Time and Change in Mesolithic Britain *c*. 9800–3600 cal BC

By CHANTAL CONNELLER and SEREN GRIFFITHS

APPENDIX S1: SUPPLEMENTARY RESOURCES

Additional analytical considerations for specific sites

The site of Netherhall (Clarke *et al.* 2022) appears to be multi-phase with Deepcar and VLS lithics present at the site. Ten radiocarbon measurements were produced as pairs of measurements from five deposits. We suggest that three results (SUERC–88683, -88684, -88688) represent measurements on redeposited material. Each of these measurements is much older than the paired measurement from the same deposits. While these earlier measurements may be associated with the Deepcar industry found at the site, as they appear to be redeposited this association cannot be regarded as robust, and the results have not been included in the assembly type analysis presented here. Results from Netherhall are therefore only included as estimates for the use of the VSL lithic assemblages which dominate the parent deposits.

At North Park Farm, Area 11, a stratigraphic relationship exists between the results from hearth 160 (see Table 1) and these results have been presented accordingly.

A single result from Lon Mor (AA-17452) has not been included in the analysis presented here. This result is much later than the other results associated with LLS from this site and had low agreement in initial analysis.

Clarke, A., Kirby, M., Alldritt, D. & Brown, F., 2022. Tuff, flint, and hazelnuts: Final Palaeolithic and Mesolithic occupation at Netherhall Road, Maryport, Cumbria. *Internet Archaeology* 59, https://doi.org/10.11141/ia.59.4

Griffiths, S. & Staff, R. 2022. Analysing datasets – Bayesian inference and archaeological chronometric data. In S. Griffiths (ed.), *Scientific Dating in Archaeology*, 153–92. Oxford: Studying Scientific Archaeology 5

