**Supplementary Information.**

**OxCal4.3 SQL code Varna models**

**Figure 6 Model 1:**

Plot()

{

Outlier\_Model("General",T(5),U(0,4),"t");

Sequence()

{

Boundary("Start");

Phase("Varna")

{

R\_Date("OxA-23613 B46 human", 5585, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23614 B47 human", 5658, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23616 B67 human", 5719, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19928 B78 human", 5752, 37)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19877 B84 human", 5687, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-24042 B87 human", 5690, 31)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23618 B89 human", 5655, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19879 B126 human", 5678, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19880 B129 human", 5728, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13694 B137 human", 5654, 36)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23620 B139 human", 5668, 33)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19931 B151 human", 5715, 55)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19923 B171 human", 5666, 37)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19924 B179 human", 5696, 37)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19925 B197 human", 5689, 38)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13693 B225 human", 5660, 29)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19927 B256 human", 5702, 39)

{

Outlier("General", 0.05);

};

Interval("total span");

};

Boundary("End");

};

};

**Figure 7 Model 2:**

Plot()

{

Outlier\_Model("General",T(5),U(0,4),"t");

Sequence()

{

Boundary("Start");

Phase("Varna")

{

R\_Date("OxA-23613 B46 human", 5585, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23614 B47 human", 5658, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23616 B67 human", 5719, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19928 B78 human", 5752, 37)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19877 B84 human", 5687, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-24042 B87 human", 5690, 31)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23618 B89 human", 5655, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19879 B126 human", 5678, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19880 B129 human", 5728, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13694 B137 human", 5654, 36)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23620 B139 human", 5668, 33)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19931 B151 human", 5715, 55)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19923 B171 human", 5666, 37)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19924 B179 human", 5696, 37)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19925 B197 human", 5689, 38)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13693 B225 human", 5660, 29)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19927 B256 human", 5702, 39)

{

Outlier("General", 0.05);

};

R\_Date("OxA-24044 B40 animal", 5531, 31)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13846 B111 animal", 5757, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-18576 B111 animal", 5710, 33)

{

Outlier("General", 0.05);

};

R\_Date("OxA-X-2256-43 B143 animal", 5725, 45)

{

Outlier("General", 0.05);

};

R\_Date("OxA-2256-44 B182 animal", 5610, 45)

{

Outlier("General", 0.05);

};

R\_Date("OxA-18577 B286 animal", 5564, 30)

{

Outlier("General", 0.05);

};

R\_Date("OxA-X-2256-45 B286 animal", 5555, 45)

{

Outlier("General", 0.05);

};

Interval("Span");

};

Boundary("End");

};

};

**Figure 8 Model 3:**

Plot()

{

Outlier\_Model("General",T(5),U(0,4),"t");

Outlier\_Model("SSimple",N(0,2),0,"s");

Sequence()

{

Boundary("Start");

Phase("Varna")

{

R\_Date("OxA-13687 B10", 5569, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13686 B11", 5639, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19867 B25", 5629, 34)

{

Outlier("General", 0.05);

};

R\_Combine("B 28")

{

Outlier("General", 0.05);

R\_Date("OxA-23611 B28", 5574, 31)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-18575 B28", 5550, 31)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23612 B28", 5590, 31)

{

Outlier("SSimple", 0.05);

};

};

R\_Combine("B 30")

{

Outlier("General", 0.05);

R\_Date("OxA-19868 B30", 5567, 34)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-19869 B30", 5599, 34)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-19870 B32", 5631, 35)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19871 B34", 5638, 35)

{

Outlier("General", 0.05);

};

R\_Date("OxA-24044 B40", 5531, 31)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13685 B43", 5720, 29)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13692 B44", 5657, 30)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19873 B45", 5583, 35)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23613 B46", 5585, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23614 B47", 5658, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19874 B50", 5574, 33)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19875 B51", 5849, 39)

{

Outlier("General", 0.05);

