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World Reports Covering Climate, Behavior, and Commodities Original Papers Historical Perspectives

BROWNING NEWSLETTER

A Fraser Management Publication

36 YEARS – NEW FRONTIERS

IN THIS ISSUE

- Starting on March 1, 2012, the Browning Newsletter will offer a premier edition with special services for premier subscribers.
- A new generation, James J. Garriss, has joined the staff of the Browning Newsletter. The third generation of our family to work for the newsletter, James brings a fresh understanding of international business interests to the publication.
- The current La Niña is creating very atypical weather, bringing relief to the drought stricken Southern Plains and an unusually warm and sunny December to the northern tier of states and large portions of Canada.
- 2011 had twelve billion dollar disasters in the US. The number will probably be raised to 13 when the damages of Tropical Storm Lee and its aftermath are finally calculated. Most of these events were due to the strong La Niña that shaped weather for the first half of the year.
- This winter's La Niña weakened, especially in the East Pacific, due to the warming ripple of a smaller Madden Julian Oscillation. It is now strengthening in the Central Pacific and will be getting stronger in January.
- There is a high probability of much colder and stormier weather in Eastern North America by mid-January as well as typical La Niña drought in the South. The La Niña is expected to last into spring.

SUMMARY

The Browning Newsletter is beginning its 36th year of publication with a new generation, a new premier edition and an expanding examination of changing climate and its economic impact.

It all started with rotten raisins . . .

Long, long ago, it rained in Fresno, California during the month of September. Fresno is the "Raisin Capital of the World" and it produces more than 80% of America's raisins. During September, the grapes dry in the sun. Unfortunately, thanks to the rain, nearly a million tons of grapes rotted.

A cereal company had to search for another source of raisins, at much higher prices, and suffered an economic loss that year. Then they searched for an expert that could warn them if this was going to happen in the future. The man they hired was my father, Dr. Iben Browning. A scientist with degrees in chemistry, physics, math and biology, his passionate hobby was the newly evolving science of climatology.

He found himself a consultant and speaker on climate change. Thirty-six years ago, he met with Jim Fraser, publisher and head of Fraser Management Associates, LLC. They shook hands and the Browning Newsletter was born.

A lot has happened since then.

Meet the New Generation

The *Browning Newsletter* is currently in its second generation of publication. In 1981, at the age of 32, my father lured me into the business. Together, we combined his unique understanding of climate science, with my grounding in history and anthropology to address the question – "How does changing climate affect humans?" The *Newsletter* focused on projecting upcoming

fig. 1
Dr. Iben Browning
courtesy of the author

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.

fig. 2
Evelyn Browning Garriss

fig. 3
INTRODUCING **James Garriss**

climate change and explaining how these types of changes affect different nations, particularly their agriculture, energy demand, water supplies and political stability.

In 1989, Dr. Browning's health deteriorated and I intermittently began to run the business. In 1991, he died and it took six scientific advisors to replace one Renaissance man. He left behind a huge and unique database and understanding of how complex climate change is.

The third generation has now joined the Newsletter. James Garriss (30) is currently a partner in the Newsletter, working on research and reports. He is still interning in climate science, but he brings an understanding of international business interests. Since he joined this year, we have doubled our circulation and expanded over a third of our business to international clients.

New Products

On March 1, the Browning Newsletter will introduce our Premier Service.

As our circulation has spread, we have had to cover a variety of climate topic. While our focus has remained on North America, the scope of the research has spread globally. Typically, we discuss growing, heating and cooling seasons. Ocean cycles, from El Niños to the larger, but lesser known, long-term oscillations and their impacts on water supplies are also frequent subjects.

In short, we cover a broad array of subjects and many of our clients are left with questions about more specific issues. This is where the Premiere Service comes in.

The Premiere Service will offer:

1. **A Monthly 1 Hour Conference Call:** On the third of each month, all premiere subscribers will be welcomed to a one-hour conference call to address their questions and special concerns. The session will start with a ten-minute summary of the last Newsletter, followed by a Question and Answer session.

   The conference link will be delivered to all subscribers two days before and questions will be solicited. Questions that were emailed in prior to the call will be addressed first, and I will then take questions from the floor for the remainder of the hour session.

2. **Special Alert Emails:** A special alert email will be sent out to Premier subscribers if any substantial activity occurs in between newsletter distribution. This is any weather/climate activity that Evelyn feels is necessary to communicate with these priority clients before the next distribution of the newsletter is available.

3. **Volcano/Hurricane Watch:** Additionally, Premier subscribers will receive a special bulletin on the latest volcano and hurricane activity. These real-time alerts will be short paragraphs to inform clients of events that will affect local or global climate. These alerts are brief; we can send out information to set up a consultation call to discuss in depth if the client feels the need to do so.

