

Particulate organic carbon fluxes of the upper ocean response to typhoons in the northern South China Sea

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Remote sensing of chlorophyll *a* (Chl) has revealed evidence of phytoplankton blooms evoked by typhoons in the tropical and subtropical ocean but it is difficult to assess if the particulate organic carbon (POC) fixed by marine phytoplankton can be downward exported into deep waters. Recent sea-going observations have shown increment in primary production, Chl and POC flux associated with the post-typhoons over the shallow waters (< 200 m) of the continental shelf. However, it is still unclear whether typhoons, which originate beyond the continental margin, can transfer the newly fixed carbon to deeper waters. Here we report POC fluxes and other biogeochemical data in the northern South China Sea (NSCS) before and shortly after the passage of typhoons, between September 2012 and June 2014. POC fluxes after the passage of typhoons *Tembin* and *Soulik* were 78 ± 12 and 115 ± 16 mg-C m⁻² d⁻¹ (average ± 1 standard deviation), i.e. 1.6 and 2.4 times higher than those obtained before the typhoon ($42 \sim 73$ mg-C m⁻² d⁻¹). In addition, variations in both surface and depth-integrated Chl were decoupled from POC fluxes. This decoupling may be resulted from a change in the plankton community composition due to water column instability or to lateral inputs of particulate matter released from shelf or slope sediments. Overall, our analysis of this two-year dataset highlights the spatial and temporal variability of the factors controlling POC exports to the deep NSCS.

Keywords: typhoon, carbon flux, northern South China Sea