};

R\_Combine("B 67")

{

Outlier("General", 0.05);

R\_Date("OxA-23615 B67", 5717, 32)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23616 B67", 5719, 32)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-19876 B69", 5608, 35)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23617 B72", 5739, 32)

{

Outlier("General", 0.05);

};

R\_Combine("B 78")

{

Outlier("General", 0.05);

R\_Date("OxA-19928 B78", 5752, 37)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-19929 B78", 5831, 39)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-19877 B84", 5687, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19878 B85", 5730, 33)

{

Outlier("General", 0.05);

};

R\_Date("OxA-24042 B87", 5690, 31)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23618 B89", 5655, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13250 B94", 5626, 31)

{

Outlier("General", 0.05);

};

R\_Combine("B 111")

{

Outlier("General", 0.05);

R\_Date("OxA-13865 B111", 5855, 34)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-13846 B111", 5757, 34)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-18576 B111", 5710, 33)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-13251 B112", 5702, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13848 B117", 5766, 36)

{

Outlier("General", 0.05);

};

R\_Combine("B 121")

{

Outlier("General", 0.05);

R\_Date("OxA-13252 B121", 5672, 34)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23619 B121", 5771, 31)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-13253 B125", 5685, 33)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19879 B126", 5678, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-24041 B127", 5735, 31)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19880 B129", 5728, 34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13694 B137", 5654, 36)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23620 B139", 5668, 33)

{

Outlier("General", 0.05);

};

R\_Combine("B 143")

{

Outlier("General", 0.05);

R\_Date("OxA-13689 B143", 5690, 32)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-13690 B143", 5700, 30)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2258-31 B143", 5703, 36)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2256-43 B143", 5725, 45)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-19931 B151", 5715, 55)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19930 B154", 5665, 39)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13688 B158", 5787, 30)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19923 B171", 5666, 37)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23621 B174", 5658, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19924 B179", 5696, 37)

{

Outlier("General", 0.05);

};

R\_Combine("B 182")

{

Outlier("General", 0.05);

R\_Date("OxA-2256-44 B182", 5610, 45)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23622 B182", 5659, 31)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-19925 B197", 5689, 38)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13691 B215", 5668, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13693 B225", 5660, 29)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19926 B249", 5618, 39)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13254 B255", 5732, 33)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19927 B256", 5702, 39)

{

Outlier("General", 0.05);

};

R\_Date("OxA-24043 B261", 5539, 32)

{

Outlier("General", 0.05);

};

R\_Combine("B 286")

{

Outlier("General", 0.05);

R\_Date("OxA-23623 B286", 5688, 32)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23624 B286", 5654, 31)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2256-45 B286", 5555, 45)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-18577 B286", 5564, 30)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23625 B286", 5646, 31)

{

Outlier("SSimple", 0.05);

};

};

R\_Date("OxA-X-2256-46 B293", 5725, 40)

{

Outlier("General", 0.05);

};

R\_Date("OxA-23626 B294", 5608, 32)

{

Outlier("General", 0.05);

};

Interval("Model 3");

};

Boundary("End");

};

};

**Figure 9 Model 4:**

Plot()

{

Outlier\_Model("General",T(5),U(0,4),"t");

Outlier\_Model("SSimple",N(0,2),0,"s");

Curve("Marine13","Marine13.14c");

Delta\_R("LocalMarine",50,65);

Curve("IntCal13","IntCal13.14c");

Sequence("Varna cemetery")

{

Boundary("Start burials");

Phase("Varna")

{

Combine("Burial 28")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-18575 B28",5550,31)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23612 B28",5590,31)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed61","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-23611 B28",5574,31)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 30")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed52","IntCal13","LocalMarine",12.7,10);

