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Seasonal variability of turbulent fluxes over a vegetated subtropical coastal wetland measured by large aperture scintillometry and eddy covariance

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Subtropical coastal wetlands are particularly susceptible to the impacts of climate variability: their recharge rates strongly depend on rainfall, and the occurrence of prolonged droughts or wet periods have direct consequences for wetland health and bio-diversity. There is therefore a need to close the water budget of these ecosystems and this requires the quantification of rates of evaporation/evapotranspiration. However, few studies have documented land-atmosphere exchanges over wetlands for which water level varies considerably during a typical annual cycle.

Here, we present a year of turbulent flux observations over a wetland on the subtropical coast of eastern Australia. Large Aperture Scintillometry and Eddy Covariance are used to derive sensible heat fluxes. Latent heat fluxes are also derived through an energy balance for both instruments' observations and also directly through Eddy Covariance. Careful sensitivity analysis of the instrumental footprints, seasonal variations of land surface parameters such as roughness length and displacement height are examined and subsequent uncertainties in the derived turbulent fluxes are discussed. Finally we show how these observations can also help better understand hydrological processes at the catchment scale.