

Supporting information

S2: OxCal age-depth model coding:

```
Plot()
{
  Outlier_Model("General", T(5), U(0,4), "t");
  P_Sequence("LLO13", 1, 0.25, U(-2,2))
  {
    Boundary("LLO13 7.00m")
    {
      z=700.0;
    };
    After(R_Date(13215, 75))
    {
      Outlier("General", 0.05);
    };
    Date("OxA-33324 (Humin)")
    {
      z=679.5;
    };
    Date("NGRIP Holocene Onset", N(calBP(11703-50), 99/2))    } included
    {                                                            } in model A
    z=672.0;                                                    } only
    };                                                            }
    After(R_Date(10210, 50))
    {
      Outlier("General", 0.05);
    };
    Date("OxA-32974 (Ceratophyllum)")
    {
      z=661.5;
    };
    Date("Fondi Di Baia Tephra", N(calBP(9610), 85/2))        } included
    {                                                            } in model B
    z=579.5;                                                    } only
    };                                                            }
    After(R_Date (8190, 45))
    {
      Outlier("General", 0.05);
    };
    Date("OxA-32973 (Potamogeton)")
    {
      z=576.5;
    };
    Date("Lairg_A_tephra", N(calBP(6899.5), 95/2))            } included
    {                                                            } in model B
    z=506.2;                                                    } only
    };                                                            }
```

```

R_Date("OxA-33160 (Betula), LLO13_483/LL09_505 Tephra", 9225, 45)
{
  Outlier("General", 0.05);
  z=482.5;
};
R_Date("OxA-33159 (Wood), LLO13_468 tephra", 8215, 40)
{
  Outlier("General", 0.05);
  z=467.5;
};
Date("LLO09_345 tephra")
{
  z=329.5;
};
After(R_Date(4725, 50))
{
  Outlier("General", 0.05);
};
Date("LuS-7107 (Humin)")
{
  z=286.1;
};
Date("Aniakchak CFE II Tephra", N(calBP(3572), 4))           } included
{                                                             } in model B
  z=283.7;                                                     } only
};                                                             }
After(R_Date(3380, 45))
{
  Outlier("General", 0.05);
};
Date("LuS-7106 (Humin)")
{
  z=156.0;
};
Boundary("LLO13 Core Top", AD(2013))
{
  z=0;
};
};

```