

# BROWNING

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NEWSLETTER

A BROWNING MEDIA PUBLICATION

## The Battle in the Pacific

### IN THIS ISSUE

- ⊙ The battle between the El Niño and other oscillations in the Pacific is weakening the El Niño conditions and slowing its development. This has allowed some tropical development in the Atlantic.
- ⊙ The outlook so far is hard for India's early monsoon, less severe than normal for Southeast Asia and good, once the heavy volcanically caused Midwest storms ease, for US agriculture. The California and Texas droughts may ease, but won't end until winter.
- ⊙ Roughly 25% of the US economy is directly or indirectly tied to weather, and El Niño provides better weather than normal. The phenomenon affects North American agriculture, fishing, energy, electricity, real estate, insurance, retail sales, exports/imports and tourism.

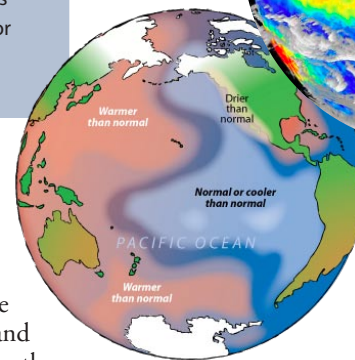
### SUMMARY

After a strong start, El Niño development is slowing down due to MJO oscillations in the Pacific. The outlook so far is hard for India's early monsoon, less severe than normal for Southeast Asia and good, once the heavy Midwest storms ease, for US agriculture.

Everyone hates to be wrong. Unfortunately, in 2012, a huge number of scientists and weather people (including, for a few months, our *Newsletter*) expected an El Niño and were wrong. The warming ocean twisted and cooled. Instead of a cozy warm El Niño, the Pacific developed a chilly La Niña. It altered global weather patterns and intensified the heatwaves and drought of late 2012.

The reason the El Niño petered out was that it was fighting a much greater phenomenon – the giant negative Pacific Decadal Oscillation. Is the same thing happening this year and will it kill the El Niño?

### El Niño



### The Negative PDO

fig. 1A-B

**Which one will win the Battle of the Pacific and shape the rest of this year's weather?**

top: courtesy NOAA, bottom, Evelyn Browning Garriss

## War Zone

There is currently a battle in the Pacific and the outcome is still uncertain. At the equator is a warm El Niño; around it is the PDO, which has trended cool since 2006.

Many factors are involved, and they are battling to shape global weather.

In May, the El Niño was winning. By the middle of the month, the Central and Eastern Tropical Pacific were more than 0.5°C (0.9°F) warmer than average – the very definition of an El Niño. So much warm water was flowing north from

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- 5 **The Economic Consequences of El Niño – North America**  
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Which parts of the Pacific have been warming and cooling over the past 4 weeks. (°C) June 18, 2014 minus May 21, 2014

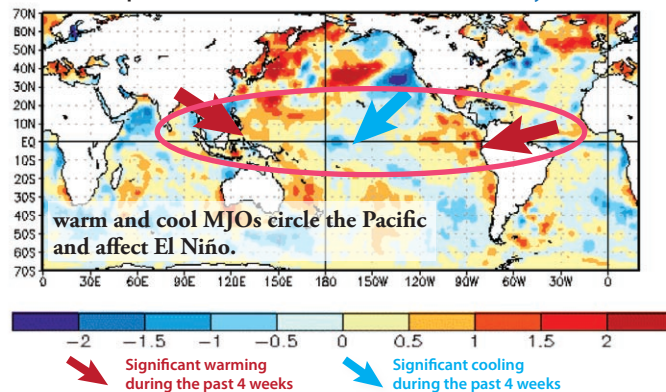


fig. 2 [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/lanina/enso\\_evolution-status-fcsts-web.pdf](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf)

This newsletter contains articles, observations and facts to support our contention that humanity is significantly influenced by changing climate.

*Our calculations show the climate, over the next term, will cause dramatic changes in our social and economic patterns. We feel that readers, attuned to the changes that are occurring, may develop a competitive edge; and, by understanding their current and future environment, can use the momentum of change to their advantage.*  
BrowningNewsletter.com

the El Niño that it upset the balance of the PDO and the larger event became positive and stayed positive for five months. (This typically happens during moderate to large El Niños, even when the overall trend for the PDO is negative.)

An increasing number of scientists suggested that there was a real possibility that the 2014 El Niño would be a powerful event, perhaps as strong as the 1997 – 98 event, which was the strongest in 400 years!

Then, in June, the Central Pacific began to cool!

**Are the developing El Niño conditions of 2014 about to collapse as they did in 2012?**

**Probably not!**

**What we are seeing is a third weather pattern enter the warzone – a cool Madden-Julien Oscillation (MJO).** [See Figure 3] MJOs are relatively small tropical wind patterns that last four-to-eight weeks in any one spot. They are alternating weak and strong patches of trade winds and their storminess shapes water temperatures. Where the winds are weak, the Pacific waters under them become still, sunbaked and hot. Where they are strong, they stir up and cool the waters underneath. These patches of warm and cool tropical waters are called Kelvin waves. Look at Figure 2 and you can see the cool Kelvin wave rippling through the warm pool of El Niño, from west to east through the Central Tropical Pacific. Another is off the coast of East Africa and there

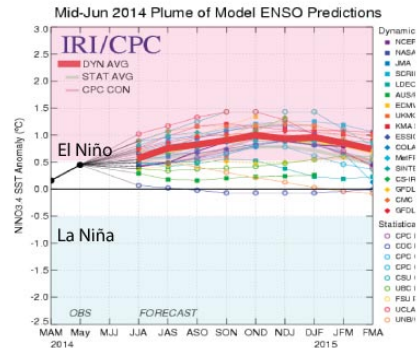


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 17 June 2014).

fig. 4 **The majority of international models predict an El Niño event that lasts through winter.** [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/lanina/enso\\_evolution-status-fcsts-web.pdf](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf)

seems to be one around Indonesia.

