

OxCal and R Code Supplement

Christopher Ellis, James Conolly, Stephen G. Monckton, "Dating the Late Archaic at the Davidson Site (AhHk-54), Ontario"

Please Contact James Conolly (jamesconolly@trentu.ca) for further information on model procedures, if required.

(1) OxCal Model: Kernel Density Analysis Model (see Figure 7)

```
Plot()
```

```
{
```

```
  KDE_Model(Davidson)
```

```
{
```

```
  R_Date("AA106287", 3729, 33);
```

```
  R_Date("AA106289", 2978, 32);
```

```
  R_Date("AA106290", 4079, 34);
```

```
  R_Date("AA106291", 3114, 33);
```

```
  R_Date("AA106292", 3054, 41);
```

```
  R_Date("AA106293", 3848, 36);
```

```
  R_Date("AA1067517", 3875, 21);
```

```
  R_Date("AA107247", 3932, 22);
```

```
  R_Date("AA107248", 2864, 25);
```

```
  R_Date("AA107249", 2913, 25);
```

```
  R_Date("AA107251", 3767, 26);
```

```
  R_Date("AA107252", 3791, 21);
```

```
  R_Date("AA107253", 3033, 25);
```

```
  R_Date("AA107254", 3009, 25);
```

```
  R_Date("Beta-257094", 2850, 40);
```

```
  R_Date("Beta-257095", 3400, 40);
```

```
  R_Date("Beta-277023", 3450, 40);
```

R_Date("Beta-277024", 2660, 40);
R_Date("Beta-277025", 2800, 40);
R_Date("Beta-277026", 3010, 40);
R_Date("Beta-277027", 3870, 40);
R_Date("Beta-277028", 3120, 40);
R_Date("Beta-294186", 3660, 30);
R_Date("Beta-294187", 3050, 40);
R_Date("Beta-294188", 3020, 40);
R_Date("Beta-294189", 2980, 40);
R_Date("Beta-294190", 3810, 40);
R_Date("Beta-294191", 2930, 40);
R_Date("Beta-381334", 4020, 30);
R_Date("Beta-381335", 3480, 30);
R_Date("Beta-381336", 3870, 30);
R_Date("Beta-381337", 2930, 30);
R_Date("Beta-381338", 2970, 30);
R_Date("Beta-381339", 3830, 30);
R_Date("Beta-381340", 3810, 30);
R_Date("Beta-381341", 3040, 30);
R_Date("Beta-381342", 3920, 30);
R_Date("Beta-381343", 3940, 30);
R_Date("Beta-412431", 2890, 30);
R_Date("Beta-412432", 2890, 30);
R_Date("Beta-412433", 2850, 30);
R_Date("Beta-412434", 2890, 30);
R_Date("Beta-412435", 3820, 30);
R_Date("Beta-412436", 3690, 30);
R_Date("Beta-412437", 3640, 30);
R_Date("I-10313", 3780, 90);

```
R_Date("ICA-17C/0113", 3670, 30);
R_Date("ICA-17C/0114", 2930, 30);
R_Date("ICA-17C/0115", 3160, 30);
R_Date("ICA-17C/0116", 2890, 30);
R_Date("ICA-17C/0117", 2960, 30);
R_Date("ICA-17C/0118", 3770, 30);
R_Date("ICA-17C/0119", 3770, 30);
R_Date("ICA-17C/0120", 3750, 30);
R_Date("ICA-C/0515", 3230, 40);
R_Date("ICA-C/0516", 3930, 40);
R_Date("UOC-3719", 2894, 38);
};
};
```

