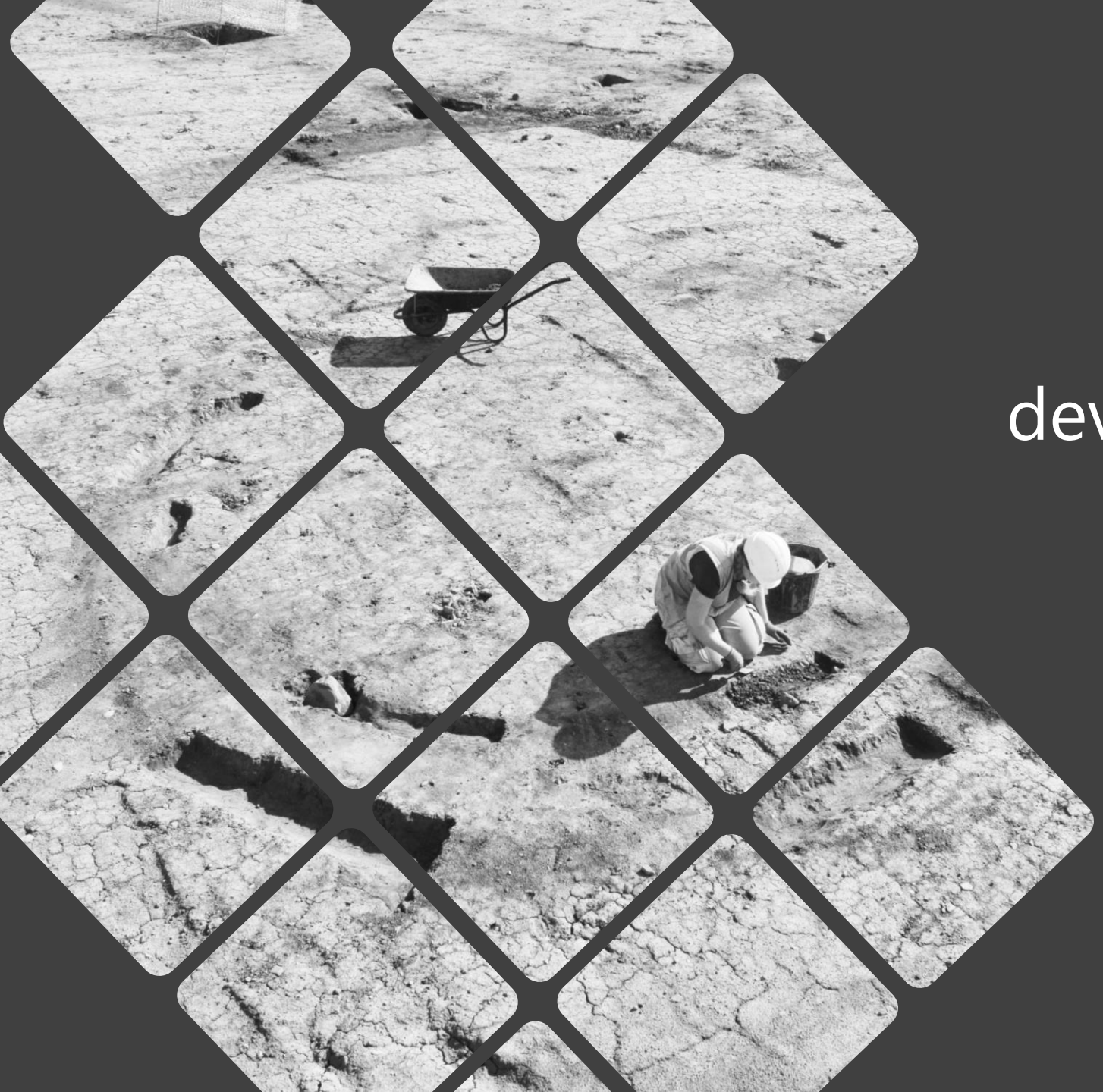

The use of scientific techniques within developer-led archaeology

Dr Alex Smith

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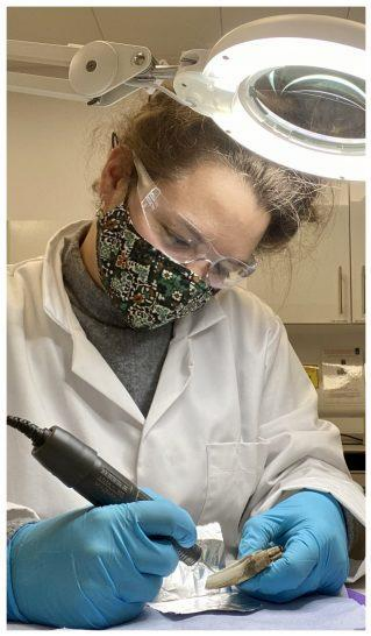
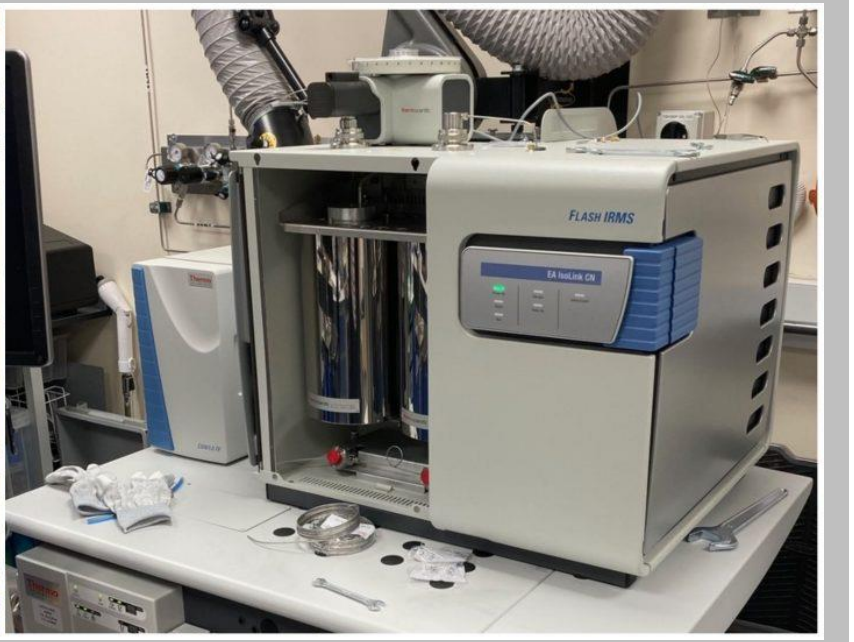
Science and Infrastructure





