



The Pacific Tradewinds Quarterly

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

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Scientists Record Deepest Erupting Volcano

December 17, 2009—News Release

Scientists funded by the National Oceanic and Atmospheric Administration (NOAA) and the National Science Foundation (NSF) recorded the deepest erupting volcano yet discovered, describing high-definition video of the undersea eruption as "spectacular." Eruption of the West Mata volcano, discovered in May, occurred nearly 4,000 feet below the surface of the Pacific Ocean, in an area bounded by Fiji, Tonga and Samoa.

Imagery includes large molten lava bubbles approximately three feet across bursting into cold seawater, glowing red vents explosively ejecting lava into the sea, and the first-observed advance of lava flows across the deep-ocean seafloor. Sounds of the explosive eruption were recorded by a hydrophone and later matched to the video footage.

"We found a type of lava never before seen erupting from an active volcano, and for the

first time observed molten lava flowing across the deep-ocean seafloor," said the mission's Chief Scientist Joseph Resing, a chemical oceanographer at the University of Washington who collaborates with NOAA through the Joint Institute for the Study of the Atmosphere and Ocean. "Though NOAA and partners discovered a much shallower eruption in 2004 in the Mariana Arc, the deeper we get, the closer the eruption is to those that formed most of the oceanic crust."

"It was an underwater Fourth of July – a spectacular display of fireworks nearly 4,000 feet deep," said Co-Chief Scientist Bob Embley, a marine geologist based in the Newport, Ore., office of NOAA's Pacific Marine Environmental Laboratory. "Since the water pressure at that depth suppresses the violence of the volcano's explosions, we could get the underwater robot within feet of the active eruption. On land, or even in shallow water, you could never hope to get this close



SOURCE: ESRI, National Oceanic and Atmospheric Administration

AP

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and see such great detail," he said.

Mission scientists released the video and discussed their scientific observations at a Dec. 17 news conference at the American Geophysical Union's annual fall meeting in San Francisco.

"For the first time we have been able to examine, up close, the way ocean islands and submarine volcanoes are born," says Barbara Ransom, program director in NSF's Division of Ocean Sciences. "The unusual primitive compositions of the West Mata eruption lavas have much to tell us."

The West Mata volcano is producing Boninite lavas, believed to be among the hottest erupting on Earth in modern times, and a type only seen before on extinct volcanoes older than a million years. University of Hawaii geochemist Ken Rubin believes this active Boninite eruption provides a unique opportunity to study magma formation at volcanoes and how the Earth recycles material where one tectonic plate is subducted under another – a long-term goal of many Earth scientists.

Water from the volcano is very acidic, with some samples collected directly above the eruption measuring somewhere between battery acid and stomach acid. Julie Huber, a microbiologist at the Marine Biological Laboratory, found diverse microbes even in such extreme conditions.

Tim Shank, a biologist at the Woods Hole Oceanographic Institution (WHOI), found shrimp were the only animals thriving in the acidic vent water near the eruption. Shank is analyzing shrimp DNA to determine if they are the same species as those found at eruptive seamounts more than 3,000 miles away.

Mission scientists believe 80 percent of eruptive activity on Earth takes place in the ocean,

and most volcanoes are in the deep ocean. Until this discovery, NOAA and NSF had sponsored research on submarine volcanoes for 25 years without observing a deep-ocean eruption. Scientists believe further study of active deep-ocean eruptions will provide a better understanding of oceanic cycles of carbon dioxide and sulfur gases, how heat and matter are transferred from the interior of the Earth to its surface, and how life adapts to some of the harshest conditions on Earth.

The science team operated from the University of Washington's research vessel Thomas Thompson, and deployed Jason, a remotely-operated underwater robot operated by WHOI that is recognized as one of the most capable in the world. Jason collected samples using its manipulator arms and obtained imagery using a prototype still and HD imaging system developed and operated by the Advanced Imaging and Visualization Lab at WHOI.

Other participants included Oregon State University, Monterey Bay Aquarium Research Institute, Western Washington University, Portland State University, Harvard University, the University of Tulsa, California State University's Moss Landing Marine Laboratory, the University of California Santa Cruz and Lamont Doherty Earth Observatory.