R\_Date("OxA-19868 B30",5567,34)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed60","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19869 B30",5599,34)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 67")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed21","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-23616 B67",5719,32)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed50","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-23615 B67",5717,32)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 78")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed28","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19928 B78",5752,37)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed37","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19929 B78",5831,39)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 111")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-18576 B111",5710,33)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-13846 B111",5757,34)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed68","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-13865 B111",5855,34)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 121")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed42","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-13252 B121",5672,34)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed67","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-23619 B121",5771,31)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 143")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-13690 B143",5700,30)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-13689 B143",5690,32)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2258-31 B143",5703,36)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2256-43 B143",5725,45)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 182")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-2256-44 B182",5610,45)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed63","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-23622 B182",5659,31)

{

Outlier("SSimple", 0.05);

};

};

Combine("Burial 286")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-18577 B286",5564,30)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2256-45 B286",5555,45)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed35","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23624 B286",5654,31)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed43","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-23623 B286",5688,32)

{

Outlier("SSimple", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-23625 B286",5646,31)

{

Outlier("SSimple", 0.05);

};

};

Curve("=IntCal13");

R\_Date("OxA-24044 B40",5531,31);

R\_Date("OxA-X-2256-47 B294",5860,60)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13811 B117",5530,36)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13693 B225",5660,29)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13694 B137",5654,36)

{

Outlier("General", 0.05);

};

R\_Date("OxA-19877 B84",5687,34)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13691 B215",5668,32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13692 B44",5657,30)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed12","IntCal13","LocalMarine",1.4,10);

R\_Date("OxA-13686 B11",5639,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed13","IntCal13","LocalMarine",1.4,10);

R\_Date("OxA-19879 B126",5678,34)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed15","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-19880 B129",5728,34)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed16","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-24042 B87",5690,31)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed18","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-23620 B139",5668,33)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed19","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-19924 B179",5696,37)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed23","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-13688 B158",5787,30)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed24","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-19927 B256",5702,39)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed25","IntCal13","LocalMarine",5.6,10);

R\_Date("OxA-23618 B89",5655,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed26","IntCal13","LocalMarine",7,10);

R\_Date("OxA-23614 B47",5658,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed27","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19931 B151",5715,55)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed29","IntCal13","LocalMarine",7,10);

R\_Date("OxA-13687 B10",5569,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed30","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19923 B171",5666,37)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed31","IntCal13","LocalMarine",7,10);

R\_Date("OxA-23613 B46",5585,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed32","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19925 B197",5689,38)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed33","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23626 B294",5608,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed34","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19926 B249",5618,39)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed36","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-13848 B117",5766,36)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed39","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19930 B154",5665,39)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed41","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23621 B174",5658,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed44","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-24043 B261",5539,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed47","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-24041 B127",5735,31)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed48","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-19878 B85",5730,33)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed49","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-23617 B72",5739,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed51","IntCal13","LocalMarine",12.7,10);

R\_Date("OxA-19871 B34",5638,35)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed53","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19873 B45",5583,35)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed54","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13251 B112",5702,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed55","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19874 B50",5574,33)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed56","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19876 B69",5608,35)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed57","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13253 B125",5685,33)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed58","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13250 B94",5626,31)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed64","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-13254 B255",5732,33)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed65","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-13685 B43",5720,29)

{

Outlier("General", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-X-2256-46 B293",5725,40)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed69","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-19870 B32",5631,35)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed70","IntCal13","LocalMarine",21.1,10);

R\_Date("OxA-19875 B51",5849,39)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed71","IntCal13","LocalMarine",25.4,10);

R\_Date("OxA-19867 B25",5629,34)

{

Outlier("General", 0.05);

};

Interval("Varna cemetery");

};

Boundary("End burials");

};

};

**Figure 10: Area analysis.**

Plot()

{

Outlier\_Model("SSimple",N(0,2),0,"s");

Outlier\_Model("General",T(5),U(0,4),"t");

Curve("Marine13","Marine13.14c");