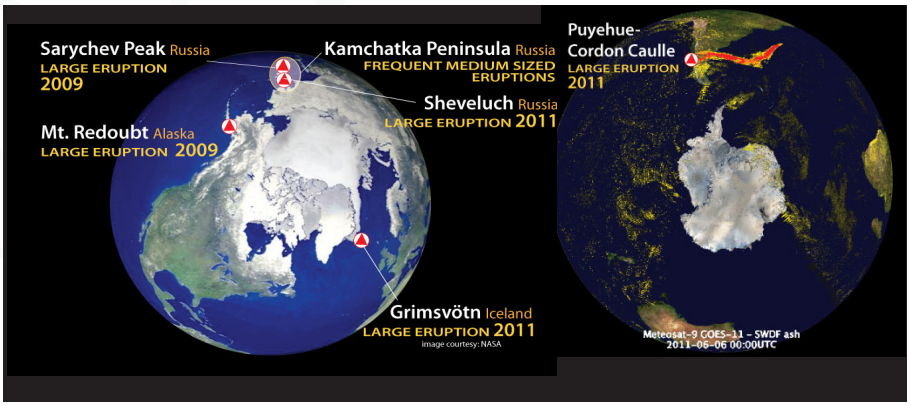
4. **Discount and Priority on Individual Consultation Calls:** If premier subscribers wish for individual consultation calls, we offer:

   a. A 10% discount on consultation calls

   b. Scheduling priority over non premier level subscribers.

New Research

The Newsletter has begun to focus on new areas of interest for our clients. While we will continue to report on the natural climate factors shaping the weather in both the US and Canada, we are also expanding our research into other regions. In particular, we are working on:



FIGS. 4-5 **Since 2009, five large polar volcanoes have been shaping global climate.**
left: Image courtesy NASA right: http://pubs.usgs.gov/gip/dynamic/slabs.html

- **Multi-ocean impact on the continents** – The US Geological Survey has published an excellent study that co-ordinates the effects of changes in the Atlantic and the Pacific on the US. In the past, we expanded the research to include the effects on Canada as well. This year we intend to expand our research to examine how the changes in these two oceans affect South American rainfall and crop production as well.

Similarly, we are initiating research to co-ordinate the impact of the Indian and Pacific Oceans on Asia.

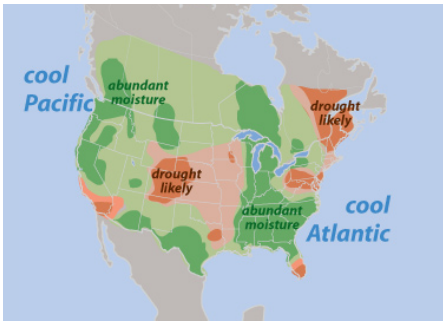
- **Monsoons** – Almost half the world's population live in lands that depend on monsoons. We are working with several scientists studying the outlook for these vital rainfalls.

  Hurricanes – We are continuing our research on the impact of hurricanes. In particular, we are focusing on projections for the economic impact, not only of the tropical storms, but also of the storms after they lose their tropical characteristics. As the tremendous flooding from the remnants of Tropical Storm Lee showed – these storms are dangerous throughout their entire cycle.

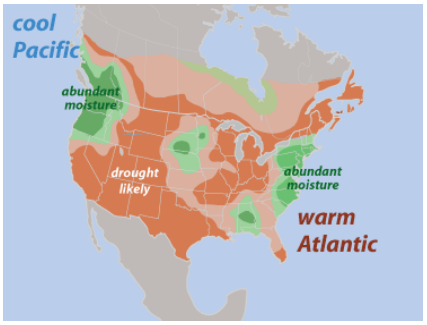
- **Volcanoes** – The impact of polar volcanoes continues to be poorly covered by the scientific community. We will be reporting on volcanic activity and assessing potential impacts.

- **The El Niño/La Niña cycle** – So far the Newsletter has warned our clients about approaching El Niños and La Niñas about 4 to 6 weeks before the events are announced by the scientific community. We will continue to strive to improve our record.

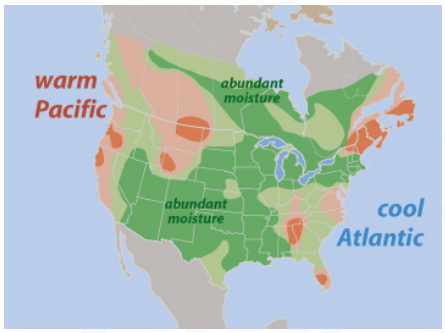
2012 promises to be an exciting and productive year. We want to thank our subscribers and clients for their loyalty last year. The best is yet to come!



