

Bulk coefficients over a water surface under calm wind condition: an influence of large-scale atmospheric circulation?

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Over the Lake Kasumigaura, 10 Hz fluxes data have been obtained since June of 2007, and characteristics of the bulk transfer coefficients of momentum C_{dn} and of water vapor and heat have been studied with emphasis on the possible influence of the large-scale convection to surface fluxes. Increase of C_{dn} when mean wind speed u becomes smaller in the range of $u < 4$ m/s was found. By applying the cospectral and ogive analyses, a possible cause of this increase was the influence of convective circulation, as manifested by the mismatch of characteristic time scale of the flux (2nd moment) and mean wind speed (1st moment). Possible solutions to this the mismatch of time scale under weak wind speed was studied which include adaptation of the effective wind speed U_e instead of the traditional vector-averaged mean wind speed. However, complete solution is not likely available since this problem arises from ill-defined nature of C_{dn} under light wind condition.

Keywords: Lake Kasumigaura, Bulk coefficients, ogive, large-scale convection, fluxes