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# Isotope-based evapotranspiration partition in semi-arid environments

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Evapotranspiration (ET) partitioning is important for quantifying the water budget and understanding vegetation control on water cycles in various ecosystems. With the development of spectroscopy-based techniques for in-situ isotope measurements, the use of stable isotope based ET partition is rising rapidly. The sub-daily scale ET partition, however, is still rarely seen in the literature. In this study, we conducted an intensive field campaign measuring ET partition using laser-based isotope and chamber techniques in a pasture system between May and June 2012 in eastern Australia. Six soil collars were used, three of which had natural vegetation and the other three were bare soil collars where vegetation was artificially removed. The vegetated and bare soil collars were used to determine the isotopic composition of ET and evaporation, respectively. The isotopic composition of the transpiration flux was determined using a Licor leaf chamber for grasses inside the vegetated collars. The diurnal patterns in dET, dE and dT are observed. In the morning, they are depleted and became more enriched and level off during mid-day. Overall the total ET flux is dominated by evaporation, though transpiration contributions are relatively higher between 10am and 12pm. D-excess is a conservative tracer of ET components and may not be useful in ET partition. This study demonstrated the use of chamber-based measurements for direct partitioning of ET at sub-daily scale and showed a rarely observed diurnal pattern of ET partition.