MOLA HEADLAND INFRASTRUCTURE

MOLA HEADLAND ARCHAEOLOGY

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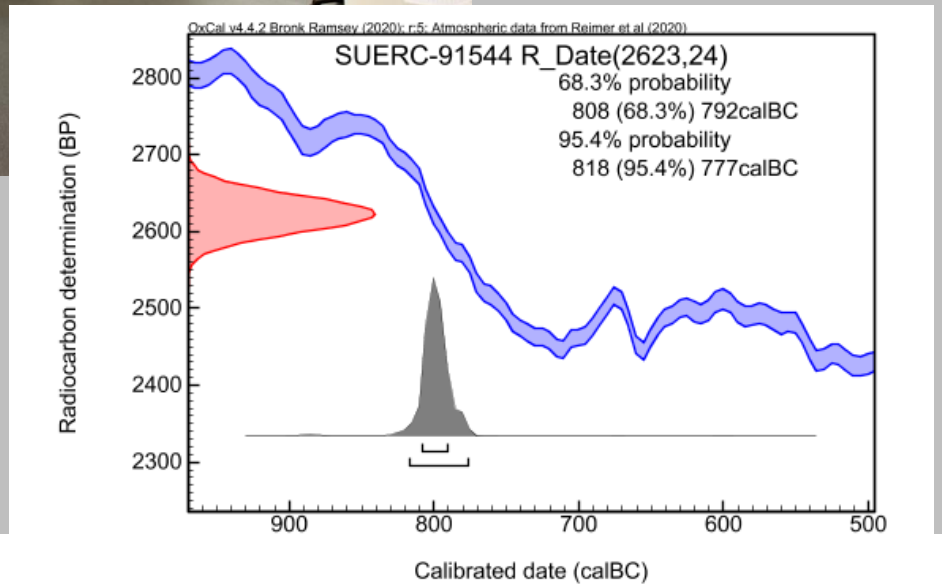
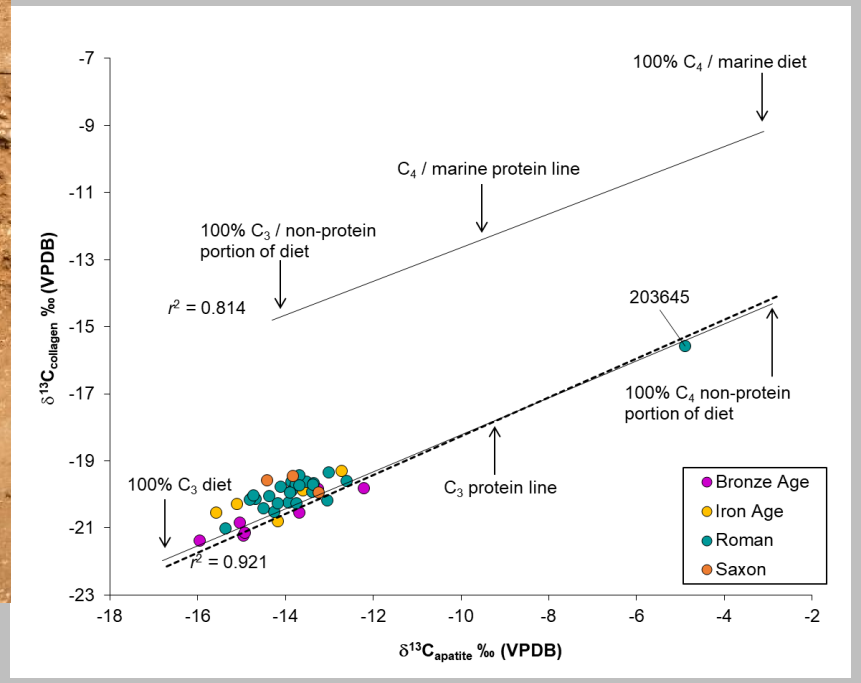
Radiocarbon dating and modelling



- Over 450 radiocarbon dates from the A14 scheme
- 75 dates from single Iron Age site at Lower Callerton
- Still some reluctance for dating sites of certain periods

Isotope analysis: Human bone and teeth

- Strontium, oxygen, and lead - mobility
- Carbon and nitrogen - diet



- 42 individuals from A14
- Little change in diet and mobility over time
- Exception is Roman period

