

Isotopic variations of direct runoff

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Abstract The isotopic variations of direct runoff are studied through laboratory experiments with low initial soil water content and constant isotopic rainfall input situations. The experimental results show that isotopic compositions of direct runoff decrease to a minimum at maximum discharge and increase as discharge decreases; the average values of δD and $\delta^{18}O$ are respectively, 5‰ and 0.4‰ lower than those of rainfall. Isotopic compositions of the soil water increase along its pathway; δD and $\delta^{18}O$ values of soil water at the end of experiment are respectively, 11‰ and 1.2‰ higher than those of water from surface storage in the trough. Isotopic compositions of rainfall change greatly due to soil regulation. A thorough understanding of the isotopic variation of direct runoff can be useful in providing information for hydrograph separation.

Key words hydrogen and oxygen stable isotopes; direct runoff; isotopic variations