So, a cool Kelvin wave (created by the strong MJO) and a negative (cool) PDO are ganging up against the warm El Niño. So far, El Niño conditions are still winning. However, the western side of the warm El Niño is cooling. **This means weak El Niño conditions through early and mid-summer.**

Notice, right behind the cool MJO is a warm MJO. This will flow east and rewarm the tropical waters. The El Niño conditions will strengthen again around August. This is good news for August and September. It provides timely Midwestern rainfall

for soybeans and suppresses the Atlantic Hurricane season during the historically most active period for storm development.

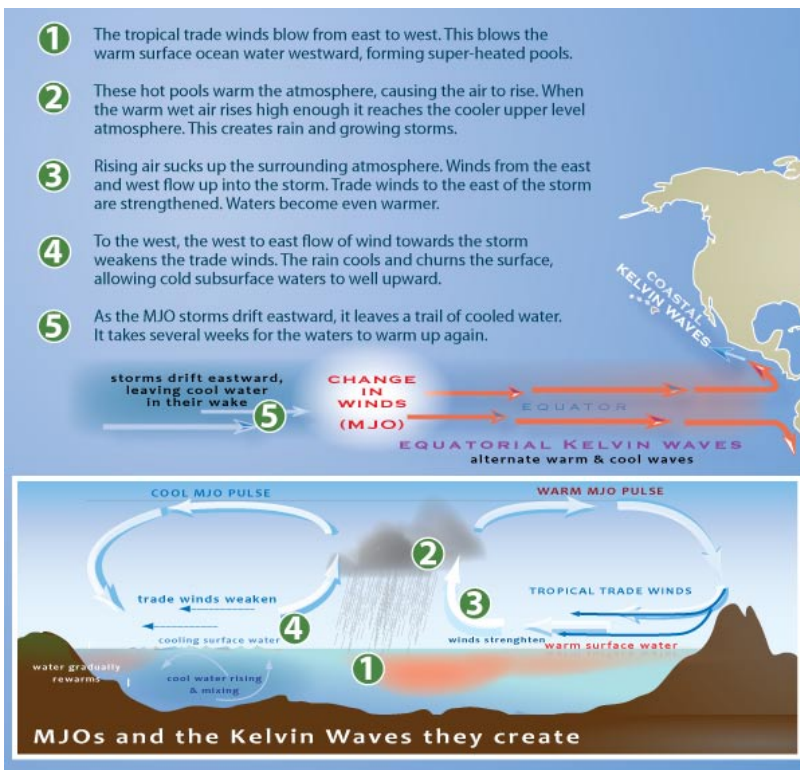
Even with the conflict, it is probable that:

- The current El Niño conditions will last long enough to become an El Niño event (meaning officially recognized).
- The conditions will be relatively weak through early and mid-summer and strengthen in late summer and fall.
- **The El Niño should peak at moderate strength.** With its development interrupted by rippling MJOs and hampered by the long-term negative trend of the PDO, it is unlikely that it will be a huge event like 1997-98 (which developed when the PDO was trending in its warm phase.)
- The conditions should last through winter into early springtime.

## A Closer Look at MJOs and North America

Scientists are studying Madden Julian Oscillations and building a field of knowledge. Unlike El Niños, scientifically recognized in the late 1800s, the study of MJOs is relatively new. NOAA scientists Roland Madden and Paul Julian discovered MJOs

