



The Pacific Tradewinds Quarterly

How Can SPaRCE Fit In?

Friday, July 7, 2006

A Sustainable Rainfall Climate Measuring Network in the Pacific Island Countries

Developing countries, especially in the Pacific, require information concerning many aspects of their environment in order to address issues such as enhancing the efficiency of agriculture, water and energy utility management. In addition, the Pacific Island Countries (PICs) are positioned to take advantage of the high potential in the Pacific for renewable energy projects (solar, wind, etc.). Efficient renewable energy projects could substantially reduce the PICs dependence on imported oil and gas. In addition, the looming specter of global warming will have great impact in the Pacific and the PICs need to monitor changing conditions in order to adapt to them. Data collected and analyzed from the PICs would provide more quantitative evidence of the impact of global climate change in the Pacific to the global community.

However, while most PIC governments generally agree with the issues in the above state-

ment, the role that quality climate networks could play in successfully addressing these issues is not completely understood within government circles. Climate networks are required for successful seasonal forecasts, which are possible in the Pacific given the persistence associated with the El Niño phenomenon. The data from these networks initialize and verify these forecasts. Accurate seasonal forecasts help both farmers and utilities by allowing them to optimize power, agricultural, and water management. The SPaRCE program plays an important role in collecting data, as well as motivating and training participants to become Pacific meteorologists.

Issues Involved with Climate Network Establishment:

The National Meteorological and Hydrologic Services (NMHS) in the Pacific are currently struggling to address many of the issues above. Some difficulties include lack of funding, training, instrumentation and awareness of the services they could potentially supply to the country. While most aid agencies will fund useful workshops on various relevant

Inside this issue:

How can SPaRCE Fit In?	2/3/4
Welcome to the SPaRCE Family	5
Powerful Quake Rocks Central Indonesia	6/7/8
Fiji Questions Tsunami Warning System	8/9
Developers Need to Plan for Climate Change	9
Climatologist Blames Rain on Global Warming	10
Fire Leaves Island w/o Power & Water	11
Lopevi Erupting - A 4th Threatening	11
Fiji Initiate Climate Change Project	12
Classroom Weather Focus: Clouds	13
ENSO Update	14
Get to Know: Lauren Bodenhamer	14

“However, the support provided by PIC governments must be at a level they can afford...”

Susan Postawko and Mark Morrissey.



Niue meteorologists setting up a new tipping bucket rain gauge

issues, they are not set up to provide funding for long-term projects, such as the establishment and sustainability of climate networks. Thus, it is incumbent upon the individual PIC governments to provide the needed support. However, the support provided by PIC governments must be at a level they can afford, with benefits far outweighing costs. There are three primary issues that must be addressed. They are: 1) professional instrumentation using efficient, cost effective measurement technology and methodology; 2) training and 3) sustainability.

Professional Instrumentation using efficient, cost effective measurement technology and methodology:

Given current staffing levels and budgets of most PIC

NMHS, it is not feasible to expect a distributed network of PIC NMHS sub-offices within a single country. An important role that SPaRCE participants play is in collecting rainfall and other environmental data that supplements the data collected by the NMHS.

However, in some instances what is needed is a network of self-sustaining, high quality, and affordable instruments that produce hourly observations, but can be read (i.e. downloaded into a computer) on a monthly basis. This would free the meteorological staff to conduct the needed climate analyses and work directly with appropriate government and non-government agencies on various projects mentioned above. Thus, with a good climate network in place, the services that the NMHS office

“A network of instruments, all of the same type, could be standardized and operated with a fairly small staff,”
Susan Postawko and Mark Morrissey.

can supply to the public would be vastly enhanced.

One technology which has a high potential for success for the PICs is the use of data loggers with standard instruments that can measure both event and continuous parameters, such as rainfall, wind, relative humidity, etc. A network of instruments, all of the same type, could be standardized and operated with a fairly small staff. Single data loggers are now available which can measure at set resolutions. The cost of such weatherproof data loggers is on the order of \$100 USD each (less if bought in bulk). Monthly visits by meteorological staff would be to download the data directly into laptop computers, clean and re-calibrate the instruments.

