

Responses of marine ecosystem to typhoon passages in the western subtropical North Pacific

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Strong phytoplankton blooms are occasionally observed around a recurvature point of typhoon tracks in the western subtropical Pacific. These are noteworthy events in subtropical regions where both nutrient concentrations and biological production are persistently low. We investigated the response of phytoplankton to typhoon passage using a numerical model with/without biogeochemical processes. The model reproduced the observed patch-like phytoplankton bloom around a recurvature point of Typhoon Keith in 1997. The strong bloom is caused by the typhoon-centered upwelling of nutrient-rich water from below the euphotic layer, which supplies the nutrients required for phytoplankton growth, resulting in higher chlorophyll-a concentrations. Biogeochemical processes then play essential roles in determining the response after the passage of typhoons in subtropical regions.

Keywords: typhoon, marine ecosystem model, phytoplankton