ENSO SIGNAL

Issue #13 January 2000

EDITORIAL

The Season of El Niño

Like strawberries in New England during the winter, El Niño is out of season. What I mean by this is that El Niño is one of those naturally occurring phenomena that generates interest in itself, either when it has been forecast, or when it is in progress. After it passes, the interest of the public, policy makers, and especially the media, declines. Although each event seems to make the public wiser about the phenomenon, interest goes on the shelf as other pressing issues capture its attention. Of course, the core of scientists focused on El Niño-related research continue their work out of the public's eye, until the next El Niño forecast has been issued. The period between El Niño events in the past has been four-and-a-half years, on average, and somewhere in the two- to ten-year time frame.

The paradox about an irregularly recurring natural phenomenon is that the best time to learn more about it is when it is not under way: no distractions by media warnings of impending disasters, destruction, injuries, calls for emergency assistance, and so on. It's a bit like the story of the farmer whose roof leaks when it rains. He says he'll fix it when the rain stops. Then, when the rain stops, he gets distracted by other things to do, and the roof does not need to be fixed at that moment. So the cycle continues.

All of this is relevant to producing an El Niño newsletter when no event is taking place. There is La Niña, you say? The public and the media have apparently not yet measured the importance or value of knowing more about La Niña. For so long they have heard of El Niño and its potential for worldwide destruction that those stories have overshadowed interest in the cold phase, the other side of the ENSO (El Niño Southern Oscillation) phenomenon. While extreme climate-related anomalies tend to be blamed on El Niño if they occur around the time of an event, the same cannot be said for anomalies that take place during La Niña events.

The overriding objective of a newsletter focused on ENSO is to capture and heighten the attention of those outside (as well as inside) the community of ENSO-related researchers. Physical science, impacts and application research on the ENSO cycle can provide important and usable science to those decision makers who choose to use it. The best time for societies to prepare for the potential adversities and benefits of ENSO's extremes is *between* them, a time when sustaining that interest is not such an easy task. That's the challenge of the ENSO Signal.

–Michael H. Glantz

The ENSO Signal is published by the Environmental and Societal Impacts Group (ESIG), National Center for Atmospheric Research (NCAR) in cooperation with the National Oceanic and Atmospheric Administration. NCAR is sponsored by the National Science Foundation.

About The New ENSO Signal

Issue #13 of *The ENSO Signal* is produced at NCAR's Environmental and Societal Impacts Group (ESIG) in Boulder, Colorado. We are interested in knowing what news and views that you, as a reader, would like to see addressed in this newsletter. The continued aim of the *Signal* will be to focus on issues related to the ENSO cycle and its impacts on ecosystems and societies. The newsletter will also continue to be available on line at www.dir.ucar.edu/esig/signal – To receive only the Web version, you may sign up on the Web site.

D. Jan Stewart
Managing Editor
The ENSO Signal
ESIG/NCAR
PO Box 3000
Boulder, CO 80307 USA

Tel: 303-497-8134
Fax: 303-497-8125
Email: jan@ucar.edu

The first 12 issues, produced by NOAA's Office of Global Programs, are on line at www.ogp.noaa.gov/library/library.htm

Reducing the Impact of Environmental Emergencies through Early Warning and Preparedness

UNEP, in cooperation with NCAR, was awarded a grant from the UN Fund for International Partnerships to carry out a 19-month study that began in mid-1999 to assess and review the impacts of the 1997-98 El Niño, as well as the climate-related early warning and natural disaster preparedness programs in selected countries. The objective is to identify coping mechanisms for the next event. The 16 case studies include China, Costa Rica, Cuba, Ecuador, Ethiopia, Fiji, Indonesia, Kenya, Mozambique, Panama Canal, Papua New Guinea, Paraguay, Peru, Philippines, Bangladesh, and Vietnam. The project's core partners and advisors are representatives of the World Meteorological Organization, UNEP, UNU (United Nations University), and the IDNDR (International Decade for Natural Disaster Reduction). The first meeting of the team leaders was held in Geneva, Switzerland, 8-10 July 1999. It is available on line at www.dir.ucar.edu/esig/un/geneva.html. For more information, contact Principal Investigator Michael Glantz, NCAR/ESIG, Box 3000, Boulder, CO 80307, USA; tel: 303-497-8119; fax: 303-497-8125; email glantz@ucar.edu

El Niño Marine Impacts

A two-decade warming of the California Current has combined with more frequent and intense El Niño events to damage broad swaths of coastal and ocean life. John McGowan, a biological oceanographer at Scripps Institute of Oceanography, noted big changes in the biological community structure due to these episodic warmings including kelp bed diminishment, lower fish catches and a severe decline in Pacific chinook salmon in Northern California. For more information, contact John McGowan, Scripps Institute of Oceanography, 8602 La Jolla Shores Drive, La Jolla, CA 92037; tel: 858-534-2830.