Typological analysis code

//NB users will have to recalculate posterior distributions for Star Carr and Howick or remove these distributions. The code that we have used for these sites is given below the typological analysis. The colours refer to Figure 7 in the main paper.

```
Options()
 {
  kIterations=20000;
 };
 Plot()
 {
  Phase("British mesolithic")
  {
   Sequence()
   {
    Boundary("start_early_mesolithic_forms")
           {
     color="Magenta";
    };
    Phase("early mesolithic forms")
           {
     color="Magenta";
     Phase("EM Star Carr")
     {
      Phase("Broxbourne 104")
```

```
{
 R_Date("Q-3033", 9350, 120)
        {
  color="Magenta";
  longitude=0.00083642259;
  latitude=51.755447;
 };
};
Phase("Seamer C")
{
 R_Date("HAR-5793", 9320, 150)
 {
  color="Magenta";
  longitude=-0.4234;
  latitude=54.2133;
 };
 R_Date("HAR-5238", 9300, 110)
 {
  color="Magenta";
  longitude=-0.4234;
  latitude=54.2133;
 };
};
Phase("Seamer K Star Carr phase")
{
 R_Date("HAR-5794", 9590, 120)
 {
  color="Magenta";
  longitude=-0.4154;
  latitude=54.2231;
 };
};
Phase("human activity at Star Carr")
{
 Prior("start_Star_Carr")
 {
  color="Magenta";
  longitude=-0.4234;
  latitude=54.2133;
 };
 Prior("end_Star_Carr")
 {
  color="Magenta";
  longitude=-0.4234;
  latitude=54.2133;
 };
};
First("first_Star_Carr")
       {
 color="Magenta";
};
```

```
 Last("last_Star_Carr")
 {
  color="Magenta";
 };
 Span("span_Star_Carr");
};
Phase("EM Deepcar")
{
 Phase("Broxbourne 106")
 {
  R_Date("Q-1146", 9360, 150)
  {
   color="Magenta";
   longitude=-0.0019;
   latitude=51.755;
  };
 };
 Phase("Faraday Road")
 {
  R_Date("NZA-11038", 9148, 60)
  {
   color="Magenta";
   longitude=-0.768;
   latitude=52.4214;
  };
 };
 Phase("Greenham Dairy Farm")
 {
  R_Date("OxA-5194", 9120, 80)
  {
   color="Magenta";
   longitude=-1.3185;
   latitude=51.4049;
  };
  //uncertain association with diagnostic lithic type Q-973, 8779, 110
 };
 Phase("Greylake")
 {
  R_Date("OxA-25666", 9170, 40)
  {
   color="Magenta";
   longitude=-2.8696705;
   latitude=51.098466;
  };
  R_Date("Wk-30931", 9134, 37)
  {
   color="Magenta";
   longitude=-2.8696705;
   latitude=51.098466;
  };
  R_Date("Wk-30930", 9118, 37)
```

```
 {
  color="Magenta";
  longitude=-2.8696705;
  latitude=51.098466;
 };
};
Phase("Lackford Heath")
{
 R_Date("OxA-2342", 9240, 110)
 {
  color="Magenta";
  longitude=0.6143;
  latitude=52.3096;
 };
};
Phase("Little Holtby")
{
 R_Date("SUERC-67554", 9173, 31)
 {
  color="Magenta";
  longitude=-1.5764419;
  latitude=54.318791;
 };
 R_Date("SUERC-67553", 9148, 31)
 {
  color="Magenta";
  longitude=-1.5764419;
  latitude=54.318791;
 };
};
Phase("Marsh Benham")
{
 //bulked including potential old wood Q-1129, 9300, 150
 R_Date("OxA-5195", 8905, 80)
 {
  color="Magenta";
  longitude=-1.3962;
  latitude=51.4018;
 };
};
Phase("Newbury Sewage works")
{
 R_Date("BM-2744", 9100, 80)
 {
  color="Magenta";
  longitude=-1.2812;
  latitude=51.3993;
 };
};
Phase("Oakhanger V/ VII")
{
```

```
 R_Date("Q-1489", 9225, 170)
 {
  color="Magenta";
  longitude=-0.8898;
  latitude=51.1148;
 };
};
Phase("Sanderson Site")
{
 R_Date("Beta-200075", 9230, 50)
 {
  color="Magenta";
  longitude=-0.481547639124031;
  latitude=51.5541276729596;
 };
};
Phase("Thatcham III")
{
 R_Date("OxA-2848", 9200, 90)
 {
  color="Magenta";
  longitude=-1.2783;
  latitude=51.3975;
 };
};
Phase("Three Ways Wharf")
{
 R_Date("OxA-5559", 9200, 75)
 {
  color="Magenta";
  longitude=-0.483800989130582;
  latitude=51.5501283516045;
 };
 R_Date("OxA-5557", 9280, 110)
 {
  color="Magenta";
  longitude=-0.483800989130582;
  latitude=51.5501283516045;
 };
 R_Date("OxA-5558", 9265, 80)
 {
  color="Magenta";
  longitude=-0.483800989130582;
  latitude=51.5501283516045;
 };
};
Phase("Westhampnett")
{
 R_Date("OxA-4168", 9120, 90)
 {
  color="Magenta";
```

```
  longitude=-0.7541;
  latitude=50.8408;
  };
 };
 Phase("Windy Hill Farm")
 {
  R_Date("OxA-38629", 9203, 30)
  {
   color="Magenta";
   longitude=-2.0414033;
   latitude=53.623241;
  };
  R_Date("OxA-38628", 9173, 29)
  {
   color="Magenta";
   longitude=-2.0414033;
   latitude=53.623241;
  };
 };
 First("first_Deepcarr")
 {
  color="Magenta";
 };
 Last("last_Deepcarr")
 {
        color="Magenta";
 };
 Span("span_Deepcarr");
};
Phase("EM Crammond")
{
 Sequence()
 {
  Boundary("start_Crammond_site")
  {
   color="Magenta";
   longitude=-3.2999395;
   latitude=55.978849;
  };
  Phase("Crammond site")
  {
   R_Date("OxA-10180", 9250, 60)
   {
    color="Magenta";
   };
   R_Date("OxA-10145", 9230, 50)
   {
    color="Magenta";
   };
   R_Date("OxA-10143", 9150, 45)
   {
```

```
   color="Magenta";
  };
  R_Date("OxA-10179", 9130, 65)
  {
   color="Magenta";
  };
  R_Date("OxA-10144", 9110, 60)
  {
   color="Magenta";
  };
  R_Date("OxA-10178", 9105, 65)
  {
   color="Magenta";
  };
 };
 Boundary("end_Crammond_site")
 {
  color="Magenta";
  longitude=-3.2999395;
  latitude=55.978849;
 };
};
};
Phase("EM Nab Head")
{
 Phase("Daylight Rock")
 {
  R_Date("OxA-2245", 9040, 90)
  {
   color="Magenta";
   longitude=-4.6752;
   latitude=51.6372;
  };
  R_Date("OxA-2246", 9030, 80)
  {
   color="Magenta";
   longitude=-4.6752;
   latitude=51.6372;
  };
  R_Date("OxA-2247", 8850, 80)
  {
   color="Magenta";
   longitude=-4.6752;
   latitude=51.6372;
  };
 };
 Phase("Nab Head Site I")
 {
  R_Date("OxA-1495", 9210, 80)
  {
   color="Magenta";
```

```
    longitude=-5.2009;
    latitude=51.7536;
   };
   R_Date("OxA-1496", 9110, 80)
   {
    color="Magenta";
    longitude=-5.2009;
    latitude=51.7536;
   };
  };
  First("first_Nab_Head")
  {
   color="Magenta";
  };
  Last("last_Nab_Head")
  {
   color="Magenta";
  };
  Span("span_Nab_Head");
 };
 First("first_early_mesolithic_forms")
 {
  color="Magenta";
 };
 Last("last_early_mesolithic_forms")
 {
  color="Magenta";
 };
 Span("span_early_mesolithic_forms");
};
Boundary("end_early_mesolithic_forms")
        {
 color="Magenta";
};
};
Sequence()
{
 Boundary("start_middle_mesolithic_forms")
        {
  color="Blue";
 };
 Phase("middle mesolithic forms")
        {
  Phase("Honey Hill")
  {
   Sequence("Asfordby")
   {
    Boundary("start_Asfordby")
    {
     color="Blue";
     longitude=-0.96251897;
```

```
 latitude=52.76586;
};
Phase("Asfordby")
{
 R_Date("OxA-25751", 8848, 39)
 {
  color="Blue";
 };
