
Impact of climate change scenarios on the fish production in the Northern Humboldt Current Ecosystem

Ricardo Oliveros-Ramos*^{†1}, Yunne Shin², Dante Espinoza-Morriberón¹, Carlos Romero¹, and Vincent Echevin³

¹Instituto del Mar del Perú (IMARPE) – Peru

²Institut de Recherche pour le Développement (CRH, IRD) – CRH – Institut de Recherche pour le Développement, CRH, Research Unit MARBEC (UMR 248), avenue Jean Monnet, CS 30171., France

³Institut de Recherche pour le Développement (IRD) – Institut de Recherche pour le Développement – Adresse du siège - Le Sextant 44, bd de Dunkerque, CS 90009 13572 Marseille cedex 02, France

Abstract

The Northern Humboldt Current Ecosystem (NHCE) is the more productive ecosystem in terms of fish and sustains the worlds largest small pelagic fishery, the Peruvian anchoveta fishery. A cooling of this system has been observed during recent decades but the potential regional impacts of rising atmospheric CO₂ concentrations on upwelling dynamics and productivity are still unknown. In this work, we use the ecosystem model OSMOSE to forecast the impact on fish production of several scenarios of climate change in the NHCE. The OSMOSE model is forced by plankton production from ROMS-PISCES, IPSL CM5A-LR and GFDL-ESM2M models for the period 2006-2100. For each model, optimistic (RCP 2.6) and pessimistic (RCP 8.5) environmental scenarios are considered. Total fish production and landings for each model and scenario are compared under statu quo and zero fishing effort for all main fisheries. Our results show that the impact of fishing may be as strong as climate to explain future variability in fish production, reason why the design of management procedures must be an important part of the mitigation of the impacts of climate change in the NHCE.

Keywords: Climate change, Peru, upwelling ecosystem, multi, species models, OSMOSE model

*Speaker

[†]Corresponding author: ricardo.oliveros@gmail.com