The Tropical Atmosphere Ocean (TAO) Array

The TAO Array consists of about 70 moored buoys spanning the equatorial Pacific. It measures oceanographic and surface meteorological variables critical for improved detection, understanding and prediction of seasonal-to-interannual climate variations originating in the tropics. These buoys provide climate researchers, weather predication centers, and scientists around the world with real-time data from the tropical Pacific. NOAA established an excellent TAO Web site which provides real-time data from the buoy system: www.pmel.noaa.gov/toga-tao/

WMO, IADB Establish El Niño Program

On 22 September 1999 in Geneva, Switzerland, G.O.P. Obasi, Director General of the World Meteorological Organization (WMO), and Mr. Enrique Iglesias, President of the Inter-American Development Bank (IADB) signed documents for a $1,538,000 program to strengthen the capacity of Latin American and Caribbean nations to reduce the effects of El Niño through better scientific monitoring and meteorological forecasting. Studies will identify El Niño impacts on vulnerable groups. For more information, contact Mr. Taysir M. Al-Ghanem, Information and Public Affairs Office, WMO, 7 bis, avenue de la Paix, PO Box 2300, CH-1211, Geneva 2, Switzerland; tel: 41-22-730-8315; fax: 41-22-733-2829; email ipa@ gateway.wmo.ch; Web: www.wmo.ch

WMO Retrospective

The WMO has prepared *The 1997-1998 El Niño Event: A Scientific and Technical Retrospective* as a contribution to the UN Task Force on El Niño for implementa-tion of UN General Assembly Resolutions 52/200 and 53/185. The *Retrospective* was agreed upon at a conference in Guayaquil, Ecuador, 9-13 November 1998. This publication will serve as a base of information for further analysis to understand El Niño and El Niño-related impacts. To receive a copy of this publication (WMO No. 905), please contact WMO, Information and Public Affairs Office, 7 bis, avenue de la Paix, PO Box 2300, CH-1211, Geneva 2, Switzerland, Tel: 41-22-730-8314; fax: 41-22-733-2829; email ipa@gateway. wmo.ch; Web: www.wmo.ch

El Niño 1997-98 Impacts in the United States

Joseph Barsugli, Jeffrey Whitaker, Andrew Loughe, Prashant Sardeshmukh, and Zoltan Toth addressed the question “Can an individual weather event be attributed to El Niño?” They used quantitative ensembles of medium-range weather forecasts made with and without tropical sea surface temperature anomalies. They also used the synoptic El Niño signal to attribute aspects of individual weather events to El Niño. They focused on three events: the January 1998 ice storm in the north-eastern part of North America, the February 1998 rains in central and southern California, and the October 1997 blizzard in Colorado. This represents an important research effort to identify El Niño’s influence on weather events. See Barsugli et al., 1999: The effect of the 1997-98 El Niño on individual large-scale weather events. *Bulletin of the AMS*, **80**(7), 1399-1412.

El Niño 1997-98 Impacts in Australia

Signs of a developing El Niño emerged during the Southern Hemisphere autumn of 1997, when the Southern Oscillation Index began a rapid decline. The heavy tropical summer rains ended abruptly in March, and high pressure swiftly became the dominant feature of weather maps. The Australian Bureau of Meteorology’s National Climate Centre advised early in May 1998 of the strong chance of an El Niño episode developing. One of the most striking features of this event was that it gained intensity much more rapidly than previous episodes in terms of ocean temperature anomalies. Very dry conditions set in over most of the country. Melbourne experienced its second driest year in 140 years.

