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Characterization of uranium redox state in organic-rich eocene sediments

Susan A. Cumberland, Barbara Etschmann, Joël Brugger, Grant Douglas, Katy Evans, Louise Fisher, Peter Kappen, John W. Moreau



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3 Susan A Cumberland<sup>1,2,3</sup>, Barbara Etschmann<sup>2</sup>, Joël Brugger<sup>2</sup>, Grant Douglas<sup>4</sup>, Katy Evans<sup>5</sup>,  
4 Louise Fisher<sup>6</sup>, Peter Kappen<sup>3</sup>, John W. Moreau<sup>1</sup>

5 1 School of Earth Sciences, University of Melbourne, Parkville, Victoria 3100, Australia

6 2 School of Earth, Atmosphere and Environment, Monash University, Clayton 3800, Victoria,  
7 Australia

8 3 ANSTO Australian Synchrotron, 800 Blackburn Road, Clayton 3168, Victoria, Australia

9 4 CSIRO Land and Water, Floreat, Western Australia, Australia

10 5 Western Australian School of Mines, Curtin University, Bentley, Western Australia,  
11 Australia

12 6 CSIRO Mineral Resources, Bentley, Western Australia, Australia

13

## 14 Abstract

15 The presence of organic matter (OM) has a profound impact on uranium (U) redox cycling,  
16 either limiting or promoting the mobility of U via binding, reduction, or complexation. To  
17 understand the interactions between OM and U, we characterised U oxidation state and  
18 speciation in nine OM-rich sediment cores (18 samples), plus a lignite sample from the  
19 Mulga Rock polymetallic deposit in Western Australia. Uranium was unevenly dispersed  
20 within the analysed samples with 84% of the total U occurring in samples containing  
21 >21 wt. % OM. Analyses of U speciation, including x-ray absorption spectroscopy and  
22 bicarbonate extractions, revealed that U existed predominately (~71%) as U(VI), despite the  
23 low pH (4.5) and nominally reducing conditions within the sediments. Furthermore, low

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