Geophysical Research Abstracts, Vol. 8, 01344, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01344

What impact does spatial heterogeneity have on the dynamics of the marine ecosystem?

K. Richards

IPRC, University of Hawaii (Contact email: rkelvin@hawaii.edu)

Marine biota live in a turbulent environment producing spatial heterogeneity in populations. But does this heterogeneity, or patchiness, impact on the overall dynamics of the system? And if so, how do we include the effect of unresolved scales in models used to study the behaviour of the system on broader scales? Here we address the issue by application of a simple model of primary and secondary production designed to capture some of the more fundamental aspects of the impact of fluid stirring and mixing on the interaction between species. Particular attention is put to the rate of increase of the growth rate of phytoplankton and the conditions under which the system *blooms*. Fluid stirring and mixing of heterogeneous populations can under certain conditions produce large scale blooms whilst the homogeneous counterpart does not. In other cases when the homogeneous system blooms, stirring and mixing can initiate the bloom one or two months earlier. In both cases a good fit to the behaviour of the full system can be obtained by "retuning" the homogeneous model. The goodness-of-fit is most sensitive to the assimilation efficiency of the zooplankton. Stirring and mixing effectively *slows down* the zooplankton population. Ways of relating this slowing down to the characteristics of the turbulent motions will be discussed.