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Within-day and between-day chlorophyll a dynamics during summer in Guanting Reservoir, Beijing, China

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Recognizing intra- and inter-daily dynamics of Chlorophyll a (Chl-a) and its related environmental variables in consecutive days play an important role in assessing and managing water quality and eutrophication. In this study, the water temperature, nutrients, Chl-a concentration and meteorological factors were collected at six sampling times in Guanting reservoir during summer. Chl-a concentration generally decreased from last May to primary September. At both test times, thermal stratification and mixing in the water column controlled the variation of maximum Chl-a concentration layer at both temporal and vertical scale. The position of the maximum Chl-a concentration layer between days generally followed the same dynamics as thermocline. Daily stratifications were temporary and maximum Chl-a concentration layer varies downwelling by wind driven; hence, the vertical distribution of Chl-a concentration was homogenized at night. Surface Chl-a concentration decreased during the day and increased at night, except on rainy days. The results of Person correlations and principal component analysis indicated that raw surface and daily average Chl-a concentration generally changed as a negative function of solar radiation, wind speed, water temperature and air temperature. However, when a five hour time lag is considered, the relationship between surface Chl-a concentration, water temperature and all meteorological factors became significantly positive.