Go Data Shopping!
The Asia–Pacific Data–Research Center

More and more data for research on climate variability and change are becoming available. International observation programs like Tropical Ocean Global Atmosphere (TOGA) and World Ocean Circulation Experiment (WOCE), as well as advances in satellite technology, have made this increase in data possible. With the additional new monitoring programs such as Argo and time-series stations the data stream will jump again. The data, though are often difficult to access and surprisingly underused.

To remedy this situation, the IPRC has established the Asia–Pacific Data–Research Center, which plans to provide easy, one-stop shopping for climate data and products to local researchers and collaborators, the national climate research community, and the general public. The center's mission is to increase understanding of climate variability in Asia–Pacific by developing the computational, data-management, and networking infrastructure necessary to make data resources readily accessible and usable by researchers, and by undertaking data-intensive research activities that will both advance knowledge and lead to improvements in data preparation and data products. Thus, with the somewhat unusual combination of data management and research, the center takes an important step in making sure data are put into a format useful for research.

The APDRC has four parts: (1) Data Server System (DSS); (2) data management and archive building; (3) value-added, data-intensive research projects; and (4) coordination and collaboration.

The Data Server System uses a distributed approach, that is, the data can reside in many different institutions, but it is provided in a uniform format. One major significant research feature is that both in-situ and gridded data are provided together with convenient comparisons between the two data sets. For example, the Live Access Server (LAS) has gridded data (see Figure 8) and the EPIC server has in-situ data (see Figure 9). With a few clicks, plots such as these can be yours.

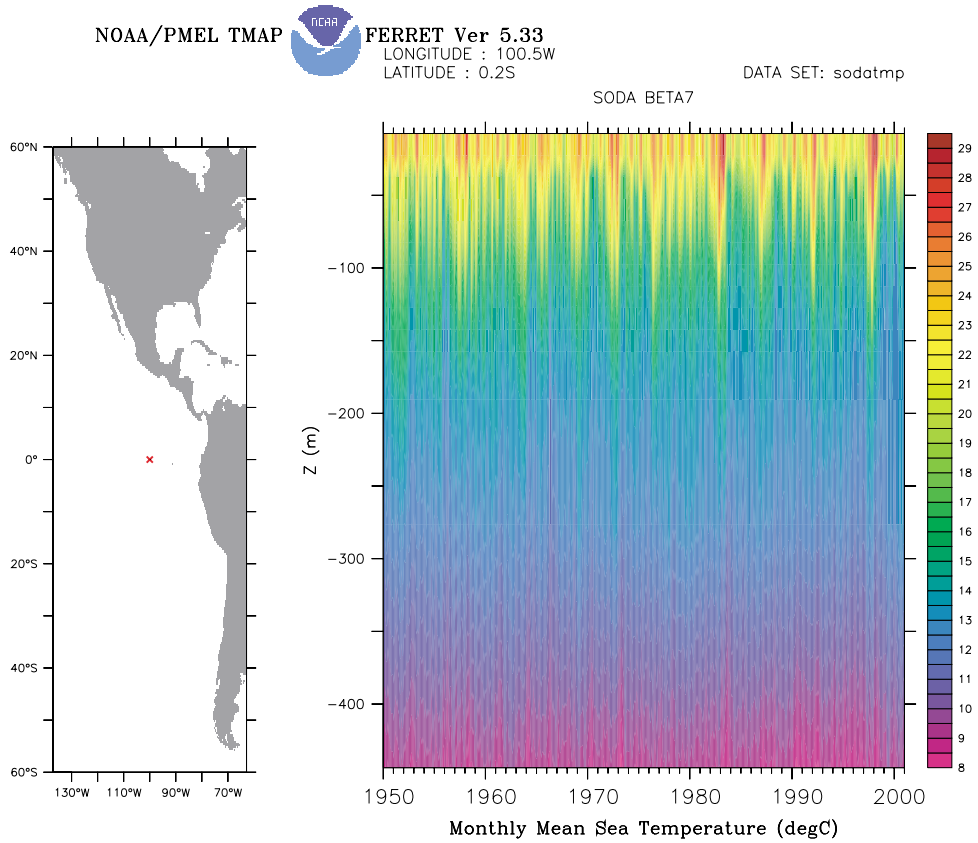


Figure 8. *Depth-time graph of assimilated ocean temperature at 100 W at the equator at point x, showing how the thermocline is deeper during El Niño years. Plotted from SODA: Simple Ocean Data Assimilation, Carton et al. 1999. The data are served by LAS in aggregates of 50 files of yearly data compiled by Catalog/Aggregation Server or CAS.*

