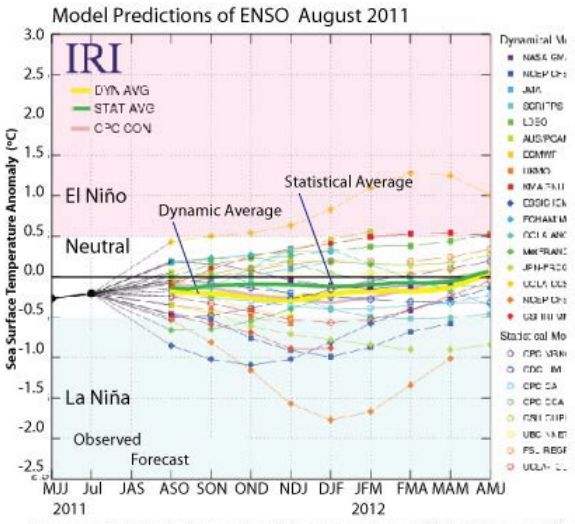
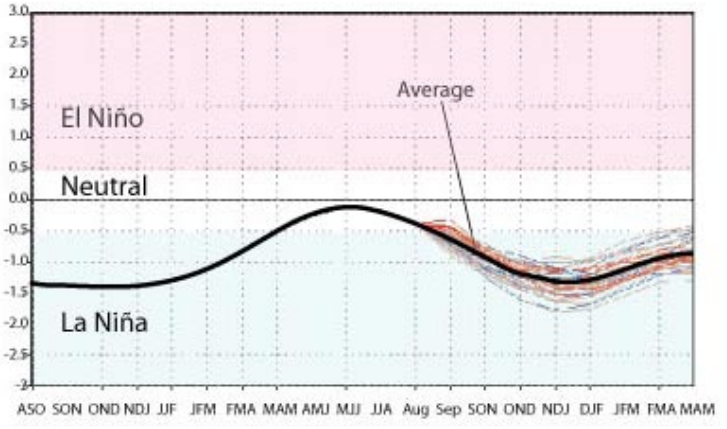


Figure provided by the International Research Institute (IRI) for Climate and Society
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

FIGS. 4-5 **American models** ***(below, right)*** **trend strongly toward a likely La Niña this winter; international models** ***(left)*** **are starting to agree.**



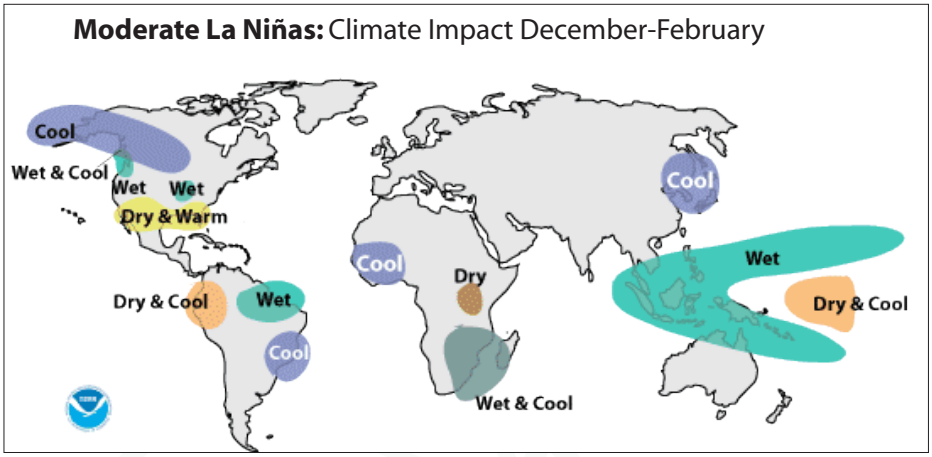


FIG. 6 *courtesy: NOAA*

have a pretty good record for getting this type of prediction right.

