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# The Pacific Tradewinds Quarterly

The official newsletter of the Schools of the Pacific Rainfall Climate Experiment

**Inside this issue:**



Blue underlined text is clickable in the electronic version of the newsletter.

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## Japan Earthquake and Tsunami of 2011

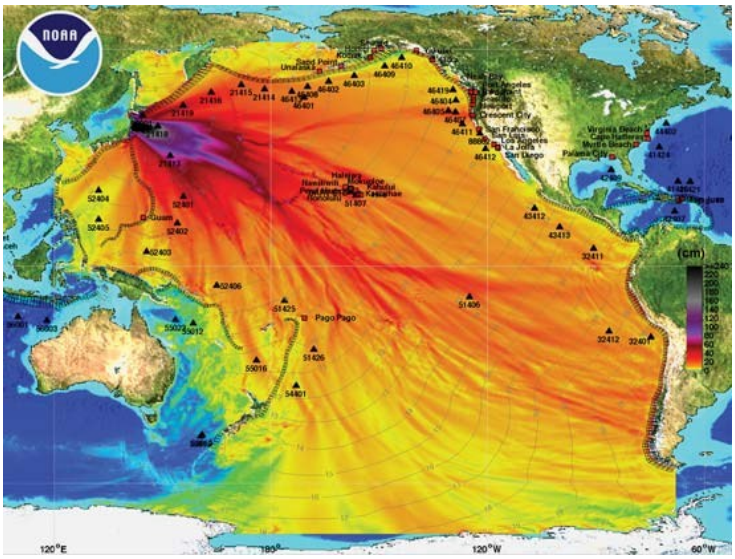
Primary Contributors: Kenneth Pletcher and John P. Rafferty

The Japan earthquake and tsunami of 2011, also called Great Sendai Earthquake or Great Tōhoku Earthquake, [was a] severe earthquake that occurred on March 11, 2011, off the northeastern coast of Honshu, Japan, the country's main island. It caused widespread damage on land and initiated a tsunami that devastated many coastal areas of the country, most notably in the Tōhoku region (northeastern Honshu)

### *The earthquake and Tsunami*

The epicenter was located some 80 miles (130 km) east of the city of Sendai, Miyagi prefecture, and the focus occurred at a depth of about 15 miles (about 24 km) below the floor of the


**Map of the northern part of Japan's main island of Honshu depicting the intensity of shaking caused by the earthquake of March 11, 2011.** **Source:** *Encyclopædia Britannica, Inc.*




**Map prepared by the U.S. National Oceanic and Atmospheric Administration depicting the tsunami wave height model for the Pacific Ocean following the March 11, 2011, earthquake off Sendai, Japan. Source:** *NOAA Center for Tsunami Reserach*

western Pacific Ocean. The earthquake—resulting from the rupture of an approximately 186 mile (300 km) long stretch of the Japan Trench that separates the Eurasian Plate from the subducting Pacific Plate—was felt as far away as Petropavlovsk-Kamchatsky, Russia; Kao-hsiung, Taiwan; and Beijing, China. (Some geologists argue that this portion of the Eurasian Plate is actually a fragment of the North American Plate called the Okhotsk microplate.) The March 11 temblor was preceded by several foreshocks, including a magnitude-7.2 event centered approximately 25 miles (40 km) away from the epicenter of the main quake. Hundreds of aftershocks, dozens of magnitude 6.0 or greater, followed in the hours and days after the main quake. The March 11 earthquake was the strongest to strike the region since the beginning of record keeping in the late 19th century, and it is considered to be one of the most powerful earthquakes ever recorded.

The sudden thrusting of the Pacific Plate, which has been slowly advancing under the Eurasian Plate near Japan, forced a portion of the seafloor upward by some 100 to 140 feet (30 to 40 metres), which displaced the water above and spawned a series of highly destructive tsunami waves. A wave measuring some 33 feet (10 metres) high inundated the coast and flooded parts of the city of Sendai, including its airport and the surrounding countryside. According to some reports, one wave penetrated some 6 miles (10 km) inland after causing the Natori River, which separates Sendai from the city of Natori to the south, to overflow. Damaging tsunami waves struck the coasts of Iwate prefecture, just north of Miyagi prefecture, and Fukushima, Ibaraki, and Chiba, the prefectures extending along the Pacific coast south of Miyagi. In addition to Sendai, other communities hard hit by the tsunami included Kamaishi and Miyako in Iwate; Ishinomaki, Kesennuma, and Shiogama in Miyagi; and Kitaibaraki and Hitachinaka in Ibaraki, As the floodwaters retreated back to the sea, they carried with them enormous quantities of debris, as well as untold numbers of victims caught in the deluge. Large stretches of land also were left submerged under seawater, particularly in lower-lying areas.

