Electronic Supplementary Material (ESM) 1 AMS $^{14}$C dates from core LEVE14, Loch Leven, Scotland

<table>
<thead>
<tr>
<th>Depth (cm)</th>
<th>Sample material</th>
<th>Radiocarbon age (yr BP ± σ)</th>
<th>Calibrated age (2 sigma)</th>
<th>Sample ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>68-69</td>
<td>Bulk sediment</td>
<td>1,882±37</td>
<td>cal AD 56-230</td>
<td>UBA-31803</td>
</tr>
<tr>
<td>96-97</td>
<td>Charcoal</td>
<td>827±34*</td>
<td>cal AD 1158-1269</td>
<td>UBA-31098</td>
</tr>
<tr>
<td>134-135</td>
<td>Bulk sediment</td>
<td>2,420±34</td>
<td>cal BC 569-402</td>
<td>UBA-31804</td>
</tr>
</tbody>
</table>

* indicates date included in the stratigraphic diagrams (Fig. 3 and Fig. 4), calibrated using Intcal13.14c (Reimer et al. 2013).

**Electronic Supplementary Material (ESM) 2** A comparison of Shannon’s Diversity Index (SDI) values calculated using unrarefied and rarefied testate amoeba count data.

**Rationale:** The counting of entire aliquots to determine testate amoeba sample concentrations can result in different count sizes above the minimum threshold of 150. To check whether this caused variation in the SDI values, the testate amoeba data were subjected to rarefaction (Birks 2012) and standardised to 150 specimens per sample using the ‘rrarefy’ function in the vegan package (Oksanen et al. 2017) in R version 3.3.2 (R Development Core Team 2016) (see Figure 1 below).

**Results:** The rarefied samples display very similar SDI values to those derived from the original counts suggesting that variations in count sizes above the minimum threshold of 150 do not significantly bias the SDI values. Consequently, the original SDI values were retained in this study.

![Figure 1](image)

**Figure 1** Graph showing SDI values from core LEVE14 calculated based on rarefied and unrarefied testate amoeba data.
References