Delta\_R("LocalMarine",50,65);

Curve("IntCal13","IntCal13.14c");

Sequence()

{

Boundary("Start SE");

Phase("SE")

{

Mix\_Curve("Mixed12","IntCal13","LocalMarine",1.4,10);

R\_Date("OxA-13686 B11",5639,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed29","IntCal13","LocalMarine",7,10);

R\_Date("OxA-13687 B10",5569,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed71","IntCal13","LocalMarine",25.4,10);

R\_Date("OxA-19867 B25",5629,34)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed53","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19873 B45",5583,35);

Mix\_Curve("Mixed69","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-19870 B32",5631,35)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed51","IntCal13","LocalMarine",12.7,10);

R\_Date("OxA-19871 B34",5638,35)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed58","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13250 B94",5626,31)

{

Outlier("General", 0.05);

};

};

Boundary("End SE");

};

Sequence()

{

Boundary("Start SW");

Phase("SW")

{

Mix\_Curve("Mixed70","IntCal13","LocalMarine",21.1,10);

R\_Date("OxA-19875 B51",5849,39)

{

Outlier("General", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-13692 B44", 5657, 30)

{

Outlier("General", 0.05);

};

Combine("Burial 28")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed61","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-23611 B28", 5574, 31)

{

Outlier("SSimple", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-23612 B28", 5590, 31)

{

Outlier("SSimple", 0.05);

};

};

};

Boundary("End SW");

};

Sequence()

{

Boundary("Start EC");

Phase("EC")

{

Mix\_Curve("Mixed36","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-13848 B117", 5766, 36)

{

Outlier("General", 0.05);

};

Combine("B121")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed42","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-13252 B121",5672,34)

{

Outlier(“SSimple”, 0.05);

};

Mix\_Curve("Mixed67","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-23619 B121",5771,31)

{

Outlier(“SSimple”, 0.05);

};

};

Mix\_Curve("Mixed57","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13253 B125",5685,33)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed13","IntCal13","LocalMarine",1.4,10);

R\_Date("OxA-19879 B126", 5678, 34)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed47","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-24041 B127",5735,31)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed15","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-19880 B129", 5728, 34)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed65","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-13685 B43",5720,29)

{

Outlier("General", 0.05);

};

Combine("B78")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed28","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19928 B78", 5752, 37)

{

Outlier(“SSimple”, 0.05);

};

Mix\_Curve("Mixed37","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19929 B78", 5831, 39)

{

Outlier(“SSimple”, 0.05);

};

};

};

Boundary("End EC");

};

Sequence()

{

Boundary("Start WC");

Phase("WC")

{

Combine("B30")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed52","IntCal13","LocalMarine",12.7,10);

R\_Date("OxA-19868 B30",5567,34)

{

Outlier(“SSImple”, 0.05);

};

Mix\_Curve("Mixed60","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19869 B30",5599,34)

{

Outlier(“SSimple”, 0.05);

};

};

Mix\_Curve("Mixed31","IntCal13","LocalMarine",7,10);

R\_Date("OxA-23613 B46", 5585, 32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed26","IntCal13","LocalMarine",7,10);

R\_Date("OxA-23614 B47", 5658, 32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed55","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19874 B50",5574,33)

{

Outlier("General", 0.05);

};

Combine("Burial 67")

{

Outlier("General", 0.05);

Mix\_Curve("Mixed21","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-23616 B67", 5719, 32)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed50","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-23615 B67",5717,32)

{

Outlier("SSimple", 0.05);

};

};

Mix\_Curve("Mixed56","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19876 B69",5608,35)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed49","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-23617 B72",5739,32)

{

Outlier("General", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-19877 B84", 5687, 34)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed48","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-19878 B85",5730,33)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed16","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-24042 B87", 5690, 31)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed25","IntCal13","LocalMarine",5.6,10);

R\_Date("OxA-23618 B89", 5655, 32)