The National Science Foundation is an independent U.S. government agency responsible for promoting science and engineering through research programs and education projects.

NOAA understands and predicts changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and conserves and manages our coastal and marine resources.

"...for the first time
[we] observed
molten lava flowing
across the deep-
ocean seafloor" —
Joseph Resing,
Chief Scientist

Effort Afoot to Save Pacific's Endangered Birds

Region contains highest number of endangered birds

December 23, 2009—Melbourne, Australia

The Pacific is home to a quarter of the world's critically endangered birds - and has the dubious distinction of being the region with the highest number of species on the brink of extinction.

There are 42 critically endangered species in

the Pacific, including colourful lorikeets, doves, honeyeaters and more.

Don Stewart, Pacific director of non-government organisation, Birdlife International, told Pacific Beat: "We are aiming, through our partners, to save the six most critically endangered species in the Pacific. Critically endangered means if direct conservation action isn't taken they will disappear."

The six most endangered, Mr Stewart said, are the Fiji petrel, the Tahiti monarch, the Polynesian ground dove, Fa Tahiti monarch, Tuamotu kingfisher and Vanuatu's crow honeyeater.

Birdlife International, which works with partner communities and organisations across the Pacific, has now found funding and signed agreements to go in to try to save the six birds. Action will include keeping rodents at bay and generally working to protect the birds' habitat. Fund-raising is also under way to protect other birds in New Caledonia, Solomon Islands, Micronesia, Vanuatu and Rarotonga.

The bird group also searches for birds feared "lost" or extinct. One such is the Pohnpei starling, on Pohnpei Island in the Federated States of Micronesia. Recently feared vanished, there have now been reports of sightings in the central mountains. "We think there is a high likelihood, given the people who are making these reports, that it is there." Birdlife International is now organising an expedition for next year to seek out the elusive starling, "to find out why it is so rare, and to take conservation action to save it."

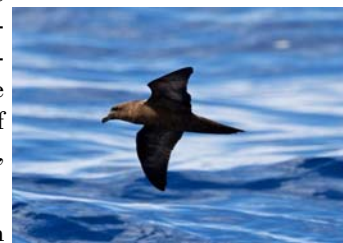
Other expeditions would be sent to try to find the Makira moorhen in the Solomons and the white-chested white-eye on Norfolk Island - the latter journey undertaken with Birds Australia. Mr Stewart says it is important to note that bird protection is not "down the scale of importance" in the face of global economic, political and climate worries.

Birds are - just about literally- the "canaries in the coalmine", he says. In olden times, before gas-detection equipment, miners took a canary in a cage into the pit with them. If the bird - with its sensitive constitution - "dropped over in its cage, you knew to get out of that mine as fast as you could because it was unsafe." "The analogy to what is going on on the whole planet is pretty clear," Mr Stewart said.

"Birds are the most visible and most ubiquitous indicators of the state of our natural environment...like the old miners, we ignore what they are telling us at our peril."

Reprinted From: *Pacific Islands Report* (<http://pidp.eastwestcenter.org/pireport/2009/December/12-24-13.htm>)

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A Fiji Petrel off Gau Island, Fiji.

Photo: © H. Shirihai Source: <http://www.kolibriexpeditions.com/>

Fisheries Expert to Join Palau Reef Project

Conservation effort prompted by over-fishing

December 21, 2009—Koror, Palau

By Philip N. Haruo

Dr. Andrew Smith, a fisheries expert of The Nature Conservancy based in Brisbane, Australia, is in Palau to assist the Northern Reefs planning team in the development of the fisheries section of the Northern Reefs Management Plan.

According to Yimnang Golbuu, chairperson of the planning team, Dr. Smith has been a great part of marine conservation efforts in Palau. He has played major roles in studies, researches, education, local capacity development, and promotion of marine conservation awareness in Palau. Dr. Smith, has, for years, worked collaboratively with Palau Conservation Society, Bureau of Marine Resources, Palau International Coral Reef Center, and state governments to create means through which Palau's marine environments and resources are protected and accorded sustainable management.