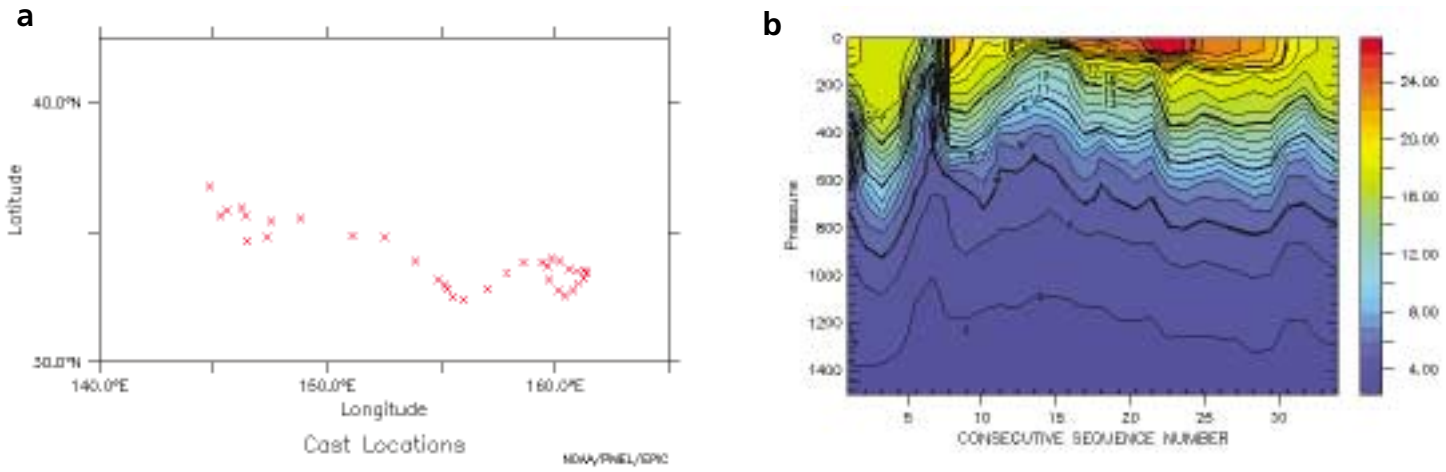
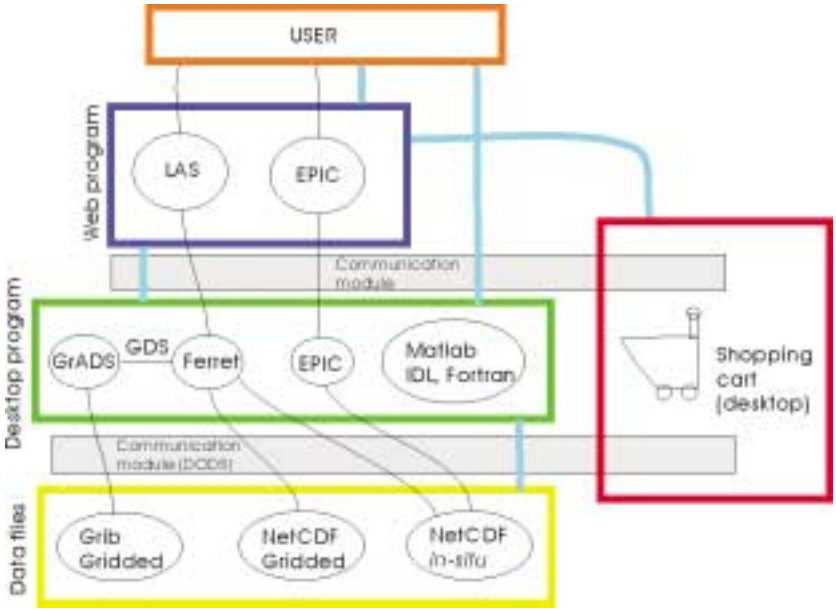