Training

In order for a system of automated climate stations to be sustainable, there must be training for PIC climate staff in site preparation, instrument repair, calibration procedures, data base management, climate forecasting and interfacing with appropriate agencies for country capacity building. It should be noted that many of the latter type of workshops are already planned or underway under the PI-GCOS umbrella. The shortage of trained and interested personnel in the Pacific Meteorological Services is a severe handicap. However, since the start of the SPaRCE program, several former SPaRCE participants have gone on to be employed by different Pacific Island Meteorological Services.



A new tipping bucket gauge alongside a SPaRCE manual gauge at the Vanuatu Meteorological Service in Port Vila.

Sustainability

Ultimately, climate networks owned by a Pacific country must be supported by that country. Thus, it is imperative that the costs are within the limits of the country's capability to afford such a network, and that the benefits of a quality, professionally run climate network are fully recognized by the appropriate government agency. It is extremely important that the economic benefits to the country outweigh the costs. Each country in accordance with their requirements could make contributions to a local meteorological instrumentation fund. This would be accomplished under the guidance of the Pacific Island Global Climate Observing System (PIGCOS) Steering Committee (please refer to last SPaRCE newsletter to learn about PIGCOS). It should be noted that the Steering Committee is composed of a majority of Pacific Island meteorological directors and every country in the Pacific will have the opportunity to be directly represented on the committee on a rotational basis.

The University of Oklahoma has several surplus (but still high quality) tipping bucket rain gauges, loggers and software that could be made available to SPaRCE participants who have a record of consistent and reliable data gathering, and are willing to work closely with their local Meteorological Service. If your school is interested in participating in the plan and would like to learn more, please contact Melissa Koeka at koekabug@ou.edu or at:

EVAC

University of Oklahoma

3200 Marshall Avenue Suite 150
Norman, Oklahoma 73072 U.S.A.

If interested please also contact your local meteorological service as well to let them know you would like to participate. It is always better to work with your local experts as they could provide you with local knowledge and you can provide them with needed rainfall data.

-Susan Postawko

-Mark Morrissey

"It is extremely important that the economic benefits to the country outweigh the costs," Susan Postawko and Mark Morrissey.

Map of the South Pacific





Welcome to the SPaRCE Family!

Ecom High School
Manus Province, Papua New Guinea



Peter Agua - He is the student who will be taking the readings for Ecom High School.



Students of Ecom High School standing around the rain gauge.



Students of Ecom High School standing around the min/max thermometer. Their handyman Joseph Kailou assembled the shelter for the thermometer.



Aaron Kepo - Aaron is in charge of the SPaRCE program at Ecom High School. Thank you for your interest Aaron!

Powerful Quake Rocks Central Indonesia

Wednesday, May 28th, 2006

Desperate relatives are searching the rubble for survivors after a powerful earthquake flattened houses in central Indonesia, killing more than 3,500 people in the ancient city of Yogyakarta and nearby towns. It was the nation's worst disaster since the 2004 tsunami and triggered fears that a nearby volcano would erupt.

The magnitude-6.3 quake struck at 5.54am near the famed Borobudur temple complex as many people were sleeping, caving in roofs and sending concrete walls crashing down. Thousands were wounded. Survivors screamed as they ran from their homes, some clutching bloodied children and the elderly.

The worst devastation was in the town of Bantul, where 80 per cent of the homes were destroyed and more than 2,000 people killed. Residents started digging mass graves almost immediately, family members sobbing and reading the Koran beside rows of corpses awaiting burial.

As night fell across the disaster zone -- stretching across hundreds of square kilometres of mostly farming communities in densely populated Yogyakarta province -- tens of thousands of people prepared to sleep on streets, in rice fields, and in backyards, fearful of aftershocks.

Power was out across much of the region, adding to their terror. After spending hours digging in vain through the smouldering de-

bris, many said they would have to give up their search for relatives or friends until morning.

"It's just too dark," said Sarjio, who was looking for his 40-year-old neighbour, believed to be trapped beneath the remains of her house. "There's nothing we can do now."