-PDO, -AMO
(Negative Pacific Decadal Oscillation,
Negative Atlantic Multidecadal Oscillation)



-PDO, +AMO
(Negative Pacific Decadal Oscillation,
Positive Atlantic Multidecadal Oscillation)



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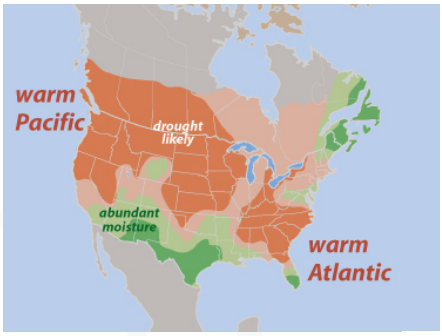


+PDO, +AMO
(Positive Pacific Decadal Oscillation,
Positive Atlantic Multidecadal Oscillation)

figs. 6-9 **Sandwiched between two oceans, North America's climate is heavily influenced by their changing patterns**

THE DARKEST DAYS OF WINTER

SUMMARY

2011 has had two very abnormal La Niñas. The early event was unusually strong and the current event is producing very atypical weather. What will this mean for the rest of winter?

When is a La Niña not like a La Niña? The answer is – NOW.

An even better question is why is this La Niña not like a La Niña? How long will it continue to be producing such atypical weather? Those questions are much more difficult to answer.

Notice how a La Niña is supposed to shape the winter weather. It is supposed to produce cold wet weather in Western Canada and the Pacific Northwest. The South and Midwest are supposed to be hot. Texas and the Southwest are supposed to be dry while the Ohio River Valley is normally wet.

So far, it hasn't happened. Indeed, during December the weather was more similar to the conditions normally produced by a warm El Niño. Almost all of Canada and the Northern Plains have been substantially warmer than average (>5˚C or 9˚F) and the Southern and Central Rockies have been freezing, averaging 8˚F (4.4˚C) cooler temperatures than normal. The Gulf has been as warm as expected, but so has the entire East. The Desert Southwest and Southern Plains have been buried in snow which is great news for drought stricken Texas but very unusual for a La Niña.

So what happened? Scientists have centuries of historical and tree ring data that indicates how a La Niña event affects climate. Why is this event behaving so differently?

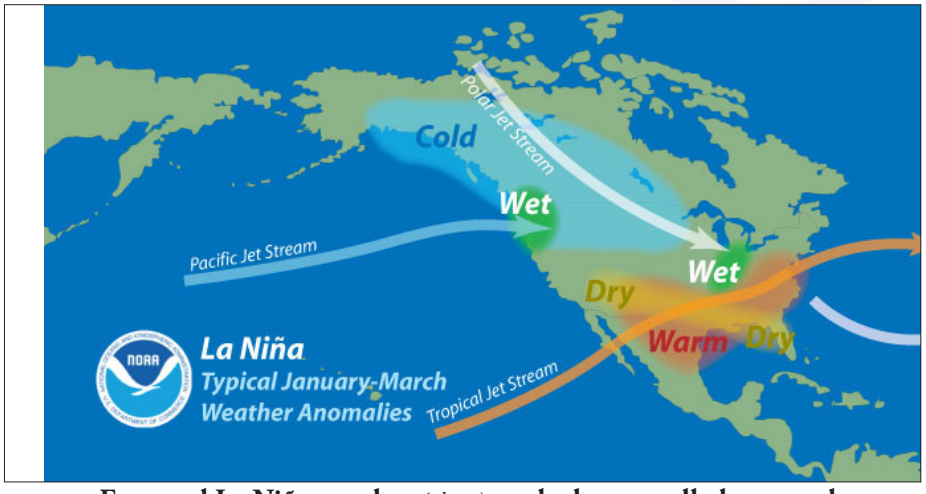
The Violent La Niña of Early 2011

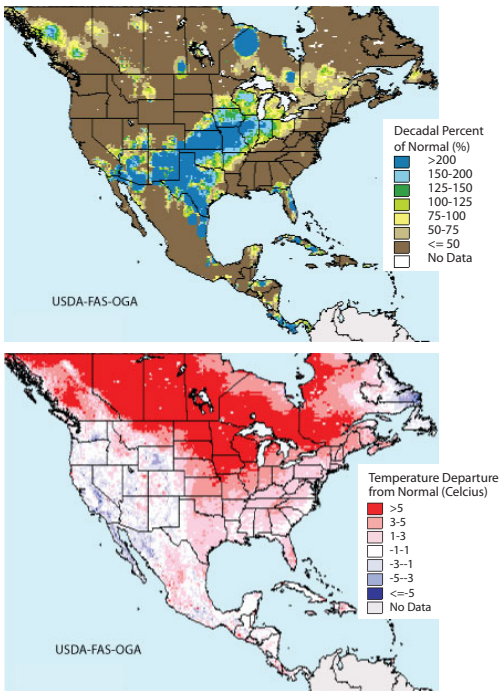
The current La Niña is the second one to strike this year. It is also the second very abnormal La Niña. This year began with one of the strongest La Niñas on record.

