Middle Bronze Age Jerusalem: Recalculating its Character and Chronology

Supplementary Information

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SM1 – Top plans of Shiloh Excavations

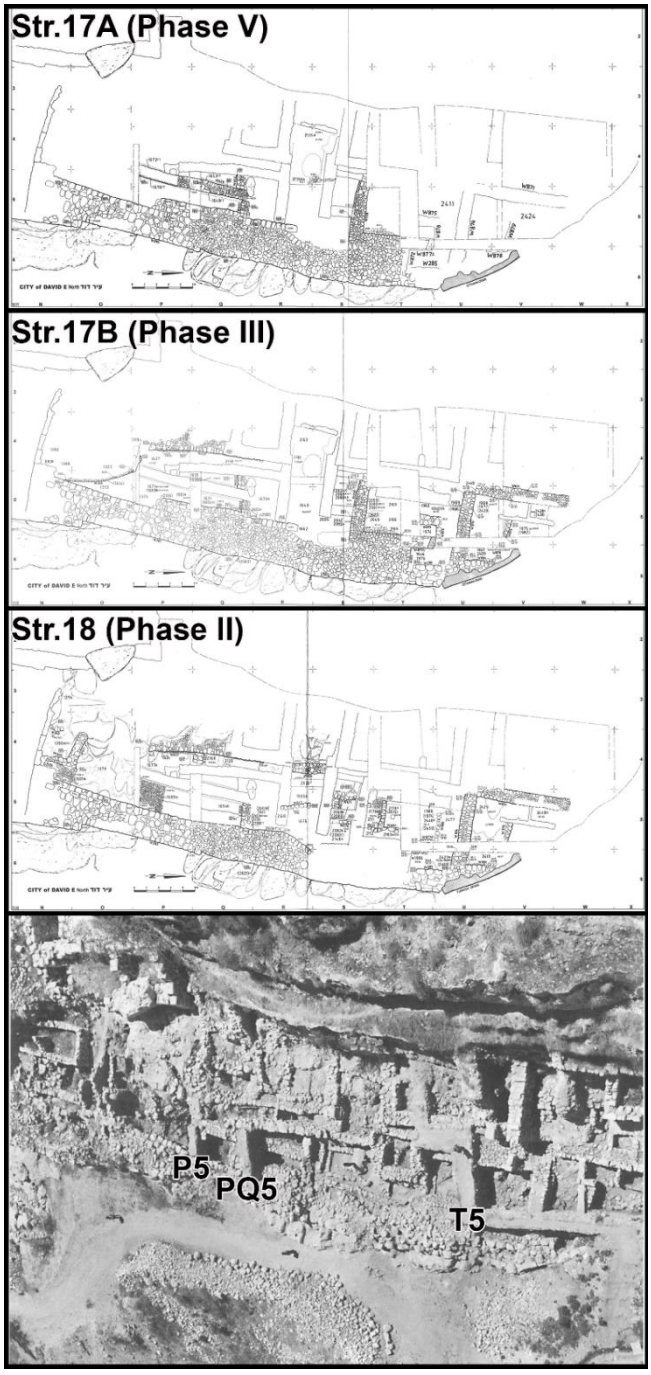

Figure S1. Area E: Top plans of strata 18, 17B, 17A, and the locations of the newly excavated baulks. The corresponding Jerusalem MB phases are in parenthesis. The plans and photo are adapted from De-Groot and Bernick-Greenberg (2012) [1], plans 49, 50, 51 and photo 65 from top to bottom accordingly.

[1] De-Groot A, Bernick-Greenberg 2012. Excavations at the City of David 1978–1985 Directed by Yigal Shiloh VIIA: Area E: Stratigraphy and Architecture (Qedem 53), 141–184. Jerusalem.

