



## **Multivariate stochastic modeling of hourly hydroclimatic variables and its effect on wind erosion predictions**

**T. Over** (1) and P. D'Odorico (2)

(1) Department of Geology / Geography, Eastern Illinois University, USA, (2) Department of Environmental Sciences, University of Virginia, USA (tmover@eiu.edu / Fax: 217-5816613 / Phone: 217-5812110)

A new multivariate stochastic model of hourly precipitation, air temperature, dewpoint, directional wind velocity components, and solar radiation has been developed, primarily for use in predicting wind erosion with wind erosion models such as the Wind Erosion Prediction System (WEPS) that predict surface soil moisture based on a physical model of soil water processes. Parameters are computed separately for each month. A four-component Markov model of air temperature, dewpoint, and the two components of the wind velocity is forced by an hourly stochastic precipitation model that accounts for the diurnal cycle of the occurrence and depth of precipitation. Solar radiation is simulated as a third step based on the output of the precipitation and temperature/wind models. Parameters have been computed for three sites in the Great Plains of the United States, and the effect on evapotranspiration, surface soil moisture, and wind erosion predictions of including the more complex aspects of the model, i.e., the auto- and cross-correlations between variables and the inclusion of the diurnal cycle, is being tested.