

SCCWRP Annual Report 2005-06

Island wakes in the Southern California Bight

Rui M.A. Caldeira¹, Patrick Marchesiello², Nikolay P. Nezlin, Paul M. DiGiacomo³ and James C. McWilliams²

¹University of California, Marine Science Center, Los Angeles, CA

²University of California, IGPP, Los Angeles, CA

³California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA

ABSTRACT

In this study, we investigated wind-induced and current-induced island wakes, using a multi-platform approach of *in situ*, remote sensing, and numerical model simulations for the Southern California Bight (SCB). Island wind wakes are a result of sheltering from the wind, with weak wind mixing, strong heat storage, and consequent high sea surface temperature (SST). Wind wakes around Santa Catalina Island are most persistent during spring and summer months. Current wakes, caused by the disruption of the poleward traveling California Counter Current, induce eddies to form off the north end of Santa Catalina Island and these move poleward every nine to twelve days. Current wake eddies induce strong mixing, with low SST and high-density sea surface signatures, whereas wind wakes induce high sea surface temperature signatures associated with the formation of a well-defined shallow thermocline. Current wake eddies vary from 1 - 30 km in diameter. From numerical solutions we predicted the frequency of occurrence of current induced wakes, off Santa Catalina Island. Wind wakes were also observed off all the other islands of the SCB as seen from the analysis of Synthetic Aperture Radar data. Time-series analysis of the island-mass-effect phenomenon has shown a concurrence of low SST and high sea surface chlorophyll for Santa Catalina, San Nicholas, and San Clemente Islands that might be related to the seasonality of the California Current and California Counter Current. Future oceanographic research in the SCB should not ignore the occurrence of wind-and current-induced island features, because they may be important in the transport and/or retention of nutrients, pollutants and plankton.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2005_06AnnualReport/AR0506_227-246.pdf