Supplementary materials

Procedures for the soil and sedimentological analyses

As a proxy for organic content in non-calcareous soils, LOI was performed at 450°C for 4 hours in a reducing atmosphere. The weight loss was then converted to percent carbon using the standard equation %weightloss x 1.724. The results are not adjusted for clay content due to the minimal presence on the site. Organic content as measured by LOI should be seen as an approximation [1], however, results were consistent with the observations on site.

Particle size determination under 1mm was performed using a laser diffraction with a Beckmann Coulter LS13 320. The samples were freeze dried prior to analysis due to the higher organic content in some of the samples.

The pH was measured using a pH meter in a solution of deionised water. The meter was calibrated using buffer solutions at pH4 and pH7 prior to analysis and regularly during testing.

Geochemical analysis was performed using pXRF technology. Dried samples of under 1mm were filled into sample cups with a polypropylene film and analysed using a Niton Xlt3 with a silver anode 50 kV, 0-200µA x-ray tube. The selected mode was Mining Cu/Zn, using fundamental parameters internal calibration, with the limits of detection set to 2σ. Analytical time totalled 300 seconds (50 seconds for main and high, 100 seconds for light and low filters). The data were calibrated using NIST 1646a and NIST 2711a, which were measured prior to analysis and at regular intervals. An analytical blank was also used to quality check the data. The data was subsequently calibrated before the statistical analysis. SPSS was used to produce descriptive and principal component analysis of the data and to test the relationships between results. The number of samples is low at 32, especially considering the large number of variables, and therefore should be treated as a very coarse indication of trends, rather than ground for interpretation.

References

1. Hoogsteen, M. J. J.; Lantinga, E. A.; Bakker, E. J.; Groot, J. C. J.; Tittonell, P. A. Estimating soil organic carbon through loss on ignition: effects of ignition conditions and structural water loss. *Eur J Soil Sci* **2015**, *66*, 320-328; https://doi.org/10.1111/ejss.12224.