"Dr. Smith is currently in Ngarchelong working with members of the Northern Reefs planning team to look at and discuss fisheries options for consideration in the development of a feasible, effective, and sustainable conservation management plan for the Northern Reefs," Golbuu added.

The initial effort to create a management plan for the Northern Reefs arose after residents, citizens, and the leadership of the Ngarchelong State along with members of environmental groups and distinguished conservationists began an attempt to address concerns of indiscriminate fishing, over-harvesting of marine resources, poaching, and commercial fishing within the boundaries of Ngarchelong State territorial waters – which encompasses more than sixty percent of the Northern Reefs. A summit was held and, soon after, a declaration was made that an efficient management plan for all of the Northern Reefs must be developed and implemented to protect and conserve the resources and marine life that thrive in and around the Northern Reefs.

Dr. Smith, has, for years, worked collaboratively with Palau Conservation Society, Bureau of Marine Resources, Palau International Coral Reef Center, and state governments

According to Golbuu, the Northern Reefs planning team has conducted extensive meetings and consultations with relevant stakeholders and community members of Ngarchelong State to raise awareness of the work that needs to be done as well as get inputs on possible solutions to existing problems.

"The team had to make sure that everyone is aware of what is at stake," Golbuu said. "At the same time, everyone needs to be a part of the development of the plan in order for it to

work."

Golbuu further added that Dr. Smith is now working with the planning team to discuss what has been gathered from the community meetings and begin the process of incorporating them into the overall plan – in particular, the management of fisheries resources.

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Cook Islands Utility to Buy Excess Wind and Solar Energy

Home renewable energy systems can tie into grid

December 7, 2009—Rarotonga, Cook Islands

By Helen Greig

Steve Anderson says more locals will likely use renewable energy with Te Aponga's new policy in place. "Solar and wind energy are the way of the future – there is no doubt about it," says businessman Steve Anderson of Matavera.

Anderson is one local person who is pleased at Te Aponga Uira's announcement of its net-metering policy for renewable energy that will allow consumers to connect solar panels and wind turbines to the wiring of their buildings – while still being connected to Te Aponga's network. The principal of Andersons Electrical uses both solar and wind power to generate his household electricity.

"We're very pleased with Te Aponga's policy of net-metering for renewable energy. Living on the Matavera coast, we frequently have strong tradewinds blowing in from the southeast. "At these times our wind turbine produces plenty of electricity day and night – more than we can use at the time. Without net-metering, the surplus energy would be wasted. The net-metering policy allows us to

export this extra energy into the grid, credit it to our Te Aponga account, and draw it back when we need it. Therefore we don't need batteries, which are expensive and don't last very long." Anderson says similarly, while at work, solar energy generated at his home is being credited to his power account.

"In the evening, when I'm watching the news on TV, I feel good knowing the electricity I'm using came from the sun on my solar panels earlier that day." Anderson says Te Aponga's policy is also very simple with no special accounting or metering equipment needed.

"The regular power meter simply goes forwards when we are 'importing' electricity, and goes backwards when we are 'exporting' to the grid. This system suits us very well, and many of our friends who use wind and solar energy are finding the same thing," he says.

"With Te Aponga now publicly committed to a net-metering policy, I'm sure many more people will be making use of renewable energy. "It's a pretty good feeling – helping the environment, and saving money at the same time."

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"Solar and wind energy are the way of the future – there is no doubt about it," — Steve Anderson, Business man of Matavera.

Micronesian Games to Cut Emissions

Palau to host eco-friendly games in 2010

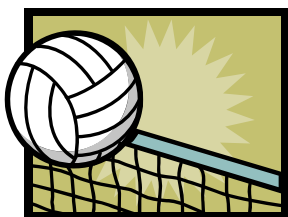
November, 16, 2009—Koror, Palau

The Palau National Olympic Committee plans to address greenhouse emissions by having athletes walk to venues rather than ride buses in the 2010 Micronesian Games.

Frank Kyota, PNOG president, noted that the athletes' village is being built at the Palau

Community College, its location near the sport facilities. "This way, it will stop the buses from going and athletes just have to walk to the sport facilities," Kyota said. The organizing committee is also doing away with foams and plastic products and will instead use paper products. This is Palau's contribution to reducing greenhouse gas emissions.