The earthquake triggered tsunami warnings throughout the Pacific basin. The tsunami raced outward from the epicentre at speeds that approached about 500 miles (800 km) per hour. It generated waves 11 to 12 feet (3.3 to 3.6 metres) high along the coasts of Kauai and Hawaii in the Hawaiian Islands chain and 5-foot (1.5-metre) waves along the island of Shemya in the Aleutian Islands chain. Several hours later 9-foot (2.7-metre) tsunami waves struck the coasts of California and Oregon in North America.

## *Aftermath of the disaster*

**Casualties and property damage**

Initial reports of casualties following the tsunami put the death toll in the hundreds, with hundreds more missing. That number in both categories increased dramatically in the following days as the extent of the devastation—especially in coastal areas—became known and rescue operations got under way. Within two weeks of the disaster, the official count of deaths had exceeded 10,000; more than one and a half times that number were still listed as missing and presumed dead. By then it was evident that the earthquake and tsunami had produced one of the deadliest natural disasters in

Japanese history, rivaling the major earthquake and tsunami that had occurred off the coast of Iwate prefecture in June 1896. By the end of March the combined count of those confirmed dead or still missing was about 28,000.

The bulk of those killed were victims of the tsunami waves. Coastal cities and towns as well as vast areas of farmland in the tsunami's path were inundated by swirling waters that swept enormous quantities of houses, boats, cars, trucks, and other debris along with them. As the extent of the destruction became known, it became clear how many thousands of people were missing—including, in some cases, half or more of a locality's population. Among those who initially were unaccounted for were people on a ship that was washed away by the tsunami and passengers on several trains reported as missing in Iwate and Miyagi prefectures. The ship was later found (and the people on board rescued), and all trains were located as well.

Although much of the destruction was caused by the tsunami waves along Japan's Pacific coastline, the earthquake was responsible for considerable damage over a wide area. Notable were fires in several cities, including a petrochemical plant in Sendai, a portion of the city of Kesennuma in Miyagi prefecture, northeast of Sendai, and an oil refinery at Ichihara in Chiba prefecture, near Tokyo. In Fukushima, Ibaraki, and Chiba prefectures thousands of homes were completely or partially destroyed by the temblor and aftershocks. Infrastructure also was heavily affected throughout eastern Tōhoku, as roads and rail lines were damaged, electric power was knocked out, and water and sewerage systems were disrupted. In Fukushima a dam burst close to the prefectural capital of Fukushima city.

**Northern Japan's nuclear emergency**

Of growing concern following the main shock and the tsunami was the status of several nuclear power stations in the Tōhoku region. Reactors at three plants closest to the quake's epicentre were shut down automatically following the temblor, which

**Two of the damaged containment buildings at the Fukushima Daiichi nuclear power plant, northeastern Fukushima prefecture, Japan, several days after the March 11, 2011, earthquake and tsunami that crippled the installation.** **Source:** *Tokyo Electric Power Co.—Kyodo News/AP*

also cut the main power to those plants and their cooling systems. Subsequently the tsunami damaged the backup generators at some of those plants, notably at the Fukushima Daiichi ("Number One") plant, situated along the Pacific coast in northeastern Fukushima prefecture about 60 miles (100 km) south of Sendai. With power gone, the cooling system failed in three reactors within days of the disaster, and their cores subsequently overheated, leading at times to the release of some radiation.

Explosions resulting from the buildup of pressurized hydrogen gas occurred in the outer containment buildings enclosing reactors 1 and 3 on March 12 and March 14, respectively, but the inner containment structure around each reactor remained intact. Workers sought to cool and stabilize the three cores by pumping seawater and boric acid into them. Because of concerns over possible radiation exposure, Japanese officials established an 18-mile (30-km) no-fly zone around the facility, and an area of 12.5 miles (20 km) around the plant was evacuated.

A third explosion occurred on March 15 in the building surrounding reactor 2 and was thought to

have damaged the containment vessel housing the fuel rods. This led Japanese government officials to designate a wider zone, extending to a radius of 18 miles around the facility, within which residents were asked to remain indoors. This development, along with a fire touched off by rising temperatures in spent fuel rods stored in reactor 4, led to the release of higher levels of radiation from the facility.

