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BROWNING NEWSLETTER

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SHIFTING OCEANS – THE NORTH AMERICAN IMPACT

IN THIS ISSUE

- La Niña ended. The April 16 satellite readings of the Pacific Ocean's surface temperatures showed that it was over.
- Some scientists expect the Pacific to enter a warm El Niño. Models disagree whether it will develop between mid-summer to late winter. Probably the Pacific will be neutral through the rest of spring and all summer.
- The Atlantic has developed conditions that allow a negative NAO and cold air to finally enter eastern North America. This is creating an extreme tornado season.
- Cooler conditions are entering the tropical Atlantic. If this continues, it could create a cooler summer and quieter hurricane season.
- With a neutral Pacific, a cooling tropical Atlantic and a neutral Indian Ocean dipole, the globe may experience weather that is more normal this summer, which will be good for crop production.
- The regions of the world with the greatest risk to their crops are India, where a possible late summer/early fall El Niño or negative IOD could end the monsoon early and northern countries in South America where the El Niño could create a dry planting season.

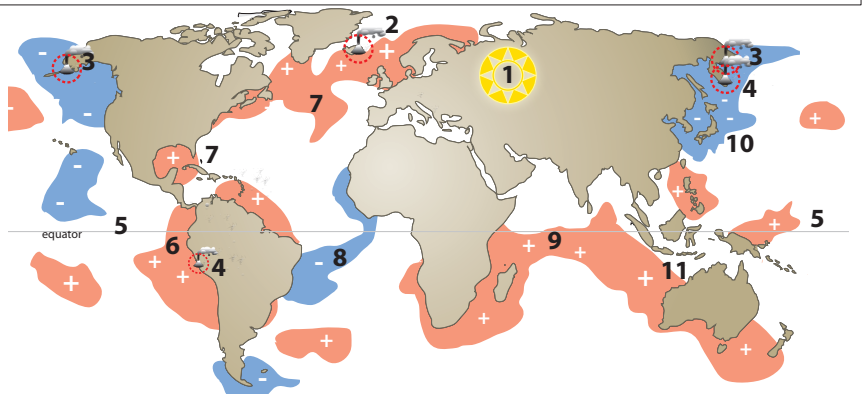
SUMMARY

The Tropical Pacific is warming and the Tropical Atlantic is cooling. This has led to unexpected April snow, more moisture for spring planting and an extreme tornado season.

First – let's announce the good news.

La Niña is gone! The cool climate phenomenon that brought so much drought to the North America and Canada disappeared by mid-April.

Natural Factors Shaping Spring and Summer's Weather



1 The sun is entering the active phase of the solar cycle.

2 The large eruption of Grímsvôtn has distorted Arctic winds.

3 Large volcanic eruptions put climate-changing debris in the stratosphere in 2009 and 2011.

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

5 The La Niña is gone.

6 The last remnants of the MJO that rippled across the Pacific and ended the La Nina.

7 The Gulf Stream is flowing fast and the North Atlantic is very warm.

8 Much of the Tropical Atlantic is cool.

9 The warm Indian Ocean Dipole is developing a weak negative Indian Ocean Dipole.

10 Cool water off most of East.

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

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.

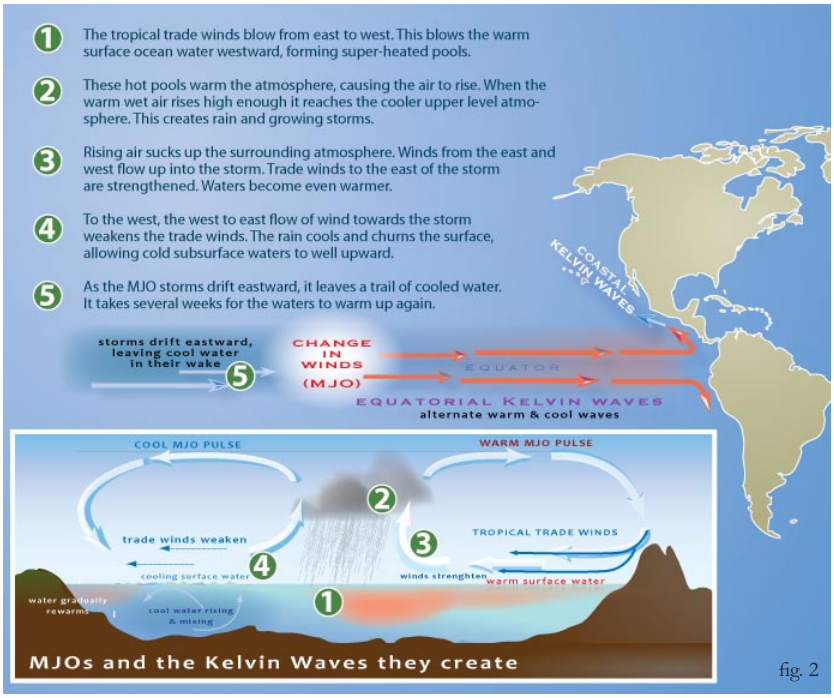


fig. 2

The warming in the Pacific hasn't stopped. Now some oceanologists are predicting a warm El Niño. How likely is it that the ocean will flip from one extreme to another this year?

At the same time the Atlantic, which has been extraordinarily warm, is beginning to cool. The ocean's warm currents have heated North America throughout this winter and spring. What will happen, now that it tropical waters are getting colder?