[*Pacific Islands Report* editor's note: Despite



financial problems, Palau has reassured the seven participating Pacific nations that next year's games will go on. The games, which are held every four years, include all states, territories and nations within Micronesia – a total of ten geopolitical entities. Sports include baseball, basketball, beach volleyball, coconut tree climbing, coconut husking, fast pitch softball, golf, slow pitch softball, spearfishing, swimming, table tennis, triathlon, va'a canoe, volleyball and wrestling.]

Kyota said that the committee is also encouraging participants to walk to the venues. Travel indirectly contributes to greenhouse gas emissions which is said to be responsible for the global warming.

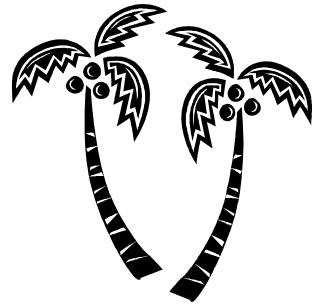
Venue construction and torch relay also con-

tribute to carbon emission. Kyota said that, Palau is following what has been announced by the Vancouver Winter Olympics Committee regarding offsetting of direct and indirect greenhouse gas emission.

The Vancouver Organizing Committee (VANOC), which has vowed to make the 2010 Games carbon neutral, unveiled plans to reduce the 150,000 tonnes of indirect greenhouse gas emissions expected to be produced as a result of the event.

The Micronesian Games in Palau is set from August 1 to 10 next year [2010].

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Samoa Tsunami Waves Reached 46 Feet High

Study finds concrete buildings survived

December 5, 2009—Apia, Samoa

The tsunami that killed more than 143 people in Samoa towered up to 46 feet (14 meters) high — more than twice as tall as most of the buildings it slammed into, scientists said.

New Zealand scientists studying the size, power and reach of the tsunami as part of efforts to guard against future disasters said they found up to three destructive waves were caused by the magnitude 8.0 undersea earthquake in September.

The massive waves that struck Samoa, American Samoa and Tonga totally destroyed traditional wooden buildings, many of them single story, along the coast while reinforced concrete buildings sustained only minor damage, said Stefan Reese, a risk engineer with New Zealand's National Institute of Water and Atmospheric Research.

The waves were up to 46 feet (14 meters) high, Reese told The Associated Press. The scientists measured watermarks on buildings and trees to help confirm the height of the waves. "In some areas there was virtually nothing left" after the waves reached up to 765 yards (700 meters) inland, Reese said. Wide reefs saved some villages by helping to reduce the waves' height to about 10 feet (3 meters), Reese said.

Here is what the New Zealand scientists found: The Samoa tsunami consisted of two to three

significant waves; the second wave was said by witnesses to be larger. The delay between the earthquake and the arrival of the first wave was about 10 minutes in Samoa and 20 minutes in American Samoa.

The maximum height reached by the tsunami on the land was 14 meters above mean sea level in Samoa and 10 meters in American Samoa. The furthest inland the waves reached was over 700 meters from the shore.

"This size of tsunami is also possible for New Zealand, equivalent to about a one-in-500 year event for the most populated parts of New Zealand," says GNS Science spokesman John Callan.

Buildings sustained varying degrees of damage. The importance of reinforcement was very clear – traditional light timber buildings were typically completely destroyed at an inundation depth of 1.5m or higher, whereas adding minimal reinforced-concrete columns reduced the damage levels significantly. Building damage was correlated with water depth, structural strength, shielding, condition of foundations, quality of building materials used, quality of workmanship, and adherence to the building code. It was also very clear that plants, trees, and mangroves reduced flow speeds and depths over land – leading to greater chances of human survival and lower levels of building damage.

"The same thing will be true in New Zealand as

"In some areas there was virtually nothing left." — Stefan Reese, Risk Engineer

"It is this strong social fabric that strengthens the local, cultural and economic features of the Samoan coastal communities and holds the basis for the resilience that allows people to more quickly recover from disasters"
— van Zijll de Jong

in Samoa: solidly constructed buildings which are appropriately located will survive much better than flimsy buildings right on the beach," says Dr Stefan Reese of NIWA. "It's also clear that practices such as flattening sand dunes or removing beach vegetation would increase the potential for tsunami damage."