SM2 – Microarchaeological analysis

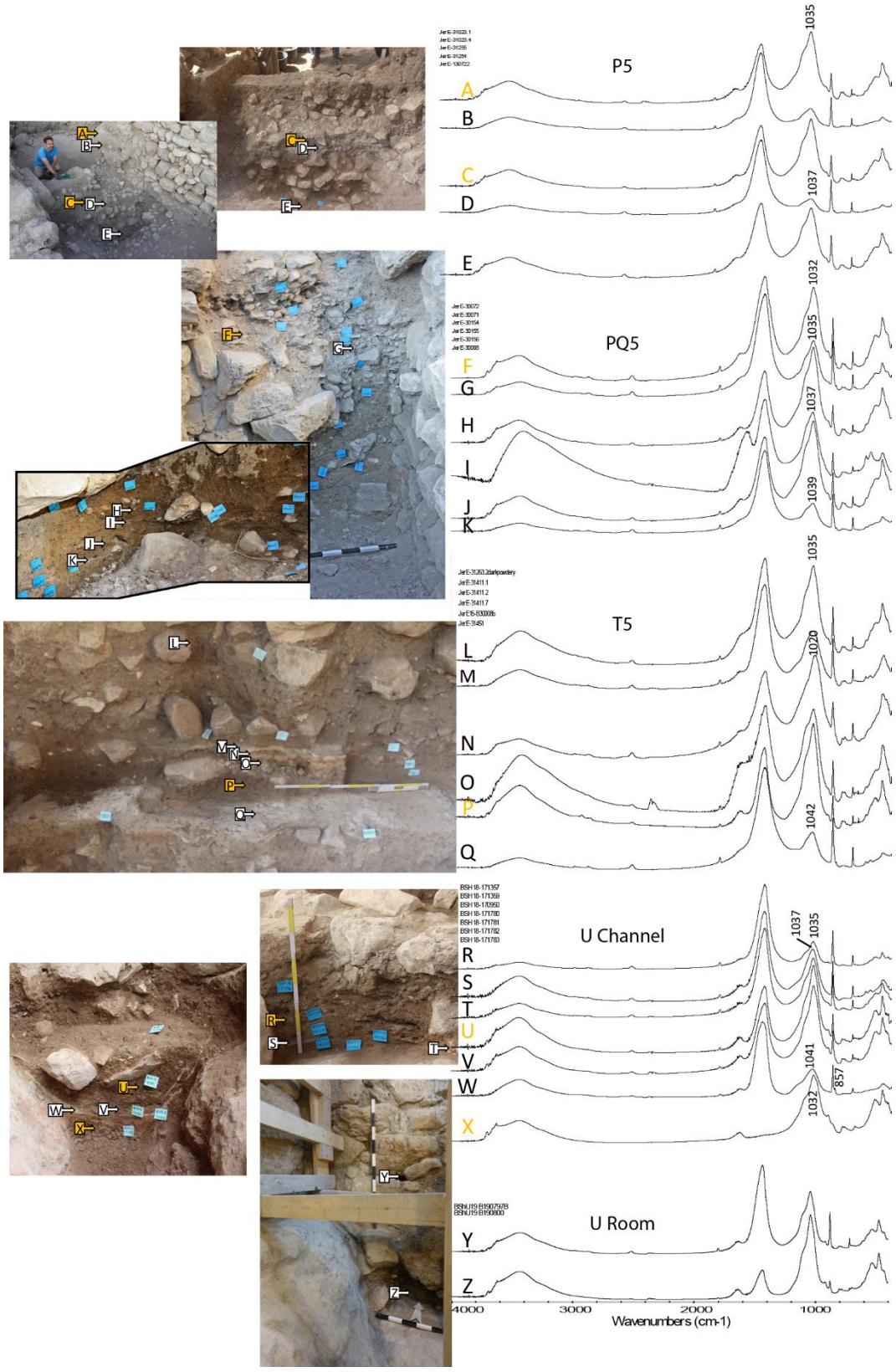

Figure S2. FTIR spectra for relevant samples and control sediments. The control sediments are marked in orange, the sediments of dated contexts are marked in white.

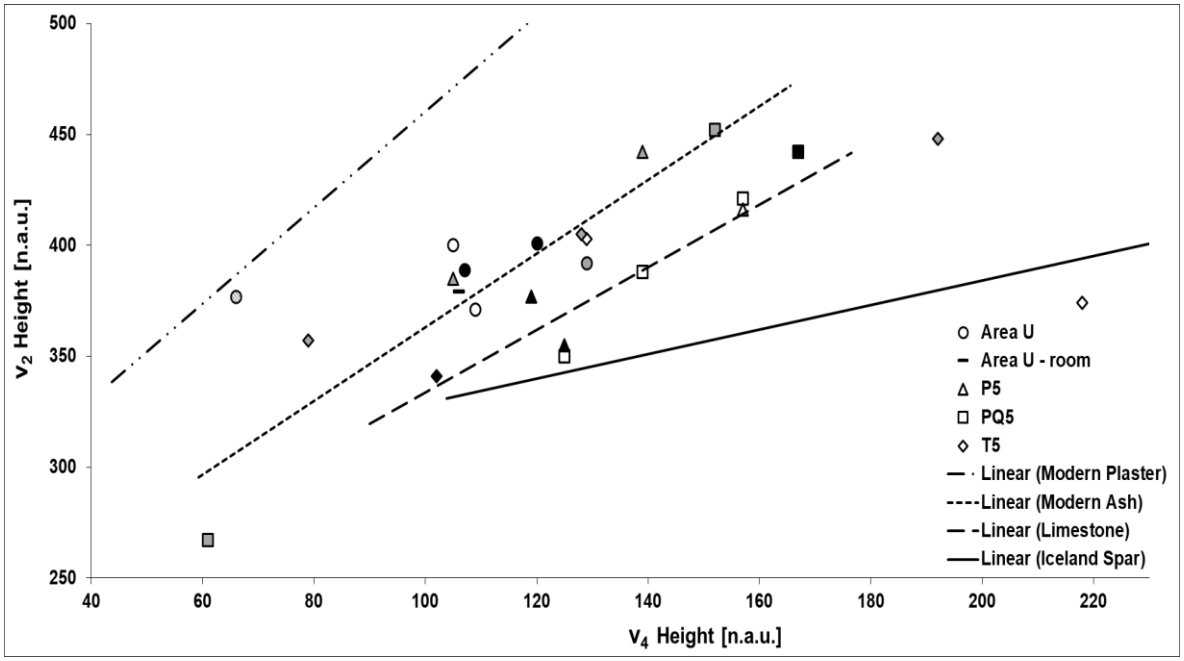

Figure S3. 'Grinding curves' plot for the calcitic component of the samples in Figure S2. Samples colored in black are control sediments. All other samples were dated. Grey markers are samples from ash layers, whites are non-ash context. The striped circle is the plaster sample from the channel of area U.

