Collaborative Doctoral Award: Interpreting Loss of Data from Metal Artefact Decay (rates, reasons and conservation management implications)

Research area: Ploughzone Archaeology
Supports: NHPP 2D1 - Agricultural and Forestry Impacts

University Partner
University of Huddersfield

Project Summary
Many archaeological sites include metal artefacts in the topsoil. They may be the primary evidence or complement stratified deposits, also indicating ongoing erosion of stratigraphy. Artefacts have suffered varying decay since deposition, rates depending on metal composition and environmental conditions, accelerating with agricultural intensification since the 1950s. Decay is poorly understood, yet is a major threat to the archaeological record, determining which artefacts remain of those originally deposited and their condition, hence what may be deduced from them and their spatial distribution.

A standard measure of condition and an understanding of factors influencing decay are essential for:

1. consistent assessment of survival, condition and thus site potential
2. establishing ongoing rates of decay, hence vulnerability
3. ranking importance of remaining evidence
4. defining measures to minimise future loss
5. understanding the archaeological evidence

Through careful choice of land to sample, to control for individual factors influencing decay, correlation will be sought between long-term environmental conditions and artefact condition, allowing hypotheses to be developed as to the relative influence of each factor on decay rates. 10 - 20 sites may be sampled, with exact numbers determined once key parameters are defined.

Analysis starts with existing collections (e.g.: Edgehill battlefield & Rendlesham Anglo-Saxon site) but archived assemblages will have suffered some post collection decay, while samples may not be wholly representative. For these reasons, and to encompass all required environmental conditions, new systematic sampling will be undertaken with high specification detectors in good survey conditions on selected sites.

Battlefields have a key role as assemblages have remained in the topsoil since deposition. On most other site types cultivation has introduced many artefacts into the topsoil from stratified deposits. When this occurred will influence their condition as stratified artefacts decay more slowly (lower aeration / mechanical damage), thus identical objects in the same area may be in different condition. Control for chronology of incorporation will be sought by sampling land: under pasture for a known period (date of enclosure / survival of ridge & furrow) ensuring no integration of artefacts from stratigraphy during that period; and areas of recent conversion from pasture or heath to arable, hence integration occurred over a known period.

The student will:

1. test techniques (e.g.: imaging to apply a standard measure of surface roughness) to establish an objective measure of artefact condition, characterising corrosion & erosion
2. assess metal composition (using xrf , 3D x-ray microtomography etc) as this affects decay rates
3. Assess factors influencing decay for areas sampled:
    a. parent geology, aspect, slope etc
    b. land use history (influences soil type, soil chemistry, aeration etc)
    c. from farmers establish recent agricultural practices (impacts mechanical damage & soil chemistry)
    d. sample soil chemistry (esp. pH & chlorides)
4. Design site-specific suites of measures, linked to grant opportunities, to modify the agricultural regime to minimise decay

The techniques are well established. It is in their combination and application to carefully chosen sites that understanding will be advanced, the student having a key role in identifying and giving weight to each factor and choosing sites.

Outcomes will be hypotheses amenable to future experiments, to validate decay explanations and test efficacy of suggested agricultural changes; a methodology and exemplars for interpretation, assessment and management of other sites; assessment on each site as to the representativeness of surviving assemblages of the original deposits, indicating the influence of decay on what can be interpreted from surviving evidence, so improving knowledge of each site and of that period or theme.

Contact Details

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