fig. 3 © Evelyn Browning Garriss



## Ensemble of GFS (GEFS) MJO Forecast

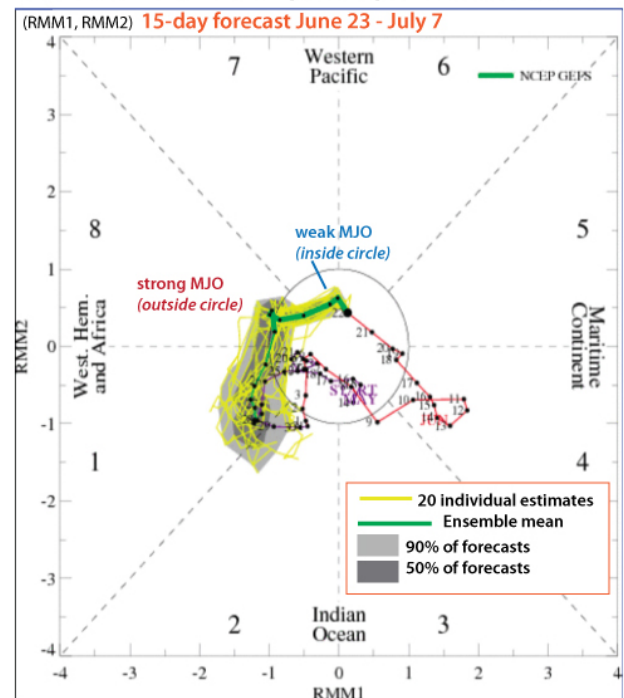
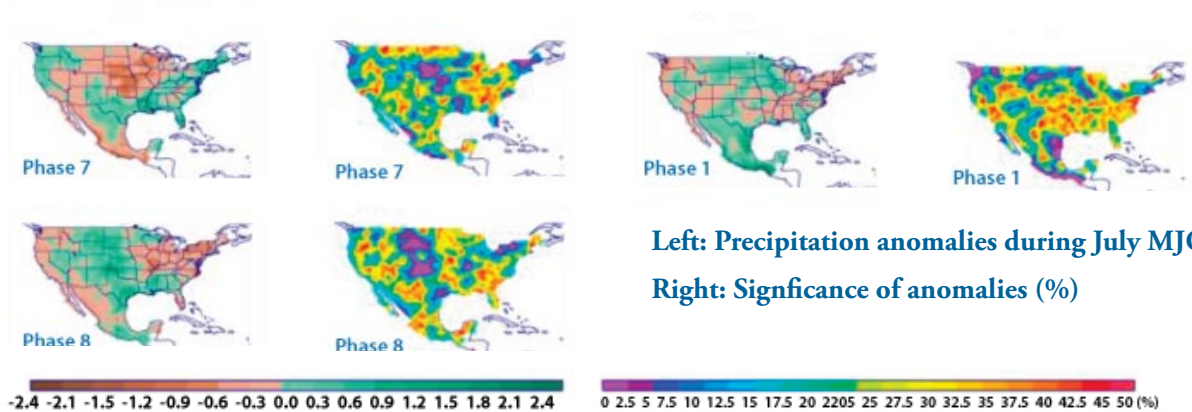


fig. 5 **Forecasts inside circle – weak MJO; Outside circle – stronger MJO** <http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/mjouupdate.pdf>



Left: Precipitation anomalies during July MJOs  
Right: Significance of anomalies (%)

fig. 6 As the MJO cycle changes from 7 to 8 back to 1, it affects US and Mexican precipitation. <http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/mjoupdate.pdf>

in 1971. Our understanding of them is still developing. We know they alter tropical conditions, which affect the middle latitudes during summer. In summertime, these oscillations affect North American rainfall, particularly in Mexico and the US west of the Mississippi.

Scientists evaluate how strong the MJOs are and where the circle of warm and cool Kelvin waves are located. They divide the patterns into eight phases as the ring of warm and cool spots circle the globe around the equator. **These phases correlate with weather patterns.** Some correlations in North American are very strong. For example, hurricanes are more likely to start when cool MJOs are in the Gulf and Caribbean. Other correlations, like MJOs and Canadian rainfall are so weak that they are insignificant.

Scientists examining the MJOs say is that the current events are very weak and in phase 7. As summer progresses and the MJOs drift to the east, the MJOs will enter phase 8 and 1. A research paper, "A composite study of the MJO influence on the surface air temperature and precipitation over the Continental United States", by Zhou et al., published in *Climate Dynamics* (2011) shows the usual impact of these three MJO phases on US and Mexican rainfall. Notice, beside the three precipitation maps are significance maps. In the purple areas of the significance maps, there is a 95% correlation between the position of the MJO and rainfall. In red areas, there is some correlation, but don't bet the farm that it will rain. Notice – the West Coast, Texas and the Great Plains frequently have strong correlations. MJO positions usually trigger rain or drought. Other areas like the Canadian border and

the Southeast are barely affected. According to these studies, the heavy Midwestern may ease (although volcanic dust may force the rains to continue) and dry parts of the High and South Plains may see early July rainfall.

### MJOs and Asia

**North America is not the only region of the world affected by MJOs nor is it the only region studying these events. Scientists are also discovering that these events enhance or suppress monsoons.** This is hardly surprising since monsoons are the flow of winds from cooler to warmer regions. Warm MJOs in the water mean weaker flows of moist ocean winds toward hot tropical lands than cool MJOs. By tracing the flow of MJOs through the Indian Ocean and West Pacific, you can see which areas in Asia will experience a weaker monsoon.

Indeed, scientists are starting to use these to warn areas one and two weeks ahead of rain, cyclones and dry weather. Here is their latest projection:

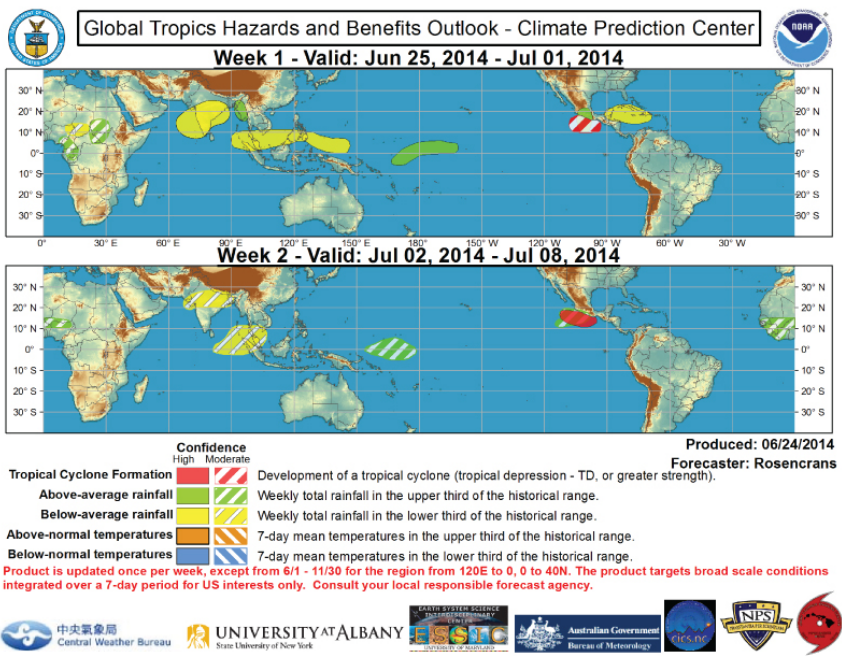


fig. 8 The monsoon is late in arriving in India's northern regions. © Evelyn Browning Garriss