SM3 – The archaeological contexts of the dated samples

Figure S4. Section P5: A close-up image of the ash layer associated with the installation, from which samples RTD-9587 and RTD-9591 were dated. For scale, the length of the blue tag is 4.5 cm.

Figure S5. Section P5: 5-10 cm thick ash layer overlaying Floor 1689 and abutting W285. Samples RTD-10223 and RTD-10224 were taken from this ash layer.

Figure S6. Section PQ5: Small part of the lowest ash layer exposed underneath the widening of wall W285, context of sample RTD-8523. For scale, the length the blue tag is 4.5 cm.

Figure S7. Section PQ5: A close-up photo of the upper ash layer extending underneath the widening of wall W285, marked by tag B30061. This is the context of samples RTD-10215 and 10218. For scale, the length the blue tag is 4.5 cm.

Figure S8. Section PQ5: The two superimposed ash layers underneath the widening of wall W285. The lower ash layer is marked by a white arrow, while the upper one can be traced along the photo and marked by yellow arrows. For scale, the length the blue tag is 4.5 cm.

Figure S9. Section T5: Sample contexts relating to Wall 875 were taken in 20cm distance from the wall. RTD-9586 comes from the east (left, black arrow) and sample RTD-9599 from the west (right, white arrow) sides of Wall 875. For scale, the length the blue tag is 4.5 cm.

Figure S10. Detail of the thin ash layer identified at the foot of the Wall 875. Sample RTD-9586. For scale, the length the blue tag is 4.5 cm.

Figure S11. Concentration of bones dated as sample RTD-9599. For scale, the length the blue tag is 4.5 cm.

Figure S12. Section T5: The two superimposed ash layers after the excavation (marked by arrows). For scale, the length the blue tag is 4.5 cm.

Figure S13. Section T5: Surface of the thick ash layer with seeds and charcoal (black), associated with stone installation, after cleaning. Samples RTD-8460, 9592, 9593. For scale, the length the blue tag is 4.5 cm.

Figure S14. A burnt context from the late MB III, beneath late Iron Age building, Area U. For scale, the length the blue tag is 4.5 cm.

Figure S15. Continuation of the ash layer from Figure S14, 2m to the south.

Figure S16. Area U: The grey accumulation above the bottom of the channel. For scale, the length the blue tag is 4.5 cm.

Figure S17. Area U: The charcoal flecks above virgin soil directly underneath the plaster of the channel. For scale, the length the blue tag is 4.5 cm.

Figure S18. Area U: The “mud mortar” between the stones of wall, prior to sampling.

Figure S19. The sampled contexts of Area U, room 1948. The pocket above bedrock (RTD-10457, 10191) and the pocket 1m above the bedrock between the stones of the wall (RTD-10192, 10456, 10481).

Figure S20. Area U, room 1948. The pick stands on the bedrock (for scale the height of the pick is 30 cm). Notice the row of smaller stones, probably used to level and strengthen the surface prior to placing the large overlying stone on it. Samples RTD-10457 and 10191 were taken beneath these small constructional stones.

SM4 – Calculated transition between strata 18 (Phase II) and 17 (Phase III)

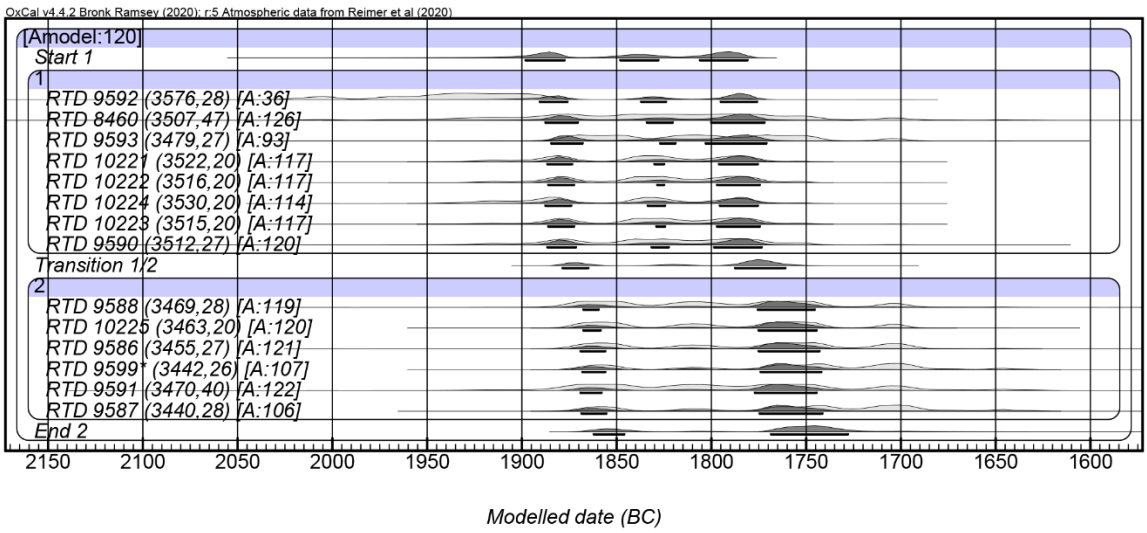

Figure S21. A model, built of two contigious phases, calculating the transition between stratum 18 (Phase II) and stratum 17 (Phase III).