In the days that followed, workers at the facility made several attempts to cool the reactors using truck-mounted water cannons and water dropped from helicopters. Those efforts met with some success, which temporarily slowed the release of radiation; however, they were suspended several times after rising steam or smoke signaled an increased risk of radiation exposure. By March 22 temporary power lines had been connected to each of the plant's six reactors in the hopes that electrical power used to drive the cooling systems of each reactor could be restored. Later the appearance of increased levels of radiation in some local food and water supplies prompted Japanese and international officials to issue warnings about their consumption. By the end of March ocean water contaminated with high levels of radioactive iodine-131 had been detected some 300 yards (about 275 metres) off the Daiichi facility.

## *Relief efforts*

In the first hours after the earthquake, Japanese Prime Minister Kan Naoto moved to set up an emergency command centre in Tokyo, and a large number of rescue workers and some 100,000 members of the Japanese Self-Defense Force were rapidly mobilized to deal with the crisis. In addition, the Japanese government requested that U.S. military personnel stationed in the country be available to help in relief efforts, and a U.S. Navy aircraft carrier was dispatched to the area. Several countries, including Australia, China, India, New Zealand, South Korea, and the United States, sent search-and-rescue teams, and dozens of other countries and major international relief organizations such as the Red Cross and Red Crescent pledged financial and material support to Japan. In addition, a large number of private and nongovernmental organizations within Japan and worldwide soon established relief funds to aid victims and assist with rescue and recovery efforts.

The rescue work itself was hampered initially by the difficulty in getting personnel and supplies to the devastation zone; compounding the difficulty were periods of inclement weather that curtailed air operations. Workers in the disaster zones then faced widespread seas of destruction: vast areas, even whole towns and cities, had been washed away or covered by great piles of mud and debris. Although some people were rescued from the rubble in the first several days following the main shock and tsunami, most of the relief work involved the recovery of bodies, including hundreds that began washing ashore in several areas after having been swept out to sea.

In the immediate aftermath of the disaster, several hundred thousand people were in shelters, often with limited or negligible supplies of food or water, and tens of thousands more remained stranded and isolated in the worst-hit areas as rescuers worked to reach them. Within days the number of displaced people in the Fukushima area grew as the situation with the nuclear reactors on the coast deteriorated and people left the quarantined area. Gradually many people were able to find other places to stay in the Tōhoku area, or they relocated to other parts of the country; some quarter million people were still in hundreds of shelters in the region two weeks after the quake, but by the end of March the number had been reduced to fewer than 170,000. In addition, by that time workers had begun assembling prefabricated temporary housing units in Sendai and other tsunami-damaged locations.

Source: **Encyclopedia Britannica** www.eb.com

Direct link to article: http://www.britannica.com/EBchecked/topic/1761942/Japan-earthquake-and-tsunami-of-2011

# New Quake Finds Old Path to Christchurch

*More destructive trembler returns to same fault*

**Monday, February 21, 2011**

By Darren Osborne

MELBOURNE, Australia- The latest earthquake near the New Zealand city of Christchurch is thought to have occurred along the same fault line that shook the city late last year, Australian experts say.

[*PIR editor's note: The latest earthquake struck on Monday, Feb. 21, 2011 at noon. 65 people are confirmed dead with 200 missing.*]

Despite being smaller in magnitude than last September's quake, it caused more damage because the epicenter was shallower and closer to the city centre.

According to Dr. Trevor Allen, an earthquake hazards expert at Geoscience Australia, the epicenter of the magnitude-6.3 quake was 10 kilometers south-east of Christchurch. "In hazard terms that was almost a direct hit on the city." While it is too early to confirm, Dr. Allen says, the quake may be on the same fault line that caused last September's quake.

"What we think has happened is the stress has been transferred from the [September] quake to a different segment of possibly the same fault," he says. He says it is not uncommon for a large earthquake to be followed by other large earthquakes close by. "For example, after the 2004 Boxing Day tsunami there was a series of very large earthquakes that occurred essentially like a zipping along a particular fault line. "This could be a similar sort of thing we are seeing here, just on a much smaller scale."