Figure 9. *(a) Trajectory of Argo float no. 29043 selected from 25 Feb. 2001 to 21 Jan. 2002 on the EPIC server. Each x marks the location where the float took measurements. (b) Vertical temperature measurements taken by the float at the 30 measurement points in panel a. Any subset of the measurements taken can be requested for plotting.*

Moreover, you have a choice of software applications. The various levels of the system and the available servers and applications you can already use are shown in Figure 10. There is a shopping cart for your use. This cart, a repository of data location and server information, makes a smooth transition from the servers to your favorite application software. The cart, for example, allows you to view gridded and in-situ data at the same time (Figure 11).



Servers	*Applications*
DODS	JOA
CAS	ncBrowse
LAS	eWoce
EPIC	Matlab
CDP	IDL
GDS	Ferret
	Grads

Figure 10. *A schematic of the APDRC Server System.*

As this issue of *IPRC Climate* goes to press, you can get the following data at APDRC's data archives: On EPIC you can obtain WOCE CTD and some sample Argo data. On LAS, you can obtain Climatologies (COADS and Levitus), CPC merged precipitation analysis, NCEP reanalysis 1 and 2, Atlas SSMI 5-day ocean winds, NASA JPL SeaWinds QuickSCAT (level3), SODA monthly (1950–2001) and TMI SST (1998–2001). If you don't find what you need for your research, let the APDRC scientists know and check back a few months later.

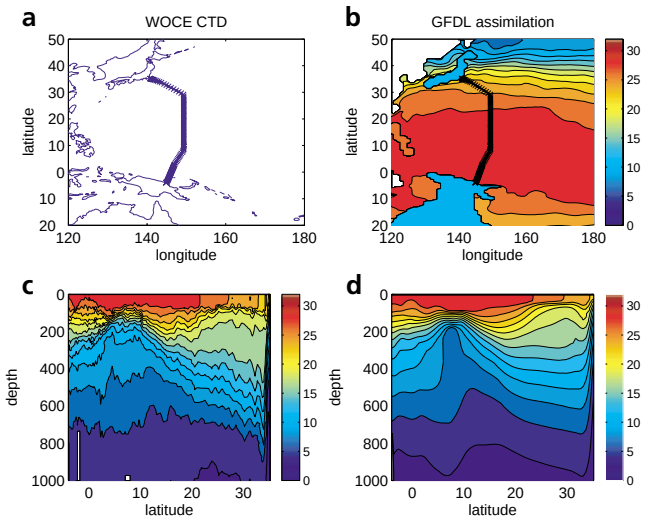


Figure 11. *A demonstration of the shopping cart. The user has requested in Matlab format remote and distributed data sets served by EPIC and LAS. The shopping cart serves as the repository of the DODS URLS selected by the two servers. (a) Location of the CTD casts of WOCE P10 line from October to November 1993. (b) Vertical temperature measurements of these casts. (c) Sea surface height of a GFDL assimilation product for November 1993. (d) Vertical temperatures resulting from an interpolation of the GFDL product at the CTD cast points.*

