



Figure 1. Main carbon fluxes during the spring season in the coastal upwelling areas of northern (23° S) and central Chile (36° S). Mean values were integrated for an euphotic layer of 25 and 35 m, respectively. The number in the box represents mean integrated primary production ($\text{mgC m}^{-2} \text{d}^{-1}$). PP: Percentage of primary production removed daily, SP: Percentage of secondary production removed daily.

HCS082 - A satellite study of the oceanic surface circulation in the southeastern Pacific

P.T. Strub¹, R. P. Matano¹, E. D. Palma²

¹College of Oceanic and Atmospheric Sciences, Oregon State University, 104 COAS Administration Building, Corvallis, OR U.S.A. 97331-5503. [tel: 541-737-3015, fax: 541-737-2064, tstrub@coas.oregonstate.edu].

²Dept. de Fisica, Universidad Nacional del Sur, Avda. Alem 53, 8000 Bahía Blanca, Argentina

Keywords: Circulation, Climate & Interannual Variability, Eastern Boundary Currents, Numerical Models

Aspects of the surface circulation of the SE Pacific are described using two primary types of satellite data: sea surface temperature (SST) fields from the Pathfinder (1985-2003) and Reynolds (1982-2005) data sets; and sea surface height (SSH) fields from the JPL along track SLA and the gridded AVISO SSH and velocity data sets (1993-2005). Results from the satellite analyses will be compared with results from a numerical simulation of the circulation (see abstract by Matano et al). If time allows, comparisons to the NE Pacific will also be presented. Seasonal cycles and interannual anomalies will be presented to describe El Niño, La Niña and "neutral" periods. The typical fields include evolving SST and SSH fields; differences between SST at the coast and offshore (an upwelling index); variances of SSH, geostrophic velocity and SST; wavenumber spectra of SSH and SST; etc. At some locations, comparisons to detailed climatologies are possible, for instance off northern Chile, where 30 years of hydrographic data have been analyzed.

HCS109 - Is the nutrient flux into the euphotic zone the driving mechanism of fish abundance in eastern boundary currents?

E. Machu¹, S. Kifani², H. Masski², A. Bertrand³, F. Colas⁴, V. Echevin⁵, M. Gutiérrez⁶ and P. Penven⁷

¹Institut de Recherche pour le Développement (IRD), 2 rue de Tiznit, Casablanca, MOROCCO [e-mail: machu@ird.fr]

²INRH 2 rue Tiznit Casablanca. Morocco

³Institut de Recherche pour le Développement IRD c/o Instituto del Mar del Perú, Esquina Gamarra y Gral. Valle s/n, Apartado 22, Callao, Lima-Perú, tel: +51 1 4297630

⁴UCLA /IGPP Los Angeles CA 90095 USA

⁵IRD/LOCEAN Paris France

⁶IMARPE Esquina Gamarra y General Valle S/N Chucuito Callao Peru

⁷IRD BREST, France

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Upwelling ecosystems are characterized by short food chain length. Apex predators forage on small pelagic fish which feed on plankton which grows on the nutrient rich waters newly brought to the surface by the strong upward nearshore vertical velocity. If bottom up processes control small pelagic fish populations we can expect a rather direct relationships between nutrient supply and fish abundance. Here

we propose a proxy which might reflect fish abundance and test it in different upwelling ecosystems: the Canary, the Benguela and the Humboldt Current systems. In each system the Regional Oceanic Modeling System (ROMS) with an eddy-permitting resolution coupled to a biogeochemical model (Nitrate-Phytoplankton-Zooplankton-Detritus - NPZD) has been run over the last 30 years in order to investigate ecosystem changes at a decadal scale. ROMS is forced by NCEP reanalysis at the surface and SODA at the open boundaries of the regional oceanic domain. The three-dimensional outputs of the ROMS-NPZD model (temperature, salinity, turbulence, food and nutrients) are used to link latitudinal distribution of fish biomass to its environment variability.

