The need for accurate and updated soil erosion estimations has been the focus of several recent environmental studies. These include potential soil loss in agricultural land, water quality, conservation practices assessments and climate change impacts. We know that the soil erosion process is impacted by many factors, including precipitation, temperature, solar radiation and others. These inputs are the drivers to high quality estimations using any process-based soil erosion model, specifically when future scenarios are considered and the variability of the inputs is taken into account. In this regard, the Water Erosion Prediction Project (WEPP) is an extensively used tool for soil and water conservation planning and assessment (Flanagan et al, 2007). Its capabilities include simulation of important physical processes such as infiltration, runoff, raindrop and flow detachment, sediment transport, and plant growth, all of which affect the resulting soil erosion and sediment yield from a slope profile. WEPP model applicability extends to hillslope processes and small watersheds with different geological and climatic conditions (Mahmoodabadi and Cerda, 2013; Brooks et al., 2016).

Climate inputs are created for use in the WEPP model with the application of the climate generator CLIGEN, a stochastic weather generator that produces daily time series estimates of precipitation, minimum temperature, maximum temperature, dew point temperature, solar radiation, and wind speed and direction for a single geographic point based on descriptive monthly statistical parameters from historic measurements. Originally, the CLIGEN database was composed of approximately 2600 climate stations within the U.S. on about a 1 degree latitude by 1 degree longitude grid (Nicks et al., 1995). The climate station data was typically from the 1960’s to the early 1990’s, though there was a wide range of years of record. Several studies have successfully developed their climate input files using CLIGEN, without counting on a possible change in the parameters that may affect the daily weather predictions by the generator.

Last year in 2015, the USDA-ARS National Soil Erosion Research Laboratory in West Lafayette, Indiana updated the CLIGEN dataset using temporally consistent climate data from 1974 to 2013 for the same 2600 climate stations. However, testing of the new climate estimates is needed to determine how the new climate files are affecting the potential runoff and soil loss predicted by the WEPP model. This work utilizes CLIGEN version 5.3 and WEPP model version 2012.8. Scenarios evaluated include 20 different locations as in the Tiwari et al. (2000) study. Results using the new CLIGEN station parameters will be compared with those from the old CLIGEN database, and effects on predicted runoff, soil loss, and sediment yield discussed. The testing should indicate any major changes or trends in predicted runoff and soil loss when using the most recent climate information available.
References


