

a source for unventilated fluid in the western pool region of the classical theory causes this region to fill entirely with ventilated fluid, which is injected into the interior from the surface and carries the dynamic and thermodynamic imprint of the surface conditions. The result is the formation of a deep, vertically homogeneous fluid layer that extends from the surface to the base of the ventilated thermocline in the western pool. This ventilated pool is a natural analog of the observed subtropical mode waters. The pool also has the interesting properties that it determines its own boundaries and affects the dynamical structure of the gyre.

Because of their location adjacent to warm western boundary currents and underneath midlatitude atmospheric storm tracks, and their ability to support deep convection and, in turn, rapidly release large quantities of heat and moisture to the atmosphere, subtropical mode waters play a central role in midlatitude ocean-atmosphere interaction. Our results suggest that it is large-scale ocean dynamics, not the details of local air-sea exchange processes, that are responsible for their existence and control their fundamental structure. If this is true, coupled models that represent these ocean

dynamics accurately will be needed to understand and predict interannual, decadal, and long-term climate variability. Further study should include the assessment and evaluation of this hypothesis and the associated mechanisms using more complete models of subtropical gyre circulation, and observations.—W. K. DEWAR (THE FLORIDA STATE UNIVERSITY), R. M. SAMELSON, AND G. K. VALLIS. "The Ventilated Pool: A Model of Subtropical Mode Water," in the February Journal of Physical Oceanography.

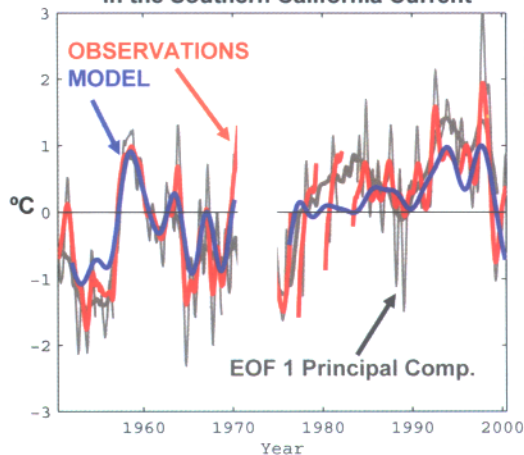
## THE WARMING CALIFORNIA CURRENT SYSTEM

Ocean observations in the California Current System from 1950 to the present show a warming trend in upper ocean temperatures of 1.3°C and a deepening of 18 m in the depth of the mean thermocline. A reconstruction of the coastal ocean dynamics conducted with a high-resolution ocean model reveals that such

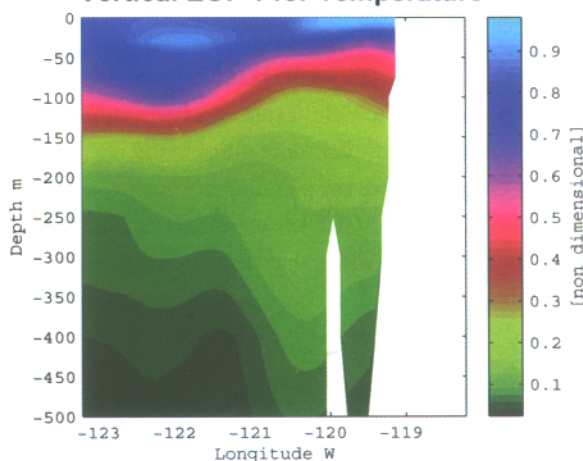
changes are primarily forced by large-scale decadal fluctuations in surface heat fluxes over the northeast Pacific Ocean, combined with horizontal advection by the mean California Current. The temperature variance caused by these decadal changes in heat flux is strong enough to inhibit a clear detection of a global warming signal. Nonetheless, the new study provides important indications of the response that we may expect in the coastal upwelling system in a warming climate.