In Samoa, it was clear that community-based tsunami education activities had saved lives in some areas, while in others there was still some confusion about how to respond.

The impact of the tsunami may have permanently changed residential patterns in Samoa. "Many people are scared of the sea, and people are staying away from devastated villages" says Dr van Zijll de Jong.

"The sea has been a source of livelihood and identity for generations. The violence of the tsunami really shook them. Their sense of personal security and economic well-being is deeply shaken."

The Government of Samoa is very supportive of communities that want to resettle further inland. However, the families that have moved inland are very aware of the challenges facing them in re establishing their communities, par-

ticularly with it now being cyclone season.

There is a very strong social fabric in Samoa, through families, villages, religious organizations and right up into government at a local and national level. It is this strong social fabric that strengthens the local, cultural and economic features of the Samoan coastal communities and holds the basis for the resilience that allows people to more quickly recover from disasters says van Zijll de Jong.

The team also found that national and international response to the disaster had been extremely good. The interface between the Government of Samoa and in-coming international, regional and local humanitarian groups who had the capacity to respond to the disaster was impressive.

The team from NIWA and GNS Science was part of a UNESCO-IOC International Tsunami Survey team from New Zealand, Australia, Fiji, French-Polynesia, Italy, Japan, and the USA, in collaboration with teams from several ministries within the Government of Samoa.

Reprinted from: *Pacific Islands Report* (<http://pidp.eastwestcenter.org/pireport/2009/December/12-07-09.htm>)

December Hottest Month on Record for Tahiti

El Niño said to be strengthening in Pacific

January 8, 2010— Papeété, Tahiti

In Tahiti, December was the hottest of any month for the Society Islands since Météo France opened its Tahiti-Faa'a Airport meteorological weather station in 1957. Besides the Windward Islands of Tahiti and Moorea, the Society Islands include the Leeward Islands, the most famous of which is Bora Bora.

[*Pacific Islands Report* editor's note: *The Society Islands are a group of islands in the South Pacific Ocean. They are politically part of French Polynesia. The islands are divided, both geographically and administratively into two groups: Windward and Leeward Islands. They have a population of approximately 228,000 inhabitants and cover a land area of 1,590 square kilometers.*]

The hot and dry December followed a rainy November, during which Météo France's rain gauge was 96 percent above normal at Faa'a and 35 percent above normal on Bora Bora. There were 85mm (3.3 inches) of rainfall measured during December at Faa'a and 106mm

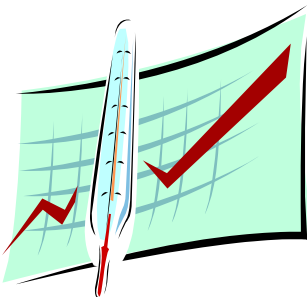
(4.2 inches) on Bora Bora. The Faa'a rainfall was 75 percent below normal and the Bora Bora rainfall was 61 percent below normal, Météo France said in a media communiqué.

As for January and February of 2010, Météo France is forecasting above normal rainfall for the Society Islands and temperatures, which, while less hot than December's, are expected to be above normal for this time of year.

As for the rest of French Polynesia, Météo France forecast close to normal rainfall in January and February in the northernmost Marquesas Islands, the Tuamotu Archipelago and the southernmost Austral Islands. It said this seasonal forecast model agreed with those of other meteorological services in Europe and the U.S.

Météo France said it recorded an average December temperature of 29.0° Celsius (84.2° Fahrenheit) at its Faa'a station. That broke the previous record high average temperature of 28.9° C (84.02° F) for March 1998.

Météo France noted that 1998 was an excep-



tional El Nino year, referring to a yearly abnormal warming of waters in the central and eastern equatorial Pacific Ocean. An El Nino event's warmer-than-normal waters traditionally pose a potential threat of cyclones to French Polynesia, whereas a La Nina event's cooler-than-normal waters in the Pacific pose less of a cyclone threat.

During 1998, the days of Dec. 10, 11 and 31 were particularly hot, Météo France said. The temperature rose to a new record high of 33.2° C (91.76° F) for a single day in December. The previous record had been 33.1° C (91.58° F), which Météo France recorded on Dec. 15, 1990.