 R_Date("OxA-27069", 8759, 37)
 {
  color="Blue";
 };
 R_Date("SUERC-38120", 8930, 35)
 {
  color="Blue";
 };
 R_Date("SUERC-24080", 8898, 27)
 {
  color="Blue";
 };
 R_Date("OxA-25748", 8885, 40)
 {
  color="Blue";
 };
 R_Date("OxA-25747", 8876, 40)
 {
  color="Blue";
 };
 R_Date("OxA-27125", 8870, 45)
 {
  color="Blue";
 };
 R_Date("OxA-27070", 8825, 40)
 {
  color="Blue";
 };
 R_Date("OxA-27124", 8800, 45)
 {
  color="Blue";
 };
 R_Date("OxA-25746", 8734, 39)
 {
  color="Blue";
 };
 R_Date("SUERC-38121", 8705, 35)
 {
  color="Blue";
 };
 R_Date("SUERC-381119", 8690, 35)
 {
  color="Blue";
```

```
 };
 R_Date("OxA-25728", 8690, 39)
 {
  color="Blue";
 };
 R_Date("SUERC-381114", 8600, 35)
 {
  color="Blue";
 };
 R_Date("SUERC-38118", 8575, 35)
 {
  color="Blue";
 };
 R_Date("OxA-27068", 8471, 35)
 {
  color="Blue";
 };
 R_Date("OxA-27101", 8345, 40)
 {
  color="Blue";
 };
 R_Date("SUERC-24079", 8278, 26)
 {
  color="Blue";
 };
};
Boundary("end_Asfordby")
{
 color="Blue";
 longitude=-0.96251897;
 latitude=52.76586;
};
};
Phase("Spong Hill")
{
 R_Date("HAR-7063", 8280, 80)
 {
  color="Blue";
  longitude=0.9333;
  latitude=52.7383;
 };
};
First("first_Honey_Hill_forms")
{
 color="Blue";
};
Last("last_Honey_Hill_forms")
{
 color="Blue";
};
Span("span_Honey_Hill_forms");
```

```
};
Phase("VSL")
{
 Phase("Filpoke Beacon")
 {
  R_Date("Q-1474", 8760, 140)
  {
   color="Blue";
   longitude=-1.2623;
   latitude=54.7301;
  };
 };
 Sequence( "Howick")
 {
  Prior( "start_structure")
  {
   color="Blue";
   longitude=-1.5889131;
   latitude=55.441329;
  };
  Prior( "end_structure")
  {
   color="Blue";
   longitude=-1.5889131;
   latitude=55.441329;
  };
 };
 Sequence()
 {
  Boundary("start_Kinloch_VSL")
  {
   color="Blue";
   longitude=-6.2789;
   latitude=57.0162;
  };
  Phase("Kinloch VSL")
  {
   R_Date("GU-1873", 8590, 95)
   {
    color="Blue";
   };
   R_Date("GU-1874", 8515, 190)
   {
    color="Blue";
   };
   R_Date("GU-2040b", 8490, 70)
   {
    color="Blue";
   };
   R_Date("GU-1873b", 8360, 70)
   {
```

```
  color="Blue";
 };
};
Boundary("end_Kinloch_VSL")
{
 color="Blue";
 longitude=-6.2789;
 latitude=57.0162;
};
};
Phase("Lightmarsh Farm")
{
 Phase("OxA-4327")
 {
  color="Blue";
  longitude=-2.3086;
  latitude=52.3911;
 };
};
Sequence()
{
 Boundary("start Netherhall")
 {
  color="Blue";
  longitude=-3.490908;
  latitude=54.718098;
 };
 Phase("Netherhall")
 {
  Phase("pit 400")
  {
   R_Date("SUERC-88684",9212,24)
   {
       Outlier();
   };
   R_Date("SUERC-88685",8952,24)
   {
    color="Blue";
   };
  };
  Phase("pit 411")
  {
   R_Date("SUERC-88686",8966,24)
   {
    color="Blue";
   };
   R_Date("SUERC-88687",8970,24)
   {
    color="Blue";
   };
  };
```

```
 Phase("layer 105")
 {
  R_Date("SUERC-88677",8863,22)
  {
   color="Blue";
  };
  R_Date("SUERC-88678",8849,24)
  {
   color="Blue";
  };
 };
 Phase("layer 106")
 {
  R_Date("SUERC-88679",8905,23)
  {
   color="Blue";
  };
  R_Date("SUERC-88683",9923,20)
  {
   Outlier();
  };
 };
 Phase("pit 513")
 {
  R_Date("SUERC-88688",9200,24)
  {
   Outlier();
  };
  R_Date("SUERC-88689",8999,24)
  {
   color="Blue";
  };
 };
};
 Boundary("end Netherhall")
 {
  color="Blue";
  longitude=-3.490908;
  latitude=54.718098;
 };
};
Phase("Prestatyn (Bryn Newydd)")
{
 R_Date("OxA-2269", 8730, 90)
 {
  color="Blue";
  longitude=-3.4115;
  latitude=53.3263;
 };
 R_Date("OxA-2268", 8700, 100)
 {
```

```
  color="Blue";
  longitude=-3.4115;
  latitude=53.3263;
 };
};
Sequence()
{
 Boundary("start_Snail_Cave_Rock_Shelter")
 {
  color="Blue";
  longitude=-3.8326072;
  latitude=53.336112;
 };
 Phase("Snail Cave Rock Shelter")
 {
  R_Date("SUERC-37670", 8870, 30)
  {
   color="Blue";
  };
  R_Date("SUERC-42947", 8862, 31)
  {
   color="Blue";
  };
  R_Date("SUERC-42946", 8788, 31)
  {
   color="Blue";
  };
  //duck feeding on plant material and insects may include an aquatic offset SUERC-45181, 8636, 28
 };
 Boundary("end_Snail_Cave_Rock_Shelter")
 {
  color="Blue";
  longitude=-3.8326072;
  latitude=53.336112;
 };
};
First("first_variably_lateralised scalenes_forms")
{
 color="Blue";
};
Last("last_variably_lateralised scalenes_forms")
{
 color="Blue";
};
Span("span_variably_lateralised scalenes_forms");
};
        Phase("Horsham")
{
 Sequence()
 {
  Boundary("start_Kettlebury_103")
```

```
{
 color="Blue";
 longitude=-0.74611786;
 latitude=51.148937;
};
Phase("Kettlebury 103")
{
 R_Date("OxA-378", 8270, 120)
 {
  color="Blue";
 };
 R_Date("OxA-379", 7990, 120)
 {
  color="Blue";
 };
 R_Date("OxA-6395", 7990, 90)
 {
  color="Blue";
 };
 R_Date("OxA-3696", 7890, 80)
 {
  color="Blue";
 };
};
Boundary("end_Kettlebury_103")
{
 color="Blue";
 longitude=-0.74611786;
 latitude=51.148937;
};
};
Phase("Longmoor I")
{
 R_Date("OxA-376", 8930, 100)
 {
  color="Blue";
  longitude=-0.8768;
  latitude=51.0616;
 };
 R_Date("OxA-377", 8760, 110)
 {
  color="Blue";
  longitude=-0.8768;
  latitude=51.0616;
 };
};
Sequence()
{
 Boundary("start_North_Park_Farm_Bletchingly_middle_mesolithic")
 {
  color="Blue";
```

```
  longitude=-0.096185585;
  latitude=51.252036;
 };
 Phase("North Park Farm, Bletchingly middle mesolithic")
 {
  Phase("hearth 161")
  {
   R_Date("OxA-16905", 8275, 40)
   {
    color="Blue";
   };
   R_Date("SUERC-13955", 8275, 40)
   {
    color="Blue";
   };
  };
  Sequence("hearth 160")
  {
   R_Date("SUERC-12927", 8270, 35)
   {
    color="Blue";
   };
   R_Date("SUERC-13207", 8235, 35)
   {
    color="Blue";
   };
  };
 };
 Boundary("end_North_Park_Farm_Bletchingly_middle_mesolithic")
 {
  color="Blue";
  longitude=-0.096185585;
  latitude=51.252036;
 };
};
First("first_Horsham_forms")
{
 color="Blue";
};
Last("last_Horsham_forms")
{
 color="Blue";
};
Span("span_Horsham_forms");
};
First("first_middle_mesolithic_forms")
{
 color="Blue";
};
Last("last_middle_mesolithic_forms")
{
```

```
  color="Blue";
 };
 Span("span_middle_mesolithic_forms");
};
Boundary("end_middle_mesolithic_forms")
        {
 color="Blue";
};
};
Sequence()
{
Boundary("start_late_mesolithic_forms")
        {
 color="Cyan";
};
Phase("late mesolithic forms")
        {
 Phase("left lateralised scalenes")
 {
  Phase("Ascott-under-Wychwood")
         {
   R_Date("GrA-27098", 6180, 45)
   {
    color="Cyan";
    longitude=-1.5658;
    latitude=51.8553;
   };
   R_Date("GrA-27099", 6000, 45)
   {
    color="Cyan";
