

Demonstration of the KINEROS2-RHEM-AGWA Suite of Modeling Tools

David Goodrich, Research Hydraulic Engineer, USDA-ARS, Tucson, Arizona, dave.goodrich@usda.gov

D. Phillip Guertin, Professor, Univ. of Arizona, Tucson, AZ, dpg@arizona.edu

Shea Burns, Senior Research Specialist, Univ. of Arizona, Tucson, Arizona shea.burns@usda.gov

Carl Unkrich, Hydrologist, USDA-ARS, Tucson, AZ, carl.unkrich@usda.gov

Patrick Broxton, Assistant Research Professor, University of Arizona, Tucson, AZ broxtpd@arizona.edu

Yoganand Korgaonkar, Assistant Professor of Practice, University of Arizona, Tucson, AZ, yoganandk@arizona.edu

Mariano Hernandez, Principal Research Specialist, USDA-ARS, Tucson, AZ, mariano@arizona.edu

Phil Heilman, Research Leader, USDA-ARS, Tucson, AZ, phil.heilman@usda.gov

Haiyan Wei, Assistant Research Professor, University of Arizona, Tucson, AZ, haiyan@arizona.edu

Mark Kautz, Hydrologist, USDA-ARS, Tucson, AZ, mark.kautz@usda.gov

Jason Williams, Research Hydrologist, USDA-ARS, Tucson, AZ jason.williams@usda.gov

Abstract

KINEROS2 (K2), developed by the USDA-Agricultural Research Service, is a spatially distributed rainfall-runoff erosion watershed model has been in use for a number of decades. Model improvement has continued for a variety of projects and purposes resulting in an informal suite of K2-based modeling tools. Like any detailed, distributed watershed modeling tool, the K2 suite of tools can require considerable time to delineate watersheds, discretize them into modeling elements and then parameterize these elements. These requirements motivated the development of the Automated Geospatial Watershed Assessment (AGWA) tool (see: www.tucson.ars.ag.gov/agwa or <https://www.epa.gov/water-research/automated-geospatial-watershed-assessment-agwa-tool-hydrologic-modeling-and-watershed>). AGWA is a GIS interface jointly developed by the USDA-Agricultural Research Service, the U.S. Environmental Protection Agency, the University of Arizona, and the University of Wyoming to automate the parameterization, execution, and visualization of simulation results of a suite of hydrologic and erosion models (K2, and SWAT) using nationally available data or user provided input. A number of model improvements have been added since the 2019 SEDHYD meeting. They include the incorporation of the RHEM hillslope hydrology and erosion model, the ability for continuous model simulation and a snow component. All these components can be driven by stochastically generated climate variables from CLIGEN. The Climate Assessment Tool (CAT) available in AGWA alters CLIGEN parameters to produce realistic future climate scenarios including intensification. The objectives of this demonstration are to: 1) Allow users to become more familiar with K2-AGWA-RHEM; 2) Provide visualization of RHEM, snow, and interactive runoff-infiltration and erosion dynamics; and, 3) Display the preliminary ArcGIS Pro version of AGWA.