

Determination of Surface Fluxes Using a Bowen Ratio System

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Abstract

Components of the surface fluxes of the energy balance equation were determined using a Campbell Bowen ratio system. The fluxes are obtained by the energy balance Bowen ratio technique, a gradient method that uses vertical gradients of temperature and vapour pressure in combination with point measurements of net radiation and soil heat flow from two sets of soil sensors. The Bowen ratio was measured as the ratio of air temperature and vapour pressure gradients between two fixed heights within 6 m of the surface. Net radiation (R_n) was measured using net radiometers. Soil heat flux (Q_g) was measured with ground heat flux plates and the change in energy storage of the layer of soil above the heat flux plates was computed using direct measurements of soil temperature and moisture content. Measurements made every 20 min are stored in the Campbell data logger. Results show most of the net radiation is converted to latent heat when there are more water available for evaporation. Estimates of sensible and latent heat flux have an accuracy of $\pm 10\%$ of the measured value.