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RELATIONSHIPS BETWEEN TUNA CATCH AND VARIABLE FREQUENCY OCEANOGRAPHIC CONDITIONS

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Abstract. Skipjack (*Katsuwunus pelamis*), yellow fin (*Thunnus albacares*) and albacore (*Thunnus alulunga*) tunas landed in the Eastern Pacific Ocean (EPO) countries and Ecuador were correlated to the Indexes Oceanic El Niño (ONI) and Multivariate Enso Index (MEI). The temporal series 1983-2012, and 1977-1999 (warm Pacific Decadal Oscillation, PDO), and 2000 – 2012 (cold PDO) were analyzed. Linear correlation showed that at least 11 % of the total landings were associated with the MEI, with a slightly negative gradient from cold to warm conditions. When non-linear regression (n=6), the R^2 was higher up to 0.304 (MEI, r= 0.551). The correlation shows high spread from -0.5 to +0.5 for both MEI/ONI; the highest landings occurred at 0.34-0.45; both indexes suggested that at extreme values <-1.0 and >1.1 total landings tend to decrease. Landings were associated up to 21.9 % (MEI) in 2000-2012, 1983-1999 rendered lower R^2 (<0.09); i.e., during cold PDO periods there was a higher association between landings and oceanographic conditions. For the non-linear regression (n=6) a R^2 of 0.374 (MEI) and 0.408 (ONI) were registered, for the 2000-2012, a higher R^2 was observed in 1983-1999, 0.443 and 0.711 for MEI and ONI respectively, suggesting that is better to analyze split series (198-1999, 2000-2012) than as a whole (2983-2012), due to noise produced by the transition from hot to cold PDOs. The highest landings were in the range -0.2 to 0.5 for MEI/ONI. The linear regression of skipjack landings in Ecuador gave an R^2 of 0.140 (MEI) and 0.066 (ONI) and the non-linear were 0.440 and 0.183 respectively. Total landings in the EPO associated to oceanographic could be used somehow as predictors of the high El Niño o La Niña. In a longer scale of time, the Pacific Interdecadal Oscillation also plays a role, suggesting that during cool period (2000-2030) there should be more tuna biomass in the water column, whilst in a warm period availability and biomass should be less.

Key words. El Niño, La Niña, PDO, tuna landings, skipjack (*Katsuwunus pelamis*), yellow fin (*Thunnus albacares*), catch effort.

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