Looking at last month, Météo France said the "unusually warm" temperatures occurred during a particularly dry period highlighted by mostly sunny days, including a 15-day stretch of more than 10 hours of daily sunshine.

Those hot, sunny days occurred as the western, Pacific Ocean surface temperatures were also high, Météo France said. Those temperatures rose 2° C above normal, which corresponded to a mature moderate El Nino.

Meanwhile, the U.S. Climate Prediction Center reported Thursday, "El Nino strengthened during December 2009, with above average sea surface temperatures encompassing the central and eastern equatorial Pacific Ocean. Subsurface temperature anomalies exceeded +2° C across much of the equatorial Pacific, with the largest departures seen in the eastern part of the basin."

However, the center reported that El Nino models continue to disagree on the eventual peak strength of this phenomenon. "The average subsurface temperature is expected to exceed +1.5° C for the November-December-January and December-January-February periods."

"Regardless of its precise peak strength, El Nino is expected to exert a significant influ-

ence on the global weather and climate in the coming months," according to the center's El Nino advisory on Thursday.

"Most models indicate that subsurface temperature anomalies in the central equatorial region will begin to decrease in early 2010, and that El Nino will persist through April-May-June 2010," the center reported.

Meanwhile, Météo France said the Society Islands' record temperatures in December can be observed in an established global warming context. However, it warned that those temperatures are not a global warming proof just by themselves. That can only be done through a lengthy analysis of an increasing number of measurements.

Meanwhile, meteorologists must wait to see whether record temperatures increase. These observations are consistent with the analysis done over the past 30 years of rising minimum temperatures at Faa'a, Météo France said.

Looking at December outside of the Society Islands, Météo France noted that the Marquesas Islands experienced less than normal rainfall after heavy rains in October when the rainfall gauge was 185 percent above normal.

Météo France's two meteorological stations on the islands of Hiva Oa and Nuku Hiva recorded 25.4mm and 18.8mm (1 inch and 0.74 inch) of rain respectively, or 75 percent and 82 percent below normal.

However, Météo France reported that the last three months of 2009 produced an accumulation of rainfall that as 42 percent above normal.

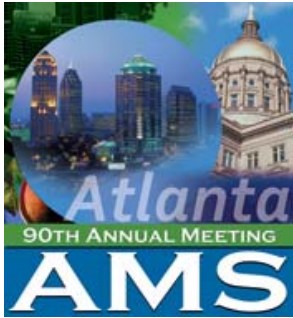
The average monthly temperature was 28.0° C (82.4° F) for Nuku Hiva and 28.1° C (82.58° F) for Hiva Oa. Those temperatures were 1.2° C above normal, but were not unusual for the season, Météo France said.

Reprinted from: *Pacific Islands Report* (<http://pidp.eastwestcenter.org/pireport/2010/January/01-11-04.htm>)



"El Nino strengthened during December 2009, with above average sea surface temperatures encompassing the central and eastern equatorial Pacific Ocean. Subsurface temperature anomalies exceeded +2° C across much of the equatorial Pacific..." — U.S. Climate Prediction Center

What's Going on with SPaRCE



I was in Atlanta, Georgia during the week of January 17 for the 90th Annual Meeting of the American Meteorological Society. Meetings like this are important for meteorologists and other scientists to get together and discuss their latest projects and research. I attend this meeting every year to publicize what we are doing with PACRAIN and SPaRCE.

This year, I gave a presentation entitled “Quality assurance of PACRAIN tipping bucket gauge data”. In addition to the plastic rain gauges we send out to SPaRCE participants, for several years we have also been providing tipping bucket gauges (automatic rain gauges that don’t have to be read by a human observer) to the regional meteorological services. Quality assurance is the process of finding and correcting errors in the data. SPaRCE participants are certainly aware of how errors can happen when recording data from your own gauges, but you may be surprised to know that even automatic gauges can have errors.