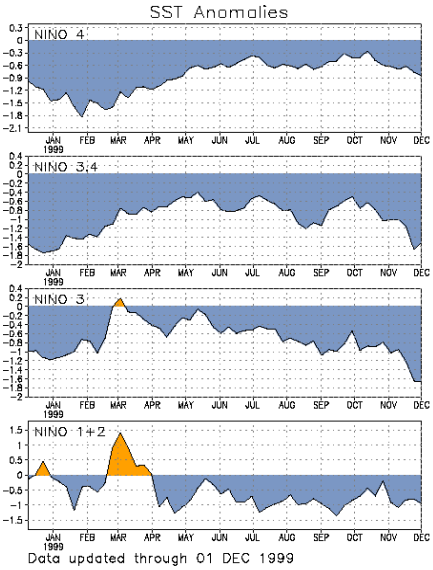
An unusual aspect of this event was the occurrence of significant rainfall in September and November 1998, in some cases turning imminent crop failure into useful yields. Although this event was the equal of the 1982-83 El Niño event, its effects on rainfall were far less severe. Damage and losses from bushfires were also much less than they might have been because of careful planning for the expected severe season. In April, when the event was near its end, widespread heavy rainfall fell over much of Australia. (Excerpted from the Bureau of Meteorology’s *Climate Activities in Australia 1999*)

The Top 10 El Niño Events of the 20th Century

NOAA's National Climatic Data Center identified global temperature anomalies during the ten strongest El Niños of the twentieth century. El Niño events were based on work described in Livezey et al., 1997, "Teleconnective response of the Pacific-North American region atmosphere to large central equatorial Pacific SST anomalies," *Journal of Climate*, **10,** 1787-1820. For more information, contact: Mike Crowe, NOAA/NCDC, 151 Patton Ave., Asheville, NC 28801-5001; fax: 828-271-4328; email: mcrowe@ncdc.noaa.gov

Queensland Climate Applications Research

The Queensland Department of Natural Resources and the University of Queensland have developed several climate research programs dealing with variability, forecasting, modeling, etc. The program overviews can be found in a publication entitled *Developing Seasonal Forecasts for Australian Natural Resources Management*. For more information, contact Lawrence Lau, Advanced Computational Modelling Centre, University of Queensland; tel: 61-7-3365-1349; fax: 61-7-3365-1477; email: ll@maths.uq.edu.au



Current State of the Tropical Pacific

Cold episode conditions (La Niña) strengthened in the tropical Pacific during December, as equatorial sea surface temperatures dropped to more than 1°C below normal between 165°W and the South American coast. This cooling was reflected by increasing negative values of all four Niño region indices, compared to those observed just a few months ago. Cold conditions have persisted since June 1998, with below-normal SSTs and reduced rainfall throughout the central equatorial Pacific. Accompanying these conditions, tropical rainfall has been above normal over large portions of Indonesia, Malaysia, and the western Pacific. It is likely that cold episode conditions will continue for the next several months. This assessment is supported by most coupled model forecasts. Weekly updates for ENSO advisories are available from the Climate Prediction Center, National Centers for Environmental Prediction (NCEP), NOAA/National Weather Service, W/NP52, Room 605, WWB, 5200 Auth Rd., Camp Springs, MD 20746-4304; Web site www.cpc.ncep.noaa.gov; email wd52vk@hp31.wwb.noaa.gov

Guest Editorial

Roger A. Pielke Jr.
Social Scientist, ESIG/NCAR

A Warning about Seasonal Forecasting

Seasonal forecasts have impacts that can rival the impacts of the phenomena being forecast. Thus, dealing with the impacts of forecasts is one of the greatest challenges facing the climate forecasting community.

For example, as the 1997-98 El Niño developed in southern Africa, scientists and U.S. aid agencies warned farmers of the likelihood of drought in coming seasons and offered strategies such as the early planting of crops. In this instance, unlike with the 1991-92 El Niño, no drought materialized, as much of southern Africa received plentiful

rains. At the end of the agricultural season, much of southern Africa was in a grain deficit situation – not because of El Niño, but in part because of the seasonal forecast! Why? As one newspaper reported, the "smart" farmers – those who listened to the forecasters and altered their planting routine – were the ones who lost out.

Before the 1997-98 event, scientists had documented a clear relationship between ENSO and grain production in southern Africa. Now that relationship is no more, having been supplanted by a relationship between the issuing of the ENSO *forecast* and grain production. Depending on how farmers responded to what some perceive as a "bad" forecast in 1997-98, grain production may oscillate wildly between correlating positively or negatively with the forecast. The forecast itself has become an intervening variable.

