

## **A reconnaissance study of water and carbon fluxes in a tropical watershed of Peninsular Malaysia: stable isotope constraints**

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**Abstract** Evapotranspiration is a nexus for planetary energy and carbon cycles, as yet poorly constrained. Here we use stable isotopes of oxygen and hydrogen to partition flux of water due to plant transpiration from the direct evaporative flux from soils, water bodies and plant surfaces in a tropical watershed of Peninsular Malaysia. Mean annual rainfall, obtained from 30 years of hydrological data, is  $2145 \pm 237$  mm. Tentatively, 48% of this precipitation returns to the atmosphere via transpiration ( $T$ ), with 33% partitioned into discharge ( $Q$ ), 8% into interception ( $I_n$ ), and 11% into evaporation ( $E_d$ ). The large  $T$  emphasizes the role of water cycle as a “conveyor belt” essential for nutrient transport in terrestrial ecosystems. The flux of carbon from the atmosphere to the tropical ecosystem of the watershed, related to this transpiration water flux via water utilization factor (WUE), is  $1373 \pm 137$  g C m<sup>-2</sup> year<sup>-1</sup>.

**Key words** water cycle; carbon cycle; river; stable isotopes; hydrology