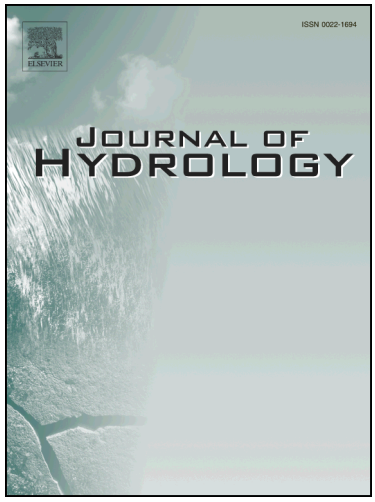

Research papers

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Assessing the seasonality and uncertainty in evapotranspiration partitioning using a tracer-aided model

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Abstract

Evapotranspiration (ET) partitioning is a growing field of research in hydrology due to the significant fraction of watershed water loss it represents. The use of tracer-aided models has improved understanding of watershed processes, and has significant potential for identifying time-variable partitioning of evaporation (E) from ET. A tracer-aided model was used to establish a time-series of E/ET using differences in riverine $\delta^{18}O$ and $\delta^{2}H$ in four northern Canadian watersheds (lower Nelson River, Manitoba, Canada). On average E/ET follows a parabolic trend ranging from 0.7 in the spring and autumn to 0.15 (three watersheds) and 0.5 (fourth watershed) during the summer growing season. In the fourth watershed wetlands and shrubs dominate land cover. During the summer, E/ET ratios are highest for wetlands for three watersheds (10% higher than unsaturated soil storage), while lowest for the fourth watershed (20% lower than unsaturated soil storage). Uncertainty of the ET partition parameters is strongly influenced by storage volumes, with large storage volumes increasing partition uncertainty. In addition, higher simulated soil moisture increases estimated E/ET. Although unsaturated soil storage accounts for larger surface areas in these watersheds than wetlands, riverine isotopic composition is more strongly affected by E from wetlands. Comparisons of E/ET to