



## **A comparison of rating and dating techniques to estimate the threat of soil erosion to archaeological monuments under agricultural fields**

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For the protection of Dutch archaeological sites against degradation, the TOPsites project is investigating the rate, extent and mitigation of the most important processes involved. One of these processes is soil translocation or soil redistribution. For many Dutch archaeological sites the actual extent and rate of soil erosion is not yet known. In this study different techniques for dating and estimating rates have been compared on three archaeological sites on tilled fields with gentle slopes: (multi-temporal LiDar, profiles and spatial distribution of  $^{137}\text{Cs}$ , anthropogenic Pb, and  $^{239+240}\text{Pu}$ , and moreover OSL. In addition, the added value of the combination of several of these techniques together will be evaluated.

Preliminary results show evidence for colluvium formation (deposition) on two of the sites. Lead contents in a buried soil on one of these sites suggest a subrecent to recent date.  $^{137}\text{Cs}$  profiles and spatial mapping, however, do not show clear evidence for recent erosion or re-deposition patterns. These first results suggest that in these agricultural settings with typical Dutch gentle slopes, erosion may only occur in rare, catastrophic, events with local high erosion and re-deposition rates instead of a more or less continuous process with lower rates. Consequently, the impact of ploughing might be limited to mixing of the plough layer, while the effect of damaging soil translocation, for these selected archaeological sites, seems less important. Forthcoming analysis and results of Pu and OSL will provide enough data for further discussion and possible falsification of these preliminary conclusions.