The earlier La Niña began in July 2010 and continued to shape weather until June. When combined with an extremely warm Atlantic, it created disastrous weather. Indeed, the US had a dozen deadly weather events that each caused at least $1 billion in damage, the highest total of any year on record. Meteorologists blamed most of these events on the La Niña. Over a million square miles of the Tropical Pacific were abnormally cooler and this cooled the tropical atmosphere. This in turn altered air pressures and wind patterns throughout most of the globe. It produced some very severe and deadly weather.

The dozen billion dollar events were:

- **The Groundhog Day blizzard** – January 29-February 3, 2011– When the cool La Niña weather combined with a strong Arctic front, snow covered 49 of the fifty states. It killed 36 people and caused $1.8 billion in damage.
- **The Midwest/Southeast tornadoes** – When the cold air of the retreating La Niña collided with the warming air from the Gulf of Mexico, it produced nearly 1,200 tornadoes. The death toll from these tornadoes topped 500, a number not seen for a single tornado season since 1953.
  - April 4-5, 2011– An outbreak of 46 tornadoes in the Midwest and Southeast killed 9 people and caused $2.8 billion in damages.
  - April 8-11, 2011– Three days later, an outbreak of 59 tornadoes caused $2.2 billion in damage, but fortunately no fatalities.
  - April 14-16, 2011– Three days later an outbreak of 177 storms killed 38 people, mostly in North Carolina. The damages were an estimated $2.1 billion.
  - April 25-28, 2011– After a short lull, an outbreak of 343 tornadoes killed 321 people in the central and southern states caused 321 deaths. Of those fatalities, 240 occurred in Alabama alone. Several major metropolitan areas were directly impacted by strong tornadoes including Tuscaloosa, Birmingham, and Huntsville in Alabama and Chattanooga, Tennessee, causing the estimated damage costs to soar. The outbreak caused more than $7.3 billion insured losses and total losses greater than $10.2 billion.
  - May 22-27, 2011– An swarm of 180 tornadoes once again struck the central and southern states and caused at least 177 deaths and $9.1 billion in damages. Notably, an EF-5 tornado struck Joplin, Mo., the deadliest single tornado to strike the U.S. since modern tornado record keeping began in 1950.
  - June 18-22, 2011 – Not all outbreaks were La Niña weather. A June outbreak of 81 storms killed three and cost $1.3 billion.
- **Southern Plains/Southwest drought and heat wave** – Spring-Fall, 2011– The dry winter and spring caused by the La Niña produced a costly drought that cost up to $10 billion in crop and livestock damage.
- **Texas, New Mexico, Arizona wildfires** – Spring-Fall 2011– With drought comes fire. The combined wildfires of the three Southwestern states cost more than $1 billion.
- **Flooding** – The huge melting La Niña snowpack combined with heavy rains to produce massive floods.
  - Mississippi River flooding – Spring-Summer, 2011– The estimated losses were $ 3 – 4 billion.
  - Upper Midwest flooding –Summer 2011 – The snow melting in the Northern Rockies caused flooding that cost $2 billion in the US and $1 billion in crop damages in Canada.
- **Hurricane Irene** – August 20-29, 2011– The La Niña was over, indeed if it had been in place it would have





figs. 10-12 **Expected La Niña weather** *(above)* **-and what actually happened**
Precipitation anomalies *(right, top) Dec 11-20, 2011*
Temperature anomalies *(right, bottom) Dec 11-20, 2011*

above: data courtesy NASA right, top: http://www.pecad.fas.usda.gov/cropexplorer/continentView.cfm?ftypeid=24&fattributeid=1&stypeid=24&sattributeid=3&startdate=2011-12-11%2000%3A00%3A00.0&imenddate=2011-12-20%2000%3A00%3A00.0&regionid=namerica
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tended to steer the storm out to the mid-Atlantic. In addition, the estimates are not in yet, but many sources warn that the remnants of Tropical Storm Lee, which rained out on areas already saturated by Irene also may total over a billion dollars – and raising the total to 13 billion dollar disasters.

The USA was not the only nation to suffer from the La Niña's impact on weather. Back in In 2010, it warped the tropical jet stream, helping to cause the Russian heat wave and the Pakistani floods. China had a terrible winter drought along the Yangtze River. Both Asia and Europe had problems with severe cold. Australia had disastrous floods. While the La Niña was never the sole factors shaping these weather events, it was a major causation.