Overall, the international community is divided on whether or not the La Niña will return. When one looks at computer models from weather and climate services around the world, the predictions vary widely. Indeed, one group, the Center for Ocean-Land-Atmosphere Studies (COLA) in Maryland projected a strong, warm El Niño by late winter. When all the models are combined, it averages into a forecast of a near normal, slightly cooler tropical Pacific.

By comparison, NOAA's Climate Forecast System models expect temperatures close to 0.5˚C (0.9˚F) below normal in the Tropical Pacific. By November, the region is forecast to be 1.0˚C (1.8˚F) below normal, which are strong La Niña conditions.

This projection seems reasonable, given the current development in the Pacific.

- The entire La Niña region in the Pacific has below average temperatures. The Eastern Pacific areas are 0.5˚ – 0.6˚C (0.9˚ – 1.0˚F) below normal which is in weak La Niña territory.
- Temperatures in the eastern tropical Pacific have been dropping over the past four weeks. In the western regions, the temperatures have been rising, which is a La Niña configuration.
- The strong tropical trade winds are churning the ocean, bringing subsurface water to the surface. Measurements show the area of cooler than average sub-surface waters is growing rapidly. This means the water the winds are churning are unusually cool.
- History shows that when the PDO is negative, consecutive years of La Niña winters, even three years in a row, become common.

Given this evidence, it appears logical to expect La Niña conditions and La Niña weather patterns to appear by mid-to-late autumn and a cold La Niña winter. History suggests that the event will be strong but probably not as severe as last winter.

If a La Niña appears, it will have a global impact, particularly for Pacific Rim nations. The cooler patch of water in the Pacific cools the air above it. Cooler air holds less moisture. This changes air pressure, which changes wind patterns. The Pacific is big enough that tropical wind patterns are altered around the world. If the event is strong, it changes global weather.

This would have severe repercussions on agriculture in the Southern Hemisphere and heating bills in the Northern Hemisphere.

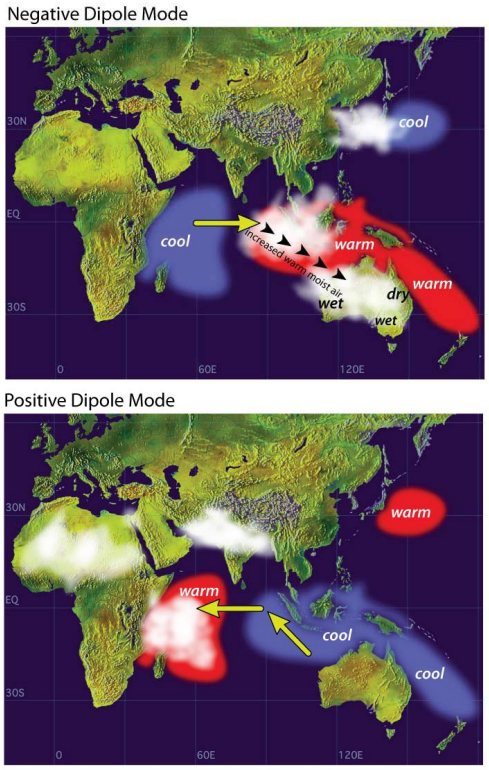
The Volcano Effect

A third natural factor will add to the combined cooling effect of the cool PDO and La Niña – the impact of stratospheric volcanic debris. As discussed thoroughly in previous issues of the Newsletter, there have been multiple high level volcano eruptions in Polar Regions over the past three years: Alaska's Mt. Redoubt and Russia's Sarychev Peak in 2009, and, during this year, Iceland's Grímsvötn and Chile's Puyehue-Cordón Caulle

Another volcano, Mt. Sheveluch on Russia's Kamchatka Pennisula, may have joined these ranks. The volcano is currently erupting 8.6 km (5.3 miles) high. This is high enough that it is forcing airlines to reroute their circumpolar flights, particularly those to Japan and Northern China. It has been erupting all month and, off and on, all year. The mountain is remote and hard to observe so some of the eruptions may have been high enough to enter the stratosphere. At a minimum, the debris is drifting down wind and raining out over North America.