    longitude=-1.5658;
    latitude=51.8553;
   };
  };
  Phase("Auchareoch")
  {
   R_Date("OxA-1601", 8060, 90)
   {
    longitude=-5.1728;
    latitude=55.4749;
    color="Cyan";
   };
  };
  Phase("Bart's Shelter, Aldingham")
  {
   R_Date("OxA-8069", 7160, 60)
   {
    color="Cyan";
    longitude=-3.1176;
    latitude=54.1279;
   };
```

```
};
Phase("Broxbourne 105")
{
 R_Date("OxA-593", 7230, 150)
 {
  color="Cyan";
  longitude=-0.0016;
  latitude=51.7613;
 };
};
Phase("Caochanan Ruadha")
{
 R_Date("SUERC-58041", 7259, 30)
 {
  longitude=-3.7416645;
  latitude=56.96478;
  color="Cyan";
 };
 R_Date("SUERC-58040", 7252, 30)
 {
  longitude=-3.7416645;
  latitude=56.96478;
  color="Cyan";
 };
};
Phase("Falmer Stadium")
{
 R_Date("SUERC-32623", 7440, 40)
 {
  longitude=-0.0766;
  latitude=50.8571;
  color="Cyan";
 };
};
Phase("Goldcliffe A")
{
 R_Date("OxA-13928", 6629, 38)
 {
  color="Cyan";
  longitude=-2.9018495;
  latitude=51.532446;
 };
};
Phase("Lominot C")
{
 R_Date("OxA-9645", 6090, 55)
 {
  longitude=-1.9719;
  latitude=53.6119;
  color="Cyan";
 };
```

```
 R_Date("OxA-10211", 6085, 45)
 {
  longitude=-1.9719;
  latitude=53.6119;
  color="Cyan";
 };
 R_Date("OxA-10210", 6070, 45)
 {
  longitude=-1.9719;
  latitude=53.6119;
  color="Cyan";
 };
};
Phase("Lon Mor")
{
 //AA-17452 5420 65 too late for other results in this part of the model
 R_Date("AA-8793", 7385, 60)
 {
  color="Cyan";
  longitude=-5.4796;
  latitude=56.3991;
 };
 R_Date("AA-17457", 6240, 65)
 {
  color="Cyan";
  longitude=-5.4796;
  latitude=56.3991;
 };
};
Sequence()
{
 Boundary("start_March_Hill_llsc")
 {
  color="Cyan";
  longitude=-1.9879;
  latitude=53.6115;
 };
 Phase("March Hill llsc")
 {
  R_Date("OxA-6300", 5855, 40)
  {
   color="Cyan";
  };
  R_Date("OxA-6297", 5835, 35)
  {
   color="Cyan";
  };
  R_Date("OxA-6299", 5830, 35)
  {
   color="Cyan";
  };
```

```
 R_Date("UB-4051", 5824, 28)
 {
  color="Cyan";
 };
 R_Date("UB-4050", 5813, 22)
 {
  color="Cyan";
 };
 R_Date("UB-4052", 5796, 29)
 {
  color="Cyan";
 };
 R_Date("OxA-6296", 5790, 35)
 {
  color="Cyan";
 };
 R_Date("OxA-6298", 5745, 35)
 {
  color="Cyan";
 };
};
Boundary("end_March_Hill_llsc")
{
 color="Cyan";
 longitude=-1.9879;
 latitude=53.6115;
};
};
Sequence()
{
 Boundary("start_Norber_Cave")
 {
  color="Cyan";
  longitude=-2.3593949;
  latitude=54.125859;
 };
 Phase("Norber Cave")
 {
  R_Date("OxA-39460", 7951, 28)
  {
   color="Cyan";
  };
  R_Date("OxA-39461", 7768, 28)
  {
   color="Cyan";
  };
  R_Date("OxA-39459", 7734, 26)
  {
   color="Cyan";
  };
  R_Date("OxA-39462", 7642, 27)
```

```
 {
  color="Cyan";
 };
};
Boundary("end_Norber_Cave")
{
 color="Cyan";
 longitude=-2.3593949;
 latitude=54.125859;
};
};
Sequence()
{
Boundary("start_Standingstones")
        {
 color="Cyan";
 longitude=-2.2333844;
 latitude=57.207555;
};
Phase("Standingstones")
{
 Phase("Standingstones")
 {
  R_Date("SUERC-49726", 8026, 38)
  {
   color="Cyan";
  };
  R_Date("SUERC-68125", 7988, 29)
  {
   color="Cyan";
  };
  R_Date("SUERC-57938", 7985, 25)
  {
   color="Cyan";
        };
  R_Date("SUERC-68126", 7967, 30)
  {
   color="Cyan";
  };
  R_Date("SUERC-68124", 7960, 29)
  {
   color="Cyan";
  };
  R_Date("SUERC-57937", 7825, 30)
  {
   color="Cyan";
  };
 };
};
Boundary("end_Standingstones")
{
```

```
 color="Cyan";
 longitude=-2.2333844;
 latitude=57.207555;
};
};
Sequence()
{
 Boundary("start Staosnaig")
 {
  latitude=56.0617;
  longitude=-6.1810;
  color="Cyan";
 };
 Phase("Staosnaig")
 {
  R_Date("AA-21624", 7935, 55)
  {
   color="Cyan";
  };
  R_Date("AA-21621", 7780, 55)
  {
   color="Cyan";
  };
  R_Date("AA-21619", 7760, 55)
  {
   color="Cyan";
  };
  R_Date("Q-3278", 7720, 110)
  {
   color="Cyan";
  };
  R_Date("AA-21623", 7665, 55)
  {
   color="Cyan";
  };
  R_Date("AA-21622", 7660, 55)
  {
   color="Cyan";
  };
 };
 Boundary("end Staosnaig")
 {
  latitude=56.0617;
  longitude=-6.1810;
  color="Cyan";
 };
};
First("first_left_lateralised_scalenes")
{
 color="Cyan";
};
```

```
 Last("last_left_lateralised_scalenes")
 {
  color="Cyan";
 };
 Span("span_left_lateralised_scalenes");
};
First("first_late_mesolithic_forms")
{
 color="Cyan";
};
Last("last_late_mesolithic_forms")
{
 color="Cyan";
};
Span("span_late_mesolithic_forms")
{
 color="Cyan";
};
};
Boundary("end_late_mesolithic_forms")
        {
color="Cyan";
};
};
Sequence()
{
Boundary("start_final_mesolithic_forms")
        {
color="Red";
};
Phase("final mesolithic forms")
        {
         Phase("Stratford's Yard, Chesham")
 {
 R_Date("BM-2404", 5890, 100)
 {
  longitude=-0.6120;
  latitude=51.7036;
  color="Red";
 };
};
Phase("rods")
{
 Phase("Fir Tree Field Shaft")
 {
  R_Date("OxA-7987", 5275, 50)
  {
   color="Red";
   longitude=-1.9989527;
   latitude=50.93148;
  };
```

```
};
Phase("Lydstep rod")
{
 R_Date("OxA-1412", 5300, 100)
 {
  longitude=-4.75668;
  latitude=51.652893;
  color="Red";
 };
};
Sequence("March Hill rods")
{
 Boundary("start_March_Hill_rods")
 {
  color="Red";
  longitude=-1.9719;
  latitude=53.6119;
 };
 Phase("March Hill rods")
 {
  R_Date("OxA-6302", 5315, 35)
  {
   color="Red";
  };
  R_Date("OxA-6301", 5310, 45)
  {
   color="Red";
  };
  R_Date("OxA-6305", 5270, 45)
  {
   color="Red";
  };
  R_Date("OxA-6303", 5255, 30)
  {
   color="Red";
  };
  R_Date("OxA-6306", 5190, 45)
  {
   color="Red";
  };
  R_Date("OxA-6304", 5180, 30)
  {
   color="Red";
  };
  R_Date("UB-4053", 5271, 24)
  {
   color="Red";
  };
  First("first_March_Hill_rods")
  {
   color="Red";
```

```
   };
   Last("last_March_Hill_rods")
   {
    color="Red";
   };
  };
  Boundary("end_March_Hill_rods")
  {
   color="Red";
   longitude=-1.9719;
   latitude=53.6119;
  };
 };
 Phase("South Haw")
 {
  R_Date("Beta-189653", 5270, 40)
  {
   color="Red";
   longitude=-1.87118572589114;
   latitude=54.2057765184527;
  };
  R_Date("Beta-189652", 5010, 40)
  {
   color="Red";
   longitude=-1.87118572589114;
   latitude=54.2057765184527;
  };
 };
 First("first_rods")
 {
  color="Red";
 };
 Last("last_rods")
 {
  color="Red";
 };
 Span("span_rods");
};
First("first_final_mesolithic_forms")
{
 color="Red";
};
Last("last_final_mesolithic_forms")
{
 color="Red";
};
Span("span_final_mesolithic_forms")
{
 color="Red";
};
};
```

```
   Boundary("end_final_mesolithic_forms")
           {
    color="Red";
   };
  };
 };
};
```