Dean Solofa, of the South Pacific Regional Environmental Programme in Apia, Samoa, was scheduled to give a presentation entitled “Climate observations and seasonal rainfall forecasting in the Pacific Islands”. Unfortunately, Dean was not able to attend the meeting, so I gave the presentation in his place. The tipping bucket gauges that we send to the Pacific are part of a project to expand weather and climate monitoring in the region. This is important not just to the residents of the Pacific Island nations, but also to the rest of the world because the Pacific Ocean is a major influence on Earth’s weather and climate.

—Mike Klatt

Send in Your Questions!

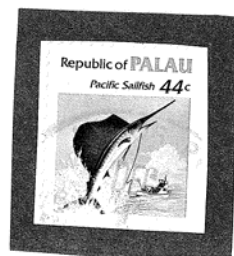
If you or your students have any questions relating to science please send them to us here at SPaRCE. Once we receive a question we will publish the question and an answer in

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



Classroom Science Focus



In the 1500s, fishermen who lived in South America began to wonder about a current of unusually warm water that came to their shore every few years near Christmastime. Since the fishermen believed in the birth of the Christ child at Christmas, and since they spoke Spanish, they named the hot water El Niño, which means "the infant" in Spanish.

El Niño is characterized by unusually warm ocean temperatures in the Equatorial Pacific, as opposed to La Niña, which is characterized by unusually cold ocean temperatures in the Equatorial Pacific. El Niño is an oscillation of the ocean-atmosphere system in the tropical Pacific having important consequences for weather around the globe.

Scientists and governments from around the world—United States, France, Japan, Korea and Taiwan—are sharing knowledge and funding for The Tropical Atmosphere Ocean (TAO) Array.

Materials:

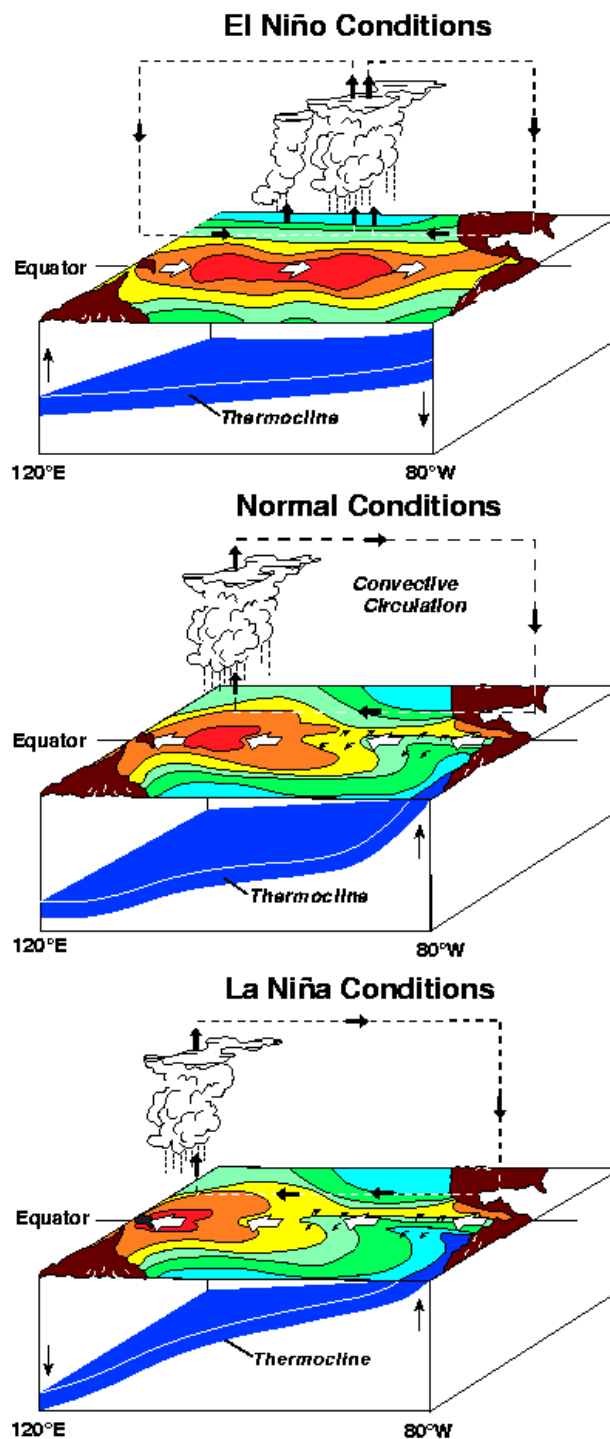
- 2 cups of the same material
- Cool water
- Hot water
- A mirror