President Susilo Bambang Yudhoyono ordered the army to help evacuate victims and arrived this afternoon with a team of cabinet ministers to oversee rescue operations, telling people "at a time like this we have to unite". He slept in a tent camp with survivors.

The quake was the most recent in a series of disasters to strike Indonesia - from the tsunami that ravaged Aceh province, to a widening bird flu outbreak, to the threat of volcanic eruption from nearby Mount Merapi.

At least 3,505 were killed in the quake, command post officials from each of the affected districts told The Associated Press, two-thirds of the fatalities in devastated Bantul.

"The numbers just keep rising," said Arifin Muhadi of the Indonesian Red Cross, adding that more than 3,400 people were hurt.

Many roads and bridges were destroyed, hindering efforts to get taxis and pickup trucks filled with wounded to hospitals.

Doctors struggled to care for the injured, hundreds of whom were lying on plastic sheets, straw mats and even newspapers out-

"The magnitude-6.3 quake struck at 5.54am near the famed Borobudur temple complex as many people were sleeping..." The Sydney Morning Herald.

<http://www.smh.com.au/news/world/more-than-3500-killed-in-java-quake/2006/05/28/1148754855669.html?page=fullpage#contentSwap1>



Residents look go through the wreckages of a house after a powerful earthquake in Bantul, Yogyakarta.

Photo: AFP <http://www.smh.com.au/news/world/more-than-3500-killed-in-java-quake/2006/05/28/1148754855669.html?page=fullpage#contentSwap1>

side the overcrowded hospitals, some hooked to intravenous drips dangling from trees.

Bloodstains littered the floor at Yogyakarta's Dr Sardjito Hospital, along with piles of soiled bandages and used medical supplies.

"We are short of surgeons," said Alexander, a doctor who goes by one name. "There are still so many critically injured people here."

By nightfall, health officials at the hospital had tallied 89 dead, but bodies kept arriving and some family members were taking them home before they could be added to the official toll.

The quake cut electricity and phone lines in some areas.

It struck close to the rumbling Mount Merapi, and soon after the trembler a large burst of hot clouds and debris avalanched 3.5

km down its western flank. No one was injured.

Bambang Dwiyanto, chief geologist in the Energy and Mineral Ministry, said the two events did not appear to be directly related, but warned that today's earthquake could still trigger a larger eruption.

"It will influence the activities of Mount Merapi, particularly in the lava dome," he cautioned.

A geological researcher at the Indonesian Science Institute, Dani Hilman, said however he did not think the quake was powerful enough to create a large eruption.

The quake also cracked the runway and the waiting lounge at the airport in Yogyakarta, close to the famed Borobudur temple, closing it to aircraft until at least tomorrow while inspections take place, Transport Minister Hatta Radjasa

"Many roads and bridges were destroyed, hindering efforts to get taxis and pickup trucks filled with wounded to hospitals," The Sydney Morning Herald.

<http://www.smh.com.au/news/world/more-than-3500-killed-in-java-quake/2006/05/28/1148754855669.html?page=fullpage#contentSwap1>

"Other governments and international aid organizations also promised money, medical teams, tents and other forms of humanitarian relief," Pacific Magazine.

<http://www.pacificislands.cc/pm52006/>

said.

Officials said the 7th century Buddhist temple, one of Indonesia's most popular tourist attractions, was not affected by the quake. Nearby Prambanan, a spectacular Hindu temple to the south-east, suffered some damage but it was not immediately clear how much, officials said.

Close to a million tourists flock to the temples every year.

One man from Holland died in the quake, but there were no other reports of foreigners killed or injured. US embassy spokesman Max Kwak said he did not know of any American casualties, adding the US was donating \$US100,000 (\$A131,700) for search-and-rescue efforts and emergency care.

Other governments and international aid organizations also

promised money, medical teams, tents and other forms of humanitarian relief.

Indonesia, the world's largest archipelago, is regularly rocked by earthquakes because of its location on the so-called Pacific "Ring of Fire," an arc of volcanoes and fault lines encircling the Pacific Basin.

A 9.1 quake on December 26, 2004 triggered the tsunami that crashed into 11 countries across the Indian Ocean, killing more than 230,000 people, most of them in the Indonesian province of Aceh.

