



Modeling recession curve of karstic springs- parallel or serial reservoirs?

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The hydrograph of a spring during dry season that follows a rainy period will decay following an exponential curve, or the sum of several exponentials. This trend is mathematically equivalent to a model of spring flow recession with one reservoir, or several parallel reservoirs. In this case recession process will start at the very end of the rainy season. Analysis of measured spring discharges in the karstic Hermon region (North Israel) reveals a clear diversity of recession curves during the dry season. While the recession of two large springs are fast during the beginning of the dry season and slow during the end, the recession of the third spring is rather slow after the beginning of the dry season and becomes faster towards the end of this season. Moreover, following a low precipitation season, the recession of this spring is faster than the recession following a high precipitation season. It is proposed that the appropriate modeling approach for each spring in this karstic region includes two serial reservoirs, where the upper one stands for the vadoze zone, and the lower represents the groundwater. Our analysis showed that if we use a model with two serial reservoirs, the spring discharge will always be a function of constant recession parameters, and the initial conditions for each reservoir. The predictions of the spring flow will therefore be independent of the selected period of recession, and, the entire system will be more physically based.

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