As the recent Nor'easter, with its record-breaking late-April snow has shown, the strange weather of 2012 will continue to be strange and extreme.

The Warming Pacific

On April 16, satellite measurements of the Tropical Pacific showed that this year's La Niña had finally faded away. The government has not yet announced that the event is over, but the cool pool of water in the Pacific has finally warmed up to neutral conditions. Indeed, the waters off the coast of South America are as warm as a strong El Niño.

The reason the government was quiet was that, as scientists, they had to be certain before they made their announcement. There are other cycles, oscillations and events happening in the Pacific and they needed to be sure that the current warmer conditions were part of the ENSO (El Niño/Southern Oscillation) cycle.

In particular, they needed to make sure that what we are seeing in the Tropical Pacific is not just a short Madden Julian Oscillation (MJO). This MJO is a ripple that flows through equatorial waters. It can temporarily alter larger patterns, like the La Niña.

The ripple is a 4 – 8-week-long localized weakening or strengthening of the tropical trade winds. 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 remains quieter and more sun-warmed. Since January, the winds over the Indian and Pacific Oceans stayed quiet. This produced warm water (called a Kelvin wave) which dramatically raised temperatures. By late April, the Kelvin wave had rippled across the Pacific warming the waters off the coast of South America.

Historically, the MJO varies in strength. The cool phase of the MJO was very strong in November and the warm phase was strong in March and early April. According to the April 24 US Climate Prediction Center Global Tropical Hazards Outlook bulletin:

"The MJO has weakened during the past week and convection in the equatorial band, on a weekly average, is closer to normal than it has been for quite some time."

In other words, the major factor responsible for warming Pacific waters and ending the La Niña is weaker.

This is significant because the big question now is whether the Tropical Pacific will be neutral or evolve into a warm El Niño. Oceanologists around the world disagree. Some forecast an El Niño, some forecast neutrality and some even expect the ocean to cool back into the third La Niño in a row.

The International Research Institute compares the various models. [see figure 3] Notice that there are two types of models – statistical and dynamic. The statistical

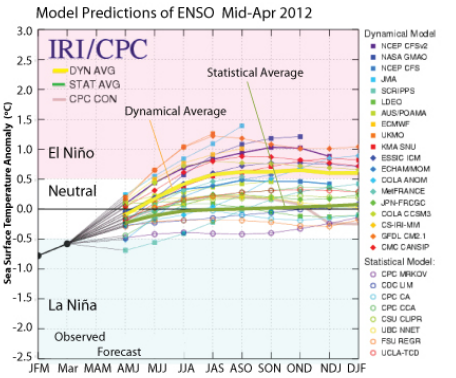
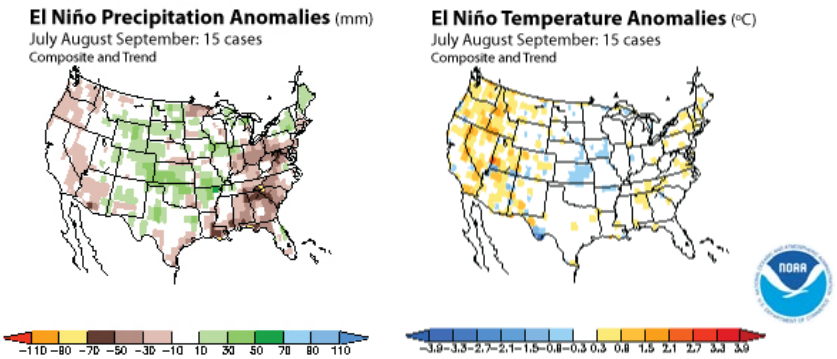


Figure provided by the International Research Institute (IRI) for Climate and Society

fig. 3 **Statistical models predict a neutral Pacific, Dynamic models predict a warm El Nino** *http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf*



figs. 4-5 *left: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ENSO/composites/elnino.jas.temp.gif right: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ENSO/composites/elnino.jas.precip.gif*

models, based on historical records from the 1950s on, predict the Tropical Pacific remaining neutral through the rest of the year. The dynamic models weigh the current developmental trends into their calculations and predict the Tropical Pacific will be at least 0.5˚C (0.9˚F) warmer than normal by late summer. This would be warm enough to create weak El Niño conditions.

The US Coupled Forecast System model, which has a relatively good record of forecasts, is even bolder. It predicts the Pacific will flip from the recent La Niña to a warm El Niño by mid-summer. This would switch the globe from one set of extreme weather to another in only four months! The result would be very damaging for the East Coast, since the phenomenon typically produces very dry conditions for the East Coast, especially the Southeast which is already in drought. It would provide good moisture and moderate temperatures for most of the grain belt. At the same time, it would shift the Southwest monsoon soon eastward, which would be good news for Texas and very bad news for California and Arizona.

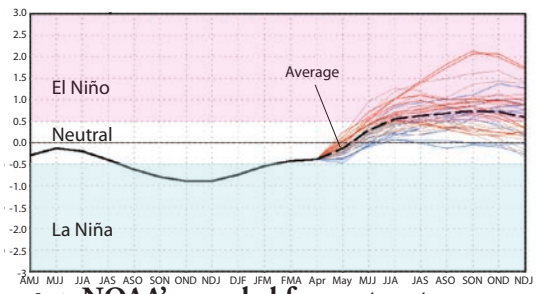


fig.6 **NOAA's coupled forecast system models predict a warm El Nino by mid-summer.**
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

When examining the evidence that these different models are based on, it does seem logical to assume the Pacific will evolve into a warm El Niño. While I am warning my clients that it could begin as early as this summer or as late as next year, I expect, based on the current evidence, that neutral conditions will linger through the rest of spring and summer. The MJO conditions that encouraged such volatile swings in tropical temperatures are currently very weak and, given its cycle, it should take weeks for it to strengthen.