Yogyakarta, about 2,230 km south-east of Aceh, was not affected by the killer waves.

AP Pacific Magazine: <http://www.pacificislands.cc/pm52006/>

<http://www.smh.com.au/news/world/more-than-3500-killed-in-java-quake>

"... 'desperate need' for a dedicated early warning system for Fiji..." Nilesh Kumar Jit. Fiji Times

Online:
<http://www.fijitimes.com>

Fiji Seismologist Questions Tsunami Warning System

Monday, May 5th, 2006

SUVA, Fiji – The Seismology Department in Fiji is questioning the effectiveness of an early warning system based at the Pacific Tsunami Warning Center in Hawaii.

Seismologist Nilesh Kumar Jit said it took more than half an hour for a tsunami warning to be issued to the public in Fiji after it was released from Hawaii.

He said there was a "desperate need" for a dedicated early warning system for Fiji as the 30-

minute warning delay "took just too long."

Deputy director of the Tonga National Disaster Office Mali'u Takai told the Associated Press his department did not receive adequate warning from the Pacific Tsunami Warning Center.

"Nobody got a warning through the emergency satellite system in our meteorological office," Takai said. "Judging by the location of the epicenter we would have been caught without any warning at all

because of the system's malfunction."

The early morning earthquake measured 8.0 on the Richter scale.

The Pacific Tsunami Warning Centre says its first alert went out 16 minutes after the earthquake but it was not received in Tonga because of a power failure there.

Gerard Fryer, acting director, said, "There was a problem in Tonga where there was a power outage and they didn't get our initial message."

He said the center needs to work with Tonga to correct the problem

and he did not know whether the earthquake caused the power failure.

Tonga has since felt two earthquakes termed as aftershocks, which was picked up by the U.S. Geological Survey. Their magnitude was between 5 and 5.2 on the Richter scale.

Seismologists from 12 Pacific Island States including Fiji are currently in Melbourne, Australia discussing the establishment of a \$17million Early Warning System for the Pacific.

Fiji Times Online: <http://www.fjtimes.com>

"Nobody got a warning through the emergency satellite system in our meteorological office," said Mali'u Takai. Fiji Times Online: <http://www.fjtimes.com>

Developers need to Plan for Climate Change

Thursday, May 18th, 2006

Cook Islands - Developers in the Cook Islands are being warned about the need for precautionary planning for climate change.

The WWF South Pacific Climate change team will be in Rarotonga from this weekend for a week-long programme of workshops about climate change.

It's the first in a series of climate change activities being carried out in the Cook Islands, in a three-year partnership between WWF, the National Environment Service (NES), and NGOs with sponsorship from the European Union.

NES climate change technical officer, Pasha Carruthers, said peo-

ple driving development in Cook Islands often overlook the need to plan for the future benefit rather than short-term economic gain.

"And it's hard to think beyond either a political time scale or an economic one. Most businesses probably plan on a maximum of a ten-year time scale so when you're talking about things that you're going to be concerned about in ten to twenty years, perhaps even now".

"But people are becoming aware that some of the impacts that we're seeing now, you really have to start responding to, right away."

Pacific Magazine: <http://www.pacificislands.cc/pm52006/>

"It's the first in a series of climate change activities being carried out in the Cook Islands..." Pacific Magazine.

<http://www.pacificislands.cc/pm52006/>

Climatologist Blames Rain on Global Warming

Tuesday, May 6th, 2006

WELLINGTON, New Zealand – A U.S. climate scientist says global warming is contributing to an increase in rain over parts of the Pacific region.

Gabriel Vecchi from the U.S. National Oceanic and Atmospheric Administration says global warming is weakening the vast system of air currents that fuel Pacific trade winds, creating more El Nino-like weather patterns.

Mr Vecchi says countries like Kiribati and the Marshall Islands stand to experience more rain from the pattern.

He says the wind system brings moisture collected from the Pacific Ocean from east to west where it precipitates as it rises.

