

## **A Story of Decoupling: A Synthesis of Export Processes in the California Current Ecosystem**

THOMAS B KELLY<sup>1,2,\*</sup>, MATI KAHRU<sup>3</sup>, SVEN KRANZ<sup>1</sup>,  
RALF GEORICKE<sup>3</sup>, MICHAEL R STUKEL<sup>1,2</sup>

<sup>1</sup>Earth, Ocean & Atmospheric Sciences, Florida State  
University, Tallahassee, FL

<sup>2</sup>Center for Ocean and Atmospheric Prediction Studies,  
Florida State University, Tallahassee, FL

<sup>3</sup>Integrative Oceanography Division, Scripps Institute of  
Oceanography, La Jolla, CA

(\*correspondance: tbk14@fsu.edu)

In this project we analyze the decoupling of new and export production throughout the California Current region. While most traditional approaches have either integrated over sufficient spatial scales or explicitly assumed coupling between new production and export, this model explores the individual processes by which particles are removed from the euphotic zone. Data for this project includes direct observations of particle flux, geochemical proxy data for new and export production, and hydrodynamical modeling. Export mechanisms, broadly categorized, include gravitationally mediated settling, mixing across gradients, and subduction of water parcels. Our study includes all three mechanisms with attention paid to the relative strength of each, since the remineralization length scale is directly dependent upon the export mechanism.

Previous research has found that subduction may be responsible for 20-40% of export in the California Current Ecosystem[1] as well as strong evidence of spatial-temporal decoupling of export from NPP[2]. This study links these two results by directly modeling the fate of new production over seasonal time scales. The observed strong nonlinear relationship between depth horizon and residence time requires synoptic modeling of export processes to determine the long term fate of atmospheric carbon in the world's oceans.

[1] Stukel, M. R., Song, H., Goericke, R., & Miller, A. J. (2017). The role of subduction and gravitational sinking in particle export, carbon sequestration, and the remineralization length scale in the California Current Ecosystem. *Limnology and Oceanography*.

[2] Kelly, T.B., Goericke, R., Kahru, M., Song, H., & Stukel, M.R. (submitted). CCEII: Spatial and interannual variability in export efficiency and the biological pump in an eastern boundary current upwelling system with substantial lateral advection. DSR I.