If eruptions are big enough for their columns to enter the stratosphere, the debris can linger for years. This has multiple effects on the weather including:

FIG. 7 **Volcanic eruptions and their consequences**



FIGS. 8-9 **The Indian Ocean Dipole affects Asian, Australian and East African Monsoons**

w.jamstec.go.jp/frsgc/research/d1/iod/

- The ash and chemicals block out incoming sunlight, cooling the air.
- Water collects around the aerosols (solid and liquid particles) forming clouds, which also block incoming sunlight.
- When the clouds finally precipitate out, the rains and snows are unusually heavy.
- The cooler air changes air pressure which changes wind patterns.

In the case of volcanoes near the Arctic and Antarctic, this means the changed air pressure weakens the circumpolar winds. These are winds that circle around the poles, trapping most of the frigid air over the Arctic or Antarctic. If the winds are weak, these frozen air masses can escape. We saw this last winter when the Arctic air masses escaped south and buried 48 of the 50 states in snow, brought European Christmas travel to a standstill and inundated Asia.

We are currently seeing this in the Southern Hemisphere. The Chilean government declared an official "catastrophe" after heavy snows that the nation's Interior minister called a "white earthquake." The nation's capital had rare snow and southern regions have as much as 9 feet (2.7 meters). South Africa, which usually receives a dusting about once or twice a year, has been hit with storms that have dumped up to 60 cm (2 feet) in some areas. New Zealand was hit by a freak winter storm with heavy snow and bitterly cold weather two weeks ago, snowing on Wellington for the first time in decades.

This is a warning for the Northern Hemisphere. In summertime, the polar air masses are trapped north. Europe, Asia and North America have been more affected by balmy tropics. As fall evolves, the polar air masses will spread south, bringing a cold wet harvest season, particularly for Europe, China and the US. This will be followed by a frozen winter.

The Balmy Indian and Atlantic Oceans

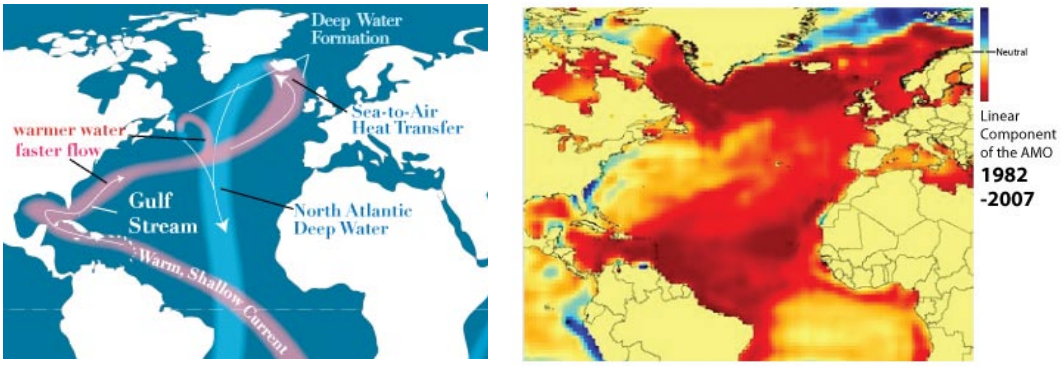
While fall and winter are shaping up to be extremely cold, this summer has been hot. This is because both the Indian and the Atlantic Oceans have been warmer than normal.

The Indian Ocean has been heating up for over 50 years. It is currently between 0.3˚ – 0.9˚C (0.5˚ – 1.6˚F) warmer than the thirty-year average for this time of year. This has altered the temperatures and air pressures in the region which in turn is altering the seasonal monsoon wind patterns. Almost half the world's population depends on monsoon rainfall shaped by the Indian Ocean.

