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Landscape-Scale Heat Flux Measurements Using Scintillometry Over Complex Terrain

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Abstract

Landscape scale measurements (of the order of 2 Km²) of sensible and latent heat fluxes are required for hydrological and meteorological modeling. Evaporation is strongly dependent on land surface properties, particularly the type of vegetation cover and the aerodynamic roughness; thus aggregating field-scale measurements has much uncertainty because of the need for detailed land-cover maps and the possible disproportionate contribution of hedgerows and other patches of mixed vegetation; in any case, such a collection of field-scale instruments is a highly resource intensive approach. A potentially better alternative is reported here: long-path (large aperture) scintillometry has been used over topographically complex chalk downland with mixed vegetation, to measure sensible heat fluxes at the landscape scale. In combination with a new 94 GHz scintillometer the latent heat flux has been calculated using the two wavelength method. Comparison is made with in-field eddy correlation measurements, and the success of applying this method is discussed.