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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

A.B. Yates, A.M. Smith, F. Bertuch, B. Gehlen, B. Gramsch, M. Heinen, R. Joannes-Boyau, A. Scheffers, J. Parr, A. Pawlik

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## ACCEPTED MANUSCRIPT

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4 5	Corresponding author: Andrea Bettina Yates, email: ayatesarchaeo@gmail.com, telephone: 0061280113037 or 00610406779473, <i>Fax: 006126621 2669</i>
6 7	A.B.Yates <sup>1</sup> , A.M. Smith <sup>2</sup> , F. Bertuch <sup>2</sup> , B. Gehlen <sup>3</sup> , B. Gramsch <sup>4</sup> , M. Heinen <sup>5</sup> , R.Joannes- Boyau <sup>1</sup> , A. Scheffers <sup>1</sup> , J. Parr <sup>1</sup> , A. Pawlik <sup>6</sup>
8 9	<sup>1</sup> Southern Cross University, Southern Cross GeoScience, PO Box 157, Lismore, NSW, 2483, Australia
10 11	<sup>2</sup> Australian Nuclear Science and Technology Organisation, Locked Bag 2001, Kirrawee DC 2232, Australia.
12 13	<sup>3</sup> University of Cologne, CRC 806, Project D4, Bernhard-Feilchenfeld-Str. 11, D-50969 Köln, Germany
14	<sup>4</sup> Wielandstraße 21, D-14471 Potsdam, Germany
15	<sup>5</sup> Artemus GmbH, Kölner Str. 201, D-50226 Frechen, Germany
16 17	<sup>6</sup> University of the Philippines, Archaeological Studies Program, Albert Hall, Lakandula St., Diliman, Quezon City 1101, Philippines
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## 19 **1. Introduction**

20 Direct dating of artefact residues has the potential to provide archaeologists with new chronological Accelerator Spectrometry 21 information. Mass (AMS) radiocarbon measurements can be made on samples containing as little as 5  $\mu$ g or less of carbon (' $\mu$ gC') 22 23 (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 24 25 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, 26 however, was the impact of contamination due to the extremely low mass used for the dating. 27 Fungus and soil components can be easily transferred into archaeological residues during 28 handling and storage (e.g. Barton, 2009: 134 Wadley and Lombard, 2007: 1003; Langejans, 29 2011). This highlights the need to develop preparation and removal protocols for accurate 30 31 AMS dating.

32 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

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