Revised versions of the Starr Carr and Howick code

//NB users will have to recalculate posterior distributions for Star Carr and Howick from these or remove these distributions. The approaches we have presented here vary slightly in approach from the original published versions, see Griffiths & Staff (2022) for discussion. Readers should cite these approaches as Conneller and Griffiths and reference the original publications. Readers are advised that the Star Carr analysis is complex and includes composite palaeo-environmental sequences and anthropogenic activity; it may be advantageous to process elements of this approach individually and save the different constituent distributions in order to calculate the parameter 'start_Star_Carr' which estimates the anthropogenic activity.

```
//Howick
Plot()
 {
  Outlier_Model("General",T(5),U(0,4),"t");
  Sequence( "Howick")
  {
   Boundary( "start_structure");
   Sequence( "Mesolithic Hut")
   {
    Phase( "(Phase 1A)")
    {
     Phase( "Hearth 383")
     {
      R_Date( "OxA-12292", 8785, 40)
      {
       Outlier(1);
      };
      R_Date( "OxA-12402", 8885, 65)
      {
       Outlier(1);
      };
     };
     Sequence( "Hearths 379/357")
     {
      Phase( "Hearth 379")
      {
       R_Date( "OxA-11857", 8750, 45)
       {
        Outlier(1);
       };
       R_Date( "OxA-11856", 8785, 45)
       {
        Outlier(1);
       };
```

```
 };
 Phase( "Hearth 357")
 {
  R_Date( "OxA-11802", 8754, 38)
  {
   Outlier(1);
  };
 };
};
Sequence( "Hearths 355/291")
{
 Phase( "Hearth 355")
 {
  R_Date( "OxA-12327", 8725, 39)
  {
   Outlier(1);
  };
  R_Date( "OxA-11801", 8734, 37)
  {
   Outlier(1);
  };
 };
 Phase( "Hearth 291")
 {
  R_Date( "OxA-11803", 8763, 38)
  {
   Outlier(1);
  };
  R_Date( "OxA-12326", 8765, 40)
  {
   Outlier(1);
  };
 };
};
Sequence( "(Phase 1B)")
{
 Phase( "Hearth 340")
 {
  R_Date( "OxA-11804", 8802, 38)
  {
   Outlier(1);
  };
  R_Date( "OxA-12325", 8739, 39)
  {
   Outlier(1);
  };
 };
 Phase( "Hearth 293")
 {
  R_Date( "OxA-11828", 8785, 45)
```

```
 {
  Outlier(1);
 };
 R_Date( "OxA-11829", 8890, 45)
 {
  Outlier(1);
 };
};
Phase( "Hearth 268")
{
 R_Date( "OxA-11855", 8650, 45)
 {
  Outlier(1);
 };
 R_Date( "OxA-11854", 8710, 45)
 {
  Outlier(1);
 };
};
};
Date( "rebuild 1");
Phase( "(Phase 2)")
{
 Phase( "210")
 {
  Phase( "burnt patch 2")
  {
   R_Date( "OxA-12324", 8739, 39)
   {
    Outlier(1);
   };
   R_Date( "OxA-12347", 8710, 38)
   {
    Outlier(1);
   };
  };
 };
 Phase( "Hearth 158")
 {
  R_Date( "OxA-11853", 8790, 45)
  {
   Outlier(1);
  };
  R_Date( "OxA-11832", 8780, 45)
  {
   Outlier(1);
  };
 };
 Phase( "Hearth 109")
 {
  R_Date( "OxA-11830", 8715, 50)
```

```
    {
     Outlier(1);
    };
    R_Date( "OxA-11831", 8715, 45)
    {
     Outlier(1);
    };
   };
  };
  Date( "rebuild 2");
  Phase( "(Phase 3)")
  {
   Phase( "Hearth 051")
   {
    R_Date( "Beta-153650", 8730, 40)
    {
     Outlier(1);
    };
   };
   Phase( "Hearth 173")
   {
    R_Date( "OxA-11827", 8700, 45)
    {
     Outlier(1);
    };
    R_Date( "OxA-11826", 8630, 40)
    {
     Outlier(1);
    };
   };
   Phase( "Hearth 047")
   {
    R_Date( "OxA-11805", 8324, 37)
    {
     Outlier(1);
    };
    R_Date( "OxA-12294", 8690, 40)
    {
     Outlier(1);
    };
    R_Date( "AA-41788", 8555, 60)
    {
     Outlier(1);
    };
   };
  };
 };
 Boundary( "end_structure");
 Span( "use_hut");
};
};
```

```
//Star Carr
Plot()
 {
  Phase("Star Carr")
  {
   Phase("_central platform_")
   {
    Sequence("M1 & VP85A 2010")
    {
     After("TPQs for onset organics")
     {
      R_Date("CAR-1027", 9800, 80);
      R_Date("CAR-1021", 11010, 120);
     };
     P_Sequence("VP85 2010 & M1",100,0,U(-2,2))
     {
      Boundary("onset organics M1")
      {
       z=23.29;
      };
      R_Date("OxA-3351", 9630, 100)
      {
       z=23.305, 0.0025;
      };
      Date("base of reed peat M1")
      {
       z=23.35;
      };
      R_Date("OxA-3350", 9500, 70)
      {
       z=23.365, 0.0025;
      };
      R_Date("OxA-3349", 9640, 70)
      {
       z=23.4175, 0.00125;
      };
      R_Date("OxA-3348", 9700, 70)
      {
       z=23.4525, 0.00125;
      };
      R_Date("SUERC-36339", 9600, 35)
      {
       z=23.47, 0.00625;
      };
      Boundary("start seasonal flooding M1")
      {
       z=23.486;
      };
      Date("end of burning 1")
      {
```

```
 z=23.49;
};
R_Date("OxA-3347", 9680, 70)
{
 z=23.5075, 0.00125;
};
R_Date("OxA-3346", 9560, 70)
{
 z=23.555, 0.0025;
};
Date("start of burning 2")
{
 z=23.57;
};
R_Date("OxA-3345", 9580, 70)
{
 z=23.5975, 0.00125;
};
R_Date("OxA-3344", 9360, 70)
{
 z=23.6525, 0.00125;
};
Date("end of burning 2")
{
 z=23.68;
};
R_Date("OxA-3343", 9420, 70)
{
 z=23.7075, 0.00125;
};
Boundary("onset fen carr M1")
{
 z=23.71;
};
Date("burning 3")
{
 z=23.73;
};
R_Date("OxA-3342", 9390, 70)
{
 z=23.7575, 0.00125;
};
Date("first hazel")
{
 z=23.79;
};
R_Date("OxA-4376", 9385, 115)
{
 z=23.82, 0.005;
};
R_Date("OxA-25247", 8865, 40)
```

```
 {
  z=23.88, 0.01;
 };
 Date("start hazel rise")
 {
  z=23.91;
 };
 R_Date("OxA-4377", 8940, 90)
 {
  z=23.94, 0.005;
 };
 Date("hazel 50 TLP")
 {
  z=23.96;
 };
 Date("1st hazel peak")
 {
  z=23.97;
 };
 Boundary("end M1")
 {
  z=23.99;
 };
};
R_Date("CAR-1022", 8670, 90);
};
Sequence("between onset organics and start seasonal flooding")
{
 Date("=onset organics M1");
 After("TPQs for start seasonal flooding M1")
 {
  R_Date("CAR-919", 9510, 80);
  R_Date("CAR-1026", 9680, 110);
 };
 Date("=start seasonal flooding M1");
};
Sequence("around central platform")
{
 Date("=onset organics M1");
 After("TPQs for central platform")
 {
  R_Date("CAR-1020", 9720, 80);
  R_Date("CAR-1019", 9410, 110)
  {
   color="red";
   Outlier();
  };
  R_Date("CAR-928", 9670, 120);
  Date("=OxA-3349");
 };
 After("reused timber")
```

```
{
 R_Date("OxA-33574", 9735, 45);
};
Combine("central platform")
{
 R_Date("SUERC-65243", 9663, 31);
 R_Date("OxA-33731", 9675, 45);
 R_Date("SUERC-65247", 9629, 30);
 R_Combine("99726")
 {
  R_Date("SUERC-59168", 9650, 31);
  R_Date("OxA-32318", 9460, 65);
 };
 R_Combine("99738")
 {
  R_Date("OxA-32146", 9660, 45);
  R_Date("SUERC-59169", 9702, 45);
 };
 R_Date("CAR-926", 9240, 90)
 {
  Outlier("red");
  color="red";
 };
};
Phase("later than central platform")
{
 Combine("burnt area 318")
 {
  R_Date("SUERC-65241", 9606, 30);
  R_Date("OxA-33570", 9580, 50);
 };
 Sequence("225 & 224")
 {
  Phase("225")
  {
   R_Date("SUERC-36338", 9555, 35);
   R_Date("OxA-25246", 9515, 40);
   After("aquatics")
   {
    R_Date("CAR-924", 9320, 80);
   };
  };
  Phase("224")
  {
   R_Combine("S246")
   {
    R_Date("OxA-26561", 9305, 45);
    R_Date("SUERC-40160", 9415, 30);
   };
  };
 };
```

```
  Sequence("VP85A/2")
  {
   After("aquatics")
   {
    R_Date("CAR-1018", 9410, 110);
   };
   R_Date("CAR-1017", 8580, 90);
  };
 };
};
Sequence("upper part of VP85A/3")
{
 Date("=start seasonal flooding M1");
 After("aquatics")
 {
  R_Date("CAR-1025", 9480, 100);
  R_Date("CAR-1024", 9540, 110);
 };
 Phase("around level of auroch metatarsal <56>")
 {
  R_Date("CAR-923", 9030, 100)
  {
   color="red";
   Outlier();
  };
  R_Date("OxA-1176", 9700, 160)
  {
   color="red";
   Outlier();
  };
  R_Date("CAR-1023", 9290, 60);
 };
 Date("=CAR-1022");
};
};
P_Sequence("Profile 3178",100,0,U(-2,2))
{
 Boundary("base 3178")
 {
  z=23.035;
 };
 After("sand (320)")
 {
  R_Combine("110553")
  {
   R_Date("SUERC-65242", 9977, 30);
   R_Date("OxA-32056", 10010, 40);
  };
 };
 Date("onset organics 3178")
 {
```

```
 z=23.0475;
};
R_Date("SUERC-65229", 10095, 30)
{
 z=23.0725, 0.00625;
};
R_Combine("base of reed peat 3178")
{
 z=23.225, 0.00625;
 R_Date("SUERC-65228", 9559, 31);
 R_Date("OxA-33699", 9740, 65);
};
R_Combine("start seasonal flooding 3178")
{
 z=23.2475, 0.00625;
 R_Date("OxA-33698", 9555, 55);
 R_Date("SUERC-65227", 9583, 30);
};
R_Date("SUERC-65223", 9290, 30)
{
 z=23.66, 0.0125;
};
Boundary("top 3178")
{
 z=23.84;
};
};
Phase("_western platform_")
{
 P_Sequence("CII 2010",100,0,U(-2,2))
 {
  Boundary("base CII 2010")
  {
   z=23.42;
  };
  Date("onset organics CII")
  {
   z=23.44;
  };
  Combine("23.495m")
  {
   z=23.495;
   R_Date("OxA-25238", 9735, 40);
   R_Date("SUERC-36348", 9710, 35);
  };
  Date("base of reed peat CII")
  {
   z=23.56;
  };
  Date("start seasonal flooding CII")
  {
```

```
 z=23.57;
};
R_Date("OxA-25239", 9400, 40)
{
 z=23.70;
};
Date("TPQ fen flint")
{
 z=23.77;
};
Date("onset fen carr CII")
{
 z=23.87;
};
Combine("24.05m")
{
 z=24.05;
 R_Date("OxA-25242", 8810, 40);
 R_Date("SUERC-36354", 8845, 35);
};
Boundary("top CII 2010")
{
 z=24.08;
};
};
Sequence("western platform area")
{
Date("=onset organics CII");
Phase("below western platform")
{
 After("in basal sand")
 {
  R_Date("OxA-32319", 9540, 50);
 };
 R_Date("SUERC-59176", 9670, 31);
 R_Date("OxA-32055", 9766, 39);
 Sequence("98 & 97")
 {
  Phase("98")
  {
   R_Date("SUERC-36343", 9680, 30);
   R_Date("OxA-25199", 9765, 50);
  };
  Phase("97")
  {
   R_Date("SUERC-36344", 9590, 35);
   R_Date("OxA-26563", 9650, 45);
   After("reworked")
   {
    R_Date("OxA-25200", 9765, 45);
   };
```

```
  };
 };
 Date("=start seasonal flooding CII");
};
Phase("western platform timbers")
{
 After("salvaged timbers")
 {
  R_Combine("timber [46]")
  {
   R_Date("Hd-30440", 9606, 22);
   R_Date("SUERC-40169", 9585, 30);
   R_Date("OxA-26479", 9595, 50);
  };
 };
 Combine("western platform")
 {
  R_Combine("timber [50] other")
  {
   R_Date("SUERC-40168", 9510, 30);
   R_Date("OxA-X-2475-22", 9570, 90);
  };
  R_Combine("timber [48]")
  {
   R_Date("MAMS-18277", 9441, 26);
   R_Date("SUERC-40170", 9515, 45);
  };
  R_Date("Hd-30193", 9463, 18);
