despite an apparent increase in alongshore wind stress. A trend towards increasing wind stress and upwelling off California and Peru may be related to the increased atmospheric pressure gradients associated with 20th century warming. However, the relative influences of wind-induced upwelling and ocean-atmosphere heat exchange differ between the regions.

HCS053 - Interannual Variability of the Humboldt Peru/Chile Current System in 1997-98: a Modeling Study Using ROMS.

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Keywords: ENSO, Humboldt, Interannual Variability, Lagrangian Diagnostics, Mesoscale Processes, Numerical Modeling.

The Humboldt Peru/Chile Current System, flowing along the South American West Coast (SAWC) is the most productive eastern boundary current system. It is also the only upwelling region in direct connection with the equatorial ocean. A high resolution regional model (ROMS, 7km) encompassing the whole SAWC and its equatorial surroundings is used to investigate the mean circulation and mesoscale activity with a special focus on near-shore dynamics (i.e., within 300km from the shore). We assess the interannual variability by carrying out a downscaling experiment where boundary conditions are provided by a lower resolution basin-scale model of the Pacific. This framework allows us to investigate how low-frequency equatorial signal affect the SACW through poleward propagation of Kelvin-wave like anomalies. We focus on the 1997/98 El Niño event because it had an unambiguous signature and was well sampled both with in-situ and satellite measurements. The model captures well the strong double-peak signal of this ENSO event and reveals significant changes in the ocean state and dynamics.
We discuss the implication of this Niño event with a focus on near-shore mesoscale activity. In particular, the changes in dispersion, retention and advection are determined with the help of LaGrange diagnostics.

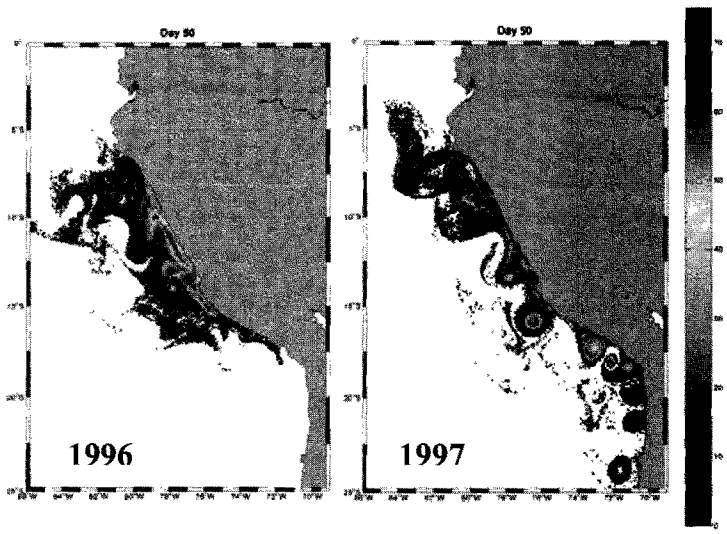

Figure1: 100000 LaGrange particles initially released over the Peruvian shelf and advected by the numerical model during 50 days. Release in May 1996 (left panel) and May 1997 (right panel). Colorscale is for particles concentration (per model grid cell).

HCS092 - Understanding the coupled dynamical/biogeochemical processes at seasonal time scale in the Humboldt Current System: comparison of model results to recent IMARPE data.

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The Humboldt Current System thrives one of the richest ecosystems in the world. Located in an upwelling region where vertical velocity brings nutrient rich waters to the enlighted surface layers, primary productivity is very high and a large amount of organic matter is generated and exported to the deep ocean. In subsurface layers, a zone of suboxic to anoxic waters appears in part due to the local intense remineralisation of organic matter and to the low rate of ventilation. However, the processes that control the spatial and temporal variations of this high productivity are not well known.