Advancements in the science of seasonal forecasting seem to have outpaced advancements in the effective use of those forecasts. One of the greatest challenges facing the climate community is to manage the expectations of the users of seasonal forecasts. Experiences like those in southern Africa must give a renewed impetus to improving the understanding of the societal aspects of forecasts *and* to incorporating that knowledge into the practice of climate forecasting.

Pacific ENSO Update

The *Pacific ENSO Update* is a newsletter of the Pacific El Niño-Southern Oscillation (ENSO) Applications Center, a pilot project established to conduct research and produce information products on climate variability related to the ENSO climate cycle in the United States-affiliated Pacific Islands. The newsletter supplies information for the benefit of those involved in climate-sensitive sectors. It is a quarterly publication with additional special reports on important changes in ENSO conditions. For information, contact Raymond Tanabe, Editor, Pacific ENSO Update, Pacific ENSO Applications Center (PEAC), University of Hawaii, Dept. of Meteorology, 2525 Correa Rd., HIG #350, Honolulu, HI 96822; tel: 808-956-2324; fax: 808-956-2877; email: rayt@soest.hawaii.edu – http://lumahai.soest.hawaii.edu/Enso

International Research Institute

The International Research Institute for climate prediction (IRI) was established through a cooperative agreement between NOAA's Office of Global Programs and Columbia University's Lamont-Doherty Earth Observatory (LDEO). The IRI aims to continually assess and develop seasonal-to-interannual climate forecasts, and to foster the application of such climate forecasts to the explicit benefit of societies. The IRI addresses all aspects of end-to-end prediction, including model and forecast system development, experimental prediction, climate monitoring and dissemination, applications, research and training, in coordination with the international research and applications community. The IRI has collected precipitation and temperature data around the globe from October 1997 to the present. This information and more about the IRI is available at iri.ldeo.columbia.edu/iri/ or contact the Director at IRI, LDEO, Columbia University, 204 Oceanography Bldg., Route 9W, Palisades, NY 10964; tel: 914-365-8368; fax: 914-365-8366.

Journals Online

The following American Meteorological Society (AMS) journals (starting with the January 1997 issues) can be accessed online through the AMS Web site:
ams.allenpress.com/

- Journal of the Atmospheric Sciences
- Journal of Climate
- Journal of Atmospheric and Oceanic Technology
- Monthly Weather Review
- Weather and Forecasting
- Journal of Applied Meteorology
- Journal of Physical Oceanography

- Bulletin of the American Meteorological Society

The complete articles are available in HTML and Adobe Acrobat PDF formats to subscribers. For more information about the journals or subscription details, contact the AMS, 45 Beacon Street, Boston, MA 02108.

Famine Early Warning System Tracking El Niño/La Niña

The US Agency for International Development 's Famine Early Warning System (FEWS) has implemented a Web site, "Tracking El Niño/La Niña" because these events affect weather in Africa, especially southern Africa, eastern Africa, and the Horn. One of the stronger relationships (i.e., teleconnections) is between El Niño events and drought in southern Africa. This site covers the present La Niña event. Information is also provided about the 1997-98 El Niño. For more information about FEWS, contact the FEWS Project, ARD, Inc., 1611 N. Kent St., Suite 1002, Arlington, VA 22209; tel: 703-522-7722; email info@fews.org Web: www.info.usaid.gov/fews/imagery/sat_nino.html

Comprehensive El Niño Bibliography

The Center for Ocean-Atmospheric Prediction Studies Library (COAPS) has posted a comprehensive El Niño bibliography on the Internet at www.coaps.fsu.edu/lib/biblio/enso-bib-intro.html. The bibliography is searchable by author's last name and can also be browsed page by page.

Kids, El Niño, and the Web

With increased media and public attention being paid El Niño, it is not surprising that Internet sites dedicated to educating students at all levels about El Niño and related issues are appearing all over the World Wide Web. A few such focused sites of particular interest are listed below:

The ***National Oceanic and Atmospheric Administration*** (NOAA) site for students: www.coe.usouthal.edu/oar/html/el_nino.html

The ***National Aeronautics and Space Administration*** (NASA) site for students: airsea-www.jpl.nasa.gov/ENSO/welcome.html

The ***"El Niño / Earth Science Virtual Classroom"*** was created to aid the prospective student (junior high through grad school) to learn about the El Niño phenomena as well as earth science in general. It is a forum for students and scientists to communicate, interact, and collaborate: http://library.thinkquest.org/3356/main/enesvc.html

