Geophysical Research Abstracts,
Vol. 11, EGU2009-10255, 2009
EGU General Assembly 2009

Network of Polarimetric X-band Radars: A New Paradigm for Monitoring Rainfall for Hydrologic Research

W. Krajewski, A. Kruger, and P. Domaszczynski

The University of Iowa, IIHR-Hydroscience & Engineering, Iowa City, Iowa, United States (witold-krajewski@uiowa.edu)

High space and time resolution observations of precipitation are required to study the processes for which rainfall is the dominant driver in a watershed. While operational networks of weather radars can, in principle, provide such data, in practice this has proven difficult. To overcome this problem some research groups acquire small, relatively inexpensive, often mobile radars of their own. The authors present an example of a research network of four mobile, polarimetric, X-band radars that provides overlapping view of small watersheds. Networking X-band radars provides numerous advantages, the most important of which is their ability to mitigate the signal attenuation by the intervening rainfall. By "looking" at storms from different directions the path attenuation varies radar by radar and for some radars in the network might even be negligible. By operating the radars in a synchronized way, as a single instrument, it is possible to achieve improved accuracy of the estimated rainfall fields. The authors demonstrate this using simulation. To evaluate performance of existing attenuation correction algorithms in a networked environment, the authors have developed a comprehensive rainfall and radar network simulator. The simulator uses the T-matrix approach, and generates polarimetric variables for individual radars in the network. Simulation results are used to investigate an optimal configuration for the network. The authors also discuss plans for an empirical evaluation of the network's performance using a high-quality, dense rain gauge and disdrometer network.