Like the Pacific, the Indian Ocean has a strong oscillation that affects weather patterns. This oscillation is called the Indian Ocean Dipole (IOD) and it influences the strength of five inter-related monsoons: the Australian, the East African, the Indian, the Southeast Asian and the Northwest Pacific.

When the IOD is positive, the western portions of the ocean are warmer and the monsoons are strong in India and East Africa. At the same time, Southeast Asia and Australia have drought. Japan, Korea and parts of Northern China experience warmer weather and a weakened Northwest Pacific monsoon. A negative IOD creates reverse conditions, with drier weather in Africa and India and wetter conditions in Northeastern and Southeast Asia as well as Australia. China experiences a stronger monsoon in the northern and central portions of the nation and a weaker monsoon around the South China Sea.

Last winter we saw a very negative IOD. When it combined with a La Niña in the Pacific, the result was extreme flooding in Australia and deadly drought in East Africa. By springtime the negative phase had faded and the dipole has become faintly positive. The Japan Agency for Marine-



FIGS. 10-11 **The long term Atlantic Multidecadal Oscillation (AMO) turned positive in 1995. The Gulf Stream flows faster, warming the North Atlantic.**

©Browning Newsletter (left), courtesy NOAA (right)

Earth Science and Technology forecasts this condition will last through winter. This is excellent news. It means that when the Pacific has another La Niña, which could bring floods to Australia and Southeast Asia, it will be countered by the drying influence of the IOD. The regions would have rain, but not the devastating floods that they experienced last winter. At the same time, East Africa has a better chance of drought-breaking rainfall.

The Indian Ocean is not the only unusually warm ocean that has been heating this summer. As any Texan can testify, the Atlantic Ocean and the Gulf have been bringing simmering temperatures to North America. This is because the ocean is in a long-term warming phase that began in 1995. The Gulf Stream and other currents within the large scale Atlantic Thermohalene Current are flowing rapidly, bringing more tropical water north. This has the ironic effect of, not only creating hotter summers, but also colder winters for Atlantic rim nations.

Specifically, the warmer waters provide more energy for storms, from hurricanes to Nor'easters to Atlantic storms sweeping into Europe. However, with the US cleaning up after Hurricane Irene and bracing for possible problems from Hurricane Katia and a developing region in the Gulf, it seems sensible to save this discussion for the next article, "North America".

One other point is worth noting – history shows that when the Arctic and Pacific are unusually cold and the Atlantic and Indian Oceans are hot, they create some very extreme weather conditions. This not only means severe hot and cold spells but also some spectacular storms when the air masses collide.

We will explore the global ramifications of this weather over the next two months. But for now, expect some of the same weather problems this fall and winter as we had last winter, slightly muted by the more positive conditions in the Indian Ocean. Basically, this year's extreme summer is going to evolve into another extreme fall and winter.

North America

SUMMARY

The combination of a La Niña, polar volcanic debris and a warm Atlantic is creating an active hurricane season and will create a cold, wet harvest season and very cold and stormy winter.

Irene slammed the East Coast. Katia is swelling to hurricane status off the Caribbean. A swirl of storms in the Gulf of Mexico is threatening to become yet a third hurricane. Eleven tropical storms and/or hurricanes have swept through the Atlantic over the last three months. Meanwhile over on the East Pacific, a large tropical depression has just splashed into the Mexican West Coast.

And it isn't even the peak of the hurricane season!

The Atlantic Hurricane Season

What is happening is that the Atlantic is still warming up.

The Northern Hemisphere has its maximum exposure to sunlight in late June. However the Earth continues to warm and the temperatures of the hemisphere's land masses reach their peak by late July. (Most Americans noticed the heat.) However it takes longer for oceans to warm than it does for land. The Atlantic reaches its hottest point during the first two weeks of September. It becomes so warm that a storm can drift off the shores of Africa and cross the entire ocean.

