

EGU21-1524, updated on 26 Jan 2022

<https://doi.org/10.5194/egusphere-egu21-1524>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## **RUSLE Model based Assessment of Soil Erosion in Parbati River Basin, Central India using Google Earth Engine and GIS**

**Rohit Kumar**, Benidhar Deshmukh, and Kiran Sathunuri

Indira Gandhi National Open University, Geology, India (rohitkumargeologist@gmail.com)

Land degradation is a global concern posing significant threat to sustainable development. One of its major aspects is soil erosion, which is recognised as one of the critical geomorphic processes controlling sediment budget and landscape evolution. Natural rate of soil erosion is exacerbated due to anthropogenic activities that may lead to soil infertility. Therefore, assessment of soil erosion at basin scale is needed to understand its spatial pattern so as to effectively plan for soil conservation. This study focuses on Parbati river basin, a major north flowing cratonic river and a tributary of river Chambal to identify erosion prone areas using RUSLE model. Soil erodibility (K), Rainfall erosivity (R), and Topographic (LS) factors were derived from National Bureau of Soil Survey and Land Use Planning, Nagpur (NBSS-LUP) soil maps, India Meteorological Department (IMD) datasets, and SRTM30m DEM, respectively in GIS environment. The crop management (C) and support practice (P) factors were calculated by assigning appropriate values to Land use /land cover (LULC) classes derived by random forest based supervised classification of Sentinel-2 level-1C satellite remote sensing data in Google Earth Engine platform. High and very high soil erosion were observed in NE and NW parts of the basin, respectively, which may be attributed to the presence of barren land, fallow areas and rugged topography. The result reveals that annual rate of soil loss for the Parbati river basin is ~319 tons/ha/yr (with the mean of 1.2 tons/ha/yr). Lowest rate of soil loss (i.e. ~36 tons/ha/yr with mean of 0.22 tons/ha/yr) has been observed in the open forest class whereas highest rate of soil loss (i.e. ~316 tons/ha/yr with mean of 32.08 tons/ha/yr) have been observed in gullied area class. The study indicates that gullied areas are contributing most to the high soil erosion rate in the basin. Further, the rate of soil loss in the gullied areas is much higher than the permissible value of 4.5–11 tons/ha/yr recognized for India. The study helps in understanding spatial pattern of soil loss in the study area and is therefore useful in identifying and prioritising erosion prone areas so as to plan for their conservation.