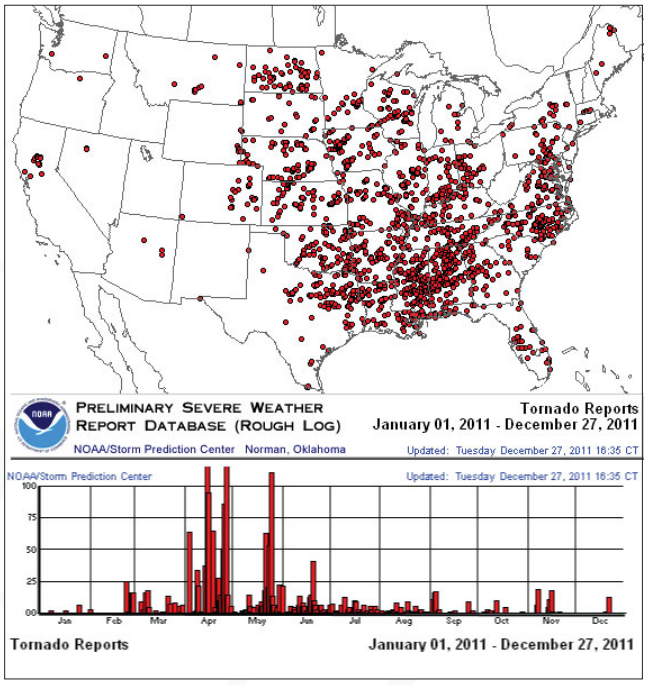
In addition to the very strong La Niña, 2011 also had a very warm Atlantic and a lot of volcanic debris in the Arctic air mass. The volcanic debris caused massive changes to polar air pressures and winds, resulting in strong southern surges of the frigid air. (Scientifically, this phenomenon is "a strongly negative Arctic Oscillation".)

The Current La Niña and Its Impact

At first glance, the natural factors shaping this winter's weather are very similar to the factors shaping last winter. We have a second La Niña, a warm Atlantic and two volcanoes that poured their ash and chemical debris into the Arctic stratosphere. However, this December has been very different from the December of 2010.

Part of the reason is that the current La Niña is not as strong as last year. Timing is everything and a warm ripple flowed through the Pacific during late November and December.

The ripple is a comparatively small, short-term event known as a Madden Julian Oscillation (MJO). Typically, it is a 4 – 8-week-long localized weakening or strengthening of the tropical trade wind that flows east across the Indian and Pacific Oceans. When the MJO wind strengthens, it overturns the sun-warmed surface of the water, so the water is cooler. When it weakens, the water underneath the wind



figs. 13-14 **The very busy, and surprising tornado season of 2011** *courtesy NOAA*

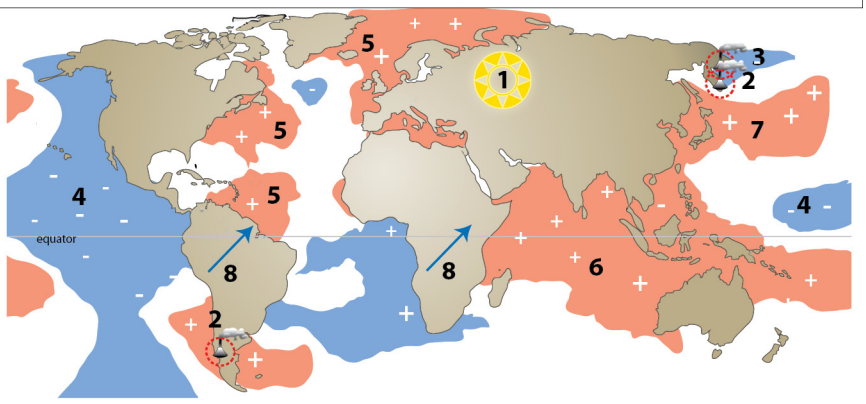
remains quieter and more sun-warmed.

The current La Niña condition started in September. Tropical Pacific temperatures in the eastern and mid-Pacific continued to drop rapidly from late August through October. Then the warm phase of the MJO began to flow across the Pacific and the tropics warmed. The event, which was moderate to strong, became weak to moderate as sections of the cooled La Niña pool of water warmed up. This warming continued through November and most of December.

The cooler phase of the MJO is following the warm phase. We currently see the eastern portion of the Tropical Pacific still warming, but the central region is cooling. The western Pacific around Indonesia and Asia is warming the way it does in a relatively strong La Niña. In short, it looks as if the phenomenon will probably reach a peak of coolness in January.