Hot water provides the energy for tropical disturbances to grow. For a tropical storm to begin to develop, water temperatures have to be at least 80.0°F (26.6°C) down to a depth of at least 160 feet, (50 m). A study by Professor Mark Saunders and Dr. Adam Lea published in *Nature* on January 31 - shows that a 0.5°C increase in sea surface temperature can be associated with an approximately 40 per cent increase in hurricane activity. The Gulf and East Coast waters have temperatures between 85° – 86.9° F (30.5° – 29.5°C), between 0.9 – 2.7°F (0.5° – 1.5°C) warmer than normal.

No wonder so many storms have bubbled up in the Atlantic.

However, tropical storms not only need hot water, they need favorable winds. For most of this summer, there has been upper level wind shear that has kept the storms from growing very high. Then the MJO arrived.

FIG. 12 **Irene, first hurricane of the Atlantic season, leaves a trail of destruction in her wake.** *© Browning Newsletter*

FIG.S 13-14 **Damages from major East Coast hurricanes** *1938-2011*

Hurricane	Year	Deaths	Damages (US$)	Damages (adjusted to 2011 US$)
Yankee Clipper	1938	682-800	$306 million	$4.9 billion
Great Atlantic Hurricane	1944	390	$100 million	$1.3 billion
Hazel	1954	1076	$420 million	$3.5 billion
Diane	1955	191	$831 million	$7.0 billion
Donna	1960	364	$900 million	$6.9 billion
Gloria	1985	8	$900 million	$1.9 billion
Bob	1991	17	$1.5 billion	$2.4 billion
Floyd	1999	57	$4.5 billion	$5.9 billion
Irene	2011	45	_	$10-12 billion (initial estimates)

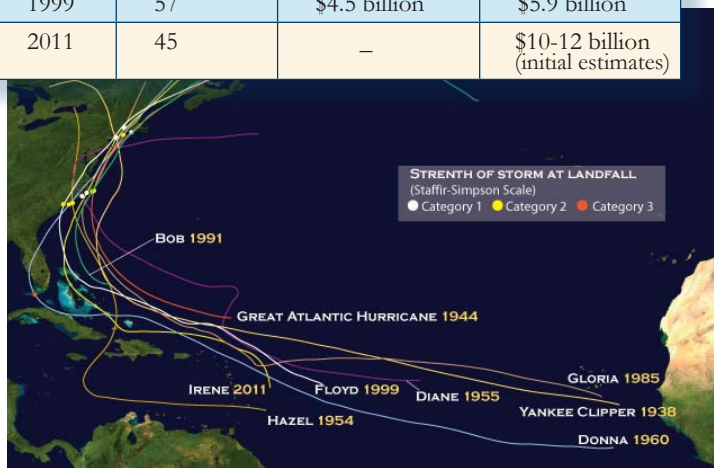
The MJO **(Madden Julien Oscillation)** is a tropical oscillation that lasts 4 – 8 weeks. It is a localized weakening and strengthening of tropical trade winds. When the wind is weak, the ocean surface is quiet and the sun warms it. When it was strong, it ruffles and cools the surface. Basically the weak winds linger for a few weeks, allowing the water to warm. Then the area of weak winds drifts east, followed by an area of strong winds. The waters cool.

To a satellite, it looks like large areas of warm water, called Kelvin waves, slowly moving east, followed by areas of cool water. Over each drifting pool of water are layers of winds that shape weather. Over the cooler waters, winds are very favorable for rainfall, tropical storms and hurricanes.

The MJO winds have arrived in the Atlantic just at the peak of the Atlantic water temperatures. The Atlantic winds and waters are absolutely ideal for storms for the next two to three weeks. It has been years since we have had conditions this perfect for brewing hurricanes.

The Atlantic winds and waters are absolutely ideal for storms for the next two to three weeks.