When autumn comes, the odds of an El Niño developing are stronger. At this time 40% of the scientific models are predicting an El Niño by the end of the year. Since the development of El Niño conditions in autumn would result in a very quiet Atlantic hurricane season, it will be carefully monitored.

The Warm Atlantic

Like the Pacific, the Atlantic is in a state of transition. Like the Pacific, changes in the Atlantic can have a major impact on North American climate.

As this publication has noted over the years, the Atlantic has a roughly 70-year cycle known as the Atlantic Multidecadal Oscillation. It is shaped by the flow of the Atlantic Thermohalene Current, a vast network of northward flowing currents that include the Gulf Stream. When the current flows rapidly, the tropical waters that it carries north warm the North Atlantic. When it slows, the North Atlantic cools.

Centuries of Scandinavian fishing records show a pattern of roughly 40 years of catching warm water fish, followed by approximately 30 years of cool water fish. When scientists began to measure the waters in the mid-1800s, they found a similar long-term pattern. The waters were warm through the late 1800s and from the 1920s to 1960.They were cool through the 1960s, 70s and 80s. They then switched back to warm in 1995 and this warmth is expected to peak around 2020. Since we are only seventeen years into the present warm phase, we can expect at least 20 more years of its impact.

Notice – the 130–150 years of instrument data and 424 years of proxy reconstruction show that the AMO is not a stable trend. The oscillation ebbs and flows. Cool negative AMO phases have short warm spells and warm positive phases are interrupted by brief cold interludes. So far, computer models have not demonstrated any predictability for when the AMO will switch.

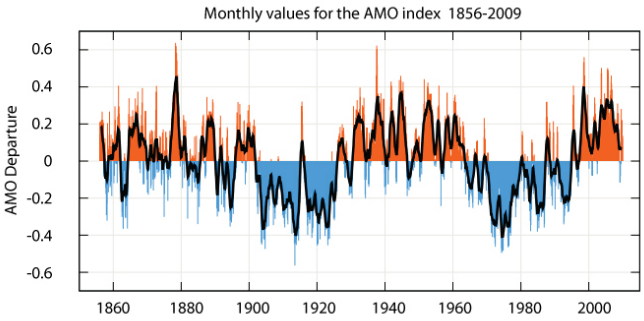


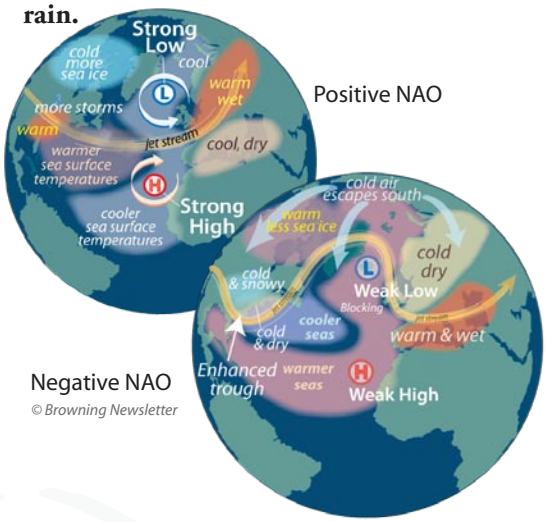
fig. 7 *http://upload.wikimedia.org/wikipedia/commons/1/1b/Amo_timeseries_1856-present.svg-*

Confusing fact:

When the AMO is positive (warm), the NAO is usually negative.

When the AMO is negative (cool), the NAO is usually positive.

figs. 8-9 **The positive NAO shaped winter. The negative NAO caused the late April Nor'easter and European rain.**



This winter, the AMO became negative (cool) in November, December and January. It returned to warm in February. The ocean and atmosphere interact and during the cool AMO spell, an important weather pattern, the North Atlantic Oscillation (NAO) became positive, more positive than any reading we have seen in over 150 years of measurement. If central and eastern Canada and the US enjoyed a warm winter, they can credit the cool AMO and its impact on the NAO weather.

It is probable that much of this North Atlantic coolness (and negative AMO) was due to the cooling impact of the eruption of Mt. Grímsvötn in Iceland. The dust and debris blocked incoming sunlight, cooling the ocean surface below. All of this cooling occurred when the Atlantic Thermohalene Current was flowing very fast. Warm tropical waters surged past North America at the same time that the