Early reports indicate the damage caused by today's quake is much greater than the magnitude-7.1 event that occurred last September. Professor James Goff, from the Natural Hazards Research Laboratory at the University of New South Wales, says the shallow depth of the quake would have contributed to the increased level of damage. "It was very shallow, only four kilometers deep, and therefore a lot more shaking was involved," says Professor Goff. The hypocenter of the September 2010 quake was located 50 kilometers west of Christchurch at a depth of 10 kilometers. He says structural damage caused by the September quake may have also played a role in more buildings collapsing. "To a certain extent this would have had a more serious impact this time because it's not as resistant as it could have been." He says the removal of buildings damaged by the September quake may have made others weaker in the process.

Previous research has mainly focused on the more active areas, says Professor Goff, such as the Southern Alps and the east coast of the North Island. "I think through no fault of their own, scientists have been blindsided a bit by this. [We've been] looking in areas where probably it was easier to look, because we knew there were big faults and earthquakes that had happened in the past," he says.

Dr. Allen agrees. "If we don't know there is an active fault . . . then we generally won't spend time and effort looking at it in detail. Being able to map every single one is going to be a time consuming job and each one has the capability of generating large earthquakes." According to Professor Goff there has been an increased level of earthquake research in the Christchurch region since the September quake. "We are just starting to find out a little more about how seismically active or how many faults Christchurch has. Now it's most definitely a focus of fairly intensive research."

Reprinted from: Pacific Islands Report (http://pidp.eastwestcenter.org/pireport/2011/February/02-23-02.htm)

Original Source: *Radio Australia:* www.abc.net.au/ra

# Rare Gray Whale Tracked in Pacific

By Dan Joling

**Wednesday, March 2, 2011**

ANCHORAGE, Alaska, United States — Marine researchers say a rare whale tracked across the Pacific Ocean into North American waters this year had been there before.

Photo analysis has confirmed that the highly endangered western Pacific gray whale dubbed Flex – one of only 130 remaining – was photographed in 2008 off Canada's Vancouver Island and was assumed to be part of the eastern gray whale population.

US and Russian researchers started tracking the male whale Oct. 4 when they tagged him with a satellite tracker off Sakhalin Island, Russia, as part of research into where the animals spend winters.

The whale left Russia's Kamchatka Peninsula on Jan. 3 and began swimming east. It swam halfway across the Bering Sea, turned south, and swam between Aleutian Islands into the Gulf of Alaska. It continued southeast to shallow coastal waters off Washington and Oregon. Its last confirmed location was Feb. 4 off Siletz Bay, Oregon, where researchers believe the satellite tag fell off. The whale had traveled 5,335 miles (8,585 kilometers) over 124 days.

The project stirred the interest of other whale researchers, said Dave Weller, a marine mammal ecologist for the National Oceanic and Atmospheric Administration's Southwest Fisheries Science Center in La Jolla, California.

"As we kind of watched that satellite track of Flex coming across the Pacific, we thought, 'We should put the photos of him in the hands of some eastern gray whale researchers to look for a match," he said. "Sure enough, they made one."

Weller is part of the Russia-US Research Program on Western Gray Whales, a team of government and university scientists that have studied the animals since 1995.

The research team sent photos of Flex to Cascadia Research Collective, a scientific and education organization based in Olympia, Washington, for a comparison to its catalog of more than 1,000 eastern gray whales. The CRC catalog focuses on several hundred gray whales known as the Pacific Coast Feeding Group that feed during summer and fall in coastal waters between northern California and the Gulf of Alaska rather than continuing north to the Bering, Chukchi, or Beaufort seas.

A CRC catalog photo showed Flex in April, 2008, in the Barkley Sound area off the west side of Vancouver Island. That summer, the whale was photographed back at the western gray whale feeding grounds off Russia's Sakhalin Island.

Analysts are now comparing the entire western gray whale catalog with CRC's catalog to look for additional matches. Weller said the process, done entirely by human eye, likely will take up to two months. Results will be presented at the International Whaling Commission's Scientific Committee meeting in June.

News of the match did not come as a complete surprise, Weller said. A NOAA colleague, geneticist Aimee Lang, studied samples of what were thought to be eastern gray whales collected between 1990 and 2006 off the North America west coast. Two samples that came from whales off California had genetic markers matching two western gray whales, leading Lang to suggest some "dispersal," or overlap, between the populations.

Eastern Pacific gray whales spend winters off Mexico breeding and calving and migrate north to feed during summer.

With numbers estimated at 18,000, they are far more numerous than the western population.