Expect a roaring hurricane season this September. Similar years had at least two Gulf storms hit the oil patch and, as Irene has shown, the East Coast is also at risk. An atmospheric high pressure area, nicknamed the Bermuda High, is unusually far north. Historically this position can steer storms up along the East Coast. Even though the city of New York feels that the warnings about Irene were hype, as the flooding in North Carolina, New Jersey and Vermont show, it has been over a decade since we have seen these types of storms and much of the recent construction in coastal and mountain areas are very vulnerable.

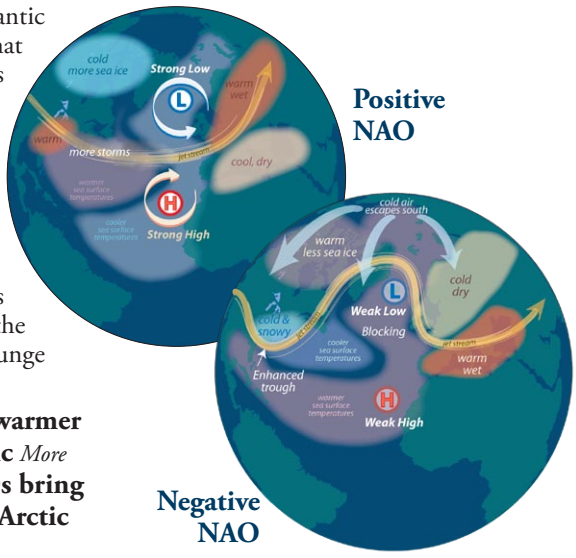


Enter the Cold – the NAO, La Niña and Polar Volcanoes

Ironically, some of the same climate features that are shaping the current hot weather and strong hurricane season are the same factors that can potentially make this winter extremely cold. The current warm phase of the Atlantic and strength and position of the Bermuda high are more likely to create a strong negative NAO this winter.

The **NAO**, or North Atlantic Oscillation is an atmospheric cycle that can last weeks or even months. It is strongest in wintertime. Basically, when the Atlantic is cool, the cold Arctic air mass expands south equally over the land and water. Winter winds tend to blow laterally. This is a positive NAO.

By contrast, when the Atlantic is warm, it blocks the southern spread of the Arctic air. Instead, the air tends to plunge south more deeply over North America and Europe, since land cools quicker than water. The polar jet stream fluctuates wildly, usually dropping deeply into the East and into Central and Eastern Europe. This pattern is called a negative NAO and it appears much more frequently on years like this when the Atlantic is unusually hot.



FIGS. 15-16 **Positive NAOs bring warmer wetter winter from the Atlantic** *More common before 1995.* **Negative NAOs bring colder, drier winters from the Arctic** *More common after 1995.*

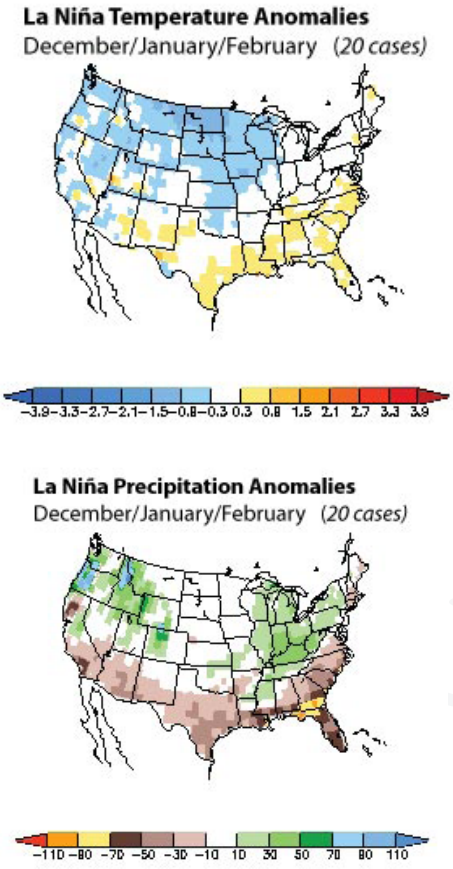


FIG. 17-18 *top: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ENSO/composites/lanina.djf.temp.gif bottom: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ENSO/composites/lanina.djf.precip.gif*

Added to this, is the volcanic dust in the polar vortex, which historically alters air pressure and causes weaker circumpolar winds. These weak winds allow the volcanically cooled Arctic air mass to escape south. We saw how dramatically this phenomenon cooled the last two winters. With the large Icelandic eruption this year and the continual large to moderate activity in Russia's Kamchatka Peninsula, (which is upwind from North America), expect the Arctic air mass to add to the cold.