  R_Date("Hd-30201", 9451, 34);
 };
 Phase("innaccurate measurements")
 {
  R_Combine("timber [50] Hd")
  {
   color="red";
   Outlier();
   R_Date("Hd-30439", 9302, 23);
   R_Date("Hd-30200", 9359, 22);
  };
  R_Date("Hd-30167", 8951, 18)
  {
   color="red";
   Outlier();
  };
 };
};
Phase("93, bark matt & 84")
{
 Sequence("93 & 84")
 {
  Phase("93")
```

```
{
 R_Combine("453")
 {
  R_Date("SUERC-40164", 9445, 30);
  R_Date("OxA-25201", 9550, 45);
 };
 R_Combine("455")
 {
  R_Date("OxA-26562", 9545, 55);
 };
 Sequence("SC22")
 {
  Boundary("start SC22");
  Sequence("SC22")
  {
   Phase("(39)")
   {
    R_Date("Hd-30190", 9611, 20);
    R_Date("Hd-30168", 9481, 20);
    R_Combine("82705")
    {
     R_Date("SUERC-40161", 9525, 30);
     R_Date("OxA-26560", 9540, 45);
     R_Date("MAMS-18276", 9433, 26);
    };
    R_Combine("82706")
    {
     R_Date("SUERC-40162", 9505, 30);
     R_Date("OxA-26478", 9755, 60)
     {
     Outlier();
     };
    };
   };
   Phase("(35)")
   {
    R_Date("OxA-16810", 9275, 40)
    {
     color="red";
     Outlier();
    };
    R_Date("OxA-16809", 9355, 40)
    {
     color="red";
     Outlier();
    };
    After("reworked")
    {
     R_Date("OxA-25088", 9580, 45);
    };
    R_Date("SUERC-36355", 9450, 35)
```

```
  {
  };
 };
 Date("SC22 scatter");
 Phase("(34)")
 {
  R_Date("Hd-30192", 9375, 20);
  R_Date("SUERC-40163", 9455, 30);
  After("reworked")
  {
   R_Date("SUERC-36356", 9560, 35);
   R_Combine("roundwood 4.2")
   {
   R_Date("OxA-26558", 9515, 45);
   R_Date("OxA-26559", 9525, 45);
   };
  };
 };
};
Boundary("end SC22");
};
P_Sequence("Dark's Clark site profile",100,0,U(-2,2))
{
 Boundary("onset organics DCS")
 {
  z=23.41;
 };
 Date("start seasonal flooding DCS")
 {
  z=23.51;
 };
 R_Date("OxA-4799", 9500, 75)
 {
  z=23.53;
 };
 R_Date("OxA-4798", 9260, 100)
 {
  z=23.60;
 };
 Date("onset fen carr DCS")
 {
  z=23.71;
 };
 R_Date("OxA-4797", 9385, 80)
 {
  z=23.76;
 };
 Boundary("top Dark's Clark site profile")
 {
  z=23.88;
 };
```

```
    };
   };
  };
 };
};
};
Sequence("human activity at Star Carr")
{
 Boundary("start Star Carr");
 Phase("human activity at Star Carr")
 {
  Phase("burning episodes in M1")
  {
   Date("=OxA-3349");
   Date("=end of burning 1");
   Date("=start of burning 2");
   Date("=end of burning 2");
   Date("=burning 3");
  };
  Sequence("artefacts from VP85A")
  {
   Boundary("start VP85A");
   Phase("artefacts")
   {
    After("auroch skull <150> aquatics")
    {
     Date("=CAR-924");
    };
    R_Date("OxA-1154",9500,120);
    After("around charcoal <153> (aquatics)")
    {
     R_Date("CAR-930",9660,110);
    };
    Phase("around barbed point <245>")
    {
     R_Date("CAR-925",9260,100);
    };
    Sequence("around antler <216>")
    {
     After("below (aquatics)")
     {
      R_Date("CAR-1047",9690,110);
     };
     R_Date("CAR-922",9250,80);
     Before("above")
     {
      R_Date("CAR-1050",9310,80);
     };
    };
   };
```

```
 Boundary("end VP85A");
};
Sequence("detrital wood scatter")
{
 Boundary("start wood scatter");
 Phase("detrital wood scatter")
 {
  Sequence("detrital wood scatter")
  {
   After("onset organics")
   {
    Date("=onset organics 3178");
   };
   Phase("317")
   {
    R_Date("SUERC-59178",9723,31);
    Sequence("108966-7 & 109030")
    {
     R_Combine("108967")
     {
      R_Date("OxA-32062",9645,45);
      R_Date("SUERC-59184",9611,37);
     };
     R_Combine("108966")
     {
      R_Date("OxA-32061",9680,45);
      R_Date("SUERC-59180",9608,39);
     };
    };
    R_Date("SUERC-59179",9743,31);
    R_Date("OxA-33671",9520,45);
    R_Date("SUERC-66181",9780,32);
    R_Date("OxA-33673",9585,45);
   };
   Date("=base of reed peat 3178");
   Sequence("312")
   {
    Phase("lower")
    {
     R_Combine("99528")
     {
      R_Date("SUERC-66179",9538,35);
      R_Date("OxA-33672",9545,45);
     };
     R_Date("SUERC-66180",9553,33);
    };
    R_Date("OxA-33668",9570,45);
   };
  };
  Sequence("108941 & 109559")
  {
```

```
  R_Combine("<108941>")
  {
   R_Date("OxA-32063",9820,45);
   R_Date("SUERC-59185",9779,40);
  };
  Date("=SUERC-59178");
 };
 Span("use wood scatter");
};
Boundary("end wood scatter");
Date("=SUERC-65223");
};
Sequence("brushwood")
{
Boundary("start brushwood");
Phase("brushwood")
{
 Date("=SUERC-59176");
 Date("=OxA-32319");
 Date("=OxA-32055");
 Date("=OxA-32059");
 Date("=OxA-32320");
 Date("=OxA-32060");
 Date("=SUERC-59175");
 Date("=SUERC-59174");
 Date("=SUERC-59170");
};
Boundary("end brushwood");
Span("use brushwood");
};
Phase("platforms")
{
Date("=western platform");
Date("=central platform");
Sequence("eastern platform")
{
 After("317")
 {
  R_Date("SUERC-66037",9762,29);
  Date("=start seasonal flooding M1");
 };
 Phase("eastern platform")
 {
  R_Date("OxA-33662",9525,45);
 };
 Before("312")
 {
  R_Date("OxA-33713",9320,50);
  R_Date("SUERC-66036",9512,29);
 };
};
```

```
};
Sequence("Clark's deposition area")
{
 Boundary("start Clark area");
 Phase("Clark's deposition area")
 {
  Phase("Clark's deposition area")
  {
   Phase("[463]")
   {
    R_Combine("barbed point [463]")
    {
     R_Date("OxA-10808",9505,60);
     R_Date("OxA-21236",9561,38);
    };
    R_Date("OxA-4451",9120,150)
    {
     color="red";
     Outlier();
    };
   };
   Phase("[460]")
   {
    R_Combine("antler splinter [460]")
    {
     R_Date("OxA-21237",9585,39);
     R_Date("OxA-10809",9530,55)
     {
     };
    };
    R_Date("OxA-4450",9060,220)
    {
     color="red";
     Outlier();
    };
   };
   R_Combine("antler crown [461]")
   {
    R_Date("OxA-4577",9670,100);
    R_Date("OxA-21238",9485,38);
   };
   R_Combine("antler tine [465]")
   {
    R_Date("OxA-21239",9468,38);
    R_Date("OxA-4578",9590,90);
   };
  };
  Phase("2004-15 excavations")
  {
   R_Date("OxA-33675",9465,45);
   R_Date("SUERC-66186",9518,35);
```

```
  R_Date("SUERC-66182",9531,35);
  R_Date("OxA-33677",9490,45);
  R_Date("OxA-33676",9560,45);
  R_Date("SUERC-66178",9529,35);
  R_Date("SUERC-66187",9479,35);
 };
};
Boundary("end Clark area");
Span("use Clark area");
};
Sequence("birch bark rolls in reed peat in Clark's deposition area")
{
Boundary("start reed peat in Clark area");
Phase("birch bark rolls in peat in Clark's depostion area")
{
 R_Date("SUERC-66048",9600,28);
 R_Date("OxA-33667",9580,45);
 R_Combine("115195")
 {
  R_Date("OxA-33669",9465,45);
  R_Date("OxA-33670",9490,45);
 };
 R_Date("SUERC-66049",9389,29);
};
Boundary("end human in reed peat in Clark area");
};
Sequence("peat over marl")
{
Boundary("start peat over marl");
After("base of (234)")
{
 R_Date("SUERC-36349",9510,35);
};
Phase("activity in peat over marl")
{
 R_Date("SUERC-66046",9577,28);
 R_Date("OxA-33666",9640,40);
 R_Date("SUERC-66044",9562,29);
 R_Date("OxA-33678",9680,50);
};
Before("(233)")
{
 R_Date("SUERC-36353",8890,35);
 R_Date("OxA-25241",8883,39);
};
Boundary("end peat over marl");
};
Sequence("flint N of CIII")
{
Boundary("start N of CIII");
Sequence("birch bark rolls & bead manufacturing")
```

```
{
 Phase("312 (base of flint scatter)")
 {
  R_Date("SUERC-66039",9552,30);
  R_Date("OxA-33663",9550,40);
 };
 Phase("310 (bead manufacturing level)")
 {
  R_Date("OxA-33664",9660,45);
  R_Date("SUERC-66043",9448,27);
 };
};
Boundary("end N of CIII");
};
Phase("dispersed episodes at lake edge")
{
Date("=burnt area 318");
Phase("bark mat")
{
 Date("=SUERC-59177");
};
After("TPQ for fen flint")
{
 Date("=TPQ fen flint");
};
Phase("SC22")
{
 Date("=SC22 scatter");
 Date("=OxA-16810")
 {
  Outlier();
  color="red";
 };
 Date("=OxA-16809")
 {
  Outlier();
  color="red";
 };
};
Phase("Clark's excavations")
{
 R_Date("OxA-V-994-33", 9680, 55);
 R_Date("KIA-307034", 9342, 41);
 R_Date("OxA-2343", 9350, 90);
 R_Combine("C-353/Q-14")
 {
  Outlier();
  R_Date("C-353", 9488, 350);
  R_Date("Q-14", 9557, 210);
 };
};
```

```
 Phase("birch bark rolls at N end of CII")
 {
  R_Date("SUERC-66045", 9519, 29);
  R_Date("OxA-33665", 9500, 45);
 };
 Sequence("S end of CII")
 {
  After("base of (234)")
  {
   Date("=SUERC-36349");
  };
  Phase("(234)")
  {
   R_Date("OxA-25240", 9470, 45);
   R_Date("SUERC-66047", 9518, 29);
  };
  Before("(233)")
  {
   Date("=SUERC-36353");
   Date("=OxA-25241");
  };
 };
 Phase("later activity in Clark's deposition area")
 {
  R_Combine("115876")
  {
   R_Date("SUERC-66177", 9431, 32);
   R_Date("OxA-33674", 9345, 50);
  };
 };
};
Phase("dryland activity")
{
 Sequence("eastern dryland structure")
 {
  Boundary("start east structure");
  Phase("eastern dryland structure")
  {
   R_Date("SUERC-65237",9556,30);
   R_Date("SUERC-65233",9587,32);
   R_Date("OxA-33700",9540,55);
   R_Date("SUERC-65232",9519,31);
   Span("use east structure");
  };
  Boundary("end east structure");
 };
 Sequence("western dryland structure")
 {
  Boundary("start west structure");
  Phase("western dryland structure")
  {
```

```
     R_Date("SUERC-65230",9542,30);
     R_Date("OxA-33703",9585,55);
     R_Date("OxA-33571",9515,50);
     R_Date("SUERC-65222",9524,30);
     Span("use west structure");
    };
    Boundary("end west structure");
   };
   Sequence("activity around central dryland structure")
   {
    Boundary("start 330");
    Phase("central dryland structure")
    {
     Phase("central depression 330")
     {
      R_Combine("1955D")
      {
       R_Date("OxA-33569",9710,50);
       R_Date("OxA-33701",9765,55);
      };
      R_Date("SUERC-65239",9754,32);
      R_Date("SUERC-65238",9221,30);
     };
     Phase("post-hole 338")
     {
      R_Date("SUERC-65240",9536,31);
      R_Date("OxA-33702",9460,50);
     };
    };
    Boundary("end 330");
   };
  };
 };
 Boundary("end Star Carr");
 Span("use Star Carr");
};
};
```

