

Applications of automated mineralogy in archaeological micromorphology and artefacts

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The Tescan Integrated Mineral Analyser (TIMA) is an automated scanning electron microscope that utilizes image analysis and chemical signatures to identify and map mineral phases within samples. This system is ideal for mineralogy and petroleum research via characterisation of ore body and the environment. More recently it has been applied to undisturbed sediments to assess provenance and post-depositional modification within archaeological sediments and soils. More traditional methods are based on petrographic thin section analysis via optical methods but this is limited by low resolution and variable expertise of the user to identify minerals. In contrast, the automated mineralogy system is faster, more accurate and reproducible. In addition, the recent advancements in the software development makes the system easy to use for fast mineral identification, modal mineralogy, grain size analysis and elemental abundance. Here we present Tescan TIMA results to characterise the micromorphology of archaeological cave sediment from Boodie Cave on Barrow Island, Western Australia. We also present the composition of ~4000 year old copper pins from the ancient city of Kültepe in conjunction with Electron Backscattered Electron Diffraction (EBSD) to draw some critical conclusions on metal processing. These results demonstrate the wider applicability of Tescan TIMA to Quaternary sciences.