Finally, the returning La Niña will also contribute to the cooling. History shows that La Niñas normally create warm autumns and chill winters in North America. The warm autumns typically allow late planted crops to finish their ripening and the cold winters raise gas and energy consumption. The cold almost always affects Western and Central Canada, the Pacific Northwest and the Northern and Central Plains. Moderate events also chill the Midwest and Great Lakes while strong La Niñas blast the Northeast and Mid-Atlantic states during mid-winter.

La Niñas also affect precipitation patterns as well. Typically in autumn, the East Coast and Gulf Coast are drenched and repeated storms hit the Pacific Northwest. Texas and Oklahoma usually receive rain in the early part of the season. Winter sees a snowy, stormy northern tier of states with particularly heavy storms in the Midwest and Pacific Northwest and Canada's western and central provinces. Southern states and California are usually dry.

When all of these factors are combined, they present a conflicting scenario for autumn. The La Niña usually warms the season while the volcanic conditions usually cool it. This year, with so many crops having been planted relatively late, the issue is crucial. To add to the complications, there is no comparable year in recent decades.

Overall, the outlook is for a wet autumn with extremely variable temperatures in most of the Midwest. Between the very active hurricane season for the next two months and the potential for cool, ashy fronts from the northwest, it looks as if the season will have heavy rains along the Gulf and East Coast and the potential for a wet fall in the Pacific Northwest and the northern and central Plains. Canada can expect the moisture in its western and Atlantic provinces. Texas should receive welcome rain early in the season, but not enough to break the long term drought. Only Southwest and the eastern corn belt have historically shown a tendency to be dry. Cold fronts will sweep into the Midwest, with the potential to shorten the growing season in some areas around the Northern Plains, but overall, the autumn temperatures in the North should average out to near normal. The South should be cooler than average, which will be a change for the better.

It looks as if the harvest will be near normal, but expect problems with moisture. The harvest may be difficult, due to frequent rains and the crops will require drying. Remember the harvest of 2009, where the USDA pronounced a good crop but storage problems reduced the supplies over the following winter.

The outlook for winter still depends on the La Niña, but all natural factors seem to indicate a very cold and stormy season.

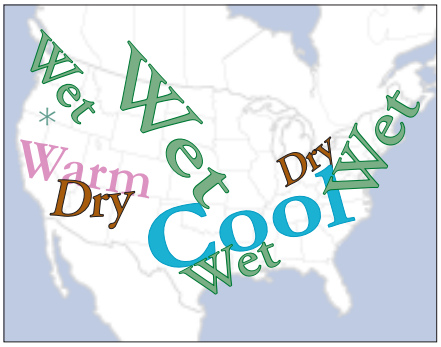
In short, looks like storms – autumn hurricanes and winter blizzards. UGH!

Cool	Hot	Warm	Dry	Wet
2°C or more lower than normal temps.	5°C or more higher than normal temps.	2-4°C or more higher than normal temps.	75% or less of normal moisture	125% or more of normal moisture

FIGS. 19-21 * Moderate eruptions in the Pacific Northwest will bring more moisture to the west.