Short-life, terrestrial results from the period c. 9800– c. 3600 cal BC

```
Plot()
{
 KDE_Model()
 {
  R_Date("OxA-679",9060,130);
  R_Date("AA-10499",8990,65);
  R_Date("AA-17452",5420,65);
  R_Date("AA-17454",5290,65);
  R_Date("AA-17457",6240,65);
  R_Date("AA-20413",6530,75);
  R_Date("AA-21255",6410,80);
  R_Date("AA-21260",6670,85);
```

R_Date("AA-21619",7760,55);
R_Date("AA-21620",7040,55);
R_Date("AA-21621",7780,55);
R_Date("AA-21622",7660,55);
R_Date("AA-21623",7665,55);
R_Date("AA-21624",7935,55);
R_Date("AA-21625",7780,55);
R_Date("AA-21627",8110,60);
R_Date("AA-21629",5415,60);
R_Date("AA-21632",7400,55);
R_Date("AA-21633",6810,55);
R_Date("AA-25202",8275,65);
R_Date("AA-25203",8340,60);
R_Date("AA-25204",8505,75);
R_Date("AA-25205",8405,60);
R_Date("AA-25206",8355,60);
R_Date("AA-25207",8420,65);
R_Date("AA-25208",8510,70);
R_Date("AA-25209",8475,75);
R_Date("AA-25210",8410,60);
R_Date("AA-25211",8460,85);
R_Date("AA-25212",8545,65);
R_Date("AA-25213",8495,65);
R_Date("AA-25214",8510,65);
R_Date("AA-25215",8490,60);
R_Date("AA-25230",5535,55);
R_Date("AA-26225",6840,85);
R_Date("AA-26226",6705,60);
R_Date("AA-26227",7420,65);
R_Date("AA-28390",5345,55);
R_Date("AA-29315",5190,55);
R_Date("AA-30354",9075,80);
R_Date("AA-30355",8055,75);
R_Date("AA-41788",8555,60);
R_Date("AA-43004",5355,45);
R_Date("AA-47770",6865,60);
R_Date("AA-50332",7525,80);
R_Date("AA-50333",7395,45);
R_Date("AA-50334",7420,45);
R_Date("AA-50335",7980,50);
R_Date("AA-50336",7925,55);
R_Date("AA-54960",8985,70);
R_Date("AA-54961",8830,70);
R_Date("AA-54962",8835,70);
R_Date("AA-8793",7385,60);
R_Date("Beta-104484",9530,60);
R_Date("Beta-108701",7350,60);
R_Date("Beta-144016",6720,40);
R_Date("Beta-189652",5010,40);
R_Date("Beta-189653",5270,40);
R_Date("Beta-195157",8650,50);

R_Date("Beta-200075",9230,50);
R_Date("Beta-206284",7060,50);
R_Date("Beta-209564",7130,55);
R_Date("Beta-221402",7830,80);
R_Date("Beta-234855",8200,50);
R_Date("Beta-249736",7240,60);
R_Date("Beta-25109",7730,60);
R_Date("Beta-25111",7470,50);
R_Date("Beta-251112",7760,50);
R_Date("Beta-251113",8070,50);
R_Date("Beta-25114",7460,50);
R_Date("Beta-264734",5350,50);
R_Date("Beta-288421",9080,40);
R_Date("Beta-288423",7820,40);
R_Date("Beta-288424",7540,40);
R_Date("Beta-288425",7010,50);
R_Date("Beta-288426",8230,40);
R_Date("Beta-288427",8240,30);
R_Date("Beta-288428",7660,40);
R_Date("Beta-288429",5120,40);
R_Date("Beta-288430",4870,40);
R_Date("Beta-288431",5130,40);
R_Date("Beta-307787",5540,40);
R_Date("Beta-307788",5250,40);
R_Date("Beta-307789",5100,40);
R_Date("Beta-307790",5060,40);
R_Date("Beta-363963",7640,30);
R_Date("Beta-363964",7010,50);
R_Date("Beta-363965",7690,40);
R_Date("Beta-392850",8750,30);
R_Date("Birm-342",7830,520);
R_Date("Birm-343",8700,170);
R_Date("Birm-419",8120,160);
R_Date("BM-0471",9114,110);
R_Date("BM-0525",9080,150);
R_Date("BM-1257",5750,140);
R_Date("BM-1258",5425,140);
R_Date("BM-1544",8770,85);
R_Date("BM-1676R",5540,110);
R_Date("BM-1725",8270,80);
R_Date("BM-1841R",8740,120);
R_Date("BM-2102",8890,340);
R_Date("BM-2181R",5750,110);
R_Date("BM-221",7869,104);
R_Date("BM-2353",5360,50);
R_Date("BM-2404",5890,100);
R_Date("BM-2719",6130,100);
R_Date("BM-2744",9100,80);
R_Date("BM-2973",8180,70);
R_Date("BM-691",8739,86);
R_Date("BM-822",8528,73);