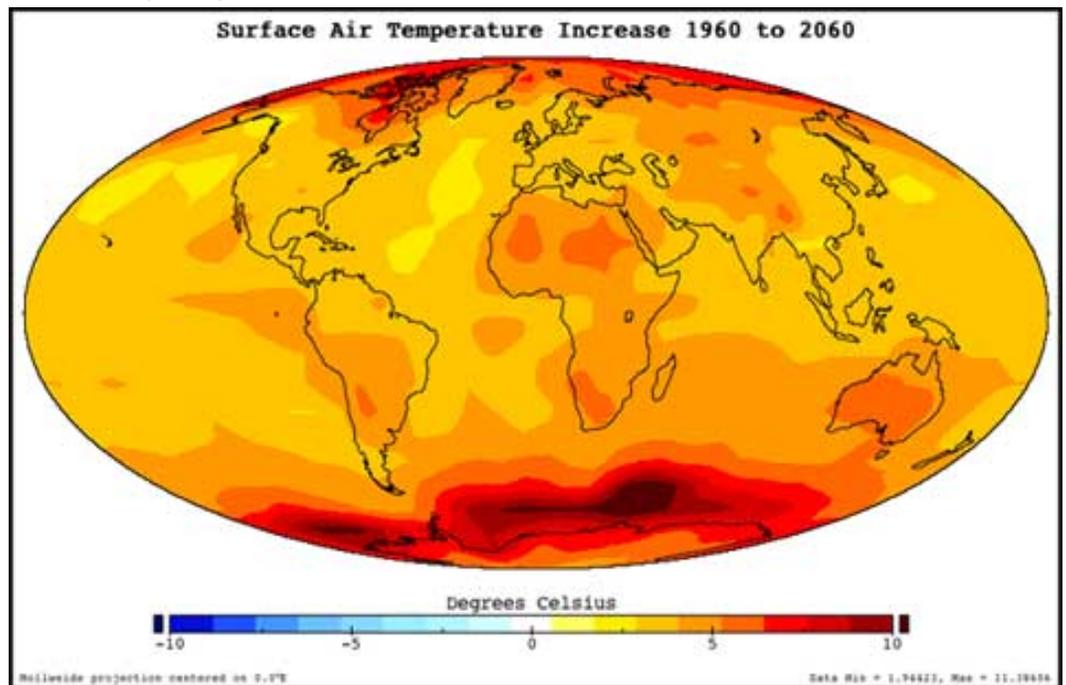
"The amount of moisture that that wind can hold under global warming increases very rapidly. Meanwhile, the amount of rainfall that can occur in the globe is constrained by other physics to increase much more slowly. So because each parcel of air has more moisture in it, to balance a smaller increase in rainfall, you have to actually slow down the winds."

The slowdown in ocean currents is also expected to cut down on ocean circulation that brings nutrients to the surface for marine life to feed on, which could have an impact on fishing in the Pacific.

Pacific Island Reports: <http://pidp.eastwestcenter.org/pireport/graphics.shtml>

"...countries like Kiribati and the Marshall Islands stand to experience more rain from the pattern," Gabriel Vecchi.

Pacific Island Reports: <http://pidp.eastwestcenter.org/pireport/graphics.shtml>



Surface Air Temperature Changes

Nasa: http://www.nasa.gov/vision/earth/everydaylife/climate_class.html

Fire Leaves Island w/o Power & Water

Wednesday, May 31st, 2006

Niue - Niueans have been told to stay home and conserve water after a blaze at the South Pacific nation's only power station last night left the island without electricity.

A spokesman from Niue Broadcasting Corporation said people were particularly concerned about water supply as the pumps were electric.

"The water is actually being pumped up by power and because there is no power we are only going by whatever's in the reservoirs at the moment," he told National Radio.

He said he was not sure how long that would last, but probably for another day or so.

Engineers were looking at ways to get the pumps going without the main generator.

"They are looking at other alternatives at the moment. They've got portable generators they can take around the villages to pump the water out."

Emergency generators were being used to provide power to essential services like the island's only hospital.

"The whole island is affected by this. There is no power except for essential services such as Broadcasting House, the airport, and Telecom who have their own generators."

The National Disaster Council was meeting this morning to discuss the next move which may involve calling on New Zealand for help.