Planet Earth Science is dedicated to developing educational software that is both scientifically valid and engaging to students. Explore the site to learn more about Planet Earth Science and their flagship CD-ROM, Ocean Expeditions. Virtual reality brings the research vessel Glomar alive as students study the impact of El Niño on global weather patterns, climate, and life: www.planearthsci.com

The GLOBE Program (Global Learning and Observations to Benefit the Environment) is a worldwide network of students, teachers, and scientists working together to study and understand the global environment. Students and teachers from over 7,000 schools in more than 80 countries are working with research scientists to learn more about our planet. GLOBE has a site dedicated to studies on La Niña and El Niño at: globe.fsl.noaa.gov

The ***University of Illinois*** has developed a comprehensive El Niño instructional manual. WW2010 includes a powerful navigation system, graphics, and online curriculum featuring both student projects and classroom activities: covis.atmos.uiuc.edu/guide/El-Nino/

Warning! Internet sites listed in the ENSO Signal are sites that were available at the time of its quarterly publication. We hope that these sites will more or less be permanently on the Web. However, Internet users must realize that Web sites tend to come and go.

More ENSO Information on the Web

The following sites are among the many about ENSO on the Web. Here are just a few of the more stable and comprehensive ones:

elnino.noaa.gov

NOAA has primary responsibilities for providing forecasts to the nation, and for observations and research.

pmel.noaa.gov/toga-tao/el-nino/nino-home.html

Designed to improve detection, understanding,and prediction of El Niño, the TAO array consists of approximately 70 moorings in the tropical Pacific Ocean. Plenty of information here.

www.coaps.fsu.edu/HOT_TOPICS/

COAPS (Center for Ocean-Atmosphere Prediction Studies) studies how El Niño affects landfalling hurricanes in the U.S., how El Niño impacts the North American climate patterns.

www.jpl.nasa.gov/elnino

This page presents images and news releases based on observations of the El Niño/La Niña phenomenon in the Pacific Ocean by the U.S./French TOPEX/Poseidon and other satellites and instruments.

netra.nmdis.gov.cn/hyzh/fzjz

China's Oceanic Administration has all the El Niño media reports gathered here (in Chinese).

nsipp.gsfc.nasa.gov/enso/visualizations

NASA's Goddard Space Flight Center provides images, movies, and other visualizations of the ENSO cycle.

www.ogp.noaa.gov/enso

NOAA's Office of Global Programs aims to provide a one-stop source for ENSO information here.

www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/

The Climate Prediction Center (CPC) provides El Niño/La Niña current outlook information, SST and temperature forecasts.

coastal.er.usgs.gov/response

The US Geological Survey as part of its Coastal and Marine Program is taking aerial photos to assess coastal erosion from severe storms.

www.senado.gov.br/web/relatorios/elnino/fenomeno.htm

This Brazilian web site has a report from the Commission on El Niño (in Portuguese).

www.met.igp.gob.pe/

This Spanish Web site for the Instituto Geofisica del Peru has

satellite images, as well as climate and temperature forecasts.

www.cenaim.espol.edu.ec

The National Center for Agriculture and Marine Investigations in Ecuador covers many aspects of El Niño impacts. In Spanish.

www.dnr.qld.gov.au/longpdk/

El Niño information for Australian agriculture produced by the Climate Impacts and Natural Resources Systems, Resources Sciences Centre.

www.dir.ucar.edu/esig/la_nina_home/

ESIG's compilation of information about La Niña events, with impacts, forecasts, data sources, and links.

Past Events

Fifth International Congress on Disasters

Where: Havana, Cuba
When: 7-10 September 1999

Sponsored by the Pan-American Health Organization, UN International Decade for Natural Disaster Reduction, and others, this congress convened environmental, economic, and development specialists to exchange information and strengthen relationships to further international cooperation in disaster (both natural and technological) management and mitigation. For more information, contact: Igdalia Luna Cisneros, Palacio de Convenciones de La Habana, Apartado Postal 16046, La Havana, Cuba. Tel: 537-22-6011
Fax: 537-22-8382
Email: migdalia@palco.get.cma.net

8th Conference on Climate Variations

Where: Denver, Colorado
When: 13-17 September 1999

This conference, sponsored by the American Meteorological Society (AMS), included sessions on seasonal to interannual variations, intraseasonal climate variability, ENSO variability-observational studies, climate prediction/predictability, modeling seasonal climate variability, seasonal forecast skill and verification, decadal scale variability, and trends and climate change. For more information, contact: AMS, 45 Beacon St,, Boston, MA 02108-3693; www.ametsoc.org/AMS

