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## Inpact of spatio-temporal variability of nutrient fluxes on primary productivity in the ocean.

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We investigate the dependence of primary productivity in the ocean on the spatial and temporal variability of the nutrient flux and the functional form used to parameterize it. We show that primary productivity is significantly affected by the form of the nutrient flux. For restoring nutrient flux, used to parameterize nutrient input by upwelling, primary productivity strongly depends on the size and/or temporal duration of upwelling events. We also show that High-Nutrient Low-Chlorophyll (HNLC) regions can easily appear when the nutrient input is in the fixed-flux form, without necessarily implying the lack of some micronutrient. We believe these results can have interesting implications for the interpretation of primary productivity estimates from observational data and ocean circulation models, and we suggest a way to obtain upper and lower bounds to primary productivity in coarse-resolution models.