Left unresolved is what Flex is doing so far from summer feeding grounds off Sahkalin Island.

"Good question," Weller said. "He's a 14-year-old male. As baleen whales and so many mammals go, those are the ones that actually tend to range the furthest into areas that may not necessarily represent the population as a whole but may represent a young male segment of the population."

Source: Manila Bulletin Publishing Corporation http://www.mb.com.ph/articles/307166/whale-tracked-across-pacific

# African Snails Chewing Up Solomons

*Calls for eradication*

**Monday, February 14, 2011**

By Gina Makaá

HONIARA, Solomon Islands- The giant African snails have now become a great concern to some locals. One of them is local florist John Fadama. "Responsible authorities should step in to stop these dangerous snails before things get out of hand," he said. Mr. Fadama said the longer it takes for responsible authorities to get rid of the snails we are the ones who will bear the consequences. "We already know what these snails will cause to our plants and soils. If we are not careful then we will end up living in a desert because these snails are dangerous to our environment," he said.

Fadama said as a florist it really hurts his heart to see such pests existing in the country. "I love flowers very much, and I don't want to see them die in the near future because responsible authorities may just turn a blind eye to this dreadful pest," he said. Fadama said it's about time authorities seriously think about getting rid of this pest because the snails are spreading like fire. He said the snails love cold places, but now they are found behind offices in China town. "So I urge the responsible authorities and the government start working towards eradicating this pest from this country before it spreads to the provinces," Fadama said.

Reprinted from: **Pacific Islands Report** http://pidp.eastwestcenter.org/pireport/2011/February/02-17-17.htm

Original Source: ***Solomon Star***: *http://www.solomonstarnews.com/*


# Brain Teasers

## Sudoku

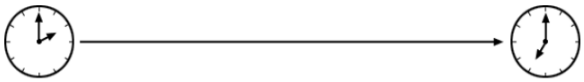
Complete the grid such that every row, every column, and the nine 3x3 blocks contain the digits from 1 to 9.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | | | | | | | | 2 |
| | | 3 | 9 | | 8 | 1 | | |
| | 9 | | 5 | | 6 | | 3 | |
| | 3 | 8 | | | | 4 | 1 | |
| | | | | | | | | |
| | 6 | 4 | | | | 8 | 9 | |
| | 1 | | 3 | | 2 | | 5 | |
| | | 2 | 7 | | 9 | 3 | | |
| 3 | | | | | | | | 9 |

Puzzles devised by © Kevin Stone
[www.brainbashers.com]

## Math Quiz

1. Exactly how many minutes is it before seven o'clock, if 40 minutes ago it was three times as many minutes past two o'clock?



2. You are given a 10x10x10 cube composed of one thousand 1x1x1 "mini-cubes" glued together. If the outer most layer falls off, how many "mini-cubes" would have fallen off?

Look for answers in the next newsletter!

Previous newsletter puzzle answers:

Sudoku

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 5 | 4 | 8 | 3 | 1 | 9 | 6 | 7 |
| 7 | 8 | 9 | 6 | 5 | 2 | 1 | 4 | 3 |
| 3 | 6 | 1 | 9 | 4 | 7 | 8 | 2 | 5 |
| 5 | 1 | 2 | 3 | 9 | 4 | 6 | 7 | 8 |
| 6 | 4 | 3 | 1 | 7 | 8 | 2 | 5 | 9 |
| 8 | 9 | 7 | 2 | 6 | 5 | 4 | 3 | 1 |
| 1 | 7 | 8 | 5 | 2 | 6 | 3 | 9 | 4 |
| 9 | 2 | 5 | 4 | 8 | 3 | 7 | 1 | 6 |
| 4 | 3 | 6 | 7 | 1 | 9 | 5 | 8 | 2 |

Math Quiz

1. 120 times: don't forget rooms 440-449.

2. Hours in 10 years. In a day there are 60 x 60 x 24 seconds = 86,400 seconds. In 10 years there are 10 x 365 x 24 hours = 87,600 hours, which even without the leap years is already the larger number.

# What's Going on with SPaRCE:

Greetings all!

Our crazy winter weather (check our last newsletter if you missed our story) has turned into a very unusually warm, dry, and windy spring. Usually, spring brings a lot of rain and thunderstorms our way However, this year there are some small bodies of water here in Oklahoma that are completely drying up.

