PREDICTING EPISODIC STORM FLOWS THROUGH A LONGLEAF-PINE / WIRE-GRASS FOREST ON THE DOUGHERTY PLAIN, SOUTHWEST GEORGIA

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On the Dougherty Plain, episodic storm runoff driven flows are observed in response to intense storms. Flows can be observed during most months of the year, but may be linked to seasonal factors or long term drought cycles. A challenge in managing water resources for these storm flows and the materials/energy that they transport is predicting when they will occur. Another challenge centers on few events being officially documented. Accordingly, our goal was to use physical data from known, documented events and then compare hindcast predictions to and calculated indices or data that can provide indicators or proxy data showing likely events in historic records. Our objectives were 1) derive the necessary antecedent physical conditions that produce episodic surface flows from antecedent conditions during known events, 2) correlate these flows with proxy data to determine when flows occurred outside of known events, and 3) evaluate predicted flow dates using convolution and deconvolution methods with proxy data that strongly correlate with conditions that produced known recent events. Soil moisture between 25% and 30% was identified as the most important condition required to produce flows observed. Other parameters identified were intense precipitation (approximately 50.8 mm/d) and wetlands at nearly at high stage (~75% of max stage). Flows also appear to happen slightly more often during winter when evapotranspiration is low but can occur in result from spring storms or late season tropical storm associated precipitation events. Palmer Drought Severity Index, Ichawaynochaway stage, evapotranspiration (Thornthawaite's), and day of the year were correlated with parameters. In our preliminary analysis Ichawaynochaway at high stage (top 10% of stages) appears to be a suitable proxy for direct observation of events. Identification of the combination of the environmental conditions that predict episodic flows will allow hindcasting of historic conditions to estimate frequency of such events.

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