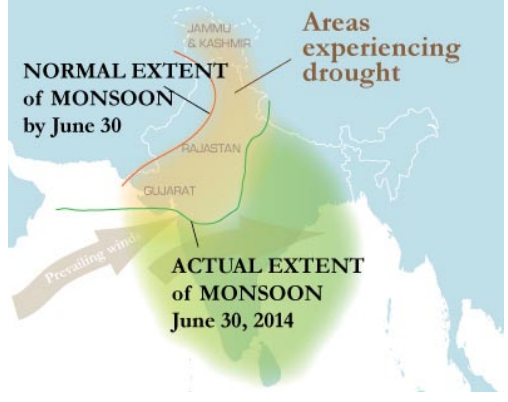


fig. 7A-B [http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ghazards/images/gth\\_full.png](http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ghazards/images/gth_full.png)

## Natural Factors Shaping Spring & Summer's Weather

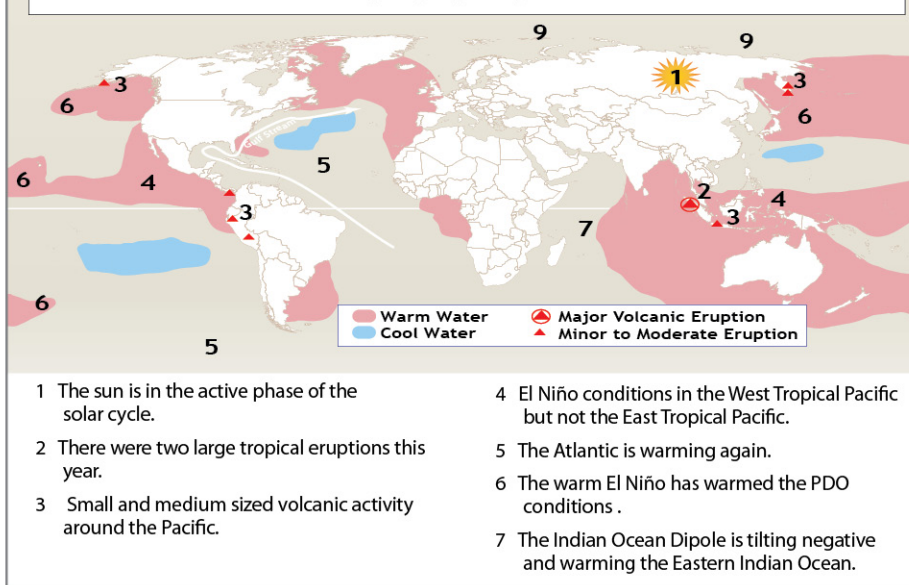


fig. 9

© Evelyn Browning Garriss

Notice, the MJOs have moved in position to slow down the advance of the Southwest Monsoon that rains on India and Pakistan. Southern Asia frequently has droughts during El Niños. Indeed, history shows that all Indian droughts occur during El Niños but not all El Niños cause droughts. Scientists are quite concerned. According to the India Meteorology Department (IMD), roughly 80% of the country has received deficient to scanty rainfall. The nation is suffering a 42% precipitation deficit. The extended range forecast of the Indian Institute of Tropical Meteorology is that monsoon activity over the country will be weaker until mid-July.

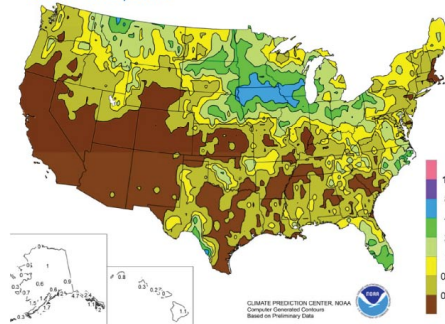
The current ripple of a cooler MJO through the El Niño conditions is hopeful. The most optimistic forecasts (by the UN's World Meteorological Organization) are that this will keep the El Niño from developing until October, when the wet season is over. Other groups speculate that at least the event will be moderate, not strong allowing the wet season to improve, if not fully recover.

In a nation where farming accounts for about 14% of the \$2 trillion GDP and employs as much as 50% of its labor force, droughts are extremely serious. Half the farmland still lacks irrigation and dry weather is delaying the sowing of key summer crops such as cotton, soya bean, pulses and coarse grains. There are fears that a continued delay will stoke inflation and unemployment, an unwelcome challenge to the new government of Narendra Modi.

Notice also, Indonesia and parts of Southeast Asia are experiencing drought. This is typical of El Niño. Normally this area experiences severe droughts and wildfires during these events.

The game changer is this pattern is the Indian Ocean Dipole (IOD). If the IOD is positive, the warmer water will shift west and precipitation will improve in Africa and India. If it is negative, the warmer water will shift east and the El Niño will not be as harmful for Indonesia and Southeast Asia. It also would bring more rainfall to Australia.