HCS105 - Photosynthesis and fish production in the Peruvian upwelling system

Francisco Chavez¹, Ruth Calienes², Georgina Flores², Sonia Sanchez², Patricia Ayon², Luis Vasquez², Miguel Niquen², Renato Guevara²

¹ MBARI, MBARI 7700 Sandholdt Road Moss Landing CA 95039 9644 USA

² Instituto del Mar del Perú IMARPE, Esquina Gamarra y Gral. Valle s/n, Apartado 22, Callao, Lima-Perú
tel: +51 1 4297630

In a seminal paper entitled Photosynthesis and Fish Production in the Sea Ryther (1969) explained why coastal upwelling systems could produce almost half of the world fish catch while comprising only ~1% of the area of the global ocean. While many of the basic concepts from that paper are correct several discoveries and advances have occurred since the paper was published. Here we review those advances together with the details of the oceanographic processes along the coast of Peru which might impact fish production on seasonal, interannual and multi-decadal time scales.

HCS018 - Downward fluxes of particulate organic carbon and carbonate in coastal and oceanic areas off Chile: the contribution of functional groups of the plankton

H. E. González, E. Menschel, R. Vera, M. Marchant, D. Hebbeln, C. Barría, J. L. Iriarte.

Instituto de Biología Marina, Universidad Austral de Chile, Chile, and Center for Oceanographic Research in the Eastern South Pacific (COPAS). UACH, Campus Isla Teja s/n, Valdivia, Chile. (tel: +56-63-221559, fax: +56-63-221455, e-mail: hgonzale@uach.cl)

The contribution of key species and functional groups of the plankton to vertical fluxes of particulate organic carbon (POC) and carbonate (CaCO₃) to the deep sea were studied in sediment trap samples deployed in the oceanic area off Coquimbo, Chile during 1993-1998. The mean C-organic / C-carbonate ratio was 0.09 at 2,300 m depth in the central Humboldt Current System (HCS) off Chile, indicating a potential net export of carbonate to the deep-sea.

The carbonate flux was dominated by foraminifers and secondarily by coccolithophorids, contributing with 55 and 102% of total carbonate flux. The contribution of the carbonate flux to the total carbon flux (POC + carbonate) was 91%. This suggests that the deep-water delivery of biogenic CaCO₃ is the main pathway by which carbon is removed from the upper ocean biosphere in the central HCS off Chile.

The POC flux at 100 m depth was studied by using drifting sediment traps along the central-northern HCS during the period 1997-2005. The POC flux was dominated by diatoms and faecal material of zooplankton during the spring/summer and winter/autumn periods, respectively. Key groups contributing to this flux are chain-forming diatoms of the genera Chaetoceros, Skeletonema and Thalassiosira, and the faecal material produced by euphausiids and appendicularians. During the non-productive period (mean primary production (PP) ~1000 mgC m⁻² d⁻¹), the POC flux was dominated by faecal material and a relatively high proportion (~24%) of the PP was exported below 100 m depth. By contrary, during the productive period (mean PP ~7000 mgC m⁻² d⁻¹), the POC flux was equally composed by faecal material and phytoplankton and a relatively low proportion (~5%) of the PP was exported below 100 m depth.

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HCS121 - Lagrangian description of the connection between Equatorial Pacific and Peruvian current system in a high-resolution numerical model

Montes I.¹, F. Colas⁴, X. Capet⁴, V. Echevin², P. Penven⁵, J. Pasapera³, J. Tam³

¹ Universidad de Concepción. Facultad de Ciencias Naturales y Oceanográficas. Programa de Doctorado en Oceanografía. Barrio Universitario S/N. Cabina 5. Casilla postal 160-C. Concepción, Chile [tel: (56-41) 203493, e-mail: ivonnem@udec.cl]

² IRD/LOCEAN. Paris, France

³ IMARPE. Esquina Gamarra y Gral. Valle s/n, Apartado 22, Callao. Peru

⁴ IGPP/UCLA. California. USA

⁵ IRD -Bretagne, BP 70 Plouzane Bretagne 29280 France

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