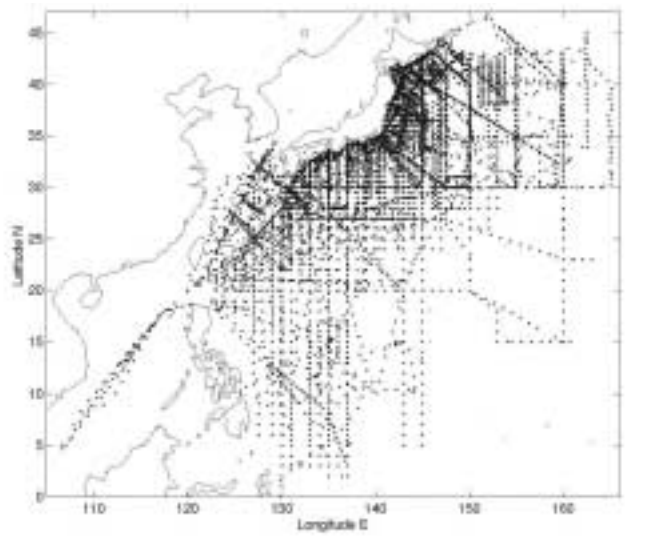


Figure 12. *Locations of 18,742 bottle stations from surveys conducted from 1969 to 1993 by the Far Eastern Research Hydrometeorological Institute in Vladivostok, Russia.*

An example of the value-added research project being undertaken at the APDRC is provided by the data from 20,000 Russian bottle stations south and east of Japan (Figure 12). The data set, which the APDRC has recently acquired through a contract with the Far Eastern Regional Hydrometeorological Research Institute, stems mainly from 48 seasonal 1980–1991 surveys and consists of temperature, salinity, and chemical tracer measurements from the surface to 1500 meters. The set represents data with spatial and temporal resolution not available from any other observational data set and covers the three most recent Kuroshio large-meander events (1981–1984, 1986–1988, and 1989–1991). The IPRC staff is combining this data with 1985–1989 satellite altimetry from the US Navy *Geosat* to describe the evolution of the geostrophic velocity field at various depths without an arbitrary reference level, to evaluate dynamic balances, and to determine the three-dimensional circulation patterns during the formation and decay of the 1986–88 Kuroshio large-meander. These studies will contribute to a better understanding of the dynamics of the deep thermohaline circulation and its interaction with bottom topography and wind-driven currents.

So, if you have an Asia–Pacific climate project, go shopping for data at *http://apdrc.soest.hawaii.edu*, the APDRC website. The APDRC team would like your input. Let them know what works for you and what does not!

The APDRC wishes to acknowledge the Pacific Marine Environmental Laboratory for their programming support and help in installing their software and data into the APDRC server. Members of the APDRC staff are **Peter Hacker**, Manager, Data-Intensive Research Projects, Coordination and Collaboration; **Ronald Merrill**, Computer Systems Manager; **Humio Mitsudera**, Data Archives; **Yingshuo Shen**, Data Server Manager; **Takuji Waseda**, Data Server System; and **Gang Yuan**, Assistant Researcher; **Yongsheng Zhang**, Atmospheric Data Specialist.

News of IPRC Scientists

Julian P. McCreary, IPRC Director, has recently been appointed to the Ocean Studies Board of the National Research Council, one component of The National Academies which comprise also the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The National Academies bring together experts from all scientific, health, and technological fields to address critical national issues and give balanced, unbiased advice to the federal government and the public. They provide science and technical advice in various ways: written reports reflecting the consensus reached by an expert study committee, proceedings from conferences and workshops, "white papers" on policy issues of special interests, symposia, roundtables, lectures, and forums on national issues.

Expert study reports on which the Ocean Studies Board (OSB) has recently participated include *Spills of Emulsified Fuels: Risks and Response*, a report on various petroleum hydrocarbon-based fuels and the ecological consequences of their use; *Transforming Remote Sensing Data into Information and Application*, a discussion of recent changes in remote sensing technology and application, and the implications of these changes; and *Abrupt Climate Change: Inevitable Surprises*, a description of, and research recommendations for, understanding recent climate change. Currently the Board is looking at environmental conditions and ecosystem restoration in Florida, particularly concerning the Everglades.

The various projects of The National Academies are supported by external grants rather than by direct funding from the US government. The committee and board members serve without compensation. The Ocean Studies Board meets three times a year, and the Spring 2003 Board meeting will be hosted by the IPRC and held at the East-West Conference Center.