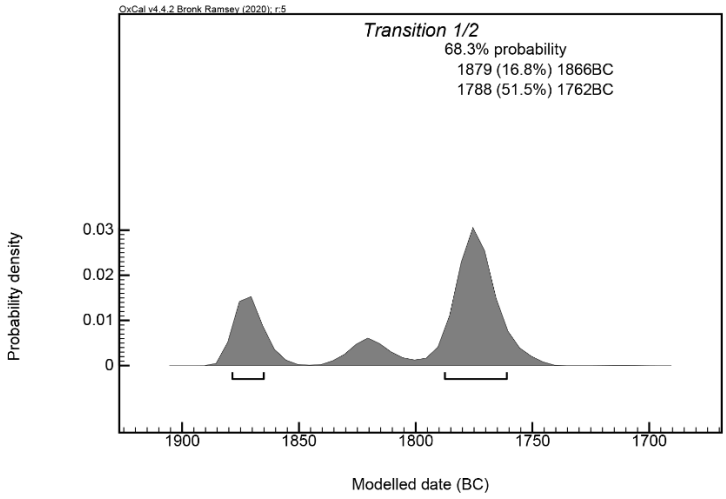

Figure S22. The resulted transition between stratum 18 (Phase II) and stratum 17 (Phase III).

SM5 – MB sub-phases Bayesian modelling

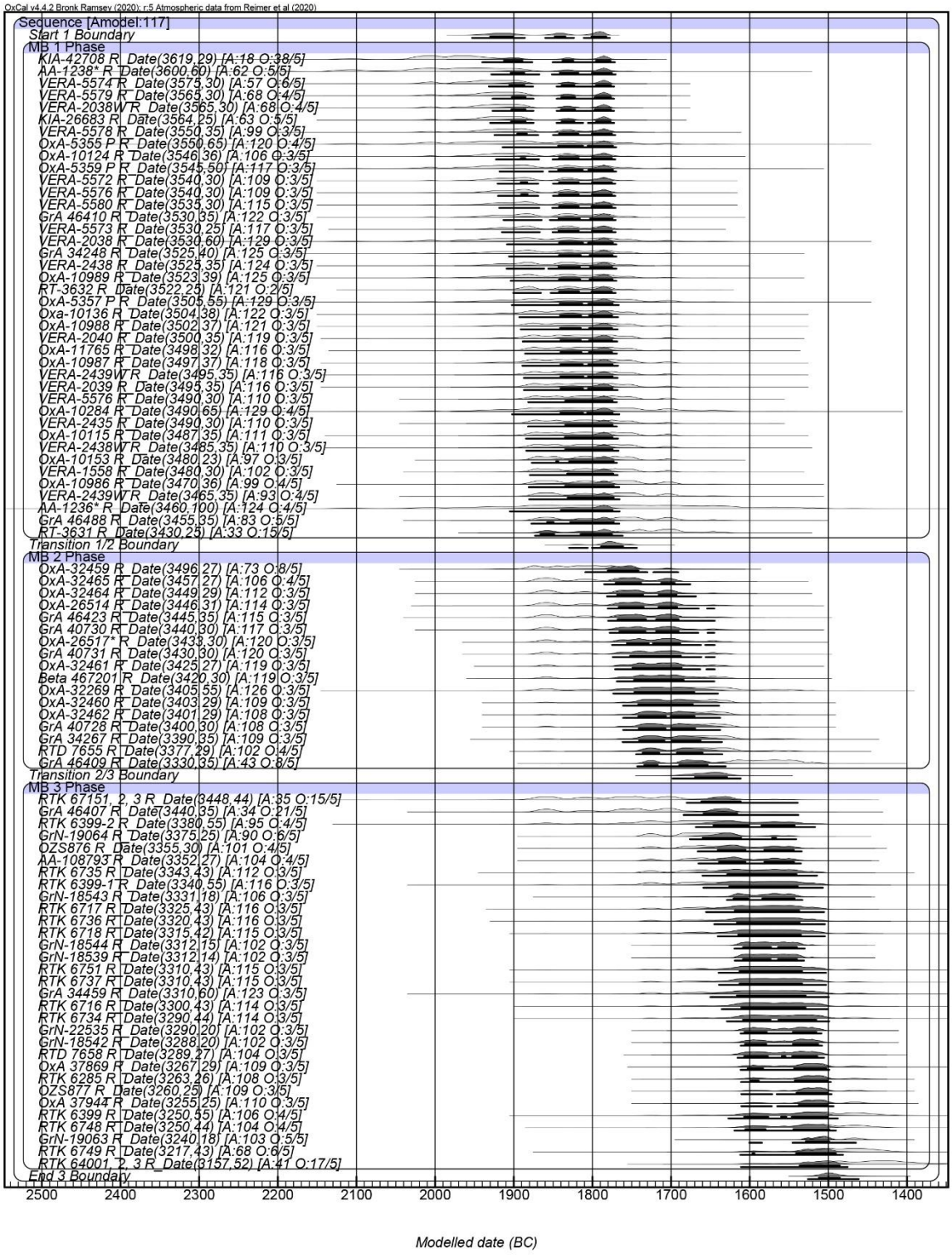

Figure S23. Modelling the MB sub-phases transitions. Short-lived samples from major sites with dates from the Middle Bronze Age, that were attributed to specific sub-phases (MB I, II, III) by the excavators. We used the outlier model (see SM6 for the model script). The transition boundaries were modeled by placing the samples as phases with contiguous

boundaries. As the transitions could be at different times at different sites, the calculated boundaries are understood to present a rough calculation of the average of cultural transition in the southern Levant. However, since the model has only three outliers, we consider the transitions to have taken place quite uniformly in the southern Levant.

