EVALUATING POTENTIAL PRODUCTIVITY OF THE CANARY CURRENT UPWELLING SYSTEM

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Biological productivity in coastal upwelling regimes such as the Canary Current depends upon both physical forcing, which dictates the availability of new nutrients and advective export, and the size structure of the planktonic population, which controls the carbon pathways, including transfer to upper trophic levels. This study uses historical in situ (hydrographic and nutrients) as well as remotely-sensed observations (wind, sea-surface temperature, and phytoplankton pigments) to understand the controlling factors of biological productivity of this region. Variability in wind forcing and in the nutrient content of upwelling source water are evaluated on seasonal and event time scales. These observations are integrated into a numerical model to evaluate the relative impact of the forcing functions. Primary production estimates based on observations of pigment from the Coastal Zone Color Scanner (CZCS) or the Sea-viewing Wide Field of View Sensor (SeaWiFS) indicate that the Canary Current region is the most productive of the four eastern boundary current regions. However, in situ measurements and fish catch are lower than in the Peru or Benguela Currents. This apparent contradiction is addressed by evaluating the effect of community size composition with a planktonic ecosystem model.