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## Holocene chronology and tephrostratigraphy for the varved record of Lake Diss Mere (UK)

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The lacustrine record of Lake Diss Mere, Norfolk (UK) is 15 m long, and shows 4.2 m of finely-laminated sediments, which are present between 9 and 13 m of core depth. The microfacies analysis identified three major seasonal patterns of deposition (microfacies 1 – 3), which corroborate the annual nature of sedimentation throughout the whole interval. The sediments are diatomaceous organic and carbonate varves with an average thickness of 0.45 mm. Microfacies 1 consists of a pale layer made of authigenic calcite crystals and diatom frustules, and a dark layer composed of a planktonic diatoms and filaments of organic matter. Microfacies 2 is similar to microfacies 1 but includes a mono-specific diatom bloom layer preceding the calcite layer. Microfacies 3 are varves with an occasional very thin calcite layer and mono-specific diatom blooms in spring and autumn.

A total of 8252 varves were counted with an error of up to 27 varves. To tie the resulting floating varve chronology to the IntCal 2013 radiocarbon timescale, we used a Bayesian Deposition model (P\_Sequence with outlier detection) on all available chronological data. The data included seven radiocarbon dates, six tephra layers with known radiocarbon ages, and the relative varve counts between dated points. The resulting age uncertainties are decadal in scale (95% confidence) and allow detailed comparisons to other high-resolution Holocene varved lake and ice-core records on absolute timescales. The potential for this record as a palaeoclimate archive for the British Isles is enhanced by the Glen Garry<sup>1</sup>(2172 ± 107 cal a BP) and OMH-185<sup>2</sup>(2667 ± 38 cal a BP) volcanic eruptions which lie amongst 3 further late-Holocene cryptotephra layers at *ca* 2400 cal a BP, 2540 cal a BP, and 3870 cal a BP, and a mid-Holocene cryptotephra layers at *ca* 6420 cal a BP. Initial investigations and geochemical characterisation suggest Icelandic eruption centres for these cryptotephra layers which are known to be present in sites in the British Isles and elsewhere in Europe.

<sup>1</sup> Barber, K., Langdon, P., Blundell, A. Dating the Glen Garry tephra: a widespread late-Holocene marker horizon in the peatlands of northern Britain. *The Holocene*, 18: 31-43. 2008.

<sup>2</sup> Plunkett, G.M., Pilcher, J.R., McCormac, F.G., Hall, V.A. New dates for first millennium BC tephra isochrones in Ireland. *The Holocene*, 14: 780-786. 2004