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Spatial modelling of understorey evapotranspiration based on the maximum entropy production method

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Abstract: Understorey vegetation of woodlands and forests forms an important part of ecosystems. Its water consumption is generally considered smaller than that of the upper-level vegetation. Nevertheless, it is crucial to quantify the understorey evapotranspiration (ET) for water balance studies that inform water resources management. In this research we employ the maximum entropy production (MEP) ET method and develop algorithms for spatial modelling of understorey ET. The MEP ET method partitions net radiation (Rn) into sensible, latent (ET), and ground heat fluxes based on the information of temperature (T) and humidity (q) at the evaporating surface. All three variables (Rn, T, and q) are difficult to estimate for the understorey. We present methods to retrieve understorey temperature based on drone thermal images and map the understorey's hourly net radiation. We demonstrate the methods and present hourly, daily, and monthly ET maps for the understorey of a River Red Gum woodland near Bookpurnong in the Murray–Darling Basin.

Keywords: *Understorey evapotranspiration, net radiation, surface temperature, maximum entropy production*