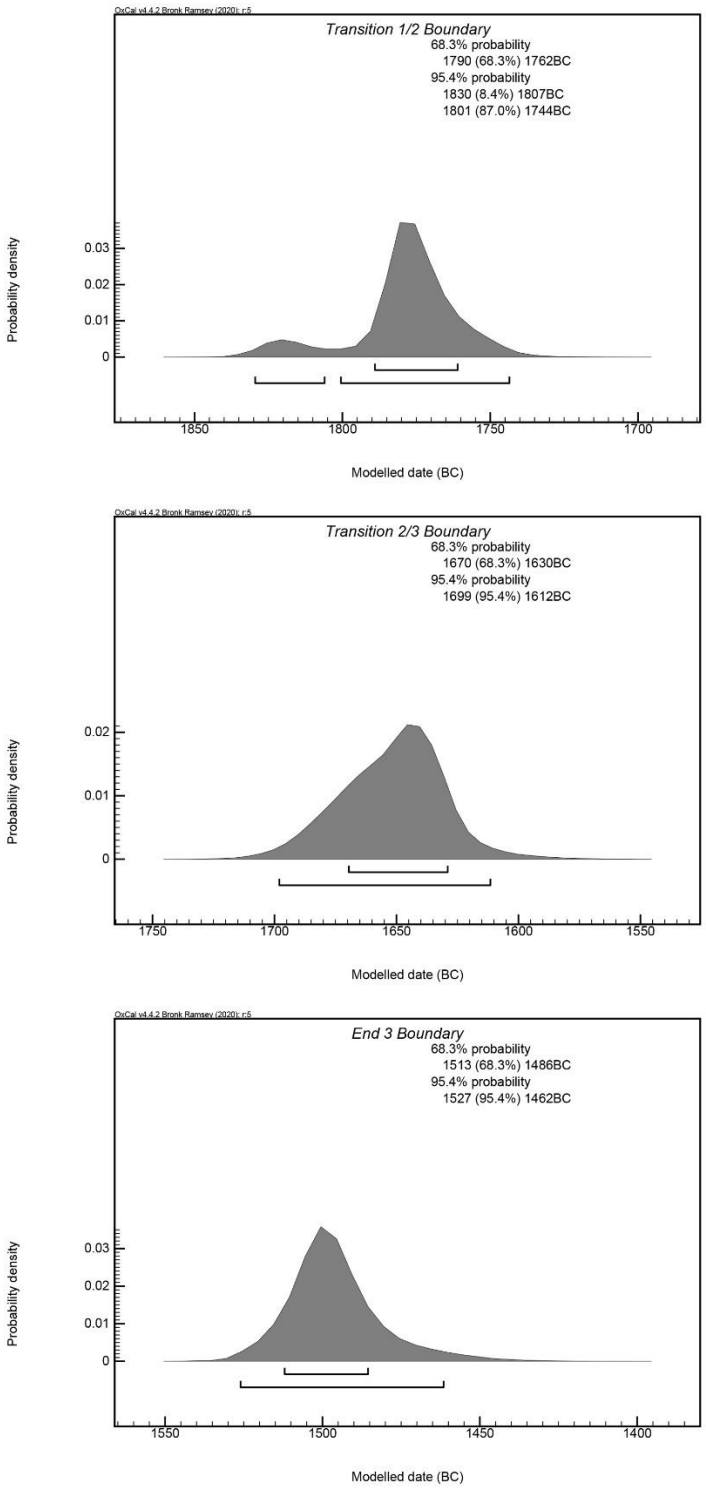

Figure S24. The three transitions between the MB sub-phases, calculated by the model in Figure S23.

Table S1. Samples used for Figure 8 and for the model of calculating transitions between MB I, II and III in Figure S21. Samples marked with (*) before the lab code were excluded from the model, either because they had measurement uncertainty of 80 years or more, or they were over 300 years different from the rest of the dates from the phase. Samples attributed to transitions (e.g., MBI-II, MBII-III) were not included as well.

