**S1. OxCal Code**

**Model 1: without reservoir**

Plot()

{

Sequence("main")

{

Boundary("start");

Phase("Below and early channels")

{

Sequence("UbaidBelowCH3")

{

Boundary("startUbaid4",Date(BC(4900)));

Phase("Ubaid")

{

R\_Date("13012\_TG38",6020,30);

R\_Date("16006",5750,30);

R\_Date("13007\_TG33",5710,30);

R\_Date("13009\_TG35",5640,30);

};

Boundary("endUbaid4",Date(BC(4500)));

R\_Date("TG-E6",5590,30);

Boundary("PostUbaid4");

};

Sequence("CH3-early")

{

Boundary("CH3-earlystart");

R\_Date("TH2-SH1-145",6860,30);

R\_Date("TH12-SH1-40",6090,30);

Boundary("CH3-earlyend");

};

Sequence("CH2sequence")

{

Boundary("startCH2phase1");

R\_Date("TH10-SH1-80",6050,30);

R\_Date("TH1-SH4-40",5930,30);

Boundary("endCH2phase1");

};

Sequence("CH7sequence")

{

Boundary("startCH7phase1");

R\_Date("TH3-SH1-400",6520,30);

R\_Date("TH8-SH2-75",6280,30);

R\_Date("TH8-SH1-60",4940,30);

Boundary("endCH7phase1");

};

};

Boundary("EDIstart",Date(BC(2900)));

Phase("Channels\_Finalphase")

{

Phase(CH6E)

{

R\_Date("TH9-CH1-70",4080,30);

};

Sequence("HarbourSequence")

{

Boundary("startHarbour");

R\_Date("TH13-SH6-130",4380,30);

R\_Date("TH13-SH1-76",3850,30);

Boundary("endHarbour");

};

Sequence("CH5sequence")

{

Boundary("startCH5");

R\_Date("TH6-SH5-120",4440,30);

R\_Date("TH6-SH4-100",6210,30)

{

Outlier();

};

Boundary("endCH5");

};

Sequence("CH6Wsequence")

{

Boundary("startCH6W");

R\_Date("TH7-SH3-100",4370,30);

R\_Date("TH7-SH2-90",4130,30);

Boundary("endCH6W");

};

Sequence("CH2-1-3")

{

Boundary("startCH2late");

R\_Date("TH15-SH2-35",4410,30);

R\_Date("TH14-SH1-60",5840,30)

{

Outlier();

};

R\_Date("16014-SH2-320",4150,30);

Boundary("endCH3late");

};

};

Boundary("OldBabylonian",Date(BC(1800)));

};

};

**Model 2: with reservoir correction**

Plot()

{

Sequence("main")

{

Curve("IntCal20","intcal20.14c");

Curve("Offset","intcal20.14c")

{

Reservoir(345,60);

};

Boundary("start");

Phase("Below and early channels")

{

Sequence("UbaidBelowCH3")

{

Boundary("startUbaid4",Date(BC(4900)));

Phase("Ubaid")

{

Curve("=Offset");

R\_Date("13012\_TG38",6020,30);

Curve("=IntCal20");

R\_Date("16006",5750,30);

R\_Date("13007\_TG33",5710,30);

R\_Date("13009\_TG35",5640,30);

};

Boundary("endUbaid4",Date(BC(4500)));

Curve("=IntCal20");

R\_Date("TG-E6",5590,30);

Boundary("PostUbaid4");

};

Sequence("CH3-early")

{

Boundary("CH3-earlystart");

Curve("=Offset");

R\_Date("TH2-SH1-145",6860,30);

R\_Date("TH12-SH1-40",6090,30);

Boundary("CH3-earlyend");

};

Sequence("CH2sequence")

{

Boundary("startCH2phase1");

Curve("=Offset");

R\_Date("TH10-SH1-80",6050,30);

R\_Date("TH1-SH4-40",5930,30);

Boundary("endCH2phase1");

};

Sequence("CH7sequence")

{

Boundary("startCH7phase1");

Curve("=Offset");

R\_Date("TH3-SH1-400",6520,30);

R\_Date("TH8-SH2-75",6280,30);

R\_Date("TH8-SH1-60",4940,30);

Boundary("endCH7phase1");

};

};

Boundary("EDIstart",Date(BC(2900)));

Phase("Channels\_Finalphase")

{

Phase(CH6E)

{

Curve("=IntCal20");

R\_Date("TH9-CH1-70",4080,30);

};

Sequence("HarbourSequence")

{

Boundary("startHarbour");

Curve("=Offset");

R\_Date("TH13-SH6-130",4380,30);

R\_Date("TH13-SH1-76",3850,30);

Boundary("endHarbour");

};

Sequence("CH5sequence")

{

Boundary("startCH5");

Curve("=Offset");

R\_Date("TH6-SH5-120",4440,30);

R\_Date("TH6-SH4-100",6210,30)

{

Outlier();

};

Boundary("endCH5");

};

Sequence("CH6Wsequence")

{

Boundary("startCH6W");

Curve("=Offset");

R\_Date("TH7-SH3-100",4370,30);

R\_Date("TH7-SH2-90",4130,30);

Boundary("endCH6W");

};

Sequence("CH2-1-3")

{

Boundary("startCH2late");

Curve("=Offset");

R\_Date("TH15-SH2-35",4410,30);

R\_Date("TH14-SH1-60",5840,30)

{

Outlier();

};

R\_Date("16014-SH2-320",4150,30);

Boundary("endCH3late");

};

};

Boundary("OldBabylonian",Date(BC(1800)));

};

};