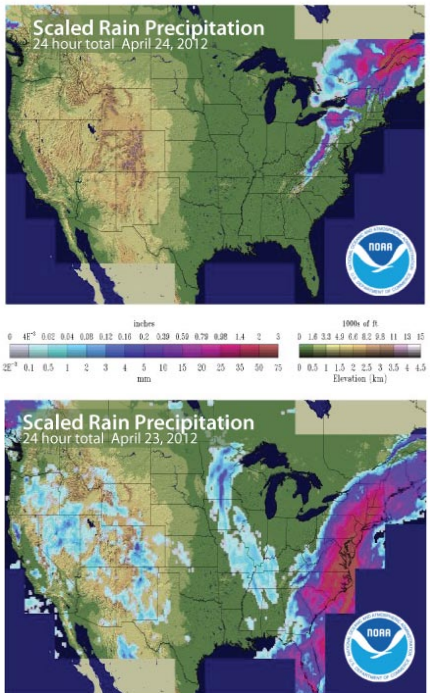


fig. 10-11 **The April Nor'easter brought rain and snow to the drought-stricken East.**

http://www.nohrsc.noaa.gov/snow_model/images/full/National/ruc_nonsnow_precip_24hr/201204/ruc_nonsnow_precip_24hr_2012042305_National.jpg and http://www.nohrsc.noaa.gov/snow_model/images/full/National/ruc_snow_precip_24hr/201204/ruc_snow_precip_24hr_2012042405_National.jpg

NAO blocked Arctic air from hitting the land. Winds from the Gulf and Atlantic warmed the land, producing record-breaking temperatures throughout winter and early spring. (March alone broke 15,000 temperature records!)

By March, the warm currents finally began to warm the northern Atlantic waters producing a very weak positive for the AMO. By April, enough water had reached the north that the positive AMO was near normal. It allowed the NAO weather pattern to turn negative. Cold air could finally enter eastern North America.

And it did. On April 23, a record-breaking Nor'easter dumped up to two feet of snow and five inches of rain on the parched East Coast. More than 75,000 people were left without power.

All of this has produced an extreme tornado season. The crash of hot marine air from the Gulf and Atlantic with cold polar air has produced horrendous storms. When these air conditions were combined with the unusually warm land surface, it created the type of low-lying thunderstorms ideal for tornado development. So far, there have been 635 reported twisters. Twice, on March 23 and April 13 – 16, the 2012 tornado seasons became the busiest on records. Unfortunately, with the warm Atlantic, this storminess will continue. The only change is that with the disappearance of the La Niña, the storm development should retreat further west.

As one looks at the tropical Atlantic, an interesting development is occurring in the eastern tropics. The water is becoming cooler! The waters of the Atlantic Thermohalene current are flowing so fast that they appear to not only be bringing more tropical water to the north, but also more southern waters to the tropics. Cooler water from southern Africa appears to be entering the eastern Tropical Atlantic.

This cooling could be very significant for the late summer and the upcoming hurricane season.

Volcanic Activity

At the same time both the Atlantic and Pacific are undergoing major changes, volcanoes are pouring debris into the atmosphere. So far, none of this year's eruptions are strong enough to reach the stratosphere, but several are strong enough to be affecting North American weather.

Mt. Sheveluch has been active almost all April. Its plumes rose from 4.0 to 9.7 km. (2.5 to 6 miles) high. The lower eruptions had little impact on the climate, but the plumes over three miles high have had an impact on Pacific cold fronts.

Volcanic debris, both the ash and chemicals, combine with the water in the atmosphere. The water tends to form micro-droplets, too small to precipitate out. They can drift for hundreds, even thousands of miles before gathering enough water to form full-sized drops. Thick clouds of these micro-droplets block incoming sunlight, creating cooler temperatures. With large eruptions, which enter the stratosphere, this cooling can last for years. Moderate eruptions, like the recent Sheveluch activity, enter cold fronts and usually precipitate out in one or two weeks.

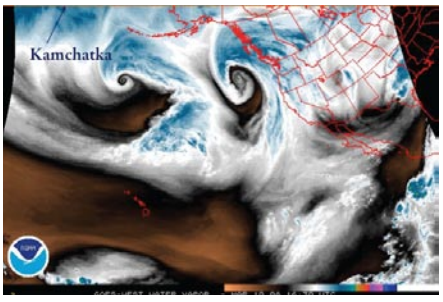


fig. 12 **A long series of moderate eruptions of Russia's Mt. Sheveluch, added to the disappearing La Niña, helped increase precipitation to Western Canada, the Pacific Northwest, and parts of the Great Plains.**

courtesy: NOAA/GOES

This April, Sheveluch debris cooled several cold fronts. After crossing the Pacific, they gathered enough moisture to precipitate out as rain and snow in western states and provinces. Most of this fell in California, the Pacific Northwest and western Canada although some may have enhanced the rainfall in the Midwest. Certainly, the cooler Western air mass, crashing into the warm Gulf air, increased the storminess of the Southern Plains.

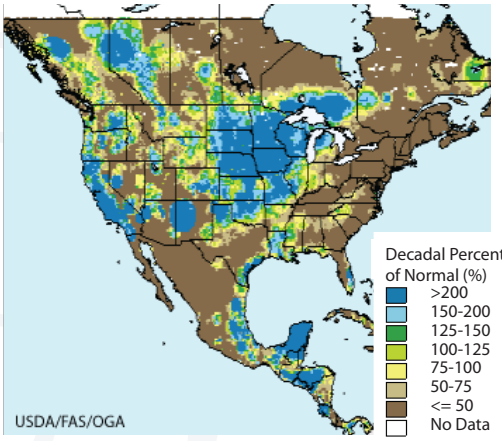


fig. 13 **North American Precipitation Anomalies**

April 11-20 *http://www.pecad.fas.usda.gov/cropexplorer/continentView.cfm?regionid=namerica*

Looking Ahead

With two oceans in transition and an erupting volcano, a volatile spring has become even more volatile. It has also become wetter, which is good news for the US, which currently has 59.4% of the contiguous states in dry or drought conditions. Most of the moisture is falling in the West Coast, the northern tier of states, the Northeast, the Mid-Atlantic and the Great Plains. This is good news for spring planting. It will take considerable moisture to end the drought conditions in many areas, but the surface moisture will be good for the US grain production outlook.