Niue has been self-governing in association with New Zealand since 1974.

New Zealand Herald: http://www.nzherald.co.nz/section/story.cfm?c_id=2&ObjectID=10384341

"Emergency generators were being used to provide power to essential services like the island's only hospital,"
New Zealand Herald.

http://www.nzherald.co.nz/section/story.cfm?c_id=2&ObjectID=10384341

Lopevi Erupting - A 4th Threatening

Monday, May 29th, 2006

Vanuatu - Lopevi volcano in Vanuatu is continuing to cause havoc on surrounding islands, while several other volcanoes are also threatening.

The national disaster office says it is not able to reach one of two villages on Paama Island which has been badly affected by ash from Lopevi over the past two weeks.

Villagers in Paama have appealed to the government for help secur-

ing new sources of water, while crops have also been destroyed by ash contamination.

Reports from nearby Ambrym say the two Benbow and Marum volcanoes have also started erupting and are sending down ash over ten villages in southeast Ambrym.

The latest development, meteorological offices confirmed the color of Manaro lake in central Ambae has turned to grey which means that it is likely to erupt again.

Pacific Magazine: <http://www.pacificislands.cc/pm52006/>

"...the color of Manaro lake in central Ambae has turned grey which means that it is likely to erupt again," Pacific Magazine.

<http://www.pacificislands.cc/pm52006/>

Fiji Initiates Climate Change Project

Tuesday, May 30th, 2006

Fiji - Fiji has been selected as pilot country for a series of projects to help the tourism sector adapt to climate change. These will be coordinated by the World Tourism Organization (UNWTO) in conjunction with UNEP and UNDP and financed by the Global Environment Facility.

A similar plan is also being prepared for the Maldives.

The go-ahead for the Fiji project was followed by the staging of a UNWTO workshop for stakeholders in the tourism sector held in Suva from 2-4 May in conjunction with the Ministry of Tourism, a forum which served to identify current and potential impacts of climate change and the policies and capacity building needed to implement adaptation measures.

Island destinations are particularly prone to the effects of cli-

mate change as many of them rely on warm waters and long hours of sunshine to attract tourists to their beaches. Alterations in weather patterns can have a serious impact on the programming of trips, the comfort of tourists and their health. Extreme climatic events can affect natural attractions, with storm surges and rising sea levels eroding beaches and higher sea temperatures bleaching coral. There is also the increased risk of drought and the possibility of physical damage to both people and property.

"UNWTO has been actively working in this field since the organization of the First International Conference on Climate Change and Tourism, held in Tunisia in April 2003, which resulted in the issuing of the Djerba Declaration in conjunction with other UN specialized agencies," said Gabor Vereczi, Programme Officer in UNWTO's Sustainable Development of Tourism Department.

"Addressing the impact of climate change on Small Island Developing States has become a priority, given the heavy dependence of their economies on tourism, their high level of vulnerability and their relatively low adaptive capacity". "Climate change should not be seen by tourism administrations and businesses as a distant phenomenon, but one that is already affecting destinations and the daily operation of the tourism sector.

Pacific Magazine: <http://www.pacificislands.cc/pm52006/>

"Island destinations are particularly prone to the effects of climate change," Pacific Magazine.

<http://www.pacificislands.cc/pm52006/>



Map of Fiji

<http://murugan.org/temple/fiji-map.jpg>



CLASSROOM WEATHER FOCUS

Welcome to Weather Focus! This section is dedicated to the students and teachers of the SPaRCE program. Every newsletter will have a weather trivia section or an activity. Trivia questions will start out simple and progressively increase in difficulty with the arrival of your workbooks.