In other SPaRCE news, we are currently looking for a new SPaRCE Coordinator. I'm nearing the completion of my degree and will be moving sometime this summer. After spending the last four years working on this project I am truly saddened at the thought of leaving. However, before I completely let go of my duties as SPaRCE Coordinator, Susan Postawko and I will be traveling to Pohnpei, FSM, in July for the Pacific Educator's Conference sponsored by the Pacific Resources for Educators and Learning (PREL) non-profit corporation. More information on the conference can be found at: http://www.prel.org/pec2011.aspx I really hope to get a chance to meet some of you!

In closing, we are keeping those affected by the Japan earthquakes, tsunami, and radiation disasters in our thoughts.

On behalf of the SPaRCE crew,

Nikki Acton

Call for Newsletter Contributions

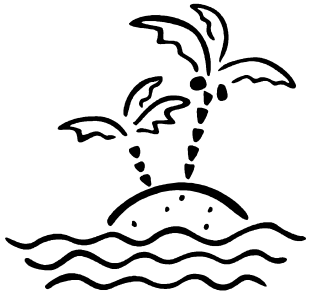
In order to get to know our schools and participants a bit better, please send us items to be published in the SPaRCE newsletter.

Here is a list of ideas:

- ✉ Accounts of extreme weather events
- ✉ School history
- ✉ Pictures of students taking measurements
- ✉ Activities using SPaRCE data
- ✉ Songs or poems about weather
- ✉ Any other interesting facts about your school or culture.

## Send in Your Questions!

If you or your students have any questions relating to science please send them to us here at SPaRCE. Once we receive a question we will publish the question and an answer in the next newsletter.



# Join us on Facebook!

## Classroom Science Focus

# How to Create Fog

Fog is a cloud that forms just above the ground. Thick fog can reduce visibility to where you can only see a few feet in front of you. Foggy conditions can be a real hazard to cars, planes, and boats.

There are two kinds of fog: advection fog and radiation fog.

Advection fog is common along the Pacific coast of the United States. Warm, moist air over the Pacific Ocean is blown eastward. When that air moves over colder coastal waters, it cools quickly and fog forms. The fog is moved inland by the same westerly winds.

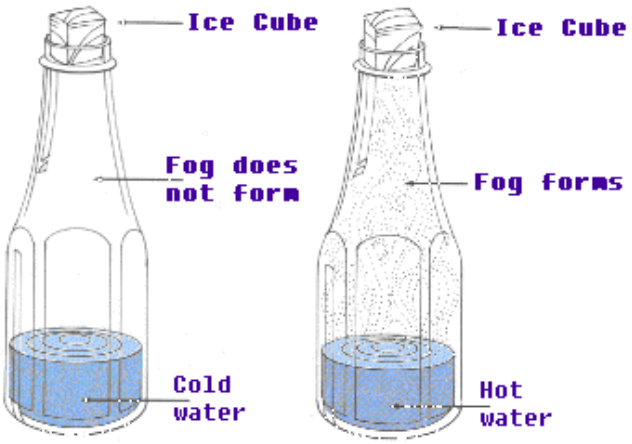
Advection fog plays an important role in the life of California redwood trees. The redwood trees have very shallow roots. They depend on water from sources other than water deep underground. What the trees do not get from rain, they get from the fog. Advection fog deposits moisture on the pine needles which then drips to the ground and is absorbed by the roots.

The other kind of fog is radiation fog, also known as ground fog. This fog is common in lots of places. It forms when a layer of warm, moist air forms low to the ground. As the ground cools, the warm, moist air is cooled quickly. As the air temperature lowers, small droplets of water condense, which we see as fog.

Radiation fog forms most often on cool, clear nights with a very slight breeze. It forms first in low valleys and spreads outward so long as conditions remain the same.

**Materials**

Ice cubes
Bottle with wide bottom and small opening
Cold water
Hot water




**Procedures**

1. Pour cold water into the bottle and set an ice cube in the opening of the bottle. Observe what happens.
2. Pour hot water into the bottle and set an ice cube in the opening of the bottle. Observe what happens.