Less fortunate are the Southwest and Southeast. While the Southwest has a high probability of a good summer monsoon, conditions are worrisome for the Southeast, particularly if the Pacific evolves into a warm El Niño.

Overall, history shows that years similar to the current years tend to have good crops, 80% with good grain and soybean harvests. Sixty percent have had good fruit and vegetable production in California. The only major crop that has historically had problems is cotton.

If the Pacific remains neutral through summer and the coastal waters off the Atlantic remain warm for the next four months, then history shows that the following weather patterns are the most likely outcome:

LATE SPRING – In 80% of similar years, the central and eastern portions of North America, barring the far Southeast, have average to above average moisture, with most of the region having wet conditions. If Sheveluch continues to erupt, expect continued moisture in large portions of California, and the Pacific Northwest. (Years without these eruptions are normally dry.) Expect severe tornado outbreaks.

EARLY SUMMER – Early summer is a time of transition and similar years show extreme variability. 80% show hot temperatures in the Southwest and Texas, prior to the summer monsoon. Sixty percent show heat and very wet conditions in the Northeast and Mid-Atlantic. Similarly, 60% of similar years show drought conditions continuing in portions of the Southeast and the west-central Plains. The most ambiguous area is the Midwest, where 40% of similar years were dry, 40% were wet and 20% were normal! It seems most probable that the eastern regions of the Midwest will be wetter than normal while the central and western areas will be near normal.

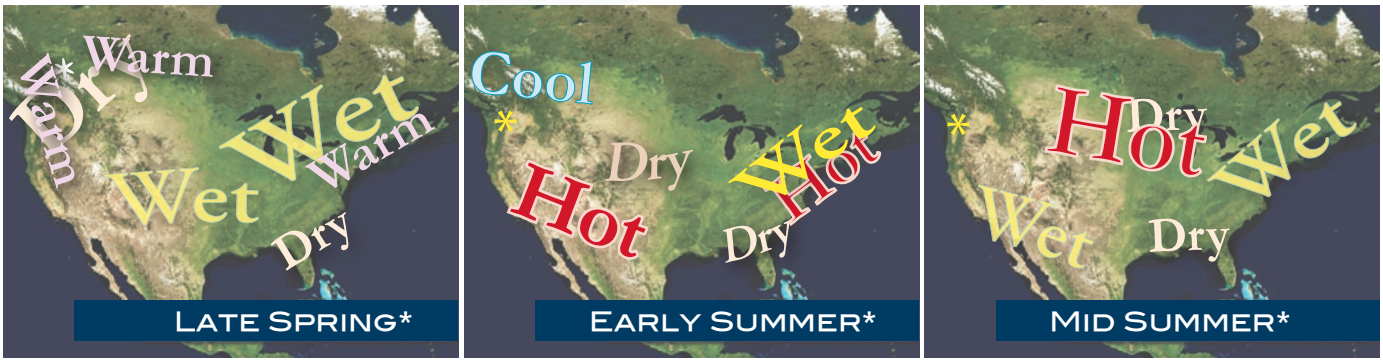
LATE SUMMER – If the models are right, and warm El Niño conditions have not developed, the mid-continent is hot, with potential heat waves, 80% of the time. The Southwest has a strong monsoon that brings moisture to areas of West Texas that were low on spring moisture. Large portions of the South have below normal precipitation while the Northeast and Mid-Atlantic are wet.

So far the outlook for the hurricane season look normal, with a probability of a heavier than average early season fading to normal to below normal as (or if) the Tropical Atlantic cools. If an El Niño develops or the Atlantic cooling speeds up, it would dramatically reduce tropical activity. Next issue will focus on the most probable outlook.

North America is caught between two oceans that are in a state of transition, a warming Pacific and a hot but cooling Atlantic. Think of it as being caught between two grinding gears. With plenty of storms and tornadoes, it will be very messy!

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. 14-16*, *below,* **Moderate eruptions in the North Pacific will bring more moisture to the west.**



SHIFTING OCEANS – THE GLOBAL IMPACT

SUMMARY

The Indian Ocean is also in transition. The combination of three oceans shifting will produce a few pleasant months where most global weather will be closer to normal. This means there is a very high probability of improved crop production.

North America is not the only continent being affected by the changing Atlantic and Pacific. These massive changes are affecting every continent on Earth. When joined by the Indian Ocean, swinging into its negative Indian Ocean Dipole phase, global climate will make dramatic shifts.