Masami Nonaka, Frontier Researcher at the IPRC, was awarded the Frontier Research System for Global Change 2001 Outstanding Scientist Award. **Toshio Yamagata** presented him with the award for "having published and in press four scientific papers during 2001. His studies with Shang-Ping Xie (IPRC) on the Hawaiian Wake, (published in the June 15, 2001, issue of *Science)*, have opened a new page in the study of the air–sea interactions in the subtropics." Nonaka's publications deal mainly with the subtropical shallow overturning circulation (subtropical cells) and their decadal variability.

Shang-Ping Xie, Associate Professor of Meteorology and researcher at the International Pacific Research Center, School of Ocean and Earth Science and Technology, has been awarded the prestigious 2002 Medal of the Meteorological Society of Japan, the highest honor awarded by the society to a member for meteorological research. Xie, the first non-Japanese member of the society to be thus honored, received the medal for his "contributions to the understanding of ocean–atmosphere interaction that shapes the tropical climate and its variability." The medal was presented at the Spring Meeting, May 22–24, 2002, in Omiya, Japan.

New Scientific Staff

Saji Hameed joined the IPRC in January 2002 as an assistant researcher from Frontier Research System for Global Change (FRSGC). He began his oceanography studies at Cochin University in India, obtaining a B.Sc. in 1990. He continued his education at the Indian Institute of Science in Bangalore, where he received his M.Sc. and Ph.D. in atmospheric sciences in 1994 and 1997, respectively.

Hameed then moved to Japan and worked as a researcher at FRSGC, where his research focused on documenting the features of the newly identified mode of coupled variability in the tropical Indian Ocean referred to as the Indian Ocean Dipole Mode (IDM, see p. 16). Together with **Toshio Yamagata** and colleagues at FRSGC, he has described the salient features of the spatial structure and temporal evolution of the IDM in SST, surface winds and precipitation.

At the IPRC, Hameed will work in Theme 1, the Indo-Pacific Ocean Climate, and continue to pursue his interest in the climate and environment of the Indian Ocean. Currently he is analyzing the teleconnection patterns that are induced by the IDM and its interference with the teleconnection patterns generated by ENSO. In addition to his work on the atmospheric mechanisms involved in IDM teleconnections, he plans to study the seasonal and intraseasonal structures in equatorial Indian Ocean SST, winds, rain, and ocean currents using satellite and *in-situ* data. He also intends to investigate the environmental impacts of extreme events on coral populations in the region.

Haiming Xu joined the IPRC as a postdoctoral fellow in January 2002. He obtained his B.Sc. and M. Sc. in synoptic dynamic meteorology from the Department of Atmospheric Sciences, Nanjing University, in 1985 and 1988, respectively. He then worked for three years at the Chinese National Marine Environmental Forecast Center as an assistant engineer. Returning again to Nanjing University in 1991, he studied at the Nanjing Institute of Meteorology (NIM), where he completed his Ph.D. dissertation on the circulation features leading to onset of the East-Asian tropical and subtropical summer monsoons and associated mechanisms. Based on his research, he proposed that the Indochina Peninsula is important in establishing and maintaining the South China Sea summer monsoon, while the Indian Peninsula is important for the course of the Asian summer monsoon. This research also revealed a relationship between the Meiyu onset and the North Atlantic Oscillation and SST over the North Atlantic.

Upon earning his Ph.D., Xu worked as an associate professor at NIM, continuing his research on monsoon dynamics, short-term climate change, and air–sea interaction based on climate models and data analysis. He was also an instructor at NIM's Regional Meteorological Training Center of the World Meteorological Organization.

At the IPRC, Xu is working with **Shang-Ping Xie**, **Yuqing Wang**, and **Tim Li** on air–sea–land interaction in the eastern Pacific. Using the IPRC–Regional Climate Model developed by Yuqing Wang and **Omer Sen** (see *IPRC Climate*, Vol.1, Fall), he is studying the effects of the Andes on atmospheric circulation. He intends to develop this regional climate model into an air–sea coupled model to investigate how the presence of the Andes affects the air–sea interaction and thereby the climate in the eastern Pacific.