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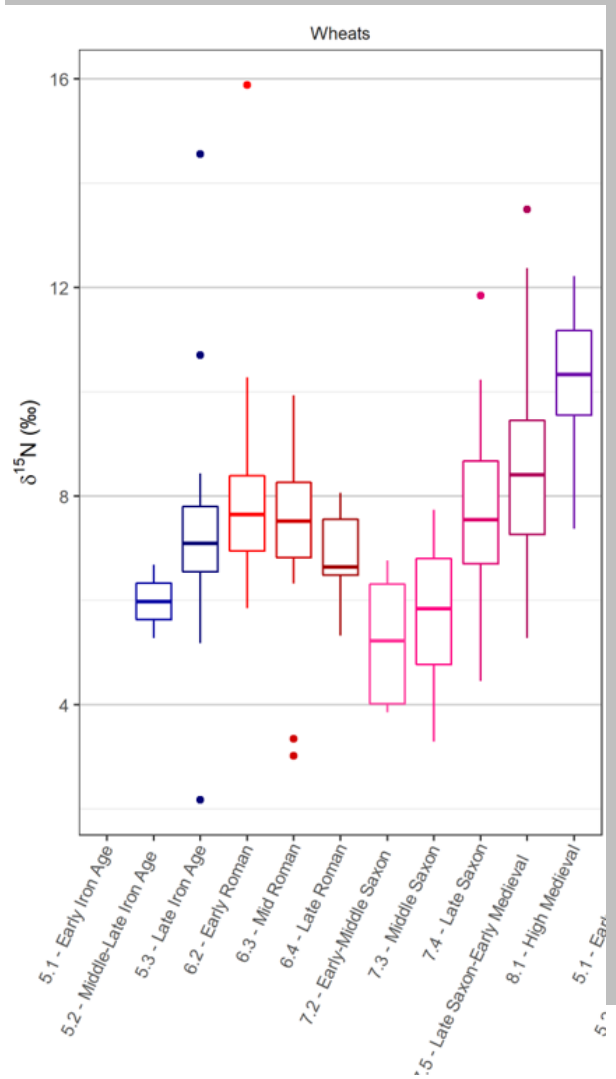
Isotope analysis: Plants and animals



- **Animals** (C, N & O): long-term fodder-provision patterns or grazing patterns and migration patterns
- **Plants** (C, N & S): variation in crop management regimes

