



Tracing floating green algae blooms in the Yellow Sea and the East China Sea using Lagrangian transport simulations

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Lagrangian particle tracking experiments were conducted to understand the pathway of the floating green algae patches observed in the Yellow Sea (YS) and East China Sea (ECS) in summer 2011. The numerical simulation results indicated that dominant southerly winds during June and July 2011 were related to offshore movement of the floating green algae, especially their eastward extension in the YS/ECS. An infrequent and unusual event occurred in June 2011: a severe Tropical Storm MEARI, caused the green algae to detach from the coast and initiated movement to the east. After the typhoon event, sea surface temperature recovered rapidly enough to grow the floating green algae, and wind and local current controlled the movement of the massive floating algae patches (coastal accumulation or offshore advection in the area). Analysis of the floating green algae movement using satellite images during passage of Typhoon MAON in July 2011 revealed that the floating green algae patches were significantly controlled by both ocean currents and enhanced winds. These findings suggest that the floating green algae bloom off Qingdao, China and in the middle of the YS and ECS in the summer of 2011 occurred due to the combined effects of recent rapid expansion of seaweed aquaculture, strong winds, and the wind patterns in blooming regions. Our combined approach, using satellite data and numerical simulations, provides a robust estimate for tracing and monitoring changes in green algae blooms on a regional scale.