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Radiocarbon-dating adhesive and wooden residues from stone tools by Accelerator Mass Spectrometry (AMS): challenges and insights encountered in a case study

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Radiocarbon-dating adhesive and wooden residues from stone tools by Accelerator Mass Spectrometry (AMS): challenges and insights encountered in a case study.

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1. Introduction

Direct dating of artefact residues has the potential to provide archaeologists with new chronological information. Accelerator Mass Spectrometry (AMS) radiocarbon measurements can be made on samples containing as little as 5 µg or less of carbon ('µgC') (Smith et al., 2007, 2010a; 2010b; Yang et al., 2013) and in principle this allows very small amounts of residues from stone tools to be radiocarbon dated. In a pilot study, we demonstrated the feasibility of direct residue dating under laboratory conditions with only 10.5 µgC obtained from wooden residues (Yates et al., 2014). One of the key limitations, however, was the impact of contamination due to the extremely low mass used for the dating. Fungus and soil components can be easily transferred into archaeological residues during handling and storage (e.g. Barton, 2009: 134 Wadley and Lombard, 2007: 1003; Langejans, 2011). This highlights the need to develop preparation and removal protocols for accurate AMS dating.

In our pilot study, we also suggested that a next step after experimental residue dating should be to date well-preserved residues from artefacts that are stratified and well dated, so as to