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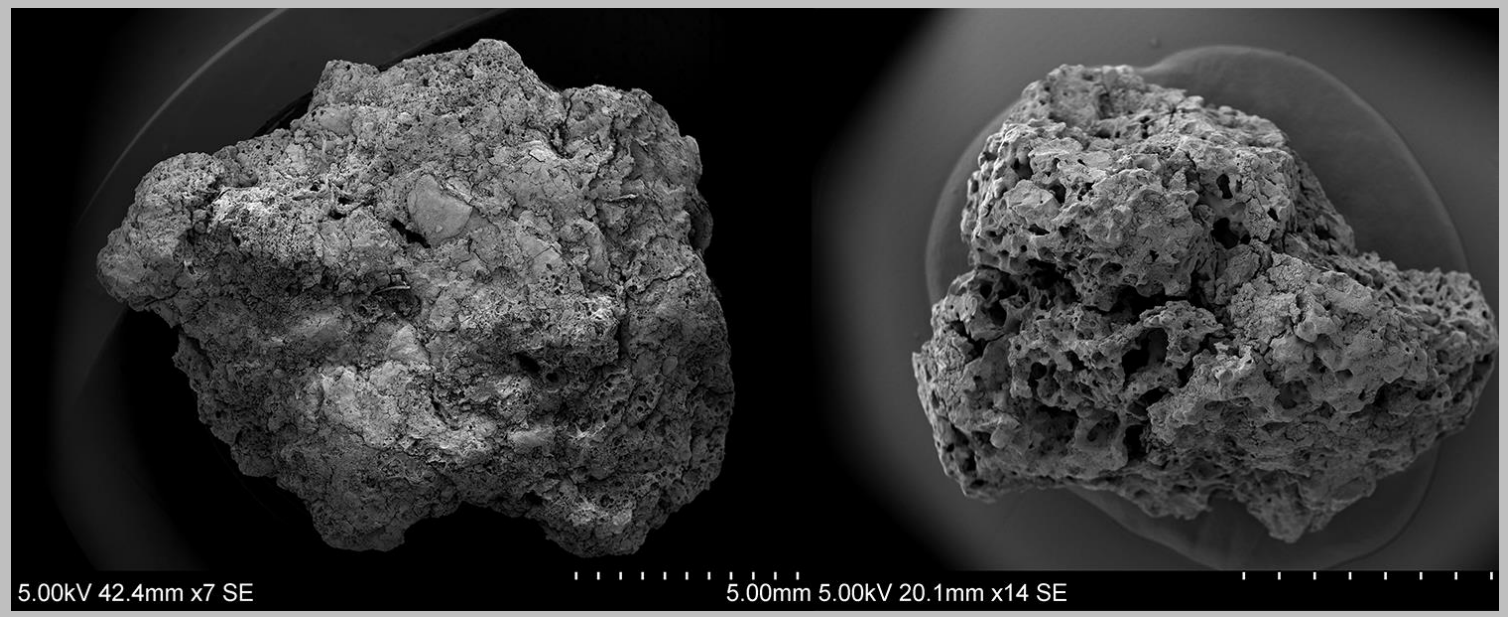