The international computer models are mixed. Many of the dynamic models reflect the past month of warming while others note the beginning of a new cooling trend. At the same time, underwater measurements show that the subsurface water is cooling. This means that when trade

Natural Factors Shaping Winter's Weather



1 The sun is entering the active phase of the 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 The La Nina is widespread but only weak to moderate.

5 Warm phase of the AMO.

6 The Indian Ocean Dipole is warm with a neutral Dipole.

7 Warm water off Asia and Australia (a cool PDO/IPO)

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

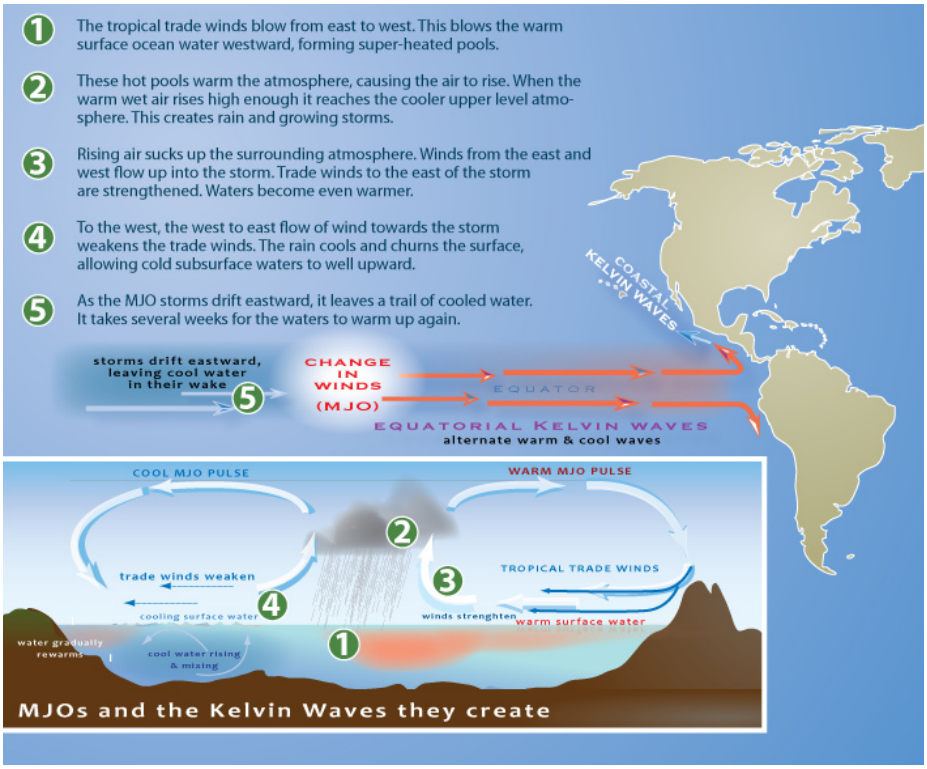


fig. 16 **A warm Kelvin wave weakened December's La Niña.** © Browning Maps

winds ruffle the surface of the Pacific, it will bring even colder waters to the surface. This seems to reinforce the probability that the next few weeks will see a strengthening of the La Niña over the next four to six weeks. All models indicate that the event will last all winter into spring and some of the US models indicate the La Niña will last until summer.

The warmed Eastern Pacific reduced the impact of La Niña during the month of December. The event did almost nothing to the weather in North America. Instead, three other factors shaped the weather. One of the factors was the Pacific Decadal Oscillation (PDO), the second was the AMO warmed Atlantic and the final factor was the Arctic Oscillation.

The PDO warmed the western waters of the North Atlantic and cooled the waters off the western coasts of North America. We saw cooler than average temperatures throughout the western states. Since the La Niña had little to no impact, Western Canada did not experience the colder weather that it usually would. With cooler waters offshore, the atmosphere had below normal moisture and the most of the West was drier than normal, particularly the Pacific Northwest.