4th International Conference on Modeling of Global Climate Change and Variability

Where: Hamburg, Germany
When: 13-17 September 1999

This conference was an opportunity to present new climate research results and to discuss current developments and the outlook for the future. Topics covered included:

1. Development and Validation of Comprehensive Climate Models and Emerging Issues
2. Modeling of Climate Variability including ENSO Modeling Decadal to Centennial Climate Variability
3. Prediction and Detection of Anthropogenic Climate Change

For more information, contact:
Lydia Dümenil, Max-Plank-Institut für Meteorologie, Bundesstraße 55, D-20146, Hamburg, Germany
Web: www.mpimet.mpg.de/~mpi-conference/

24th Annual Climate Diagnostics and Prediction Workshop

Where: Tucson, Arizona
When: 1-5 November 1999

This workshop provided an opportunity for participants to exchange information, ideas, and opinions on a variety of topics including: (1) Review of the 1998-99 climate; (2) An assessment of 1998-99 climate predictions; (3) Climate variability and human health; (4) Understanding the links between extreme events and climate variability;

and (5) Prediction and diagnosis of monthly and seasonal-to-interdecadal/ decadal phenomena (e.g., ENSO).
For more information, contact:
Institute for the Study of Planet Earth, Attention John All, 715 N. Park Ave., 2nd Floor, Tucson, AZ 85721
Fax: 520-792-8795.

International Conference on Urban Climatology (ICUC)

Where: Sydney, Australia
When: 8-12 November 1999

This conference was held in conjunction with the 15th International Congress of Biometeorology. A wide range of participants interested in modeling atmospheric processes and the climatic effects of cities, including those working in seasonality, impacts of climate change and El Niño, attended the ICUC. For more information, contact Richard de Dear, Macquarie University, Sydney, NSW 2109, Australia. Fax: 61-2-9850-8420; email rdedear@laurel.ocs.mq.edu.au; Web: www.es.mq.edu.au/ICB-99/

80th AMS Annual Meeting

Where: Long Beach, California
When: 9-14 January 2000

The theme of the 80th AMS meeting was "Applying Environmental Science to Societal Needs in the New Millenium". Issues related to this theme were covered in several of the conferences making up the Annual Meeting and were highlighted in the Second Symposium on Environmental Applications. Among the associated conferences concurrently taking place in Long Beach are:

- The 16th International Conference on Information and Processing Systems for Meteorology, Oceanography and Hydrology
- The Second Symposium on Environmental Applications
- The 15th Conference on Hydrology
- The 11th Symposium on Global Change Studies
- The 4th Symposium on Integrated Observing Systems
- An AMS Short Course on Mesoscale Atmospheric Modeling by Original Model Developers

For more information, please contact:
AMS Meetings Office; Tel: 617-227-2462
Email: amsmtgs@ametsoc.org
Web: www.ametsoc.org/AMS

Upcoming Events

A **Workshop on the Madden-Julian Oscillation (MJO) and El Niño-Southern Oscillation (ENSO)**

Where: Princeton, New Jersey
When: 15-17 March 2000

The theme of this workshop is whether and how the MJO might play a role in ENSO. Scientists with expertise on the MJO and ENSO will discuss a full range of views on this subject and key research activities needed to improve our understanding of the MJO-ENSO problem. The objectives of this workshop are to (i) bring out a full range of views on the controversial issues related to possible MJO influences on ENSO, including the possibility that the MJO may be incidental to ENSO and its predictability, (ii) summarize the knowns and unknowns related to these issues, and (iii) identify the most critical research areas that need to be covered in order to advance our understanding of the MJO-ENSO problem. A preliminary prospectus of the workshop can be found at orca.rsmas.miami.edu/mjomip/mjo.enso.workshop. For more information, email: czhang@rsmas.miami.edu

Beyond El Niño: A Conference on Pacific Climate Variability and Marine Ecosystem Impacts, from the Tropics to the Arctic

Where: La Jolla, California
When: 23-26 March 2000

This four-day conference will consist of four sections:

1. Evidence for Variability
2. Ecosystem consequences of variability
3. Mechanisms of interaction with ecosystems
4. Implications for fisheries management of climate forcing of marine ecosystems
5.

