

DATP with an extensive high concentration layer at about 2500 m. All sampling was conducted during four oceanographic cruises between March 1999 and October 2000 in the HCS off northern and central-southern Chile. Samples were collected with Niskin bottles and subsequently filtrated; ATP concentrations were measured by the bioluminescence assay. PATP concentrations averaged 28.9 ± 52.0 and 14.9 ± 15.6 ng ATP L⁻¹ off northern and central-southern Chile, respectively. DATP averaged 76.8 ± 97.9 ng ATP L⁻¹ in the northern zone and 42.8 ± 40.2 ng ATP L⁻¹ in the central-south zone. The highest concentrations of vertical PATP distribution were found in superficial strata to approximate depths of 100 m. A second PATP peak was found within the oxygen minimum zone coinciding with the secondary fluorescence peak and the DATP peak. DATP, on the other hand, showed higher variability across the water column and was the dominant ATP fraction in practically all strata. There is a trend to increase the concentration of integrated DATP in deep strata from the coast towards the oceanic zone, especially in the northern zone. A similar coastal-oceanic gradient was observed for PATP concentrations in surface waters of the central-southern zone. When all data from the HCS was analyzed as a whole, associations were observed between PATP and temperature and between DATP and salinity. In the surface stratum association between DATP and PATP were observed in the northern and central-southern zones. High correlations were found between PATP and autotrophic biomass (i.e. Chl - a, fluorescence) in the surface waters of the coastal zone off northern Chile. The Nazca Ridge (ca. 20° S and 80° W), could be playing an important role in determining DATP distribution in deep waters in the northern zone of the HCS. A conceptual model of the main processes involved in the release and removal of DATP in the water column of the HCS is proposed (Figure 1).

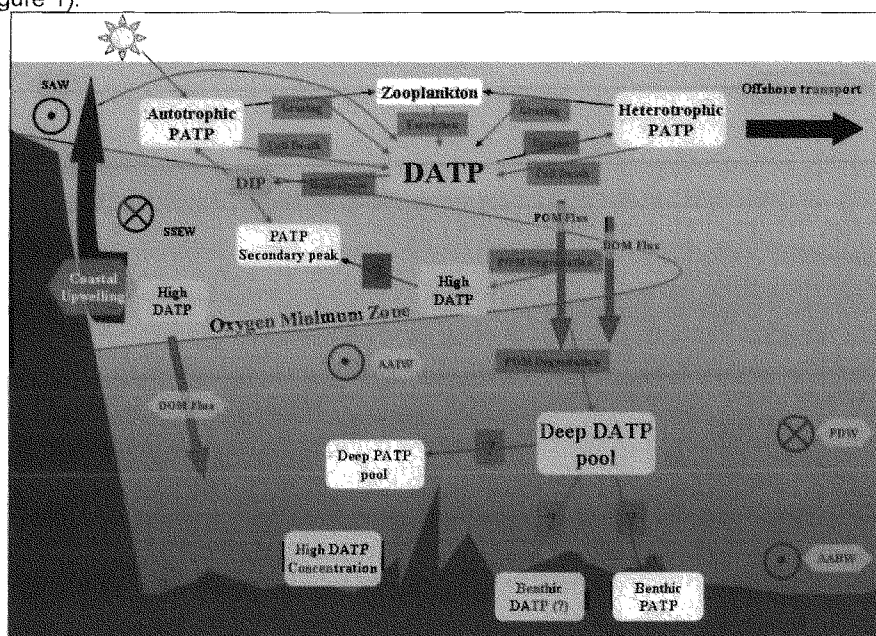


Figure 1. Conceptual diagram of the main processes involved in the release and removal of DATP in the water column of the HCS. Rectangles with rounded corners = standing stocks of compounds and biomass; Rectangles = processes involved in each of the arrows crossing them; Hexagons = physical processes or water masses; Black arrows = physical transport; Blue arrows = output processes; Red arrows = input processes; Green arrows = vertical transport of organic matter; DIP = standing stock of dissolved inorganic phosphorous. Question marks correspond to unknown or poorly quantified processes. For the sake of diagrammatic simplicity, the following DOM removal and release processes are not shown: polymer formation and uptake by metazoan, release by metazoan death, release from pellets or decomposition products from metazoan, and prokaryote lysis due to viral infection. SAW = Sub Antarctic Water; SSW = Subsurface Equatorial Water; AAIW = Antarctic Intermediate Water; PDW = Pacific Deep Water; AABW=Antarctic Bottom Water.