(2) OxCal Model: Boundary Estimates for Broadpoint and Smallpoint

```
Plot()
{
Sequence()
{
Boundary("Start of Broadpoint");
Phase("Broadpoint")
{
R_Date("AA-106290", 4080, 30);
R_Date("BETA-381334", 4020, 30);
R_Date("BETA-381343", 3940, 30);
R_Date("ICA-C/0516", 3930, 40);
R_Date("AA-107247", 3930, 20);
R_Date("BETA-381342", 3920, 30);
```

```
R_Date("AA-1067517", 3880, 20);
R_Date("BETA-277027", 3870, 40);
R_Date("BETA-381336", 3870, 30);
R_Date("AA-106293", 3850, 40);
R_Date("BETA-381339", 3830, 30);
R_Date("BETA-412435", 3820, 30);
R_Date("BETA-294190", 3810, 40);
R_Date("BETA-381340", 3810, 30);
R_Date("AA-107252", 3790, 20);
R_Date("I-10313", 3780, 90);
R_Date("AA-107251", 3770, 25);
R_Date("ICA 17C/0118", 3770, 30);
R_Date("ICA 17C/0119", 3770, 30);
R_Date("ICA 17C/0120", 3750, 30);
R_Date("AA-106287", 3730, 30);
R_Date("BETA-412436", 3690, 30);
R_Date("ICA 17C/0113", 3670, 30);
R_Date("BETA-294186", 3660, 30);
R_Date("BETA-412437", 3640, 30);
R_Date("BETA-381335", 3480, 30);
R_Date("BETA-277023", 3450, 40);
R_Date("BETA-257095", 3400, 40);
Interval( "Broadpoint");
};
Boundary("End of Broadpoint");
};
Sequence()
{
Boundary("Start of Smallpoint");
```

Phase("Smallpoint")

{

R_Date("ICA-C/0515", 3230, 40);
R_Date("ICA 17C/0115", 3160, 30);
R_Date("BETA-277028", 3120, 40);
R_Date("AA-106291", 3110, 30);
R_Date("BETA-294187", 3050, 40);
R_Date("AA-106292", 3050, 40);
R_Date("BETA-381341", 3040, 30);
R_Date("AA-107253", 3030, 25);
R_Date("BETA-294188", 3020, 40);
R_Date("BETA-277026", 3010, 40);
R_Date("AA-107254", 3010, 25);
R_Date("BETA-294189", 2980, 40);
R_Date("AA-106289", 2980, 30);
R_Date("BETA-381338", 2970, 30);
R_Date("ICA 17C/0117", 2960, 30);
R_Date("BETA-294191", 2930, 40);
R_Date("BETA-381337", 2930, 30);
R_Date("ICA 17C/0114", 2930, 30);
R_Date("AA-107249", 2910, 25);
R_Date("BETA-412431", 2890, 30);
R_Date("BETA-412432", 2890, 30);
R_Date("BETA-412434", 2890, 30);
R_Date("ICA 17C/0116", 2890, 30);
R_Date("UOC-3719", 2890, 40);
R_Date("AA-107248", 2860, 25);
R_Date("BETA-257094", 2850, 40);
R_Date("BETA-412433", 2850, 30);

```
R_Date("BETA-277025", 2800, 40);  
R_Date("BETA-277024", 2660, 40);  
Interval( "Smallpoint");  
};  
Boundary("End of Smallpoint");  
};  
};
```

(3) R Model: PDF for Overlap of End of Broadpoint and Start of Smallpoint

Dates and probabilities extracted from (2) Outputs of Boundary Models.

Broadpoint PDF

```
bp <- read.csv(text="date,prob
```

```
-1884.5,0
```

```
-1879.5,0.000015833
```

```
-1874.5,0.00012792
```

```
-1869.5,0.0004485
```

```
-1864.5,0.00103
```

```
-1859.5,0.0024267
```

```
-1854.5,0.00387
```

```
-1849.5,0.006013
```

```
-1844.5,0.007065
```

```
-1839.5,0.007909
```

```
-1834.5,0.007684
```

```
-1829.5,0.007272
```

```
-1824.5,0.006658
```

```
-1819.5,0.006103
```

-1814.5,0.006073
-1809.5,0.005735
-1804.5,0.005904
-1799.5,0.00576
-1794.5,0.005546
-1789.5,0.005166
-1784.5,0.004421
-1779.5,0.004004
-1774.5,0.003992
-1769.5,0.003666
-1764.5,0.003964
-1759.5,0.00384
-1754.5,0.004111
-1749.5,0.004032
-1744.5,0.004264
-1739.5,0.004386
-1734.5,0.004544
-1729.5,0.004772
-1724.5,0.004565
-1719.5,0.004648
-1714.5,0.004325
-1709.5,0.004267
-1704.5,0.0041
-1699.5,0.003699
-1694.5,0.003577
-1689.5,0.003467
-1684.5,0.003084
-1679.5,0.0027608
-1674.5,0.0024727

