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LONG TERM SOIL EROSION ANALYSIS ON A TERRACED SYSTEM WITH THE SUPPORT OF ARCHAEOLOGICAL DATA IN THE AREA OF AKSUM (ETHIOPIA)

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Landscape evolution in agricultural contexts is primarily the result of soil redistribution processes done by human activity and water erosion. The analysis of such soil dynamics in archaeological areas is useful to understand the evolution of the landscape structures. This study is focused on the area of Aksum (Ethiopia), one of the most relevant archaeological sites in East Africa, where the flourishing and decay of the Aksumite Kingdom (400yBC, 800yAD) took place. It provided favorable conditions for long term approach to the study of soil conservation techniques since they have been maintained from ancient times to present. In the present study, three terrace systems have been surveyed and analysed in terms of soil loss across the last two millennia by physical and archaeological evidences. Tillage and water erosion has been simulated by a long-term expert-system model (LandSoil) (Ciampalini et al., 2011) based on a raster distributed-approach accounting the principal components in soil erosion-deposition processes. The results of model analysis, integrating tillage erosion, diffusive and concentrated erosion have been compared and calibrated with the plough marks technique (Ciampalini et al., 2008; 2011), soil loss computing procedures such as the PSIAC model for Ethiopian Highlands (Negussie et al., 2005) and a re-parameterisation of P factor (USLE) for stone-bounds (Desta et al., 2005). This analysis provides values for tillage soil displacement and water erosion comparable with these reported in the literature, accounts for the relative influence of both mechanical and hydrological processes, and confirms the high efficiency of these traditional soil conservation practices.