Total Precipitation (inches)  
June 15-21, 2014



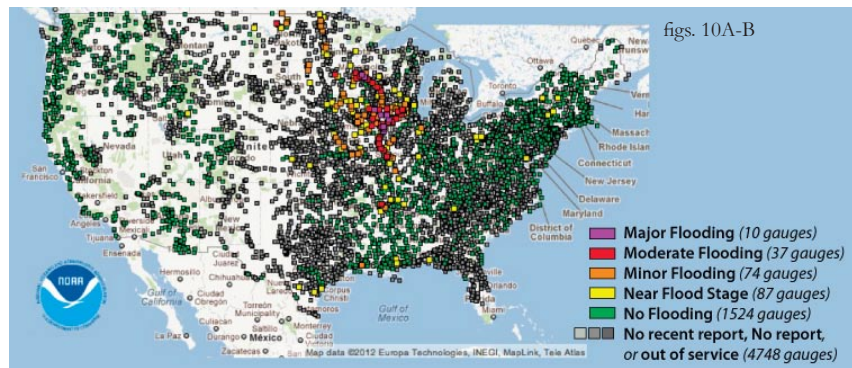
NOAA  
NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION  
U.S. DEPARTMENT OF COMMERCE

## From Summer to Autumn

The extreme and strong early development of El Niño in the Pacific created the type of El Niño conditions in early summer that normally is only seen in mid-summer – heavy rains in the Midwest. As is typical in volcano weather, the cool/cold temperatures caused by thick sun-blocking debris-filled clouds is followed by heavy rain in the Upper /Midwest/Mississippi when the clouds rain out. (We saw a more extreme version of this in 1993, when the clouds from the eruption of Mt. Pinatubo rained out.)

In 80% of similar years, this type of heavy rain would have hit in early July. This year it arrived two weeks earlier in mid-June. Now Minnesota, South Dakota, Iowa and Nebraska are sandbagging their rivers with some localities experiencing record floods.

Expect more storms. The Atlantic Multidecadal Oscillation, after four months of being negative has returned to positive – which means the Atlantic waters are warming up. Additionally, with the warmer water and slightly weakening El Niño developments in the Pacific, more



figs. 10A-B

tropical moisture, possibly even a tropical storm, could hit the US during July. While these floods are later than normal, they are the first sign that rainfall is usually generous in the Midwest throughout the summer growing season.

Notice, the rains are in the Great Plains and East. The West is still dry. Indeed, the Lower 48 states have more than 47% of their area dry or in drought – 2% more than the same time a month ago. The El Niño does bring Western rain, but not enough to break any western droughts. The major hope for the West is that the phenomenon frequently creates a strong, but more eastern monsoon. That means parts of West Texas could see some relief. At the same time, El Niño typically steers Gulf moisture east, leaving parts of the Central and Western Gulf dry.

As fall starts, the stutter in the El Niño development should be finished and the phenomenon should be stronger. This typically means near normal early autumn temperatures and typical first freeze dates. In addition, the El Niño should reduce hurricane activity – allowing the Southeast and Eastern Gulf to get tropical rain without serious storms.



<b>Cool</b> 2-4°C or more lower than normal temps.	<b>Hot</b> 5°C or more higher than normal temps.	<b>Warm</b> 2-4°C or more higher than normal temps.	<b>Dry</b> 75% or less of normal moisture	<b>Wet</b> 125% or more of normal moisture
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\*Pacific volcanic activity may bring more moisture to the Northwest.

figs 11A-C. © Evelyn Browning Garriss

Ironically, history shows that when there is a weather war in the Pacific, with El Niños, PDOs and MJOs battling, North American agriculture (except California) usually thrives. Meanwhile, we can watch the battle – the developing El Niño conditions may be down, but they are not out.



## The Economic Consequences of El Niño – North America

→ **SUMMARY**  
The economic impact of the El Niño is widespread. It is benign for most of US agriculture and lowers winter heating demand for most of Canada and large portions of the Western and Northern US. However, the impacts on other portions of the North American economy are not as favorable.]

According to NOAA analysts, nearly 25% of the US GDP is directly or indirectly affected by weather and climate. El Niños usually provide a favorable climate. Their impact is less benign on other North American countries.

Remember, no two El Niños are exactly alike. A number of studies in the 1990s and early 2000s examined the economic impact of these climate events. Investors felt that they understood what to expect. Then came the El Niños of 2004 and 2009 – and the expectations were shattered.

Part of the problem is that the understanding of El Niños is new. It was only after the giant El Niño of 1982 – 83 that scien-

tists realized the global impact of the event. The science on the behavior of Central Pacific (Modoki) El Niños versus the patterns created by classic official El Niños is still being generated and debated. The original economic studies expected more conformity. The science on the behavior of Central Pacific (Modoki) El Niños versus the patterns created by classic El Niños is still being generated and debated. The original economic studies expected more conformity.

Then the El Niño of 2004 arrived, a Modoki event. Like smaller Central Pacific events, most of its impact affected Asia not North America. It allowed heavy Atlantic hurricane activity to ravage Florida. California remained hot and dry, with soaring utility rates. The 2009 El Niño followed and the cold Arctic blast created by the polar eruption of Mt. Redoubt in April overwhelmed the normally warm El Niño winter. People began to consider El Niños as too unpredictable for investments.

They aren't, but El Niños vary and basing investments on their patterns is not simple. They interact with other natural climate factors. History shows patterns, but investors must consider the odds.

