



Episodic change in flooding in several medium-size adjacent watersheds in the Midwestern United States

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The Pecatonica River and several other streams in the Wisconsin Driftless area show a decreasing trend in annual peak flows. Previous studies of the Pecatonica River detected a significant decreasing historical trend in late winter snowmelt-driven floods, while the rainfall-driven spring and summer floods remained constant during the period of record. Unlike several previous studies which attribute the decline in flood peaks mainly to changes in land management, we hypothesize that climate change had a significant contribution to the overall decrease in flood peaks. In an attempt to validate this hypothesis, we used long-term daily precipitation, temperature, and river flow data observed in the watershed as inputs to the Variable Infiltration Capacity (VIC) model to generate the missing snowpack depth values and other non-monitored climatic variables. The model results show a decrease in snow depths for the period of record (1915-2009), an increase in sublimation and evaporation, no change in base flow, and mixed results in infiltration, providing some support to the speculation that the decreasing trend in flood peaks was a result of climate change. In addition, the fidelity of the gages was calculated to gain more insight into the model, data and hydrologic processes.