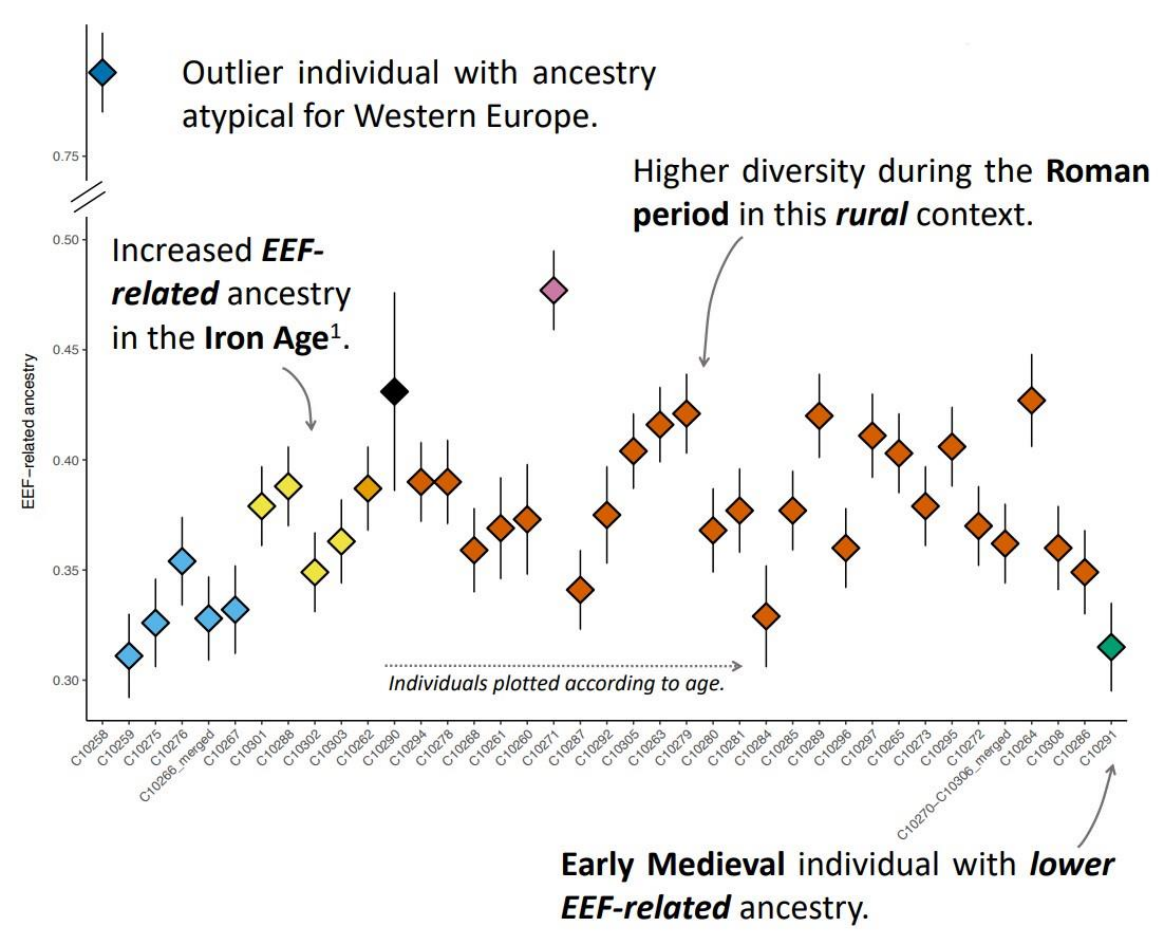
Microscopic (SEM) analysis of cereal-based food