Current El Niño conditions appear to be developing into a classic El Niño. Most international agencies project a 70% chance of it developing this summer and an 80% chance of it lingering through winter. The majority now expect it to be moderate in strength. In short, it is the type of event that most of the old studies examined. It will have certain predictable effects on the economy. In the words of *The Economic Impacts of an El Niño*, a NOAA report written in 2002:

“Weather and climate sensitive industries directly impacted by weather (such as agriculture, construction, energy distribution, and outdoor recreation) account for nearly 10 percent of GDP. Further, weather and climate indirectly influence an even larger portion of the nation’s economy, extending to parts of finance and insurance, services, retail and wholesale trade, as well as manufacturing. . . El Niño affects important business variables like sales, revenues, and employment in a wide range of climate-sensitive industries and sectors.

Overall, total U.S. economic impacts of the 1997-1998 El Niño were estimated to be on the order of \$25 billion.”

The following are some of the historical effects El Niños have had on the economy:

### AGRICULTURE –

- El Niños tend to have a beneficial impact on summer crops in the Northern Hemisphere, especially in the US and Canadian grain belts. Precipitation is plentiful and there are usually few, if any, heat waves. If there are production problems this year, it will be due to the cooler volcano weather we experienced during spring planting season, not the El Niño.
- Winter crops fare less well. The phenomenon brings cooler wetter winters to southern states. Statistics show a drop in cotton production in the Southeast during El Niño years. Similarly, Central California fruit and vegetable crops have had problems with low temperatures. An average event historically lowers crop production by 1 – 2 %. (The cold in California should be balanced out by heavy, perhaps drought-breaking, rainfall.)
- If the event lingers into springtime, it provides ample moisture and excellent cover for most winter wheat. However, the Western Provinces and parts of the Pacific Northwest historically have soil moisture deficits during their planting season.
- An additional note, if the El Niño does last into spring, it should bring heavy rainfall to drought-stricken Texas and the Southern Plains. This would be particularly good for the cattle industry.
- Typically, the most negative impacts of El Niños are on tropical agriculture – particularly in Indonesia and parts of Latin America. As noted in last month’s *Newsletter*, cocoa, coffee, cane sugar, palm oil and, in stronger events, rice suffer from droughts and floods.

(The current event will probably not be strong enough to have much impact on West Africa and the IOD will help reduce some of the problems in Southeast Asia.)

### FISHING –

- Changing ocean water temperatures have an impact on marine life. During the large El Niño of 1982-83, Pacific salmon populations dropped 20% and anchovies dropped 80%. Other marine life, from fish, to seals and bird populations, showed similar dramatic drops.
- Even more troublesome, from a Canadian point of view, was that the warm waters drove fish populations north and American fishing fleets followed. International fishing disputes rise as marine populations move.

### ENERGY –

- Typically, a classic El Niño limits Atlantic hurricane activity in Gulf of Mexico oil and gas production regions. Production facilities experience few work stoppages and little to no storm damage. El Niño conditions are still evolving, so this protection may not be as strong in summer, particularly late July and early August, as they could be in autumn.
- El Niños typically produce warmer winter weather for Western Provinces and the northern states from the West Coast to the Great Lakes. Large El Niños warm the entire US/Canadian border region. The regions that face the most reliable warming tend

to heat with propane and natural gas. Further east, the heating industry uses a greater variety, from gas to heating oil. Normally El Niños bring down demand for natural gas, causing lower prices for consumers and lower profits for producers. This winter, any lower demand for natural gas due to weather would add to the energy consumption drop due to the economic slowdown.

- Historically moderate El Niños produce a “double dip” winter in the Eastern Provinces and Northeast and Mid-Atlantic states. These regions experience cold, even Nor’easter conditions in early and late winter but less heating demand in mid-winter when the warming impact of an El Niño has expanded to its greatest extent

### ELECTRICITY –

- El Niño events typically bring dramatic changes in precipitation that affect hydro-electricity. The Tennessee Valley Authority, for example, has historically shown that it has increased reserves and production capacity during these events. The same is true for most of the Southeastern states. Unfortunately, for British Columbia and the Pacific Northwest, the opposite is true and this normally leads to higher summertime electrical costs in California.
- Cooler summers lower the Great Lake temperatures. Cooler waters are more effective in cooling coal and nuclear power plants, increasing generating efficiency for plants throughout the Midwest and Ontario. In addition, this year’s lake levels are higher than

