



Revisiting "Nutrient Trapping" in global coupled biogeochemical Ocean Circulation Models: Cause and remedy.

Heiner Dietze (1), Julia Getzlaff (1), Ulrike Löptien (1,2)

(1) GEOMAR, Kiel, Germany (hdietze@geomar.de), (2) SMHI, Norrköping, Sweden

The eastern equatorial Pacific puts our understanding of the interactions between atmosphere, ocean, and pelagic biogeochemical cycling, as expressed in numerical models, to the test. Among notorious and persistent problems are a spurious double-split ITCZ and a deficient representation of the "cold-tongue". Maybe less prominent is the problem of nutrient accumulation at depth, dubbed "nutrient trapping" by Najjar (1992).

In contrast to previous work we argue that "nutrient trapping" is also a persistent problem that has an oxygen counterpart which retards model-based estimates of denitrification. A fishing exercise (i.e. an analysis of more than 70 model simulations), carried out to isolate the cause of the problem, indicates that a deficient representation of the equatorial Intermediate Current System (EICS) is associated with the problem, rather than a deficient representation of the Equatorial Undercurrent as previously thought. Further, we present a parameterization that mimics the effect of the (unresolved) EICS in an Earth System Climate Model and discuss its effect on anticipated changes of denitrification in a warming climate.