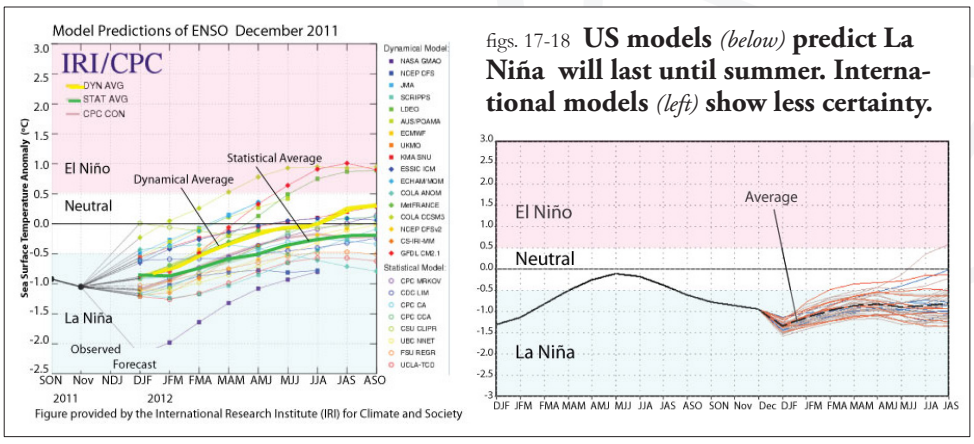
As the same time, the unusually warm conditions in the Atlantic heated the temperatures in the eastern portions of North America. (The Atlantic Multidecadal Oscillation or AMO is causing the Gulf Stream to flow extremely rapidly, carrying tropical warmth to northern waters.) The entire East Coast averaged 2˚ – 8˚F (1.1˚ – 4.4˚C) warmer than normal while the central US/Canadian border was an astonishing 6˚ – 12˚F (3.3˚ – 6.7˚C) warmer, conditions more typical for El Niños than La Niña.

Instead of being shaped by the La Niña, the US precipitation pattern is being shaped by the collision of cold northern and western air and the warm Atlantic and Gulf air. The warmth has spread through the regions west of the Gulf all the way to the Midwest. As a result, colliding air masses have caused snow and rain from Arizona, through Texas and north through the Midwest.

Normally when the Atlantic is this warm, there are blocking events, when cold fronts are blocked by stalled high-pressure cells in the Atlantic. However, last hurricane season was extremely busy, with eight of the nineteen hurricanes and tropical storms roaring up the mid-Atlantic, churning up the waters. This produced cooler mid-Atlantic water conditions that tend to reduce the strength of the high. As a result, there were little to no blocking events.

The final factor to examine is the impact of this year's Arctic volcanoes. The biggest eruption was in Iceland, an area that has not had an eruption large enough to affect the climate for decades. Just as the large 2009 eruption of Alaska's Mt. Redoubt caused a cold summer in North America, the eruption of Grimsvötn caused a cooler summer in Western Europe.

Unfortunately, there is almost no scientific research to show how this type of eruptions affects the following winter. If it was an Alaskan eruption,



figs. 17-18 **US models** *(below)* **predict La Niña will last until summer. International models** *(left)* **show less certainty.**

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

history shows that it would have started cooling eastern North America and eastern Asia by now. The ash and debris from North Pacific volcanoes typically precipitate downwind into North America, causing cooler weather. When these eruptions are high enough to reach the stratosphere, they alter air temperatures and pressures, which in turn alter the circumpolar winds. The Arctic Oscillation, (see Figures 19 & 20) becomes severely negative.

Instead, we have seen a positive AO, a common pattern during warm Pacific El Niños and, but a rarity during cool La Niñas. History shows that normally during 80% of similar years, the AO would have turned negative during early winter, usually by the last week of December. This year, we are seeing saw a much more atypical pattern.

The La Niña of 2012

Most international models indicate the AO is becoming more neutral and there are several indications that it will turn negative by mid-January. Meanwhile, the La Niña is cooling in the central Pacific and, as the MJO moves on, it will strengthen in the eastern Pacific. Meanwhile the PDO is the coldest that it has been in almost two decades, which normally enhances the impact of La Niña.

What this seems to indicate is that a stronger La Niña will gain more control of the winter weather over the next few months. Additionally, records from the few large Icelandic eruptions, as well as North Pacific eruptions show a very strong correlation between these events and a cold mid-winter.

If climate repeats its normal historical pattern, we can expect the following weather patterns:

MID-WINTER – In 80% of similar years, mid-winter was cold and stormy, with cooler than normal weather from British Columbia and the Pacific Northwest to the Midwest. In 60% of similar years, large portions of the East Coast, particularly the Mid-Atlantic States, endured very cold weather and heavy precipitation. In five of the most similar years, Texas, Georgia and parts of the Southeast suffered from drought.

LATE WINTER – The typical pattern for La Niña winters in the eastern US is a warm early and late winter and a cold and stormy mid-winter. Late winter should have at least one Nor'easter but this cold will be balanced by early warming along the Gulf and Atlantic coastlines. The La Niña cold will retreat to Western Canada and the Pacific Northwest. Normally California, especially Southern California would be extremely dry as well.

SPRING – In 60% of similar years, the northern and western states and southwest and south-central states were very cool, while the Southeast and Texas were warm.

