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## Exploring the sediment redistribution dynamics of a data-scarce catchment in southwestern Ethiopia using the USPED model and gully erosion threshold indices

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Soil erosion has on- and off-site detrimental effects, including decreased soil quality and sediment buildup in reservoirs. Predicting and monitoring soil erosion is challenging due to the spatio-temporal variation of its triggering factors. Therefore, developing and successfully implementing appropriate intervention measures requires a thorough understanding of its redistribution at the catchment scale. However, many previous soil erosion prediction models have been calibrated/validated based on sediment yield at catchment outlets. This approach does not provide any insight into the sources and sinks of erosion and deposition within the catchments. Furthermore, this approach has limited applicability in regions with no (limited) measured data. Therefore, exploring spatial patterns of erosion and deposition using the recent advances in remote sensing and GIS technologies is advisable. This research integrates the semi-distributed Unit Stream Erosion Deposition (USPED) model, and gully erosion threshold indices, described by stream power index (SPI) and topographic wetness index (TWI), to evaluate the sediment redistribution dynamics of a sub-humid catchment located in Omo-basin in southwestern Ethiopia. The catchment (~77 km<sup>2</sup>) has a rugged topography with an average slope of 35.8 %. It consists of four primary types of land use and cover (LUC): rangelands (20%), forest areas (19%), built-up areas (7%) and cultivated lands (54%). The (preliminary) results revealed that the gentle and mild slopes contribute more (53%) to the overall annual catchment soil loss (42.5 t.ha<sup>-1</sup>) from the hillslope. This is because the sediment deposited in the downstream sinks remobilizes, shifting an erosion-limited to a transport-limited system. Moreover, the total contribution of rangelands and forest areas is comparable to that of cultivated lands. Therefore, by focusing our management efforts on these areas, instead of the steeper slopes, we can make a greater impact on the overall sustainability of the catchment.

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