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Carbon dioxide fluxes from a reed (Phragmites australis) wetland during the growing season in the Yellow River Delta, China

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Wetlands are among the world's most productive ecosystems and could play an important role in the global carbon cycle. However, quantitative estimates of CO2 fluxes on these extensive ecosystems are not available. Using the eddy covariance technique, the carbon fluxes in the growing season (May to October) of 2010 were measured over a reed (Phragmites australis) wetland in the Yellow River Delta, China.

The results showed that the averaged diurnal variation of CO2 flux showed a single peaked pattern in the growing season. The daily CO2 flux showed a seasonal variation with a maximum uptake rate of -15.77 mg•CO2•m-2•s-1 on July 11 and with a maximum release rate of 3.28 mg•CO2•m-2•s-1 on May 2. The daily mean CO2 absorption rate of the ecosystem was -1.03, -7.00, -10.75, -7.70, -3.36 and -0.86 g•CO2•m-2 in May, June, July, August, September and October, respectively. Our results showed that the reed wetland in Yellow river Delta was a potential sink for CO2.The estimated total absorption of CO2 during whole growing season in 2010 was -941.42 g•CO2•m-2. Further monitoring, we found that the Ecosystem respiration (RE) and Net ecosystem exchange (NEE) were all correlated with some meteorological factors. RE can be well described by an exponential function of soil temperature at a depth of 5 cm, and daytime NEE values during the growing season were closely related to photosynthetically active radiation (PAR).