It should be noted, Alaska's Mt. Cleveland had a moderate eruption on December 29 and, for a day, the US Geological Survey warned that it might lead to a much larger event. By December 30, the warning was lowered to a mere yellow alert. Meanwhile, three Russian volcanoes Karymsky, Kizimen, and Sheveluch are having moderate activity and are on orange alert, the highest level. If these have large eruptions, they could complicate and cool the weather.

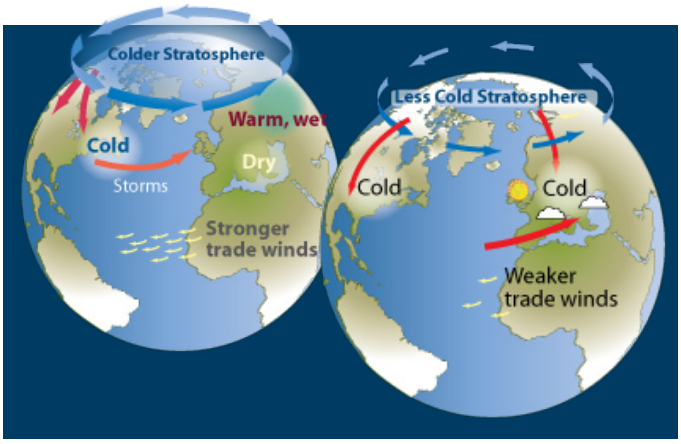


fig. 19-20 **A Positive Arctic Oscillation (AO)** *above, left,* **traps cold air in the far Northern regions.**

The weaker winds of a Negative AO allows cold air to escape *(above, right)*

Cool	Cold	Warm	Dry	Wet
2°C or more lower than normal temps.	5°C or more lower 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. 21-23 * Moderate eruptions in the Pacific Northwest will bring more moisture to the west.

News Notes

Here is some good news about pollution. Scientists have designed a monitoring instrument that allows them to survey and measure air pollutants. It was mounted on NASA's Aura satellite and has shown that there has been a sharp decline of pollution, particularly sulfur dioxide, from coal power plants. This chemical contributes to the formation of acid rain and can cause serious health problems. The scientists, led by an Environment Canada researcher, have shown that sulfur dioxide levels near major coal power plants have fallen by nearly half since 2005 and over 75% since 1980.

This winter's strange weather has not been limited to North America. A major cold snap hit Central Asia, dipping far enough south to kill 65 people across India. Meanwhile temperatures have been extraordinarily warm in Russia and parts of Eastern Siberia.

The recent rains in Texas have brought some relief but 99% of the state is still suffering from drought conditions. As the dry weather continues, losses are mounting.

- Across Texas, the drought has caused an estimated $5.2 billion in losses to farmers and livestock producers, and that figure is expected to rise.
- Texas has lost of 600,000 head of cattle, the largest-ever drop in the number of cows any state has ever seen. Two thirds of the herds were moved to regions with grass but 200,000 were slaughtered. The U.S. Department of Agriculture estimates that beef prices will increase up to 5.5 in 2012, in part because the number of cattle has declined. This follows a 9% increase in beef prices in the past year.
- Not all the losses are agricultural. The Texas Forest Service is reporting reports that a minimum of 100 million and as many half a billion trees — between two and 10 percent of Texas' estimated 4.9 billion — have died as a result of the epic drought of 2011. That's only including trees with a diameter of five inches or larger on forested land, and it doesn't touch the approximately four million acres burned by drought-induced wildfires that raged across the state.

Prepare for colorful skies!

- The sun is reaching a peak of activity and has been having enormous flares. These explosions blast hot ionized gas out into space. When the gas hits Earth, the Earth's magnetic field shields most of the earth. However, some of the ions enter the atmosphere through a hole around the poles and provide beautiful auroras. These glowing sheets of light are frequently joined accompanied by disruptions in the atmosphere that can disrupt radio signals and GPS.
- Another source of color in the polar skies are is the rare nacreous or mother-of-pearl clouds that appear just before dawn or after sunset. These are icy clouds 9 -16 miles (15 - 25 km) high in the stratosphere, which are reflecting rays of the sun. They can only form under extraordinarily cold conditions. They usually appear over the antarctic, but due to the unusually cold stratospheric temperatures last winter they appeared in the arctic from January through March. We now have had another sighting this winter.

fig. 24 **Nacreous Clouds- Historically there has been some correlation between the appearance of these clouds and a negative Arctic Oscillation.**

http://photolibrary.usap.gov/AntarcticaLibrary/NACREOUS-CLOUDS.JPG

Unfortunately, the presence of these clouds also indicates a growing hole in the ozone. The clouds are very acidic and interact with the ozone ions in the ionosphere. With all the volcanic debris in the stratosphere, it is no surprise that we are seeing these beautiful, but destructive, clouds.

HAPPY NEW YEAR!

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

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