levels. 'Small pelagics' are planktivorous, and are susceptible to changes in species composition, production and biomass that occur in the plankton in response to changing environmental conditions. As a result, the Northern Humboldt Current Ecosystem is highly dynamic – experiencing change on various time scales (seasonal, interannual – ENSO, and decadal). ENSO conditions typically involve an overall decrease in primary production due to upwelling of less nutrient-rich waters as a result of a lowered thermocline. Large diatoms that make up a major portion of the dominant small pelagic – the Peruvian anchovy – decrease in abundance and the anchovy is seen to both retreat to the few remaining productive areas and to consume at higher trophic levels from zooplankton of suitable size. Anchovy biomass was seen to decrease in response to these changes over the past ENSO of 1997-98, yet while its recuperation in the following years was fairly rapid, higher predators dependant on it as a food source have been slower to recover. Dynamic simulations using the trophic modeling program Ecopath with Ecosim, explore forcing between predator/prey trophic connections through the application of vulnerability search routines to time series of changing biomass and fishing pressure. Using these estimates, we explore the importance of fluctuations in lower trophic levels during an ENSO event – specifically, a decrease in large phytoplankton fractions (primarily diatoms) – on small pelagic dynamics. Trophic models described by Tam et al. (this conference) for the periods 1995-96 and 1997-98 provide ecosystem states for before and during an ENSO event by which to measure to simulation's performance.

References

Tam, J., Taylor, M.H., Blaskovic, V., Espinoza, P., Ballón, R. M., Purca, S., Díaz, E., Gutiérrez, D., Quipuzcoa, L., Ayón, P., Sánchez, S., Goya, E. , Argüelles, J., Wolff, M., & Wosnitza-Mendo, C., (this conference). Trophic flows in the Northern Humboldt Current Ecosystem, Part 1: comparing 1995-96 and 1997-98

HCS057 - Comparing internal and external drivers in the southern Benguela and southern Humboldt Upwelling ecosystems

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Trophic models of two upwelling ecosystems, namely the southern Benguela (South African) and southern Humboldt (Chilean), have been fitted to catch and abundance time series. Three drivers were considered during the model fitting: internal forcing by means of the trophic flow controls between the various interacting species groups, and two kinds of external forcing, namely fishing and the environment. The southern Benguela model was fitted to time series data from 1978-2005, and the southern Humboldt model to data from 1970-2004. Fishing has been relatively carefully managed in the southern Benguela during the period modelled and previous studies found that most of the resource variability was attributed to internal forcing and to environmental forcing rather than to fishing. By comparison, fishing has been shown to have played a relatively major role in driving ecosystem changes observed in the southern Humboldt model. Bearing in mind the different roles played by each of the drivers in these ecosystems, two hypotheses were tested. Firstly, flow controls between interacting species groups, which improved the fits of both models, were compared across the two ecosystems to determine to what extent the two models supported the hypothesis that upwelling ecosystems function as wasp-waist systems. Secondly, environmental forcing was examined in an attempt to uncover the processes that may be involved in linking the environment to observed ecosystem dynamics and changes in these two upwelling ecosystems. The hypothesis tested was that although completely different physical drivers and conditions act in each of the ecosystems, the processes whereby these effects are transferred through the ecosystems and manifest themselves as ecosystem changes and observed resource dynamics are essentially similar in both upwelling systems.

HCS-110 - Egg quality and yolk Sac Larval trait variations of the anchoveta *engraulis ringens* along the central and southern zones of the Humboldt Current

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A number of reproductive strategies have been proposed for species living in different environmental conditions. Among them, anchovies have been traditionally shown to have rapid growth rates, young age of maturity, high fecundity associated with the production of abundant but small and energetically cheap eggs, and high mortality rates during the early life stages. However, recent evidence suggests that these

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