



**“IRON SUPPLY AND DEMAND IN AN ANTARCTIC SHELF ECOSYSTEM:
RESULTS FROM THE PRISM PROJECT”**

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Monday, November 11, 2013

3:30 PM

Room 1202, Engineering and Computational Sciences Building

Abstract

With an annual primary production of $\sim 20 \text{ Tg C yr}^{-1}$, the Ross Sea continental shelf sustains a rich marine ecosystem and provides a significant regional sink for atmospheric carbon dioxide. Most of this production occurs during the October-March period, within a polynya that opens to a maximum area of $\sim 400,000 \text{ km}^2$. During this short growing season, surface macronutrient concentrations remain relatively high, and availability of dissolved iron (dFe), which can be drawn down to low concentrations ($\sim 0.1 \text{ nM}$) by mid-November, is thought to exert the major control on phytoplankton growth. Here we combine new data on the distribution of dFe throughout the water column, high-resolution model simulations of ice melt and regional circulation, and satellite-based estimates of primary production to quantify iron supply and demand over the Ross Sea continental shelf. Our analysis suggests that the largest sources of dFe to the euphotic zone are wintertime mixing and melting sea ice, with a lesser input from intrusions of Circumpolar Deep Water (CDW), and a small amount from melting glacial ice. Together these sources are in approximate balance with the biological dFe demand inferred from satellite-based productivity algorithms, although both supply and demand estimates have large uncertainties.

Biography

Dr. Dennis McGillicuddy earned a B.A. in Engineering Sciences, a M.S. in Applied Physics, and a Ph.D. in Earth and Planetary Sciences, all from Harvard University. He is a senior scientist at the Woods Hole Oceanographic Institution. Dr. McGillicuddy's research interests include physical-biological interactions in the open ocean and coastal margins, mesoscale dynamics, biogeochemical cycling, zooplankton population dynamics, harmful algal blooms, larval transport, and numerical modeling.

Reception before seminar at 3:00 PM