Site	Sample ID	Libby Age	±1σ	Type	Context	Phase	Bibliography	MB
Ashqelon	GrA 46410	3530	35	Sheep/goat bone	Fill in Gate, Sq 85, L38, B31,84	XXII Gate 3	Bruins 2019	MB I
Ashqelon	GrA 34248	3525	40	Animal bone	Foundation fill for Third Gate, Sq 85, L43. B60	XXII Gate 3	Bruins 2019	MB I
Ashqelon	GrA 46488	3455	35	Cattle bone	Fill, Sq 56, L10, B33	XXII Gate 3	Bruins 2019	MB I
Ashqelon	GrA 46423	3445	35	Bone	Floor with occupational debrisSq 85, L/F90, B50,52,57,	XXI Gate 4	Bruins 2019	MB II
Ashqelon	GrA 40730	3440	30	Grape pips	Burial, Sq 66, L178, B8, #48,679	XXI Gate 4	Bruins 2019	MB II
Ashqelon	GrA 40731	3430	30	Grape pips	Burial, Sq 66, L178, B8, #48,679	XXI Gate 4	Bruins 2019	MB II
Ashqelon	*GrA 34461~	3410	490	Cattle bone, pelvis	Destruction debris or occupational debris, Sq 101, FG4, L146, B259	XXI Gate 4	Bruins 2019	MB II
Ashqelon	GrA 40728	3400	30	Grape pips	Burial, Sq 66, L178, B8, #48,679	XXI Gate 4	Bruins 2019	MB II
Ashqelon	GrA 34267	3390	35	Sheep bone, cal-caneus	Destruction debris or occupational debris, Sq 101, FG68, L146, B228	XXI Gate 4	Bruins 2019	MB II
Ashqelon	GrA 46409	3330	35	Cattle bone	Fill in Footgate, Sq 85, L99, B 36,48,53	XXI Gate 4	Bruins 2019	MB II
Ashqelon	GrA 46407	3440	35	Sheep/goat bone	Bin fill, mixed MB & Iron I pottery, Sq 44, F139. L139, B175	XX	Bruins 2019	MB III
Ashqelon	GrA 34459	3310	60	Animal bone	Bin fill, mixed MB & Iron I pottery, Sq 44, L139, B175	XX	Bruins 2019	MB III
Azeka	OZS876	3355	30	Seeds	S1-11 L14/S1/L305		Webster 2015	MB III
Azeka	OZS877	3260	25	Seeds	14/S1/L312		Webster 2015	MB III

Site	Sample ID	Libby Age	±1σ	Type	Context	Phase	Bibliography	MB
Dan	GrN-22535	3290	20	Seeds	Burial jar of infant under floor Stratum IX field no.23148 L4652		Ilan David (personal communication) in Webster 2015	MB III
Jericho	GrN-19064	3375	25	Cereal grains, fragmented	HAF.XII-XIII.1ii.1iii; Bruins & van der Plicht 1995 MBA final destruction layer		Bruins and van der Plicht 1995	MB III
Jericho	GrN-18543	3331	18	Triticum sp. grains	HAF.XII-XIII.1ii.1iii; Bruins & van der Plicht 1995, 2003; Marcus 2010 MBA final destruction layer		Bruins and van der Plicht 1995	MB III
Jericho	GrN-18539	3312	14	Hordeum vulgare grains	HAF.XII-XIII.1ii.1iii; Bruins & van der Plicht 1995, 2003; Marcus 2010 MBA final destruction layer		Bruins and van der Plicht 1995	MB III
Jericho	GrN-18544	3312	15	Cereal grains, fragmented	HAF.XII-XIII.1ii.1iii; Bruins & van der Plicht 1995, 2003; Marcus 2010 MBA final destruction layer		Bruins and van der Plicht 1995	MB III
Jericho	GrN-18542	3288	20	Triticum sp. grains	HAF.XII-XIII.1ii.1iii; Bruins & van der Plicht 1995, 2003; Marcus 2010 MBA final destruction layer		Bruins and van der Plicht 1995	MB III
Jericho	GrN-19063	3240	18	Hordeum vulgare grains	HAF.XII-XIII.1ii.1iii; Bruins & van der Plicht 1995 MBA final destruction layer		Bruins and van der Plicht 1995	MB III
Megiddo	RTD 7655	3377	29	Olive pits (from cluster)	K-12		Martin 2020	MB II
Megiddo	Beta 467201	3420	30	Olive pits (from cluster)	K-12		Martin 2020	MB II
Megiddo	RTK 6751	3310	43	Olive pit	K-11		Martin 2020	MB III
Megiddo	RTD 7658	3289	27	Olive pits (from cluster)	K-11		Martin 2020	MB III
Megiddo	OxA 37869	3267	29	Olive pit (from cluster)	H-16		Martin 2020	MB III
Megiddo	OxA 37944	3255	25	Olive pit (from cluster)	H-16		Martin 2020	MB III
Megiddo	RTK 6400	3157	52	Olive pits	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6285	3263	26	Olive pit	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6399	3250	55	Olive pit	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III

Site	Sample ID	Libby Age	±1σ	Type	Context	Phase	Bibliography	MB
Megiddo	RTK 6399-1	3340	55	Olive pit	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6399-2	3380	55	Olive pit	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6715	3448	44	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6716	3300	43	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6717	3325	43	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6718	3315	42	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6734	3290	44	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6735	3343	43	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6736	3320	43	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6748	3250	44	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6749	3217	43	Olive pits	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Megiddo	RTK 6737	3310	43	Olive pits (from cluster)	K-10 (domestic occupation)		Toffolo 2014, Martin 2020	MB III
Tel el Burak	*KIA-42709~	4131	32	Vicia ervilia seeds	Mud-brick debris in Room 11	MB Phase 1a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5579	3565	30	Olea europaea seeds	Burned floor	MB Phase 1a	Hofelmyer 2019	MB I
Tel el Burak	KIA-26683	3564	25	Triticum dicoccum seeds	Deep trench in Courtyard 1	MB Phase 1a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5578	3550	35	Triticum spp. seeds	Floor material	MB Phase 1a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5580	3535	30	Triticum spp. seeds	Mud attached to front of foundation wall	MB Phase 1a	Hofelmyer 2019	MB I