{

Outlier("General", 0.05);

};

Combine("B111")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-13846 B111", 5757, 34)

{

Outlier(“SSimple”, 0.05);

};

R\_Date("OxA-18576 B111", 5710, 33)

{

Outlier(“SSimple”, 0.05);

};

Mix\_Curve("Mixed68","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-13865 B111",5855,34)

{

Outlier(“SSimple”, 0.05);

};

};

};

Boundary("End WC");

};

Sequence()

{

Boundary("Start NW");

Phase("NW")

{

Curve("=IntCal13");

R\_Date("OxA-13694 B137", 5654, 36)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed18","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-23620 B139", 5668, 33)

{

Outlier("General", 0.05);

};

Combine("Burial 143")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-13690 B143", 5700, 30)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-13689 B143", 5690, 32)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2258-31 B143", 5703, 36)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-X-2256-43 B143", 5725, 45)

{

Outlier("SSimple", 0.05);

};

};

Mix\_Curve("Mixed27","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19931 B151", 5715, 55)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed39","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19930 B154", 5665, 39)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed23","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-13688 B158", 5787, 30)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed30","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19923 B171", 5666, 37)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed41","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23621 B174",5658,32)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed19","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-19924 B179", 5696, 37)

{

Outlier("General", 0.05);

};

Combine("Burial 182")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-2256-44 B182", 5610, 45)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed63","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-23622 B182",5659,31)

{

Outlier("SSimple", 0.05);

};

};

Mix\_Curve("Mixed54","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13251 B112",5702,32);

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed34","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19926 B249", 5618, 39)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed64","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-13254 B255",5732,33);

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed24","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-19927 B256", 5702, 39)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed44","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-24043 B261",5539,32);

{

Outlier("General", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-X-2256-46 B293", 5725, 40)

{

Outlier("General", 0.05);

};

Mix\_Curve("Mixed33","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23626 B294", 5608, 32)

{

Outlier("General", 0.05);

};

};

Boundary("End NW");

};

Sequence()

{

Boundary("Start NE");

Phase("NE")

{

Combine("Burial 286")

{

Outlier("General", 0.05);

Curve("=IntCal13");

R\_Date("OxA-18577 B286", 5564, 30)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed35","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23624 B286", 5654, 31)

{

Outlier("SSimple", 0.05);

};

Mix\_Curve("Mixed43","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-23623 B286",5688,32);

{

Outlier("SSimple", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-X-2256-45 B286", 5555, 45)

{

Outlier("SSimple", 0.05);

};

R\_Date("OxA-23625 B286",5646,31)

{

Outlier("SSimple", 0.05);

};

};

Mix\_Curve("Mixed32","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19925 B197", 5689, 38)

{

Outlier("General", 0.05);

};

Curve("=IntCal13");

R\_Date("OxA-13691 B215", 5668, 32)

{

Outlier("General", 0.05);

};

R\_Date("OxA-13693 B225", 5660, 29)

{

Outlier("General", 0.05);

};

};

Boundary("End NE");

};

Difference("Start SE/SW", "Start SE", "Start SW");

Difference("Start SE/EC", "Start SE", "Start EC");

Difference("Start SE/WC", "Start SE", "Start WC");

Difference("Start SE/NW", "Start SE", "Start NW");

Difference("Start SE/NE", "Start SE", "Start NE");

Difference("Start EC/WC", "Start EC", "Start WC");

Difference("Start EC/NW", "Start EC", "Start NW");

Difference("Start EC/NE", "Start EC", "Start NE");

Difference("Start EC/SW", "Start EC", "Start SW");

Difference("Start WC/NE", "Start WC", "Start NE");

Difference("Start WC/SW", "Start WC", "Start SW");

Difference("Start WC/NW", "Start WC", "Start NW");

Difference("Start NW/NE", "Start NW", "Start NE");