-1669.5,0.0022517
-1664.5,0.0019696
-1659.5,0.0018154
-1654.5,0.0015623
-1649.5,0.001374
-1644.5,0.0012523
-1639.5,0.0010662
-1634.5,0.0008804
-1629.5,0.0008408
-1624.5,0.0007387
-1619.5,0.0005806
-1614.5,0.0005094
-1609.5,0.0004565
-1604.5,0.0003915
-1599.5,0.00031083
-1594.5,0.0002875
-1589.5,0.00026083
-1584.5,0.00021292
-1579.5,0.00018979
-1574.5,0.00014875
-1569.5,0.00014146
-1564.5,0.00011438
-1559.5,0.00010542
-1554.5,0.0000975
-1549.5,0.00006813
-1544.5,0.00006958
-1539.5,0.00006771
-1534.5,0.00004792
-1529.5,0.00004521

-1524.5,0.00003896
-1519.5,0.00004333
-1514.5,0.00003292
-1509.5,0.000029373
-1504.5,0.000026874
-1499.5,0.0000225
-1494.5,0.000024794
-1489.5,0.000018957
-1484.5,0.000017913
-1479.5,0.000017289
-1474.5,0.000010416
-1469.5,0.000011879
-1464.5,0.000010835
-1459.5,0.000007086
-1454.5,0.000008122
-1449.5,0.000011246
-1444.5,0.000006667
-1439.5,0.000008961
-1434.5,0.000007711
-1429.5,0.0000027048
-1424.5,0.000007086
-1419.5,0.000006461
-1414.5,0.00000208
-1409.5,0.0000016687")

Smallpoint SPD

sp <- read.csv(text="date,prob

-1694.5,0
-1689.5,0.0000027051
-1684.5,0.000010208

-1679.5,0.000006877
-1674.5,0.000013754
-1669.5,0.000015006
-1664.5,0.000013326
-1659.5,0.000016459
-1654.5,0.000017911
-1649.5,0.000025827
-1644.5,0.000027706
-1639.5,0.00004875
-1634.5,0.00004563
-1629.5,0.00004916
-1624.5,0.00005937
-1619.5,0.00007396
-1614.5,0.00008478
-1609.5,0.00011437
-1604.5,0.00013521
-1599.5,0.00014604
-1594.5,0.00018334
-1589.5,0.00022145
-1584.5,0.00027874
-1579.5,0.0003171
-1574.5,0.0003765
-1569.5,0.0004377
-1564.5,0.0005285
-1559.5,0.0006677
-1554.5,0.0008012
-1549.5,0.0010073
-1544.5,0.0011277
-1539.5,0.00153

-1534.5,0.0018827
-1529.5,0.0021852
-1524.5,0.002785
-1519.5,0.003289
-1514.5,0.004057
-1509.5,0.004626
-1504.5,0.005491
-1499.5,0.006576
-1494.5,0.007537
-1489.5,0.008679
-1484.5,0.009673
-1479.5,0.010376
-1474.5,0.01166
-1469.5,0.012793
-1464.5,0.013316
-1459.5,0.014238
-1454.5,0.014134
-1449.5,0.013445
-1444.5,0.011799
-1439.5,0.010412
-1434.5,0.00804
-1429.5,0.005523
-1424.5,0.003782
-1419.5,0.0023646
-1414.5,0.0011802
-1409.5,0.0006167
-1404.5,0.0004508
-1399.5,0.00026895
-1394.5,0.00017958

```
-1389.5,0.00016896
-1384.5,0.0000877")
# Establish vector of dates for likely end of BP
bp_end <- sample(bp$date, 1000, replace=T, prob=bp$prob)
# Establish vector of dates for likely end of SP
sp_start <- sample(sp$date, 1000, replace=T, prob=sp$prob)
# Figure 10A
hist(bp_end, col="yellow", breaks=20, xlim = c(-2000,-1200), ylim = c(0,0.014), freq = F)
hist(sp_start, col="green", breaks=12, xlim = c(-2000,-1200), ylim = c(0,0.014), freq = F, add=T)
# Test for differences in mean and variance
t.test(bp_end,sp_start)
# Histogram of differences (PDF) of Broadpoint end and Smallpoint start
# Figure 10B
hist(sp_start-bp_end, breaks = 20, main="PDF of interval between BP and SP", xlab="Years")
# Establish statistics of distribution
mean(sp_start-bp_end)
sd(sp_sample-bp_sample)
# END
```