In an effort to better understand the biogeochemical cycles and their relation to the Oxygen Minimum Zone in the Humboldt Current System, a biogeochemical data base of recent years (92-2004) from IMARPE, SeaWifs satellite data (Figure 1a) and a coupled physical/biogeochemical model composed of an ocean model ROMS (Penven et al., 05) and a biogeochemical component (PISCES, Aumont et al., 03, Figure 1b) were used.
The database was used to construct a seasonal climatology of surface biogeochemical fields, as well as some specific crosshore sections repeated over the years by IMARPE scientists. The coupled model was run at 1/6° resolution which enables to represent a large part of the eddy activity. The dynamical model is forced by monthly mean climatological surface forcing from quikscat and COADS, and by climatological outputs of the ORCA ½° global model over the period 1992-2000. For the biogeochemical model, WOA conditions for nutrients (Nitrates, Phosphates, Silicates) are imposed at inflow and at initial time.
The following questions were addressed: what are the physical and bio processes controlling the seasonal cycle of surface chlorophyll? What limits phytoplankton growth near shore and offshore in the HCS? What drives the seasonal variations of Oxygen concentration in the OMZ?
In an attempt to answer these questions, available observations and model results are compared in order to identify the model biases and to document the coupled physical/biogeochemical processes at seasonal time scale that are well represented by the model.

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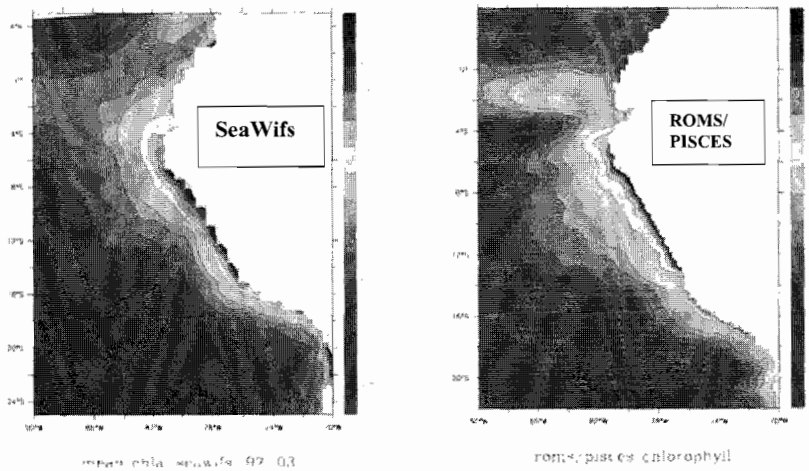

Figure 1. Mean surface chlorophyll (mgC/m3) observed by (a) SeaWifs in 97-03 and produced by (b) the coupled ROMS/PISCES model at 1/6°.

HCS220 - Coupled mechanisms involved in the unusual termination of extreme El Niño events

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Keywords: El Niño, ocean-atmosphere interactions, convection, coupled general circulation models

The extreme 1982-83 and 1997-98 El Niño events both terminated unusually in the eastern Pacific in contrast to other moderate events (e.g. 2002-2003). During these extreme events, sea surface temperature anomalies along the South American coast exceeded 4°C at the winter event peak and lasted well into the following spring. This unusual persistent warming could have important consequences in terms of fisheries but also in terms of climatic impacts on the South American continent. A coupled general circulation model (CGCM; HadOPA) has been shown to reproduce this persistent costal warming during the termination of extreme El Niño events. The coupled processes that control this unusual termination have been explored with this model. In this model, this persistent warming in winter and spring occurs despite a strong eastern Pacific thermocline shallowing and subsurface cooling and is maintained by the disappearance of trade winds from the eastern Pacific in the winter and spring due to the development of an equatorial intertropical convergence zone (ITCZ). This warming only decays when the seasonal march of solar insolation brings back the ITCZ north of the equator in summer. These CGCM results are in agreement with the studies of Vecchi and Harrison (2006) and Vecchi (2006) obtained with forced oceanic and atmospheric models. This persistent warming is also shown to be associated with very strong and

Echevin V., Ledesma J., Aumont O., Flores G., Garcia W. (2006)

Understanding the coupled dynamical/biogeochemical processes at seasonal time scale in the Humboldt current system : comparison of model results to recent IMARPE data

In : *Climate ocean dynamics, ecosystem processes and fisheries : the Humbolt current system : book of extended abstracts*

La Paz (BOL) ; La Paz : IMARPE ; IRD, p. 27-28

International Conference on The Humboldt Current System : Climate, Ocean Dynamics, Ecosystem Processes and Fisheries, Lima (PER), 27/11/2006-01/12/2006.