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Interannual variability of global phytoplankton dynamics in response to atmospheric forcing based on ocean color satellite data

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Satellite-derived ocean color data improved substantially our understanding of phytoplankton biomass and primary production distributions within the world's oceans. We have examined the year-to-year variability of timing, intensity, and spatial distribution of surface phytoplankton using satellite-derived chlorophyll a concentration (Chl) over fourteen years (1998-2011). We have documented significant variability in onset, temporal evolution, and intensity of phytoplankton blooms. This interannual variability is to a large degree controlled by local weather, as indicated by the analysis of coincident meteorological data. The atmospheric forcing was parameterized in terms of the generation rate of turbulent kinetic energy (TKERT) supplied from the atmosphere to the ocean. The correlations of Chl with net heat flux, wind energy, and TKERT depend strongly on geographical location and time of the year.