HCS061 - Comparison of the functioning of the first trophic levels of the Benguela and the Canary upwelling system: A modelling study

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In upwelling ecosystems, the food chain is relatively short with small pelagic fish (sardine, anchovy) feeding on plankton. With similar forcing and apparent similar primary production, the fish production (acoustic biomass evaluation) can differ a lot from one upwelling system to the other. The goal of this study is to investigate the role of the first trophic levels in these differences. How does transfer efficiency from autotrophic organisms to small pelagic fish might differ from one upwelling system to the other?

To bring insight towards this particular questioning, we use the Regional Oceanic Modeling System (ROMS) coupled to a biogeochemical model of phytoplankton and zooplankton to compare the functioning of the first trophic levels within two of the major eastern boundary currents, i.e. the Benguela and the Canary Currents. The sensitivity of the distribution and of the production of these oceanic regions has been tested with respect to the boundary conditions, the resolution, the atmospheric forcing as well as to the parameterization of biogeochemical processes. The differences between the two subregions will be discussed with regard to fisheries issues.

HCS077 - On the origin and maintenance of low oxygen waters along the coast of Peru

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The largest area of low oxygen in the world lies under the thermocline in the eastern tropical Pacific. The area of low oxygen extends from Central and northern South America across the eastern tropical Pacific as a tongue to either side of the equator. These tongues are divided by the higher oxygen water of the Equatorial Undercurrent (EUC) that flows eastward, underneath the SEC, on the equator. The oxygen minimum is formed by at least three processes: (1) Lack of ventilation, isolation from the atmosphere, and low oxygen content of source waters. It has been suggested that the meridional overturning circulation controls rate of ventilation of the eastern Pacific oxygen minimum, which is low during interglacial periods as at present. A permanently strong pycnocline and shallow mixed layer further isolate sub-thermocline waters from the atmosphere. Modeling studies suggest that the EUC contributes reduced oxygen source waters to the oxygen minimum because EUC oxygen levels decrease while crossing the Pacific; (2) Long residence time, with cumulative oxygen depletion. The eastern Pacific is an area of generally weak wind and is not penetrated by the subtropical gyres. As a result, residence time is long and oxygen depletion cumulates; (3) Decay of biological production sinking from overlying surface waters, depleting oxygen. In surface waters organic particles are created by photosynthesis, phytoplankton growth and the consumption of phytoplankton by animals. A fraction of these particles sink and decay below the thermocline. Decay depletes oxygen, and in the absence of ventilation, oxygen levels can fall to zero. Here we investigate the role of the EUC in the origin and maintenance of the low oxygen waters along the coast of Peru using observations from a set of cruises in the equatorial Pacific.

HCS083 - Non-linear univariate forecast of anchovy (*Engraulis ringens*) catches in the north area of Chile. A first non-seasonal approach.

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Taking into account the economic importance of the fisheries, it is necessary to know as much as possible about fish populations, which can undergo many changes in response to the commercial fishing. These include changes of abundance, total biomass, size-frequency distributions, age-structure, and spatial distributions. Fisheries science can use a wide set of mathematical and statistical methods for characterise these processes in attempts to understand the dynamics of exploited populations. The underlying assumption is that if we can understand the response of fish populations to different perturbations then we should be able to manage the fisheries according to our chosen objectives.

Forecasting biomass available for a fishery is a very interesting topic, because it plays a central role in management of stocks, preceding decision making (Makridakis et al., 1983). In fisheries management policy the main goal is to establish the fishing effort applicable in a concrete area during a known period keeping the stock replacements. For achievement of this aim, it is necessary to predict uncontrollable events, such as abundance changes. Forecasting of abundance changes is possible if catch past quantitative data are available and if the "assumption of continuity" is considered, that is to say, if some aspects of the past pattern will continue into the future. Apart from methods based on biological principles,

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