Site	Sample ID	Libby Age	±1σ	Type	Context	Phase	Bibliography	MB
Tel el Burak	*KIA-26684~	2772	24	Olea europaea seeds	Fill on floor of Room 7	MB Phase 1c	Hofelmyer 2019	MB I
Tel el Burak	*KIA-26685~	297	25	Olea europaea seeds	Fill on floor of Room 7	MB Phase 1c	Hofelmyer 2019	MB I
Tel el Burak	KIA-42708	3619	29	Fabaceae seeds	Fill in Room 11	MB Phase 2a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5574	3575	30	Triticum spp. seeds	Fill in Room 10	MB Phase 2a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5572	3540	30	Vitis vinifera seeds	Fill in Room 10	MB Phase 2a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5576	3540	30	Vitis viniferea seeeds		MB Phase 2a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5573	3530	25	Vicia ervilia seeds	Fill in Room 10	MB Phase 2a	Hofelmyer 2019	MB I
Tel el Burak	VERA-5576	3490	30	Olea europaea seeds		MB Phase 2a	Hofelmyer 2019	MB I
Tel el Burak	*KIA-42710~	4043	29	Hordeum vulgare seeds	Mud-brick debris and pottery on Room 13's floor	MB Phase 2c	Hofelmyer 2019	MB I
Tel el-Ifshar	OxA-10124	3546	36	Vicia faba and wheat	L.752	Phase A early	Marcus 2016	MB I
Tel el-Ifshar	VERA-2438W	3485	35	Vicia faba horsebean	L.626	Phase B	Marcus 2016	MB I
Tel el-Ifshar	OxA-10284	3490	65	Vicia faba horsebean	L.719	phase B	Marcus 2016	MB I
Tel el-Ifshar	Oxa-10136	3504	38	Vicia faba horsebean	L.927	Phase B	Marcus 2016	MB I
Tel el-Ifshar	RT-3632	3522	25	Vicia faba horsebean	L.927	Phase B	Marcus 2016	MB I
Tel el-Ifshar	VERA-2438	3525	35	Vicia faba horsebean	L.927	Phase B	Marcus 2016	MB I
Tel el-Ifshar	OxA-5355 P	3550	65	Vicia faba horsebean	L.927	Phase B	Marcus 2016	MB I
Tel el-Ifshar	VERA-2439W	3465	35	Vicia faba horsebean	626	Phase C	Marcus 2016	MB I

Site	Sample ID	Libby Age	±1σ	Type	Context	Phase	Bibliography	MB
Tel el-Ifshar	VERA-1558	3480	30	Vicia faba horsebean	L.626	Phase C	Marcus 2016	MB I
Tel el-Ifshar	OxA-10115	3487	35	Vicia faba horsebean	L.626	Phase C	Marcus 2016	MB I
Tel el-Ifshar	VERA-2439W	3495	35	Vicia faba horsebean	626	Phase C	Marcus 2016	MB I
Tel el-Ifshar	OxA-11765	3498	32	Triticum dicoccum Emmer wheat	L.1164 granary	Phase E	Marcus 2016	MB I
Tel el-Ifshar	RT-3631	3430	25	Triticum dicoccum Emmer wheat	L.1164 granary	Phase E	Marcus 2016	MB I
Tel el-Ifshar	OxA-5357 P	3505	55	Triticum dicoccum Emmer wheat	L.1164 granary	Phase E	Marcus 2016	MB I
Tel el-Ifshar	OxA-10153	3480	23	Vicia faba horsebean	L.1103	Phase G	Marcus 2016	MB I
Tel el-Ifshar	VERA-2435	3490	30	Vicia faba horsebean	L.1103	Phase G	Marcus 2016	MB I
Tel el-Ifshar	OxA-5359 P	3545	50	Vicia faba horsebean	L.1103	Phase G	Marcus 2016	MB I
Tel Kabri	*OxA-26516*	3547	32	Quercus small branch	DW 2078-2	Phase 5	Hofelmyer et al. 2016	MB I -II
Tel Kabri	OxA-26514	3446	31	Olea europaea, pit	DW 2071-12	Phase 4	Hofelmyer et al. 2016	MB II
Tel Kabri	OxA-26517*	3433	30	Quercus calliprinos small branch	DW 2237-1	Phase 4	Hofelmyer et al. 2016	MB II
Tel Kabri	OxA-32465	3457	27	Olea europaea, pit	Charcoal-3 DWE L4071-2	Phase 3	Hofelmyer et al. 2016	MB II
Tel Kabri	OxA-32464	3449	29	Ficus carica seeds	DWE L4071-1	Phase 3	Hofelmyer et al. 2016	MB II
Tel Kabri	OxA-32461	3425	27	Olea europaea, pit	DWE L4036/12-3	Phase 3	Hofelmyer et al. 2016	MB II
Tel Kabri	OxA-32269	3405	55	Olea europaea, pit	DWE L4036/12-3	Phase 3	Hofelmyer et al. 2016	MB II
Tel Kabri	OxA-32460	3403	29	Olea europaea, pit	DW L2461	Phase 3	Hofelmyer et al. 2016	MB II