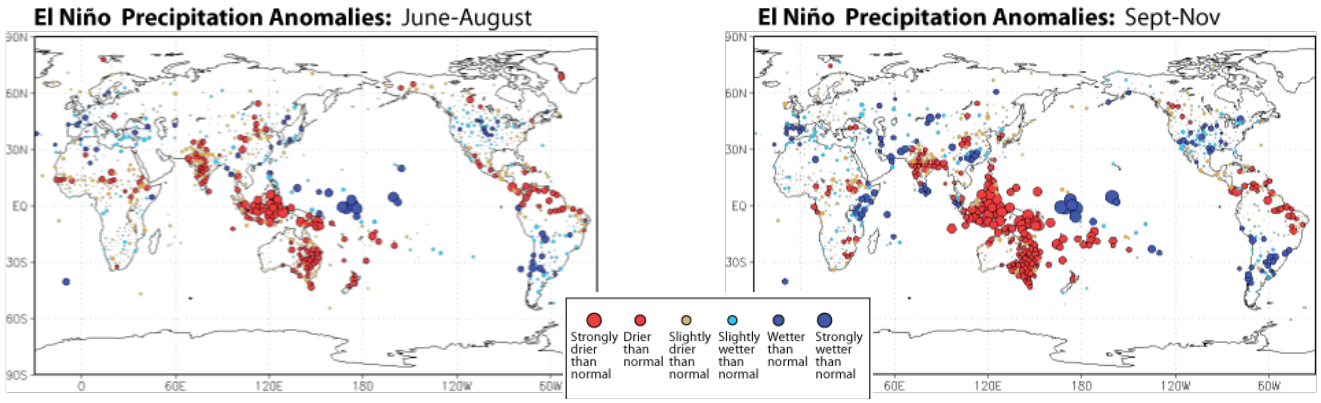
Let's examine the impacts of these transitions.

South America

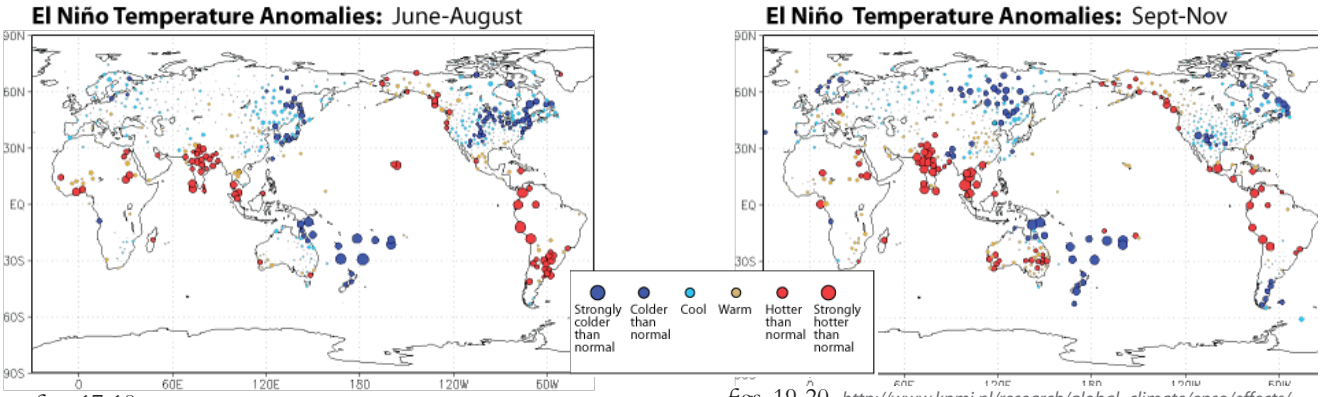
Andean civilizations were the first to observe the El Niño/La Niña shifts and record them. This is not surprising, since Peru, Ecuador and Columbia are more affected than any other region except Indonesia. Indeed, the South Americans gave us the name of the phenomenon – El Niño, after baby Jesus, since the event frequently peaked at Christmastime. The Spanish give historical records of El Niños since the 1540s.

Using these records, scientists have been able to track the impact of El Niños and La Niñas. One of the best, most concise summaries of the effects is by the Royal Netherlands Meteorological Institute (KNMI). This study shows the impact per season. Since the majority of dynamic models expect the event to develop during the second half of the year, let's examine the possible impact

For South America, an El Niño would create an extremely warm winter and warm spring. Most of the effects would be felt along the Pacific Coast and Argentina.



figs. 17-18 *http://www.knmi.nl/research/global_climate/enso/effects/*



figs. 19-20 *http://www.knmi.nl/research/global_climate/enso/effects/*

(Notice, Southern Argentina is the only region that usually has a cold spring during these events.) Typically, the impact on precipitation is extreme. June through August sees reduced rainfall throughout Columbia, Venezuela, the Caribbean nations and Northern Brazil. As the year ends, the drought spreads farther into Brazil, all the way to its northeastern tip. Meanwhile Southern Brazil, Argentina, Chile, Bolivia and the coastal zones of the Andean republics receive plentiful rain. It should also be noted that the heated Pacific waters severely reduce fishing, particularly anchovies.

It should be noted that the heated remnants of the latest Pacific Madden-Julian Oscillation are already altering South American weather. An El Niño floods Peru and Columbia and the MJO has a similar impact. Peru suffered major flooding, from the coasts, to the highlands to the Amazon. Similarly, Columbian flooding affected some 3.6 million people, about 8% of the population. Chile has also suffered. Ironically, some of the regions that endured La Niña induced flooding at the beginning of the year, might have to suffer El Niño flooding at the end of the year.

The impact of the Atlantic on South America is less understood. The location of heat in that ocean has a strong impact on Northeast Brazil and a lesser impact of western and other regions. Research suggests that these areas experience drought when the Tropical Atlantic is unusually warm, therefore the cooling tropical waters are good news. It means the Atlantic will not cause drought, nor would it reinforce drought if an El Niño develops.