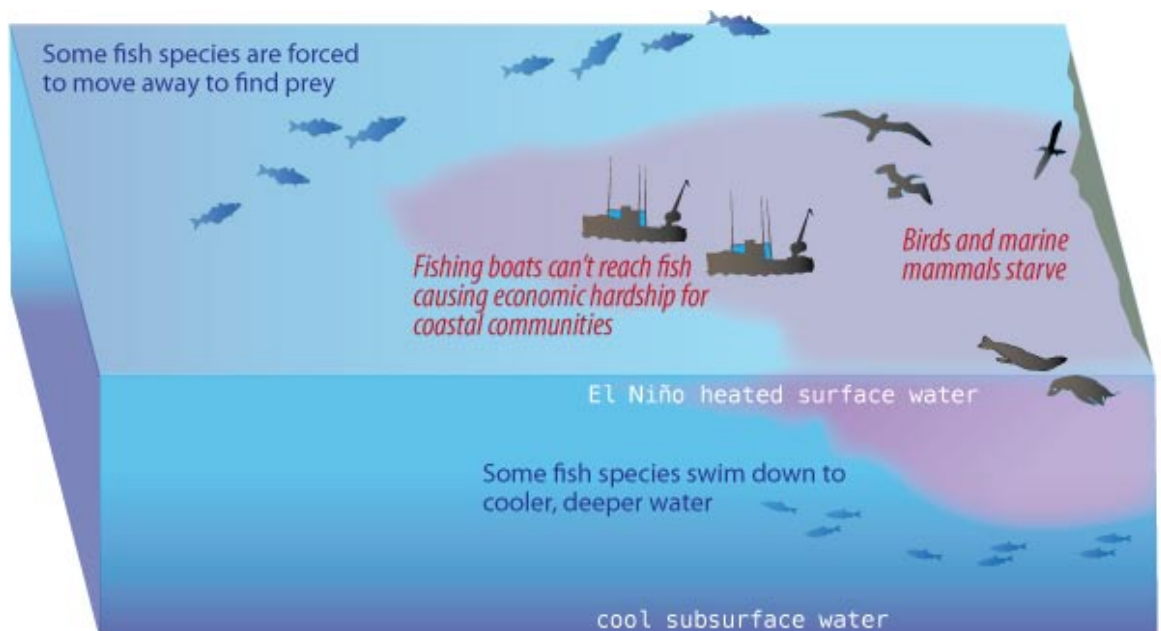


fig. 12 © Evelyn Browning Garriss

in recent years, thanks to the snows of last winter's Polar Vortex.

- Southern and East Coast utilities normally face increased wintertime ice and snow line damage during these events. (Even areas in Quebec and Ontario are affected.) Gulf States have more winter tornadoes and the Mid-Atlantic and Northeast usually have more ice storms. Additionally, moderate El Niños frequently generate late winter and early spring Nor'easters. During larger El Niños, the ice storms extend to Ontario and Quebec.

#### REAL ESTATE –

- Warmer winters in Southern and Western Canada and the Northern tier of states allow more construction activity.
- East and Gulf Coast properties face less risk from hurricane damage and northern properties incur less winter storm damage.
- Hotter Western temperatures, however, increase fire risk in California and portions of the Northwest and Southern California face more property damage from heavy winter rains and mudslides.
- In moderate to large El Niños, the southern tier of states face increased damage from heavy winter rains and the central to eastern Gulf States have more winter tornadoes.

#### INSURANCE –

- El Niños usually reduce insurance payouts due to hurricanes but can increase late and early winter payouts due to Nor'easters.
- Crop insurance payouts are usually reduced during El Niño events.

#### RETAIL –

- Lower energy prices leave consumers with more money for discretionary spending. Typically Midwestern stores report between 5 – 15% increased sales during warm El Niño winters. However, this affects only some goods, since items like snowmobiles show declining sales.
- If the El Niño continues into spring, however, it brings unusually cool weather to the East and Midwest. This hurts the sale of seasonal goods, such as gardening tools and spring clothing.

#### EXPORTS/IMPORTS –

- El Niño years are usually excellent for US agricultural exports. Typically, US crop yields are good while their potential customers have problems. El Niños usually hurt agriculture in India, large portions of China, the Philippines and Indonesia. In 25% of these years, they hurt competing grain production in Canada and South America.
- Most El Niños concentrate their most severe effects in tropical regions, raising the cost of tropical imports, particularly cocoa, coffee, palm oil and, to a lesser extent, cane sugar.

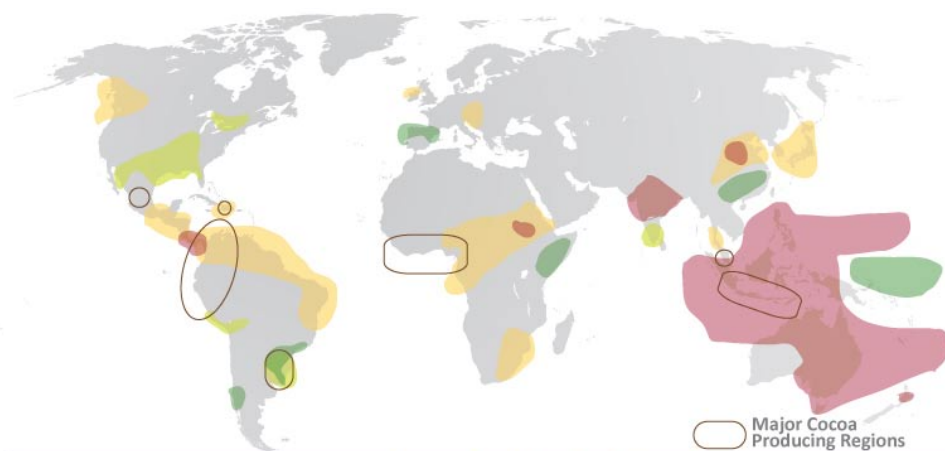
- El Niños change ocean conditions for shipping. Because the phenomenon usually suppresses Atlantic hurricane activity, the major impact is felt along the Gulf of Mexico and East Coast. The Gulf experiences calmer shipping conditions in summer and fall but stormier conditions through winter and early spring. Similarly, the East Coast has quieter hurricane and mid-winter conditions but a strong risk of Nor'easters during late winter and early spring. On the West Coast, there are more storms through California, particularly for Los Angeles and San Diego and quieter conditions for the Pacific Northwest and British Columbia ports.

#### TOURISM –

The changes in weather affect where the desirable tourist locations are.

