Oral presentation

The Daily Erosion Project Going Global: Analyzing Distinct Precipitation Datasets

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The Daily Erosion Project (DEP) is a daily sheet and rill hillslope erosion estimator using radar precipitation, the Water Erosion Prediction Project (WEPP) model, field level crop rotation and management from the Agricultural Conservation Planning Framework (ACPF), the gridded Soil Survey Geographic Database (SSURGO), and lidar derived 3m Digital Elevation Models (DEM) as inputs for erosion estimates on agricultural flowpaths across the Midwestern United States. There is interest in expanding DEP at many locations around the globe, but current DEP data requirements are greater than is readily available. For this paper, our goal is to analyze how distinct precipitation datasets will impact runoff and soil detachment estimates. Two precipitation scenarios were defined by editing WEPP climate files and replacing precipitation data with the sources: Integrated Multi-satellitE Retrievals for GPM (IMERG) and the Automated Surface Observing Systems (ASOS). Thirty Hydrologic Unit Codes (HUC12) watersheds within Iowa were chosen with three HUC12s sampled per the ten Major Land Resource Areas found in the state. Precipitation accumulation differences showed an average precipitation decrease from 943 mm at the DEP baseline, to 883 mm (6% decrease), and 841 mm (11% decrease) for ASOS and IMERG, respectively, across all modeled hillslopes within each HUC12. Runoff decreased from an average of 144 mm at the DEP baseline to 107 mm for IMERG, totaling a 26% decrease. Furthermore, ASOS runoff estimates showed an average runoff of 120 mm, totaling a 17% decrease. Soil detachment revealed average values of 8.5 t ha^{-1} from the DEP baseline, to 5.5 t ha^{-1} from ASOS, and 3.3 t ha^{-1} from IMERG, presenting a 35% and 61% decrease, respectively. Testing precipitation products with coarser spatial and temporal resolution substantially impacted runoff and soil detachment estimates due to loss in rainfall intensity. IMERG results showed higher percentage difference estimates when compared to ASOS.

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