- Allows for the study of the use of cereal crops for food preparation as well as culinary choices across time
- On A14 used to discover the earliest physical evidence for beer-making in the UK

Ancient DNA analysis of human remains



- To investigate genetic sex, ancestry and genetic relationships between individuals
- 52 burials analysed from A14 sites
- Especially effective when combined with isotope analysis

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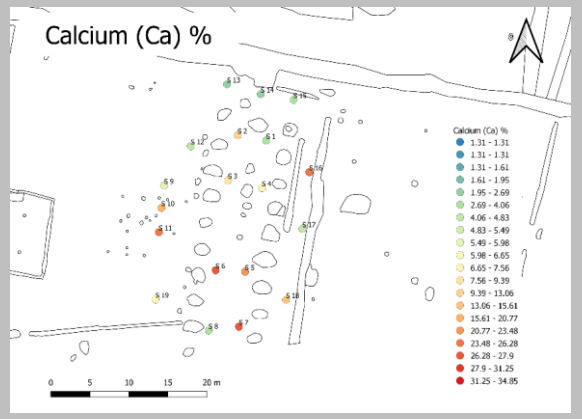
Radiographic, petrographic and geochemical analysis of pottery

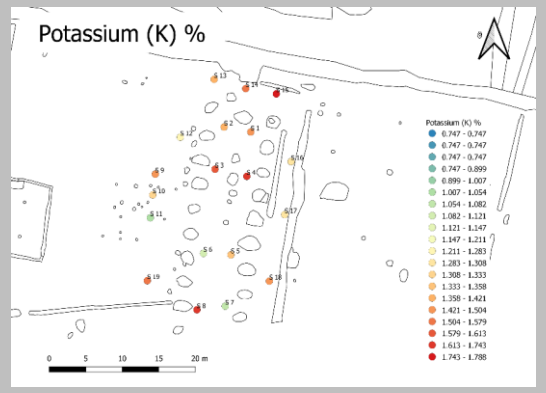
- To investigate ceramic production techniques and pottery distribution networks
- Used in study of late Iron Age pottery in A14

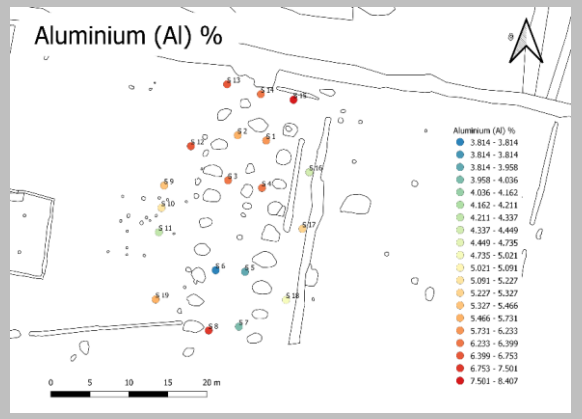
X-ray Fluorescence (XRF) of artefacts

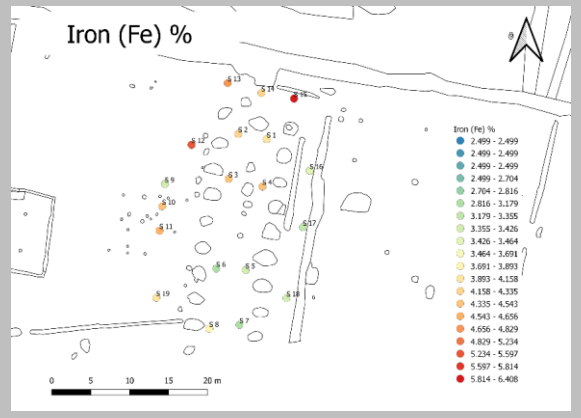
- To investigate artefact composition
- First comprehensive study into use of p-XRF within UK commercial archaeology as part of A14 Masters Studentships with UoR

