

## **Flood and discharge monitoring during the 2008 flood in Iowa using AMSR-E data**

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### **Abstract**

The objective of this work is to demonstrate the potential for using passive microwave data in monitoring flood and discharge conditions and inferring watershed hydraulic and hydrologic parameters. The case study is the recent flood in Iowa in summer 2008. A multi-temporal analysis of 37 GHz satellite imagery from AMSR-E, based on the Robust Satellite Techniques (RST) approach, has been developed to calculate a Polarization Ratio Variation Index (PRVI) and detect anomalies in soil moisture and/or inundated areas. A rating curve has been developed to assess the relationship between PRVI values and discharge observations downstream. A time lag term has been introduced and adjusted to account for the changing delay between PRVI and streamflow. Moreover, the Kalman filter has been used to update the rating curve parameters in near real time. The temporal variability of the  $b$  exponent, so-called river hydraulic width, shows that it converges toward a constant value. A consistent 21-day time, very close to an estimate of the time of concentration, was obtained. The agreement between observed discharge downstream and estimated discharge with and without parameters adjustment was 65% and 95%, respectively. This demonstrates the interesting role that passive microwave can play in monitoring flooding and wetness conditions and also estimating key hydrologic parameters.