are shown. These include the used species specific calibration coefficients (for the 1983-1991 period) and TS-Length relationships (for the 1992-2006 period).
Preliminary results show two processes that co-occur through the 1980 and 1990 decades: (i) the sustained increase of anchovy abundance while sardine, jack mackerel and mackerel declined (Gutiérrez, 2007), and (ii) the increase of giant squid and munida. In terms of distribution and abundance since the last strong El Niño in 1997-98 an almost absolute dominance by anchovy and munida along the coastal ecosystem, and of vinciguerria and giant squid in the open sea, have been observed, while the presence of jack mackerel and mackerel is seasonal, as is the presence of white anchovy and mote sculpin and of demerso-pelagic resources such as catfish and barred sea-robin. Our analysis supports hypotheses suggesting that both decadal changes and composition of plankton communities explain the observed fluctuations in population levels of studied species.

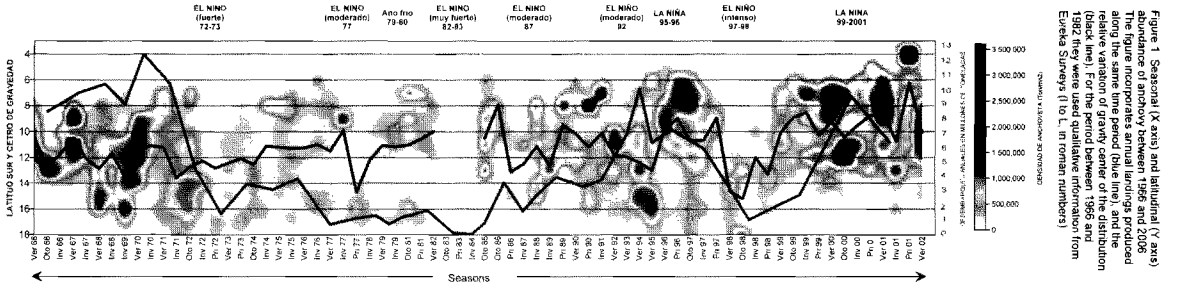

Figure 1. Seasonal (X axis) and latitudinal (Y axis) abundance of anchovy between 1966 and 2006. The figure incorporates annual landings produced along the same time period (blue line), and the relative variation of gravity center of the distribution (black line). For the period between 1966 and 1982, they were used qualitative information from Eureka Surveys (I to L, in roman numbers)

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HCS177 - Dynamic of fish schools and clusters' characteristics over time: description, analysis and comparison for small pelagic fish off Peru from 1996-2003

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When monitored with acoustic devices, the very nature of pelagic fish is probably not well reflected by back-scattering energies integrated over regular space intervals (ESDU) which is however the traditional way of doing. In this case, as integration is performed over the entire water column, fish distribution is considered as a continuous variable in a 2D space and its spatial structure can be described by means of some geostatistical tools. As a summary statistics for such spatial structures, we used the fractal dimension (in the sense of local rugosity) of the 3D surface representing the spatial fish distribution surface areas and generated a time series of this indicator for the 20 acoustics surveys realised off Peru over the past 8 years. Following theoretical concerns (Bruno and Raspa, 1989), we computed the fractal dimension from the order one variogram.
Thanks to still recent technical progress, it is now routine to store acoustic information school by school through a set of variables such as the high and length of the acoustic aggregation, its depth, its shape, its density, and other. In the case of historical data, a visual scrutinising allows extracting similar, even if less precise, information to obtain long time series of information on fish collective structure shape, abundance and distribution. However, the valorisation of that kind of data implies the development of adapted methods. Another objective of the present work is thus to develop and apply summary statistics adapted to this type of information (i.e. marked spatial point processes). School characteristics are available for the four main pelagic commercial species (anchovy (*Engraulis ringens*), sardine (*Sardinops sagax*), jack mackerel (*Trachurus murphyi*) and mackerel (*Scomber japonicus*)), and their summary statistics feed the description and analysis of the impact of environmental changes on fish aggregation behaviour. In particular the compaction of the populations and the synchronic modification of the two main levels of spatial organisation of pelagic fish (the schools and the clusters) are considered.

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