Keynotespeaker

Microarchaeology: The Importance of On-Site Analysis

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Abstract

The term "microarchaeology" refers to the investigation of a most substantial part of the archaeological record that can only be revealed with instruments. The key to integrating the macro- and microarchaeological records is to have some on-site analytical capability that can provide information in real time on the microscopic record. The information obtained can be used to better understand a newly revealed feature, to then adapt the excavation strategy accordingly and finally to collect the best possible set of samples for more detailed off-site analysis. A key instrument for operation on-site is Fourier Transform Infrared Spectroscopy (FTIR).

FTIR spectrometers are robust and light, and samples can be analysed in a few minutes. The analysis provides basic information on the identifications of the minerals and organic materials based on the characterization of the short range order of atoms. By separating the effect of particle size and atomic disorder contributions to peak width by repetitive grinding of the sample, FTIR can also be used to differentiate between well ordered geogenic calcite, less well ordered calcite in wood ash and poorly ordered calcite in plaster and mortar. This is of much importance in many archaeological sites. During diagenesis, minerals become more ordered, and this same grinding curve method can be used to monitor the preservation state not only of calcite, but also of carbonate apatite of bones and teeth. The method can therefore be used to select the best preserved samples for trace element and stable isotopic compositional analyses of the mineral. FTIR can also be used to identify clays that were exposed to elevated temperatures, and to assess the approximate exposure temperature.

Silica phytoliths are often the most robust record of the vegetation used at a site in the past, and may be indicators animal enclosures, cereal storage sites, ash accumulations and more . Phytolith concentrations per unit weight of sediment are a first indication of such remains. A relatively rapid method for measuring such concentrations enables 10-15 samples to be measured in about 3 hours. Thus this information can be obtained in one day and before excavation resumes the next day.

On-site analysis not only facilitates the integration of the macro- and microarchaeological records, but also increases significantly the information obtained during excavation and hence enables the excavation team to focus on key discoveries.

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