Portable X-ray fluorescence (p-XRF) analysis of sites









- To understand how soil composition has been altered by human behaviour
- Work with Hitachi on Roman villa site revealed differences within buildings

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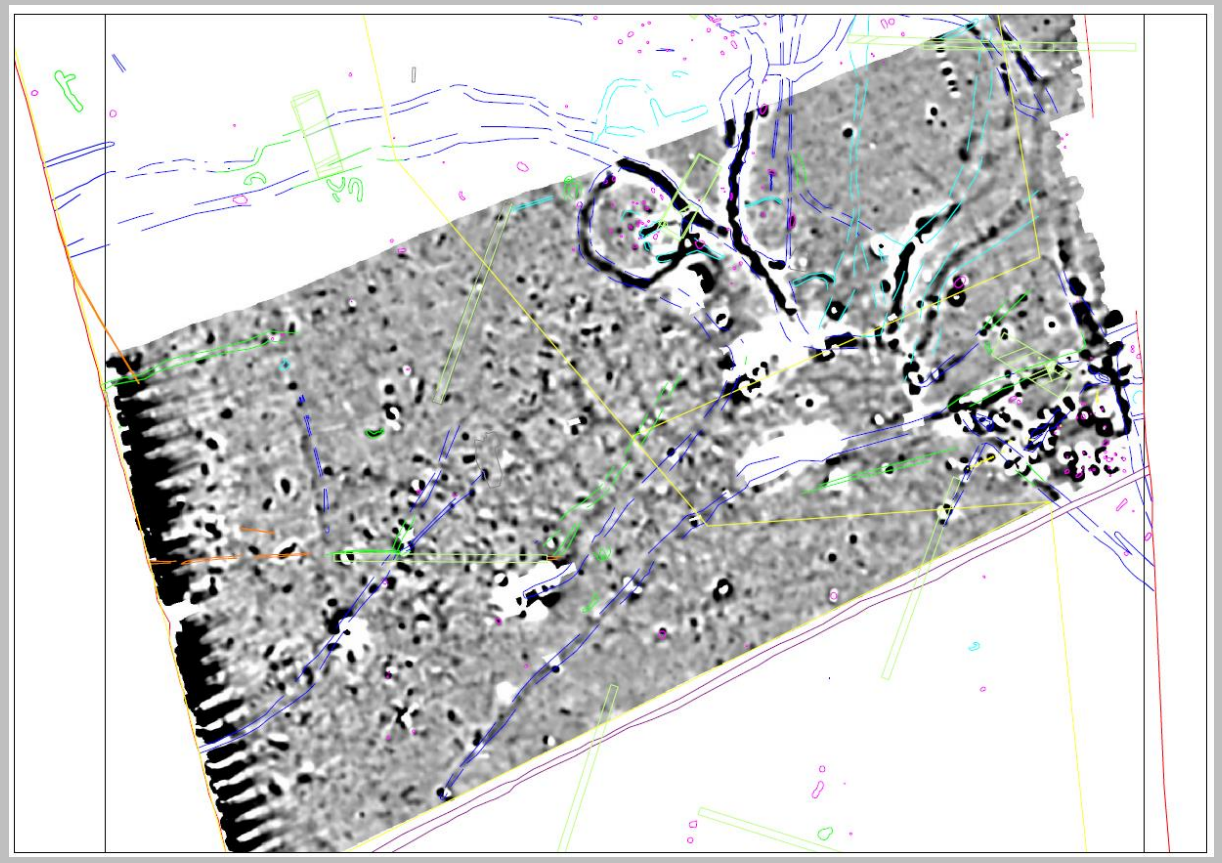
Pre-excavation post-strip geophysics



- Identify features not visible to the naked eye
- Estimate of the depth of features
- Identify relationships between features
- Identify features/cultural-debris buried beneath colluvium/alluvium

Conclusions

- Shown a limited number of wide range of scientific techniques currently used in commercial archaeology
- More scope for new techniques and applications when close links between commercial, academic and other sectors
- Not just science for sake of doing science
- Needs to be relevant for addressing wider research aims and/or creating methodological innovations