



## **Anthropogenic changes and environmental degradation in pre-Hispanic and post-Colonial periods: soil erosion modelled with WEPP during Late Holocene in Teotihuacán Valley (central Mexico)**

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Land use changes and support practices are a worldwide significant issue in soil erosion and subsequently, land degradation. Anthropogenic changes, along different periods of the history in the last 2000 years in the Valley of Teotihuacan (central Mexico), highlight that soil erosion varies depending on how the management and the intensity of soil use is handled, considering the soils as a main resource. As a part of a broader effort to reconstruct the erosion dynamics in the Teotihuacán Valley through geoarchaeological approaches, this study apply a process-based watershed hydrology and upland erosion model, Water Erosion Prediction Project (WEPP). This research aims to contribute with insights through modelling and to recreate soil erosion and sedimentation dynamics in several historical periods with different environmental and anthropogenic scenarios. The Geo-spatial interface for WEPP (GeoWEPP) was used to characterize location of detachment, depositions and erosion predicted on the profile through time, based on current and hypothetical reconstructed conditions in the watershed. Climate, topography, soil and land use were used as inputs for the WEPP model to estimate runoff fluxes, soil loss rates, and sediment delivery ratio (SDR) for three historical scenarios: current period, reconstructed Teotihuacán period (AD 1-650), and reconstructed Aztec period (AD 1325-1520). Over a simulated and established timeframe for those social periods, the runoff, soil loss rate and SDR were estimated to be greater during the Aztec period. We assume that in general the climate conditions for this period were wetter, compared with present, in agreement with several authors that proposed climate reconstructions for the center of Mexico. It is also highlighted that support practices were more effective in this period. The next period with higher values is the current one, and fewer rates are estimated for the Teotihuacán period. This comparison release new arguments in the scientific debate about the antiquity and causes on ancient erosion in central Mexico and information for the social-cultural transition of periods. Therefore, it increases the knowledge for great periods in the Mesoamerica history through interdisciplinary approach. Nucleation of settlements, due to the Colonial policy for the nucleation and, abandonment by fall in population agree with a change in the soil use. Results show how changes in land use are one of the foremost reasons in the soil erosion, not only in nowadays conditions, but also in ancient periods.