For more information, contact:
The PICES Secretariat, c/o Insitute of Ocean Sciences, PO Box 6000, Sidney, BC, Canada V8L 4B2; Tel: 250-363-6366; Fax: 250-363-6827; E-mail: pices@ios.bc.ca Web: pices.ios.bc.ca

6th International Conference on Southern Hemisphere Meteorology and Oceanography

Where: Santiago, Chile
When: 3-7 April 2000

The central theme of this conference is "Water Resources and their Management: Focus on the Southern Hemisphere (SH)." Special attention will be given to the following topics as they relate to the main conference theme:

1. Weather forecasts and climate prediction,
2. Tropical-extratropical interactions and teleconnections in the SH,
3. Decadal, ENSO and intraseasonal oscillations in the SH,
4. Ocean-atmosphere-land interactions,
5. Southern Hemisphere monsoon systems,
6. Regional climate and hydrologic applications,
7. Oceanography of the southern oceans and eastern boundary currents; and
8. Antarctic meteorology and climatology.

For more information please contact: Dr. Patricio Aceituno, Dept. of Geophysics at the University of Chile, Casilla 2777, Santiago, Postal Code 6511227, Chile; Tel: 56-2-696 8790; Fax: 56-2-696-8686; email: aceituno@dgf.uchile.cl

6th International Conference on Remote Sensing for Marine and Coastal Environments

Where: Charleston, South Carolina
When: 1-3 May 2000

The 6th International Conference on Remote Sensing for Marine and Coastal Environments will focus both on applying remote sensing and advanced geospatial data and information techniques to solve real-world problems in marine and coastal environments as well as defining future directions and implementation strategies.

For more information, contact:
ERIM/ Marine Conference, PO Box 134008, Ann Arbor, Mi 48113-4008
Tel: 734-994-1200 ext. 3234
Fax: 734-994-5123; E-mail: wallman @erim-int.com ; www.erim-int.com/ CONF/marine/MARINE.html

5th Congress on Marine Sciences (MarCuba 2000)

Where: Havana, Cuba
When: 19-23 June 2000

The National Oceanographic Committee of Cuba will hold the above meeting at the Havana International Conference Center, to bring together scientists and managers in marine sciences, services, and technologies, as well as educators, sociologists, eocnomists, policymakers, and those interested in promoting and integrating marine scientific research to sustainable development. Main topics include integrated coastal zones management, the global ocean observing system (GOOS), and ocean processes and global change. For more information or to submit a paper, please contact Organizing Committee, MarCuba 2000, 5th Marine Sciences Congress, National Oceanographic Committee, Playa Ciudad de La Habana, Cuba, tel: 537-236401; fax 537-249987; email marcuba@ unepnet.inf.cu; ioc.unesco.org/iocweb/ news/external/marcuba2000_e.htm

Recent Publications

Books

Beecroft, S., 1999: **The New Book of El Niño.** (Youth literature) Millbrook Press, 2 Old New Milford Rd., Brookfield, CT 06804; tel: 800-462- 4703. www.neca.com/mall/millbrook/orders.html

Fagan, B.M., 1999: **Floods, Famines, and Emporors: El Niño and the Fate of Civilizations**. Basic Books, Perseus Books Group, 5500 Central Ave., Boulder, CO 80301; Email: westview.orders@perseusbooks.com

Garriss, E.M., 1998: **Troubled Waters: Changing Climate and Its Impact on Society and Investments**. Fraser Publishing Co., PO Box 494, Burlington, VT 05402-9800. www.fraserbooks.com

Glantz, M.H., 1998: **Corrientes de Cambio: El Impacto de "El Niño" sobre el Clima y la Sociedad**. Translation of "Currents of Change" by Rodrigo H. Nunez, published by Servicio Hidrografico y Oceanografico de la Armada de Chile. Limited copies available free of charge. Write to M.H. Glantz, PO Box 3000, Boulder, CO 80307; email glantz@ucar.edu

Ingleton, J. (Ed.), 1999: **Natural Disaster Management**. A presentation to commemorate the International Decade of Natural Disaster Reduction. UK: Tudor Rose Publishers. Fax: 44-116-251-7123; www.ndm.co.uk

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Environmental & Societal Impacts Group
National Center for Atmospheric Research
PO Box 3000
Boulder, CO 80307 USA
Tel: 303-497-8134
Fax: 303-497-8120
Email: jan@ucar.edu

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