



High resolution hybrid coupled modeling in the tropical Pacific

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Climate models still suffer from difficulties in simulating the tropical Pacific concerning both, mean state and variability. Thus, new areas of research are developed to reduce the model biases. One idea is to include phytoplankton concentrations and the corresponding changes in the solar absorption scheme to the ocean models which leads to considerable changes in the upper ocean heat budget. However, most investigations done so far use rather simplified and low resolution models which lead to different results concerning the nature of the response while a clear effect is visible in most models. Thus, the effect of the phytoplankton apart from the first order effect is not entirely clear yet.

In the present study, the influence of a biological component on an eddy-resolving ocean model (FLAME) is tested. Beside an experiment with a full ecosystem model an experiment with phytoplankton concentration held constant in time is performed. Both experiments show substantial changes compared to the experiment with no phytoplankton included. Remarkably, the long-term response differs clearly from the first order effect which consists mainly of a redistribution of heat in the upper ocean layer.