This science experiment was adapted from the "Fog in a Bottle" lesson at StarrySkies.com (http://starryskies.com/try_this/fog.html)

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http://sparce.evac.ou.edu/

## ENSO Discussion

Issued by The Climate Prediction Center/NCEP 7 April 2011

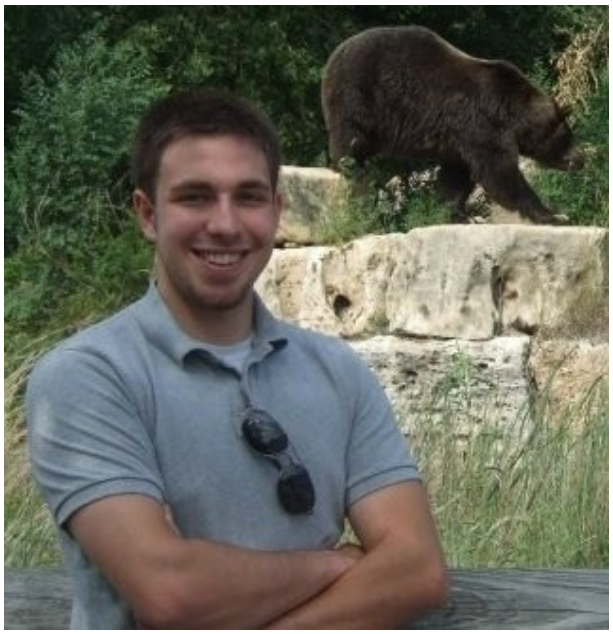
Synopsis: A transition to ENSO-neutral conditions is expected by June 2011.

La Niña weakened for the third consecutive month, as reflected by increasing surface and subsurface ocean temperatures across the equatorial Pacific Ocean. All four Niño indices ranged between –0.3°C and –0.8°C at the end of March 2011. Subsurface oceanic heat content anomalies (average temperatures in the upper 300m of the ocean) became weakly positive in response to the continued eastward progression of a strong oceanic Kelvin wave, which has begun to shoal in the eastern Pacific. However, the basin wide extent of negative SST anomalies remained considerable throughout the month. Also, La Niña impacts on the atmospheric circulation remained strong over the tropical and subtropical Pacific. Convection remained enhanced over much of Indonesia and suppressed over the western and central equatorial Pacific. Also, anomalous low-level easterly and upper-level westerly winds have persisted in this region. Collectively, these oceanic and atmospheric anomalies reflect a weakening La Niña, but with ongoing global impacts.

Nearly all of the ENSO models predict La Niña to continue weakening in the coming months, and the majority of models indicate a return to ENSO-neutral by May-June-July 2011. While there is confidence in ENSO-neutral conditions by June 2011, the forecasts for the late summer and beyond remain highly uncertain. At this time, all of the multi-model forecasts suggest ENSO-neutral conditions will persist from June through the rest of the year. However, the spread of individual model forecasts and overall model skill at these lead times leaves the door open for either El Niño or La Niña conditions by the end of 2011.

This discussion is a consolidated effort of the National Oceanic and Atmospheric Administration (NOAA), NOAA's National Weather Service, and their funded institutions. Oceanic and atmospheric conditions are updated weekly on the Climate Prediction Center web site (El Niño/La Niña Current Conditions and Expert Discussions). Forecasts for the evolution of El Niño/La Niña are updated monthly in the Forecast Forum section of CPC's Climate Diagnostics Bulletin. The next ENSO Diagnostics Discussion is scheduled for 5 May 2011. To receive an e-mail notification when the monthly ENSO Diagnostic Discussions are released, please send an e-mail message to: ncep.list.enso-update@noaa.gov.

## Get to Know: Jonathan Moore



Jonathan with a bear.

Hello! I am Jonathan Moore, and I have been working for the Oklahoma Wind Power Initiative, within the same office as SPaRCE, since June of 2010. I work as a legislative policy analyst for OWPI, investigating legislation that could affect the wind power industry. I am a Junior at the University of Oklahoma, and will be graduating in May of 2012. I am excited to see how my experiences with OWPI will help in my future.

For as long as I can remember, I have been interested in the environment, especially in finding ways that people can live happily in harmony with the environment. The work that OWPI and SpaRCE do fits well with this interest. It's exciting to work around the brilliant and driven people in these offices.

When I am not working, I try and enjoy the outdoors as much as possible. This Spring I spent a week hiking through the mountains and canyons of New Mexico and West Texas. I love everything about the outdoors from camping to climbing

SPaRCE would like to thank those who have made this program possible: NOAA's Climate Observations Division, the U.S. GCOS Program at NOAA's National Climatic Data Center, and the PI-GCOS Program based at the Secretariat of the Pacific Region Environment Program (SPREP) in Apia, Samoa.