



## **The impact of climate variability on the production of Black Sea anchovy: a modeling study**

Ceren Guraslan, Bettina A. Fach, Temel I. Oguz, and Baris Salihoglu

Middle East Technical University, Institute of Marine Sciences, Physical Oceanography, Mersin, Turkey  
(ceren@ims.metu.edu.tr)

The influence of climate variability on anchovy eggs and larvae production and the interaction with gelatinous zooplankton in the Black Sea is studied with a one-dimensional, lower trophic level and anchovy bioenergetics model including parameterizations for a gelatinous predator. Stochastic climate variability in the form of fifty-year interannual temperature and nutrient entrainment rate variability is used to simulate how climate-mediated effects cascade across trophic levels and how the anchovy population production responds to such disturbances. Model results reveal a high correlation of egg production and recruitment success in response to changes in temperature and nutrient entrainment rates and complex and highly nonlinear interactions between anchovy and gelatinous populations. Moreover, it is indicated in the results that temperature variation has strong long-term effects on anchovy population production and its signal propagates through successive adult year classes. Although, temperature has a direct effect on anchovy egg and larvae production via influencing mortality rates, it indirectly influences anchovy production by modulating the mixed layer depth, which affects phytoplankton blooms and zooplankton availability, the major food source of anchovy.