Difference("Start NW/SW", "Start NW", "Start SW");

Difference("Start SW/NE", "Start SW", "Start NE");

};

**Figure 13: Grave good analysis:**

Plot()

{

Curve("Marine13","Marine13.14c");

Delta\_R("LocalMarine",50,65);

Curve("IntCal13","IntCal13.14c");

Sequence("Varna grave goods")

{

Boundary("Start A");

Phase("A")

{

Mix\_Curve("Mixed65","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-13685 B43", 5720, 29);

Curve("=IntCal13");

R\_Date("OxA-18575 B28", 5550, 31);

Mix\_Curve("Mixed54","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13251 B112", 5702, 32);

Curve("=IntCal13");

R\_Date("OxA-X-2256-43 B143", 5725, 45);

R\_Date("OxA-13690 B143", 5700, 30);

R\_Date("OxA-13689 B143", 5690, 32);

R\_Date("OxA-X-2258-31 B143", 5703, 36);

Mix\_Curve("Mixed27","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19931 B151", 5715, 55);

Mix\_Curve("Mixed39","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19930 B154", 5665, 39);

Curve("=IntCal13");

R\_Date("OxA-18577 B286", 5564, 30);

Mix\_Curve("Mixed35","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23624 B286", 5654, 31);

Mix\_Curve("Mixed43","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-23623 B286", 5688, 32);

Curve("=IntCal13");

R\_Date("OxA-X-2256-45 B286", 5555, 45);

};

Boundary("End A");

};

Sequence()

{

Boundary("Start B");

Phase("B")

{

Mix\_Curve("Mixed12","IntCal13","LocalMarine",1.4,10);

R\_Date("OxA-13686 B11", 5639, 32);

Mix\_Curve("Mixed69","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-19870 B32", 5631, 35);

Mix\_Curve("Mixed31","IntCal13","LocalMarine",7,10);

R\_Date("OxA-23613 B46", 5585, 32);

Mix\_Curve("Mixed21","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-23616 B67", 5719, 32);

Mix\_Curve("Mixed50","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-23615 B67", 5717, 32);

Curve("=IntCal13");

R\_Date("OxA-19877 B84", 5687, 34);

Mix\_Curve("Mixed48","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-19878 B85", 5730, 33);

Mix\_Curve("Mixed36","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-13848 B117", 5766, 36);

Mix\_Curve("Mixed13","IntCal13","LocalMarine",1.4,10);

R\_Date("OxA-19879 B126", 5678, 34);

Mix\_Curve("Mixed23","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-13688 B158", 5787, 30);

Mix\_Curve("Mixed19","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-19924 B179", 5696, 37);

Curve("=IntCal13");

R\_Date("OxA-2256-44 B182", 5610, 45);

Mix\_Curve("Mixed63","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-23622 B182", 5659, 31);

Mix\_Curve("Mixed34","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19926 B249", 5618, 39);

Mix\_Curve("Mixed64","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-13254 B255", 5732, 33);

Mix\_Curve("Mixed24","IntCal13","LocalMarine",4.2,10);

R\_Date("OxA-19927 B256", 5702, 39);

Mix\_Curve("Mixed44","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-24043 B261", 5539, 32);

Curve("=IntCal13");

R\_Date("OxA-X-2256-46 B293", 5725, 40);

Mix\_Curve("Mixed33","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23626 B294", 5608, 32);

};

Boundary("End B");

};

Sequence()

{

Boundary("Start C");

Phase("C")

{

Mix\_Curve("Mixed29","IntCal13","LocalMarine",7,10);

R\_Date("OxA-13687 B10", 5569, 32);

Mix\_Curve("Mixed71","IntCal13","LocalMarine",25.4,10);

R\_Date("OxA-19867 B25", 5629, 34);

Curve("=IntCal13");

R\_Date("OxA-23612 B28", 5590, 31);

Mix\_Curve("Mixed61","IntCal13","LocalMarine",15.5,10);