Procedure:

- Fill one cup with cool water and fill the other with hot water. (Not boiling, just good and hot.)
- Hold each of your hands over one cup and feel the difference in the air above the water. (Don't actually touch the water. Just feel the air.)
- Write down or discuss the differences in the air over the cool water and hot water.
- Now, hold a small mirror over the cup of hot water for a few minutes. The moisture in the air should collect on the mirror, and, as it cools, form tiny droplets. The "water" on the mirror is caused by the water vapor in the air gathering and cooling.

Discussion:

In this experiment the hot water warms the air above it; however, the cool water does not. Scientists know that hot air rises and carries the moisture with it. Once the moisture gets into the air and starts to cool, rainclouds start to form. As the ocean waters warm the water evaporates which cause rainclouds to form. Depending on the wind direction these rain clouds form in different locations in the tropical Pacific Ocean (see figures to the right).



Sources: TAO El Niño Theme Page (<http://www.pmel.noaa.gov/tao/elnino/el-nino-story.html>) and The Franklin Institute: El Niño—Hot Air over Hot Water (<http://sln.fi.edu/weather/nino/nino.html>)

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WE ARE ON THE WEB!

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



ENSO Discussion

issued by The Climate Prediction Center/NCEP 7 January 2010

Synopsis: El Niño is expected to continue and last at least into the Northern Hemisphere spring 2010.

El Niño strengthened during December 2009, with above-average sea surface temperatures (SST) encompassing the central and eastern equatorial Pacific Ocean. Weekly values of the Niño-3.4 index increased slightly with the most recent value reaching +1.8°C. Consistent with this warmth, equatorial upper-ocean heat content anomalies remained positive. Subsurface temperature anomalies exceeded +2°C across much of the equatorial Pacific, with the largest departures seen in the eastern part of the basin at the end of the month. Equatorial low-level westerly and upper-level easterly wind anomalies were also consistent with El Niño, along with a continuation of suppressed convection over Indonesia and enhanced convection over the western and central equatorial Pacific. Collectively, these oceanic and atmospheric anomalies reflect a strong El Niño.

The models continue to disagree on the eventual peak strength of El Niño. Regardless of its precise peak strength, El Niño is expected to exert a significant influence on the global weather and climate in the coming months. Most models indicate that SST anomalies in the Niño-3.4 region will begin to decrease in early 2010, and that El Niño will persist through April-May-June 2010.

Expected El Niño impacts during January-March 2010 include drier-than-average conditions over Indonesia and enhanced convection over the central tropical Pacific Ocean, which will likely expand eastward and influence portions of the eastern equatorial Pacific, as well as coastal sections of Peru and Ecuador.

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 4 February 2010. To receive an e-mail notification when the monthly ENSO Diagnostic Discussions are released, please send an e-mail message to: ncep.list.ensupdate@noaa.gov.

Get to Know: Matt Chatelain

Hey everyone! I'm Matt Chatelain and have been working for OWPI, within the office confines of SPaRCE, since August. I'm currently a geography masters student under Scott Greene studying the future climate change impacts on the wind energy industry. In the future months, I will be issuing monthly wind tower summaries for sites across the state of Oklahoma for possible wind power investors.

I was born in Topeka, Kansas, but call Oklahoma my home as I grew up in the small western Oklahoma community of Weatherford. This may have some influence on my desire to work and perform research in the wind energy industry as one of the first major wind farms in the state was built in Weatherford while I was in high school.

I received my undergraduate degree

in meteorology from OU a year ago, and am pretty much obsessed with weather. When I find free time I enjoy storm chasing from the Canadian to Mexican border, attending sporting events (OKC Thunder and OU athletics), playing video and card games, and just hanging out with friends.



Matt launching a weather balloon



Matt on a storm chase



Matt at the Badlands in South Dakota