© Browning maps

Late Summer/Early Autumn*



Autumn*

Winter*

News Notes

It is hard for outsiders to understand just how severe the weather is in the Southern Plains. In the last week of August, temperatures were 14˚F (7.8˚C) above normal, with highs eclipsing 110°F (43.3˚C). According to the US Drought Monitor, 99.92% of the state is officially in drought conditions with 81.08% of the state categorized as D4 Drought, the most severe stage. Oklahoma has 100.00% of the state in drought conditions, with 69.15% at the D4 stage.

Crops and livestock are devastated. As of August 29, pasture and range condition was rated 98 and 92 percent poor to very poor in Texas and Oklahoma, respectively. Further illustrating the heat and drought's devastating impacts, cotton – a crop that generally thrives in hot, dry weather – was rated 60 percent poor to very poor in Texas and an astounding 92 percent poor to very poor in Oklahoma. Day after day the state faced the threats of rolling blackouts. As I saw during a recent business trip, entire rivers were reduced to beds of dead grass with a scummy trickle at the bottom.

Here's the good news. During the first week of September, a cold front is expected to sweep down from the north (Thank you, Mt Sheveluch!) and bring temperatures down to a refreshing +85˚F (29.4˚C). Meanwhile a potential tropical storm/hurricane is swirling in the Gulf. (It lets you know how desperate things are that Texans were disappointed that Tropical Storm Don didn't slam them!)

While US headlines note the dry weather in the Southern Plains, other parts of the world are facing similar problems. In China, problems with the South China Sea monsoon have led to severe drought. In just one province Guizhou, 479 reservoirs and 349 rivers have dried, leaving more than 5.47 million people short of drinking water. Further west, the drought in East Africa has left 11 to 22 million people facing famine. All three droughts – from Africa to Texas– are at least partially caused by last winter's La Niña and the current cool phase of the huge Pacific Decadal Oscillation.

The switch of the large Pacific Decadal Oscillation to cool is returning much of the globe's weather to conditions similar to the late 1930s and the 1950s. Here in the US, Texas built a number of reservoirs in the 1950s, which are in exactly the right location for today's conditions. However the infrastructure was fairly neglected for decades and needs serious dredging. In the Midwest, by contrast, much of their flood protection infrastructure was built in the 1930s and have been neglected so long that they are beyond repair. While this news note is focusing on the US, nations around the Pacific Rim are facing the same problems.

Cloudy with a chance of revolution – a new study published in the August 24 issue of Nature discovered that the chance of civil war doubles in some countries when there is an El Niño. Solomon Hsiang, an economist currently at Princeton University in New Jersey, and his colleagues ran a study examining countries that are heavily affected by the warm El Niño versus those that are not. What they discovered was a notable correlation. Countries affected by the El Niño/La Niña cycle had a 3% rate of armed conflict during cool La Niña years and 6% chance during El Niños. They tracked this correlation back for decades. The weather was not a cause, but the correlation suggests the agricultural problems it brings might be a contributing factor.

Isn't nice to know, as we shiver through this winter's cold La Niña weather, that at least the lousy weather is correlated with less warfare!

NEWS ALERT – As this issue goes out to the publisher, the latest warning on the turbulence in the Gulf of Mexico is that it will go into the Gulf oil and gas patch and has the potential to disrupt supplies for days. The official path is not out yet but **Accuweather** is reporting that it will probably hit the north-central Gulf, along the Louisiana/Mississippi/Alabama coasts. Unfortunately it does not look as if it will rain on Texas, but its movements will help bring the northern cold front down to the Southern Plains over the Labor Day Weekend.

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The opinions expressed are those of the writer, and although they are based on extensive studies of physical data and phenomena, many statements published here are not entitled to be regarded as rigorously proved in a scientific sense. Some decades must pass before these issues are resolved. Meanwhile, decisions must be based on the best available information and estimates.

This newsletter will **not** contain:
- *Analysis of, or recommendations concerning, any investment possibilities.*
- *Recommendations on any particular course of action.*

VOLCANO UPDATES

Evelyn Garriss now offers an e-mail update service to notify subscribers when eruptions happen, and how they are likely to affect the weather.

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