EGU21-9004
https://doi.org/10.5194/egusphere-egu21-9004
EGU General Assembly 2021

Tracing seismic landslide-derived sediment dynamics in response to climate change

Jun Xie and Thomas Coulthard
University of Hull, Energy and Environment institute, Hull, United Kingdom of Great Britain – England, Scotland, Wales (j.xie-2018@hull.ac.uk)

Mass movement such as landslides and rock fall is a prominent source of sediment in active mountain belt. Earthquake triggered landslides can generate substantial loose sediment and have significant geomorphic effects on long term landscape evolution. More importantly, these landslide impacts to land surface vary a lot due to the divergence of landslide characteristics and surrounding environment settings. Downslope and downstream transport of sediment into the channel network is fairly sensitive to climatic perturbations especially for extreme rainfall events. A wide variety of studies attempt to quantify or determine the contribution of landslide generated material to gross sediment budget and the corresponding retention time scale of landslide generated deposit in the mountain basin, whereas no established techniques can explicitly fingerprint/track landslide derived sediment. In this study, we first generated the hourly future extreme rainfall under two emission scenario (RCP4.5, RCP8.5) using 'NASA Earth Exchange Global Daily Downscaled Projections (NEX-GDDP)' dataset. A new tracing function is incorporated into CAESAR-lisflood to track the landslide derived sediment footprint and dynamics in response to climate change. The landscape evolution at the Hongxi catchment, which is suffered tremendous damage from Wenchuan earthquake (Ms 8.0), are then simulated using CAESAR-lisflood under two climate scenarios. The results show that more than 80 percent of material generated by seismic landslides are still retained at the hillslope even after a sufficient time (e.g. 100 year). This study is to compare the spatial-temporal evolution pattern of landslides-derived sediment under two climatic scenarios (RCP4.5, RCP8.5), thus probing into the landslide generated sediment transport and budget respond to the climate change especially the impact of extreme rainfall events. Numerical modelling can provide a quick and effective tool for broad scale predictions of sediment produced by landslide events under different climatic predictions, which is of great importance for seismic induced disaster protection and reduction under climate change.