



Estimating surface heat fluxes from remote sensing, process models and regional climate simulations

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Accurate estimation of surface heat fluxes is of considerable interest to meteorological, climatological and agricultural investigations as they identify the key physical processes that link the land surface with the atmosphere. While characterising surface fluxes is critical in describing the partitioning of water and energy across Earth's terrestrial surfaces, accurately monitoring the spatial variation, particularly at daily and sub-daily temporal scales, is notoriously difficult. Spatial and temporal scaling issues, errors in forcing variables, heterogeneity in surface characteristics and simplifications in process understanding, all limit the capacity to accurately monitor flux development and variability. To examine the performance of different techniques for estimating latent heat flux requires the development of a common forcing dataset. Here, output from multi-annual simulations of the Weather Research and Forecasting (WRF) model developed over Australia's Murray Darling Basin (MDB) are used as the principal forcing data with which to drive a number of common flux estimation approaches. In assuming consistency in forcing data across the techniques, an assessment of the retrievals can be undertaken. Common 'combination' type approaches such as the Penman-Monteith formulation are considered alongside surface energy balance retrievals and coupled regional climate model output to examine the variation and consistency within these different estimation approaches. Remote sensing retrievals are also employed to identify issues of spatial and temporal variation.