EGU22-10636
https://doi.org/10.5194/egusphere-egu22-10636
EGU General Assembly 2022

Development of a New Reservoir Trapping Efficiency Parameter for Large Scale Sediment Modeling using Remote Sensing of Fluvial Sediment

Nishani Moragoda[1], Sagy Cohen[1], and John Gardner[2]
[1]University of Alabama, Department of Geography, AL, United States of America
[2]University of Pittsburgh, Department of Geology and Environmental Science, PA, United States of America

Among the greatest stressors on global riverine sediment transport are the 48,000+ existing large dams and the ~3,700 dams that are planned or under construction. They directly obstruct sediment flowing to the ocean, alter downstream flow regimes, modify sediment carrying capacities, trigger hazardous bank erosion and riverbed incision, and influence river water quality. Understanding the role of dams in sediment retention is crucial for quantifying the anthropogenic influences on global fluvial systems. Representation of sediment trapping by dams is currently a major source of bias in continental- and global-scale hydro-geomorphic modeling frameworks. This study focuses on developing a new reservoir trapping efficiency (*Te*) parameter to account for the impacts of sediment trapping behind dams in hydrological modeling efforts. This will be done by harnessing a novel remote sensing data product, developed using Machine Learning within Google Earth Engine (GEE) to generate high-resolution and spatially continuous maps of sediment concentration across the CONUS. Sediment trapping is calculated for 400+ dams across the CONUS using pre-reservoir and post-dam sediment fluxes, and various explanatory variables including attributes of dams, topography, land use and land cover characteristics, soil parameters, and fluvial properties, are evaluated to estimate their contribution for predicting sediment trapping. This study provides a robust framework for isolating and quantifying the influence of anthropogenic factors on fluvial fluxes by informing more realistic trapping of sediment at dam locations.