R\_Date("OxA-23611 B28", 5574, 31);

Mix\_Curve("Mixed52","IntCal13","LocalMarine",12.7,10);

R\_Date("OxA-19868 B30", 5567, 34);

Mix\_Curve("Mixed60","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19869 B30", 5599, 34);

Mix\_Curve("Mixed49","IntCal13","LocalMarine",11.3,10);

R\_Date("OxA-23617 B72", 5739, 32);

Mix\_Curve("Mixed28","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19928 B78", 5752, 37);

Mix\_Curve("Mixed37","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-19929 B78", 5831, 39);

Mix\_Curve("Mixed53","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19873 B45", 5583, 35);

Mix\_Curve("Mixed16","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-24042 B87", 5690, 31);

Curve("=IntCal13");

R\_Date("OxA-13846 B111", 5757, 34);

R\_Date("OxA-18576 B111", 5710, 33);

Mix\_Curve("Mixed68","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-13865 B111", 5855, 34);

Mix\_Curve("Mixed47","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-24041 B127", 5735, 31);

Mix\_Curve("Mixed18","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-23620 B139", 5668, 33);

Mix\_Curve("Mixed30","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19923 B171", 5666, 37);

Mix\_Curve("Mixed41","IntCal13","LocalMarine",8.5,10);

R\_Date("OxA-23621 B174", 5658, 32);

Curve("=IntCal13");

R\_Date("OxA-13691 B215", 5668, 32);

Mix\_Curve("Mixed56","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19876 B69", 5608, 35);

};

Boundary("End C");

};

Sequence()

{

Boundary("Start D");

Phase("D")

{

Mix\_Curve("Mixed51","IntCal13","LocalMarine",12.7,10);

R\_Date("OxA-19871 B34", 5638, 35);

Curve("=IntCal13");

R\_Date("OxA-13692 B44", 5657, 30);

Mix\_Curve("Mixed26","IntCal13","LocalMarine",7,10);

R\_Date("OxA-23614 B47", 5658, 32);

Mix\_Curve("Mixed55","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-19874 B50", 5574, 33);

Mix\_Curve("Mixed25","IntCal13","LocalMarine",5.6,10);

R\_Date("OxA-23618 B89", 5655, 32);

Mix\_Curve("Mixed58","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13250 B94", 5626, 31);

Mix\_Curve("Mixed42","IntCal13","LocalMarine",9.9,10);

R\_Date("OxA-13252 B121", 5672, 34);

Mix\_Curve("Mixed67","IntCal13","LocalMarine",16.9,10);

R\_Date("OxA-23619 B121", 5771, 31);

Mix\_Curve("Mixed57","IntCal13","LocalMarine",14.1,10);

R\_Date("OxA-13253 B125", 5685, 33);

Mix\_Curve("Mixed15","IntCal13","LocalMarine",2.8,10);

R\_Date("OxA-19880 B129", 5728, 34);

Mix\_Curve("Mixed32","IntCal13","LocalMarine",7,10);

R\_Date("OxA-19925 B197", 5689, 38);

Curve("=IntCal13");

R\_Date("OxA-13693 B225", 5660, 29);

};

Boundary("End D");

};

Difference("Diff Start A/Start B", "Start A", "Start B");

Difference("Diff Start A/Start C", "Start A", "Start C");

Difference("Diff Start A/Start D", "Start A", "Start D");

Difference("Diff Start B/Start C", "Start B", "Start C");

Difference("Diff Start B/Start D", "Start B", "Start D");

Difference("Diff Start C/Start D", "Start C", "Start D");

Difference("Diff End A/End B", "End A", "End B");

Difference("Diff End A/End C", "End A", "End C");

Difference("Diff End A/End D", "End A", "End D");

Difference("Diff End B/End C", "End B", "End C");

Difference("Diff End B/End D", "End B", "End D");

Difference("Diff End C/End D", "End C", "End D");

};