The ocean model hindcast provides strong evidence that during the upper-ocean warmer conditions from 1950 to 2000, the

## Sea Surface Temperature Anomalies in the Southern California Current



## Vertical EOF 1 for Temperature



(Top panel) Observed sea surface temperature anomalies (red line) from the California Cooperative Fisheries Investigation (CalCOFI) spatially averaged over Southern California. It shows a warming of 1.3°C from 1950 to 2000. The model hindcast (blue line) that best fits this observed record is forced with large-scale heat fluxes and mean advection. (Bottom panel) The warming signal extends coherently in the vertical in the upper 150 m. This is evident from the vertical Empirical Orthogonal Function 1 (EOF 1) of observed temperatures. The time modulation of this EOF 1 pattern is the principal component (gray line, top panel). This also exhibits the same time dependence as the averaged surface signal.



# REQUEST FOR PREPROPOSALS

FOR SCIENTIFIC RESEARCH AT THE  
U.S. DEPARTMENT OF ENERGY'S  
ATMOSPHERIC RADIATION  
MEASUREMENT (ARM)  
CLIMATE RESEARCH FACILITY.



The U.S. Department of Energy welcomes preproposals for FY 2007 campaigns requesting use of any ARM Climate Research Facility: the Southern Great Plains, Tropical Western Pacific, North Slope of Alaska, ARM Mobile Facility, or ARM Unmanned Aerospace Vehicle. **The due date for preproposals is April 29, 2005**, from which a selected number of full proposals will be invited. Preproposals requesting use of the ARM Mobile Facility should include a deployment time of 6-18 months. **The due date for invited full proposals is June 30, 2005.**

Preproposals and proposals should be submitted online through the Field Campaign Form at [www.arm.gov/acrf](http://www.arm.gov/acrf). For more information on field campaigns, see the planning documents on the website. The ACRF has enormous potential to contribute to a wide range of interdisciplinary science in areas such as water cycle, carbon cycle, cloud physics, aerosols, and weather prediction.

source waters of the Southern California coastal upwelling are shallower and therefore less rich in nutrients. This capping effect, forced by heating, suppresses the effects of the observed increase in upwelling-favorable winds, which would be expected to cool the upper ocean and increase nutrient fluxes. This dynamical interplay represents a concrete mechanism for explaining the observed decline in zooplankton, since a lower concentration of nutrients would suppress primary productivity.

Although the increase in upwelling-favorable winds only weakly affects upwelling efficiency, it acts together with

the warming trend to change the stability properties of the currents. Mesoscale eddy variance increases significantly in more recent decades in the model numerical experiments, a result that cannot be determined from observations alone due to limited data. This is potentially an important ingredient toward understanding decadal changes in the ecosystem because the intensity of the mesoscale eddy field affects cross-shore transport and distribution of nutrients and larvae.

Further investigations of the impacts of these physical oceanographic changes on the ecosystem of the California Current System are in progress under a National Science Foundation-funded Long Term Ecological Research site called Nonlinear Transition in the California Current Coastal Pelagic Ecosystem.—EMANUELE DI LORENZO (UNIVERSITY OF CALIFORNIA, SAN DIEGO), ARTHUR J. MILLER, NIKLAS SCHNEIDER, AND JAMES C. MCWILLIAMS. *"The Warming of the California Current System: Dynamics and Ecosystem Implications,"* in the March Journal of Physical Oceanography.

## HOLY WIND FARM!

Authorities in Ireland rejected a proposed wind farm there after pilgrims protested that it would destroy the sanctity of a nearby purgatory. The turbines were to be built on a site overlooking St. Patrick's Purgatory, located on Station Island in Lough Derg, a popular pilgrimage destination for over 1000 years. An estimated 30,000 pilgrims visited the site last year. The Friends of Lough Derg, a group supporting the religious site, said the wind farm would "interfere with [the site's] tranquility both audibly and visibly." Planning Board Inspector Stephen O'Sullivan agreed, saying the farm would "seriously injure the visual setting of Lough Derg in a manner which diminished its cultural heritage value."