Modeling of dissolved organic carbon fluxes triggered by forest wild fires in the Interior Western US.

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Abstract

We present the results of our efforts to model fluxes of dissolved organic carbon produced from forest wild fires of various intensity. Using temporally dense water samples analyzed by both the EPA and USGS we indicate spatial temporary trends illustrating how forest disturbances affect surface water concentrations of dissolved organic carbon. Preliminary results indicate that the effect of forest disturbances is significant. Soil erosion appears to be the best indicator of fluxes of dissolved organic carbon. Correlation coefficients between measured dissolved organic carbon fluxes and measured erosion ranged between 0.5 to more than 0.9 for three studied forest disturbances. We use a combination of two models: the WEPP (USDA Water Erosion Prediction Project) and the GeoWEPP (GIS based Water Erosion Prediction Project) model to simulate amounts of erosion triggered by forest disturbances using hydrologic, soil, and meteorological data unique for individual watersheds or individual slopes affected by forest disturbances. The results of modelled erosion are modified for different soil types and slope angles to model fluxes of dissolved organic carbon. The results of these models are calibrated using measured concentrations of dissolved organic carbon for three watersheds located in the Interior Western United States. The modeled fluxes have correlation coefficients more than 0.5 as compared to measured fluxes. Presented trends are used to make recommendations of possible use of historic forest disturbance maps coupled with FIA data to predict future effects of forest disturbance on carbon cycle.