R_Date("BM-89",6450,150);
R_Date("C-353",9488,350);
R_Date("CAR-196",9100,100);
R_Date("F-67",6300,110);
R_Date("F-68",6380,115);
R_Date("GrA-22421",8890,45);
R_Date("GrA-22422",9095,45);
R_Date("GrA-22428",9075,45);
R_Date("GrA-22429",9100,45);
R_Date("GrA-22432",9155,45);
R_Date("GrA-22433",9090,45);
R_Date("GrA-22546",9060,50);
R_Date("GrA-22547",9170,50);
R_Date("GrA-22548",9170,50);
R_Date("GrA-22552",9200,50);
R_Date("GrA-22555",9020,50);
R_Date("GrA-22557",9120,50);
R_Date("GrA-22558",9210,70);
R_Date("GrA-22605",8980,50);
R_Date("GrA-22607",9180,50);
R_Date("GrA-22621",9130,65);
R_Date("GrA-22938",8960,50);
R_Date("GrA-27098",6180,45);
R_Date("GrA-27099",6000,45);
R_Date("GrA-35010",6055,40);
R_Date("GrN-27193",7980,25);
R_Date("GU-1376",7275,330);
R_Date("GU-1377",7080,120);
R_Date("GU-1664",5500,70);
R_Date("GU-1739",8655,85);
R_Date("GU-1873",8590,95);
R_Date("GU-1873b",8360,70);
R_Date("GU-1874",8515,190);
R_Date("GU-1874b",8060,150);
R_Date("GU-1953",7765,225);
R_Date("GU-1954",7805,90);
R_Date("GU-2039",7925,65);
R_Date("GU-2039b",7860,50);
R_Date("GU-2040",8560,75);
R_Date("GU-2040b",8490,70);
R_Date("GU-2145 ",7850,50);
R_Date("GU-2145b",7900,50);
R_Date("GU-2146",8080,50);
R_Date("GU-2147",7880,70);
R_Date("GU-2147b",7950,50);
R_Date("GU-2150",8310,150);
R_Date("GU-2211b",7220,100);
R_Date("GU-2669",5520,90);
R_Date("GU-3168",6410,70);
R_Date("GU-3172",6210,60);
R_Date("GU-3309",6145,55);

R_Date("GU-35121",6680,28);
R_Date("GU-36754",6695,31);
R_Date("GU-5109",8880,120);
R_Date("GU-5186",8990,100);
R_Date("GU-5451",9080,100);
R_Date("GU-5626",5770,50);
R_Date("GU-5627",8430,160);
R_Date("GU-5729",7880,50);
R_Date("GU-5730",7910,70);
R_Date("GU-7201",6710,70);
R_Date("GU-9806",5835,45);
R_Date("HAR-1193",7980,140);
R_Date("HAR-1194",8590,90);
R_Date("HAR-2903",8150,100);
R_Date("HAR-4533",5640,90);
R_Date("HAR-455",9130,180);
R_Date("HAR-456",8090,140);
R_Date("HAR-4568",6450,110);
R_Date("HAR-5238",9300,110);
R_Date("HAR-5355",9300,210);
R_Date("HAR-5712",5870,90);
R_Date("HAR-5791",9340,160);
R_Date("HAR-5793",9320,150);
R_Date("HAR-5794",9590,120);
R_Date("HAR-6498",8210,150);
R_Date("HAR-7037",9040,90);
R_Date("HAR-7063",8280,80);
R_Date("HAR-8351",5730,100);
R_Date("Hd-30166",9420,21);
R_Date("Hd-30167",8951,18);
R_Date("Hd-30168",9481,20);
R_Date("Hd-30190",9611,20);
R_Date("Hd-30192",9375,20);
R_Date("Hd-30193",9463,18);
R_Date("Hd-30200",9359,22);
R_Date("Hd-30201",9451,34);
R_Date("Hd-30439",9302,34);
R_Date("Hd-30440",9606,22);
R_Date("KIA-28435",6965,30);
R_Date("KIA-307034",9342,41);
R_Date("MAMS-18276",9433,26);
R_Date("MAMS-18277",9441,26);
R_Date("NZA-11038",9148,60);
R_Date("NZA-11039",8510,60);
R_Date("NZA-19005",9131,45);
R_Date("NZA-20049",7072,35);
R_Date("NZA-26839",5639,40);
R_Date("NZA-29246",5405,35);
R_Date("NZA-32689",6108,55);
R_Date("NZA-32690",6142,55);
R_Date("NZA-32691",6201,50);

R_Date("NZA-32692",6125,50);
R_Date("NZA-32800",6147,55);
R_Date("OxA-10057",7890,50);
R_Date("OxA-10058",7920,50);
R_Date("OxA-10059",8255,55);
R_Date("OxA-10060",5565,45);
R_Date("OxA-1009",6560,80);
R_Date("OxA-10143",9150,45);
R_Date("OxA-10144",9110,60);
R_Date("OxA-10145",9230,50);
R_Date("OxA-10175",7825,55);
R_Date("OxA-10176",6605,50);
R_Date("OxA-10177",6485,55);
R_Date("OxA-10178",9105,65);
R_Date("OxA-10179",9130,65);
R_Date("OxA-10180",9250,60);
R_Date("OxA-1030",9940,100);
R_Date("OxA-10384",7855,60);
R_Date("OxA-10616",8760,55);
R_Date("OxA-1070",8740,100);
R_Date("OxA-10808",9505,60);
R_Date("OxA-10809",9530,55);
R_Date("OxA-11083",9420,44);
R_Date("OxA-11128",9450,50);
R_Date("OxA-11129",9360,50);
R_Date("OxA-11486",7045,45);
R_Date("OxA-11487",7010,50);
R_Date("OxA-1154",9500,120);
R_Date("OxA-1158",5350,100);
R_Date("OxA-1159",5920,80);
R_Date("OxA-1160",8820,100);
R_Date("OxA-11658",9210,110);
R_Date("OxA-1176",9700,160);
R_Date("OxA-11801",8734,37);
R_Date("OxA-11802",8754,38);
R_Date("OxA-11803",8763,38);
R_Date("OxA-11804",8802,38);
R_Date("OxA-11826",8630,40);
R_Date("OxA-11827",8700,45);
R_Date("OxA-11830",8715,50);
R_Date("OxA-11831",8715,45);
R_Date("OxA-11832",8780,45);
R_Date("OxA-11853",8790,45);
R_Date("OxA-11854",8710,45);
R_Date("OxA-11855",8650,45);
R_Date("OxA-11856",8785,45);
R_Date("OxA-11857",8750,45);
R_Date("OxA-12292",8785,40);
R_Date("OxA-12294",8690,40);
R_Date("OxA-12324",8739,39);
R_Date("OxA-12325",8739,39);

R_Date("OxA-12326",8765,40);
R_Date("OxA-12327",8725,39);
R_Date("OxA-12347",8710,38);
R_Date("OxA-12402",8885,65);
R_Date("OxA-12677",5353,32);
R_Date("OxA-12678",5246,32);
R_Date("OxA-13131",9920,160);
R_Date("OxA-13139",5500,140);
R_Date("OxA-13318",5222,31);
R_Date("OxA-13520",5213,23);
R_Date("OxA-13551",7485,55);
R_Date("OxA-13927",7002,35);
R_Date("OxA-13928",6629,38);
R_Date("OxA-13932",5138,31);
R_Date("OxA-13933",5439,22);
R_Date("OxA-13934",5730,33);
R_Date("OxA-14088",9540,45);
R_Date("OxA-1412",5300,100);
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