- In the summer, the lower Atlantic hurricane rate makes Yucatan, Mexico and Caribbean vacations a bargain.
- Typically, the East Pacific hurricane season is more active, which can ruin trips to Baja and the Mexican Riviera. Toward the Central Pacific, however, drought conditions become more common, which means sunnier days but may blight tropical vegetation for Hawaiian trips.
- Most El Niños see a boom in Western skiing and skiing equipment sales and a drop in skiing in the Midwest and Ontario. Eastern skiing varies according to the size of the event.

The current El Niño is a classic El Niño and will probably have many, if not most, of the economic impacts listed above. If 25% of the US economy is directly or indirectly tied to weather, an El Niño provides better weather than normal. Given the current problems of our times, it is good that we are facing a favorable “economic climate.”



El Niño Precipitation Anomalies: September/October/November

# News Notes

☁ One of the first signs that the development of El Niño conditions has weakened slightly is that the Atlantic is more favorable to tropical development. As this goes to press, a storm drifted off the East Coast and hit hot water. It is now growing off the coast of Florida. The US National Hurricane Center gives it a 80% chance of becoming Arthur, the first named storm of the Atlantic Hurricane season. At the moment, it is battling dry air and wind shear. Whether the winds grow to a tropical storm or remain a tropical disturbance, it is expected to go up the East Coast during the first week of July, bringing heavy rains to Florida and the North Carolina coast.

☀ Good news you may not have heard – the air we breathe is a bit better. NASA's Aura satellite released pictures in the last week of June that show significant reductions in air pollution levels across the United States. In particular, at least one pollutant, nitrogen dioxide, has decreased substantially over the past decade.

The decrease is particularly prominent in the Northeast, the Ohio River Valley, and other major US cities. For example, NASA reported a 32% decrease in New York City and a 42% decrease in Atlanta between the periods of 2005-2007 and

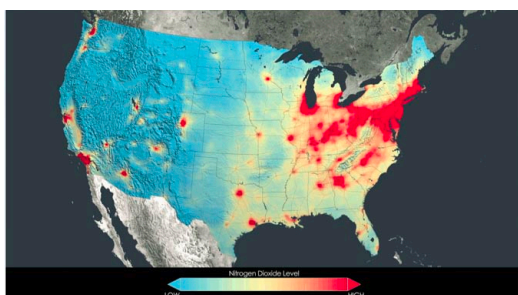
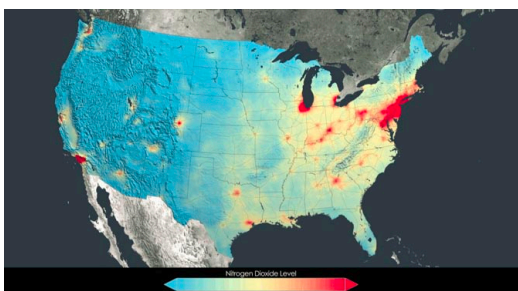


fig. 14A-B

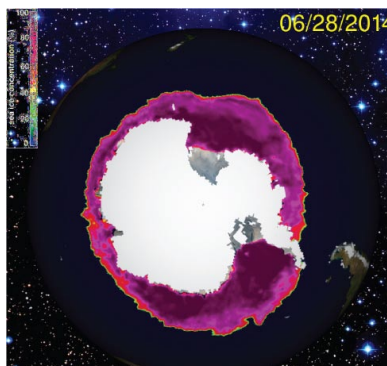
**Nitrogen dioxide pollution levels decrease over time**  
top: 2005  
bottom: 2011

[http://www.nasa.gov/content/goddard/new-nasa-images-highlight-us-air-quality-improvement/index.html#\\_U7HMQRH-b5QV](http://www.nasa.gov/content/goddard/new-nasa-images-highlight-us-air-quality-improvement/index.html#_U7HMQRH-b5QV)



2009-2011. This air pollution decreased even though population and the number of cars on the roads have increased. Congratulations – and as a reward to yourself, take a deep breath of cleaner air.

Location, location, location and some more good news -- the sea ice surrounding Antarctica, hit a new all-time record high for areal coverage. On June 28, the University of Illinois at Urbana-Champaign's The Cryosphere Today site showed



that the ice encircling the Antarctica is 2.074 million sq. km (801,000 sq. miles). That is .99 million square kilometers more than average!

What! You thought the ice was

fig. 15 [http://arctic.atmos.uiuc.edu/cryosphere/NEWSIMAGES/antarctic\\_seaice.color.000.png](http://arctic.atmos.uiuc.edu/cryosphere/NEWSIMAGES/antarctic_seaice.color.000.png)

shrinking. Look at Figure 14 and notice the tip of the peninsula sticking out of the growing ice. Guess what our satellite pictures show – the icebergs breaking off that peninsula. The ice on the peninsula is shrinking but the ice in East Antarctica is growing. Unfortunately, pictures of growing ice are too boring to make the news.

We are now hearing scientists telling us that the shrinking ice in the north is more important to global climate circulation than that pesky ice growing in the south. Tell that to the Aussies!

☄ Just in case your head isn't spinning, the latest science is showing that giant 'whirlpools' in the ocean are driving the weather. Giant swirls of water called mesoscale eddies, up to 300 miles (500 km.) wide carry huge volumes of water and heat across the oceans. Bo Qiu at the University of Hawaii has shown that they slam as much as 30 million tons of hot water against east coasts of continents every second. They are currently creating extreme weather in Japan and parts of Northern China. The science on the eddies is new – but could help us know where global heat will hit.

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Meanwhile, decisions must be based on the best available information and estimates.

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