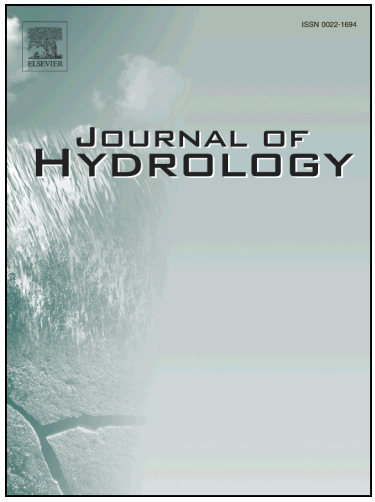

Research papers

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Estimating groundwater discharge to a lowland alluvial stream using methods at point-, reach-, and catchment-scale

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Abstract

The groundwater contribution to streamflow along a lowland alluvial stream in Denmark was estimated using a variety of methods and at different spatial scales. At the point-scale (less than a few metres), groundwater discharge to the stream was measured using seepage meters. At the reach-scale (0.5-1.5 km), groundwater discharge to the stream was estimated using differential streamflow gauging. And at the catchment-scale (greater than 1.5 km), groundwater discharge to the stream was estimated using hydrograph separation. The estimates of groundwater discharge obtained using point-scale measurements range from 12 to 41 cm/d which is lower than fluxes estimated at the reach-scale which range from 18 to 333 cm/d. This discrepancy was attributed to the partitioning of groundwater discharge into streambed seepage and bank seepage. On the other hand, the groundwater discharge estimates obtained using hydrograph separation were generally the highest and ranged from 194 to 289 cm/d. For this study, this discrepancy from the reach-scale estimates was attributed to the assumption that baseflow obtained using hydrograph separation represents groundwater discharge to the stream when part of the baseflow actually comes from artificial drainage systems. Anyhow, seepage meter measurements, differential streamflow gauging,