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CO2 flux over the Lake Kasumigaura and factors influencing its variation: a preliminaly analysis of 5-year observation

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In this research, CO2 flux over the Lake Kasumigaura was measured mainly with eddy correlation method at the center observatory from June in 2007 to November in 2012 for five years. It was found that CO2 flux of hourly time scale changed in the range of about -0.5˜0.5 mg/m2/s.Absorption and release of CO2 occurred alternatively,and both processes occurred both in the daytime and the night. Comparison with previous studies indicated that the CO2 flux over a unit area over the Lake Kasumigaura was slightly smaller than that of a forest, and larger than that of a prairie,and several orders of magnitude larger than that of the ocean. With regards CO2 flux changes on seasonally time scale, it was found that the amount of daily CO2 release differed greatly in the range of about -10˜10 g/m2/day. The amount of the 10-day average CO2 release changed in the range of about -6˜2 g/m2/day regardless of the season through the whole period. However,negative flux was dominant in most of the time. A change of the dissolved CO2 levels Cw of the lake was found to be a factor of CO2 flux change on seasonally time scale. There are an internal factors and an external factors that affect Cw values. Cw change cannot be attributed to a single factor, but various factors work simultaneously and intricately.

Keywords: eddy correlation method, Lake Kasumigaura, CO2 flux, photosynthesis, phytoplankton