Europe

Trapped between the Arctic air mass and the warming Atlantic, European climate is, in some ways, the simplest to understand. On the other hand, it has had the impact of Iceland's Grímsvötn focused on it. Historically Europe has agricultural problems following the eruption of Icelandic volcanoes.

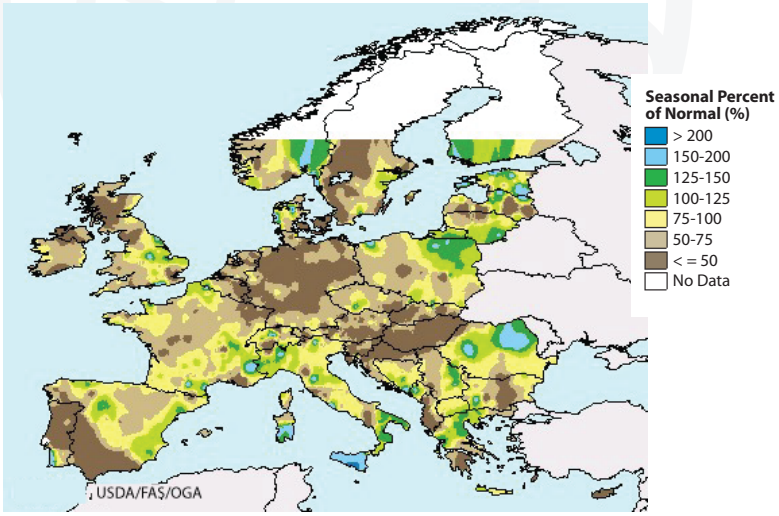


fig. 21 **European precipitation anomalies** *Jan 1-Apr 24*
http://www.pecad.fas.usda.gov/cropexplorer/imageview.cfm?ftypeid=23&fattributeid=8&stypeid=&sattributeid=&startdate=2012-03-01%2000%3A00%3A00.0&d=22085&imenddate=2012-04-20%2000%3A00%3A00.0&regionid=europe

We saw problems this spring, when the combination of a negative NAO and the warm Atlantic currents, blocked moist marine air from penetrating the continent. By spring, much of the continent was in drought.

The NAO turning negative has allowed some heavy, even drought breaking rains to hit Western Europe, particularly England and the Iberian Peninsula. (This has lowered electrical and winter wheat prices.) Depending on the spread and evolution of cooler Tropical Atlantic temperatures, Europe may actually have a relatively cool, wet summer.

Asia

Asian weather is shaped by Arctic winds and ocean oscillations. This year the Arctic winds, blocked over the Atlantic, have penetrated deeply into Siberia, creating chill winter monsoon seasons. Now, however, as summer develops, the main influence on the continent will come from the tropical Indian and Pacific Oceans. They are developing patterns that are good for China and negative for India and Southeast Asia.

The Indian Ocean has an oscillation named the Indian Ocean Dipole (IOD) that shifts the ocean's warmth east and west. Currently the ocean is neutral, but it is becoming weakly negative. This means the warmth of the Indian Ocean is shifting east. In doing so, it will strengthen monsoons in Northern China and Southeast Asia. By contrast, the South Asian monsoon and South China Sea monsoons are weakened.

NEGATIVE DIPOLE MODE

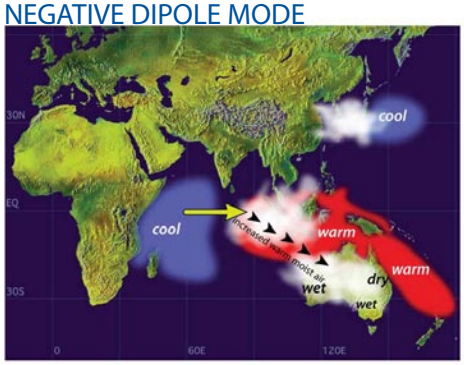


fig. 22 **The neutral Indian Ocean is swinging to a weakly negative IOD**
jamstec.go.jp

This is balanced with the impact of the Pacific. The large, long-term Pacific Decadal Oscillation is cool. At the same time, the tropics are warming and could potentially have an El Niño. El Niños typically create weak monsoons in India and Southeast Asia. In short, if a La Niña reinforces the negative IOD, it could create some real problems.

What this means is that, between a currently neutral tropical Pacific and Indian Ocean, the Indian monsoon will probably be normal, at least at the beginning of the season. (This outlook agrees with the India Meteorological Department's forecast. They are also examining the Indian Ocean Sea Surface Temperature (SST) (favorable), the North Atlantic SST (unfavorable) and the East Asia Mean Sea Level Pressure, NW Europe Land Surface Air Temperature and Equatorial Pacific Warm Water Volume (neutral). However, both the Indian Ocean and the Pacific are transitioning to unfavorable conditions. If either the IOD becomes negative or an El Niño develops before October 1, the season would be shorter than normal, particularly in Pakistan as well as western and northern India.

In Southeast Asia, the La Niña brought flooding to Indonesia and drier conditions to more northerly nations. The fading of the La Niña is a welcome relief. In the case of Indonesia, a negative IOD would counter the impact of an El Niño. This would minimize any drought that the event might create in Indonesia.