- 1) Which type of cloud creates a halo around the sun?
 - a) Altostratus
 - b) Cirrus
 - c) Nacreous
 - d) Cirrostratus
- 2) True or False: Stratus clouds produce a large amount of rainfall.
- 3) A pileus can also be known as a:
 - a) Kelvin-Helmholtz wave cloud
 - b) Cap Cloud
 - c) Scud
 - d) Ice Cream Cone Cloud
- 4) Noctilucent clouds form in what part of the atmosphere?
 - a) Troposphere
 - b) Exosphere
 - c) Mesosphere
 - d) Thermosphere
- 5) Which of the following clouds have vertical development?
 - a) Cirrus
 - b) Cumulus Congestus
 - c) Stratocumulus
 - d) Mammatus
- 6) A stratus cloud that is on the ground is considered fog when the visibility is less than what?
 - a) 20 km
 - b) 4 km
 - c) 3 km
 - d) 1 km
- 7) Which of the following clouds create a "watery sun"?
 - a) Altocumulus
 - b) Nimbostratus
 - c) Altostratus
 - d) Cirrocumulus
- 8) Which of the following clouds is most associated with thunderstorms?
 - a) Cumulus
 - b) Cumulonimbus
 - c) Cumulus Humilis
 - d) Cumulus Fractus
- 9) True or False: Stratus Fractus clouds are very dangerous.
- 10) True or False: Billow clouds look the way they do because of wind shear.



- Answers:
- 1) D. Cirrostratus
 - 2) False: Stratus clouds produce no rainfall or only a light mist.
 - 3) B. Cap Cloud
 - 4) C. Mesosphere
 - 5) B. Cumulus Congestus
 - 6) D. 1 km
 - 7) C. Altostratus
 - 8) B. Cumulonimbus
 - 9) False: Stratus Fractus clouds are harmless despite their appearance
 - 10) True

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ENSO Diagnostic Discussion

Thursday, June 8th, 2006

Synopsis: ENSO-neutral conditions are expected to prevail during the next 3 months. The current patterns of anomalous ocean temperatures are consistent with ENSO-neutral conditions in the tropical Pacific. During May 2006 SSTs were near average at most locations between the date line (180°) and 90°W, which is reflected in the near zero departures observed in all of the Nino regions... Collectively, these atmospheric and oceanic features indicate ENSO-neutral conditions.... Most of the statistical and coupled models predict ENSO-neutral conditions in the tropical Pacific through the end of 2006. However, the spread of these forecasts (weak La Nina to weak El Nino) indicates considerable uncertainty in the outlook for the last half of the year.

Climate Prediction Center:
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/index.html

Get to Know: Lauren Bodenhamer



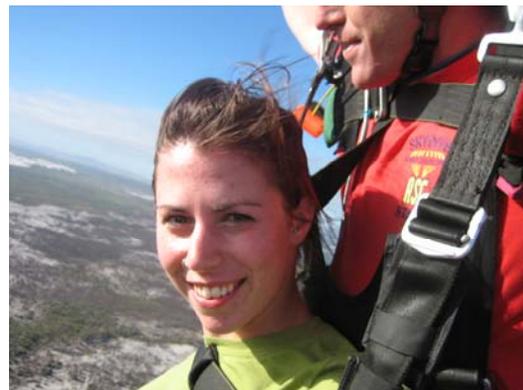
Lauren's dog, The Mighty Quinn.



Lauren and some Semester at Sea friends in Japan.

Wednesday, June 28, 2006

Hello, my name is Lauren Bodenhamer, and I am the PACRAIN correspondent. I am 23 years old and am from Oklahoma City, OK. My parents, Mark and Judy, live in Oklahoma City where my father is a physician. After graduating high school, I moved to Colorado where I attended the University of Colorado for a year. It was there that I discovered meteorology. I decided to move back to Oklahoma to attend the University of Oklahoma to pursue that course. I started working at EVAC in May and have an interest in the PACRAIN program. I now live in Norman with my dog, Quinn. My sister, Becca, also goes to the University of Oklahoma where she is currently studying communications. Last semester I was fortunate enough



Lauren skydiving in South Africa

to attend Semester at Sea. During Semester at Sea, I lived on a ship and traveled the world, visiting several countries on 3 continents. My favorite country to visit was Cambodia. I would like to go back one day to many of the places I saw. For now, I am finishing my degree at OU and am looking forward to future travel.

-Lauren Bodenhamer

SPaRCE would like to thank those of you who have made this program possible: NOAA Office of Global Programs, NOAA PI-GCOS, and especially Howard Diamond. Thank you!