Chinese experts note that, with the exception of 1998, El Niño does not have much impact on their agricultural economy. Studies show that statistically the phenomenon creates more summer and autumn rain in southern, particularly southeastern, China and less rain in the northwestern provinces. As with Southeast Asia, a negative IOD would counter the impact.

Currently, China's northeast and southwest have been dry. The La Niña enhanced the cold winter Northwest Pacific monsoon, creating drier conditions in the northeast. At the same time, it weakened the South China Sea monsoon, so that moisture remained in the Southeast China and did not penetrate to the Southwest. The fading of La Niña should allow northern China to finally get some rain in the Northeast and possibly even some in the Southwest. China is facing a crop season similar to 2008. With the effects of the IOD and the warming Pacific countering each other, conditions look good for Northern and Central China, but precipitation in Southwest China could remain a problem.

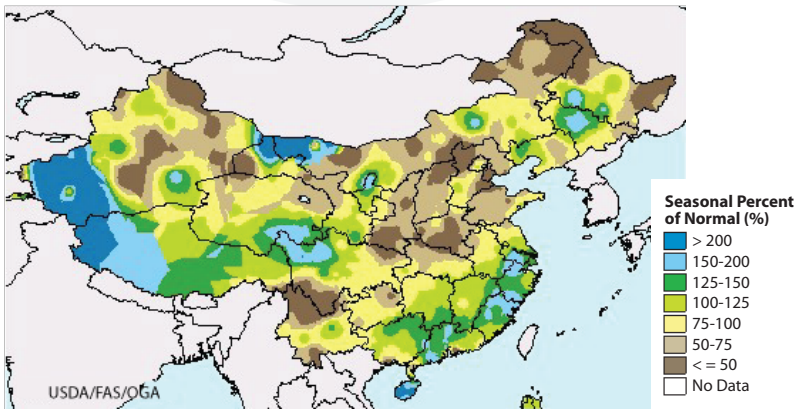


fig. 23 **Chinese precipitation anomalies** *Jan 1-Apr 24*
http://www.pecad.fas.usda.gov/cropexplorer/=che

Australia

Australia hates El Niños, which bring drought and wildfires. The good news is that both the large Pacific Decadal Oscillation and the IOD should minimize the adverse effects if a La Niña develops. In the five most similar years, Australia enjoyed a near normal winter with slightly cooler weather.

With all three major oceans in transition, the globe faces a few pleasant months where most weather will be closer to normal (if anyone can remember normal!). This means there is a very high probability of improved crop production and a gradual reduction of food prices.

Enjoy!

News Notes

A number of volcanoes are currently erupting, including Popocatépetl, near Mexico City, Alaska's Mt. Cleveland, Kilauea in Hawaii, Italy's Mt. Etna and a variety of volcanoes in Indonesia and Latin America. None of these has been big enough to affect global climate. Only one, Mt. Cleveland in Alaska was large enough to affect weather. Its relatively small 4 – 6 km. (2.5 – 3.7 miles) eruption on April 19 may have contributed some clouds and precipitation to the storms that drifted over the East Coast on the following week.

Allergy sufferers in the US have been complaining about the extraordinary amount of pollen that our early spring has caused. Our problems are nothing compared to Russia's. This April, eerie green clouds have blotted out the sun. The residents, already on edge after the fires of 2010 and the current hot spring, were mildly panicked by the clouds and the haze of "green ashes" that covered the ground. According to reports, there were fears of a chemical fire and Pushkin and Red Squares were evacuated. The official explanation was pollen, record-breaking amounts of pollen. Welcome to the spring of 2010.

This year's warm spring and heated Atlantic have been strange for animal life:

Herring and other fish have arrived in northern waters a month early. Fish species are moving unusually far north to find the water temperatures where they thrive. This can create some problems for the fishing industry. First, many government stations that count fish populations and determine catch limits, are stable. When fish populations move unusually far north, the stations don't move with them. They merely report low populations and limit catches. Secondly, fish don't recognize international borders. Fish that normally would be caught in US waters have moved to Canadian waters, which add layers of complications for boats that follow the fish.

Harbor seals are having their pups up to 2 months early. Lots of cute young pups have had to endure this late April Nor'easter with its deadly storms and cold.

"Giant cannibal shrimp" are thriving according to recent headlines. It sounds so much nicer when menus describe these creatures as "tiger shrimp." These Indo-Asian –West Pacific shrimp, normally found in tropical waters from Africa to Southeast Asia and Australia, are invading the Gulf of Mexico. The heated temperatures make them feel right at home. Defying their shrimp name, they grow a foot long and love to nibble on their smaller shrimp cousins.

The Blob was a horror movie, but real-life blobs are sometimes equally horrible. In the most recent duel, "The Blobs vs. the nuclear generator" the blobs have won. Hoards of jellyfish-like organisms, salps, are clogging the intake screens of the Diablo Canyon nuclear power plant at Avila Beach in San Luis Obispo County, California. After trying unsuccessfully to remove the creatures, the power plant has been forced to close down its Number 2 unit. Its Unit 1 was closed for maintenance, so California is going into its hot season with just a bit less electrical power. The plant plans to remain closed until the salp move on.

It's enough to make you exhale more carbon into the air – Hall of Fame announcer, Tim McCarver reported during the recent Cardinals versus Yankees baseball game, that "Global warming is 'making the air thin' and thus leading to a rise in home runs" Silly me, and I thought it might be steroids. (Thank you Timothy Burke on DeadSpin.com!)

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.*

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