Site	Sample ID	Libby Age	±1σ	Type	Context	Phase	Bibliography	MB
Tel Kabri	OxA-32462	3401	29	Rosaceae and Olea europaea seed fragments	DWE L4071-1	Phase 3	Hofelmyer et al. 2016	MB II
Tel Kabri	OxA-32459	3496	27	Olea europaea, pit	DW L2440-3-FE14	End Phase 3 - Phase 3	Hofelmyer et al. 2016	MB II
Tell el-Hayyat	VERA-2038W	3565	30	Triticum aestivum	Phase 5, H.067, ash lens Triticum aestivum; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 5	Falconer and Fall 2017	MB I
Tell el-Hayyat	VERA-2038	3530	60	Triticum aestivum	Phase 5, H.067, ash lens Triticum aestivum; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 5	Falconer and Fall 2017	MB I
Tell el-Hayyat	OxA-10987	3497	37	Triticum aestivum	Phase 5, H.067, ash lens Triticum aestivum; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 5	Falconer and Fall 2017	MB I
Tell el-Hayyat	OxA-10986	3470	36	Triticum aestivum	E.102, ash lens; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 5	Falconer and Fall 2017	MB I
Tell el-Hayyat	AA-1236*~	3460	100	Lens culinaris	F.049.288, surface, Falconer & Fall 2006: table 4.2; Marcus 2003, 2010 (hand-built vessels)	Phase 5	Falconer and Fall 2017	MB I
Tell el-Hayyat	*AA-1239*~	2930	80	Punica granatum seeds	F.045.258, ash lens; Falconer & Fall 2006: table 4.2; Marcus 2003, 2010; reported previously as AA-1238, Phase 4	Phase 5	Falconer and Fall 2017	MB I
Tell el-Hayyat	AA-1238*	3600	60	Lens culinaris	C.070.001, surface; Falconer & Fall 2006: table 4.2; Marcus 2003, 2010; reported previously as AA-1239, Phase 5	Phase 4	Falconer and Fall 2017	MB I
Tell el-Hayyat	OxA-10989	3523	39	Olea europaea seed	Phase 4, J.074, ash lens Olea europaea seed; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 4	Falconer and Fall 2017	MB I
Tell el-Hayyat	OxA-10988	3502	37	Olea europaea seed	Phase 4, E.092, tabun fill Olea europaea seed; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 4	Falconer and Fall 2017	MB I
Tell el-Hayyat	VERA-2040	3500	35	Olea europaea seed	Phase 4, J.074, ash lens Olea europaea seeds; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 4	Falconer and Fall 2017	MB I
Tell el-Hayyat	VERA-2039	3495	35	Olea europaea seed	Phase 4, E.092, tabun fill Olea europaea seed, humic acids; Falconer & Fall 2006: table 4.2; Marcus 2010	Phase 4	Falconer and Fall 2017	MB I
Tell el-Hayyat	*AA-1237*~	3280	100	Olea europaea seeds	F.040.235, surface; Falconer & Fall 2006: table 4.2; Marcus 2003, 2010;	Phase 4	Falconer and Fall 2017	MB I

Site	Sample ID	Libby Age	±1σ	Type	Context	Phase	Bibliography	MB
Tell el-Hayyat	*AA-108790	3475	28	Hordeum seeds	C.022.009, tabun	Phase 3	Falconer and Fall 2017	MB I -II
Tell el-Hayyat	*AA-108789	3493	30	Hordeum seeds	A.026.013, ash lens	Phase 2	Falconer and Fall 2017	MB II - III
Tell el-Hayyat	AA-108793	3352	27	Hordeum seeds	L.006.079, ash lens	Phase 1	Falconer and Fall 2017	MB III

SM6 – OxCal model script of the Jerusalem samples (Figure 2).

```
Plot()
 {
  Sequence("P5")
  {
   Boundary("Start 1");
   Sequence("Sequence E P5")
   {
    Phase("Phase Stone fill under F1689
(Str18)")
    {
     R_Date("RTD 10221", 3522, 20);
     R_Date("RTD 10222", 3516, 20);
    };
    R_Combine("Rcomb. Ash covering F1689
(Str18)")
    {
     R_Date("RTD 10224", 3530, 20);
     R_Date("RTD 10223", 3515, 20);
     R_Date("RTD 9590", 3512, 27);
    };
    R_Combine("Rcomb. Installation (Str17)")
    {
     R_Date("RTD 9591", 3470, 40);
     R_Date("RTD 9587", 3440, 28);
    };
   };
   Boundary("End 1");
  };
  Sequence("Sequence E T5")
  {
   Boundary("Start 1");
   Sequence("Sequence E T5")
   {
    R_Combine("Rcomb. Lower installation
(Str18)")
    {
     R_Date("RTD 9592", 3576, 28);
     R_Date("RTD 8460", 3507, 47);
     R_Date("RTD 9593", 3479, 27);
    };
    R_Combine("Rcomb. Upper installation
(Str17)")
    {
     R_Date("RTD 9588", 3469, 28);
     R_Date("RTD 10225", 3463, 20);
    };
    Phase("Phase At the foot of W875 (Str17)")
    {
     R_Date("RTD 9586", 3455, 27);
     R_Date("RTD 9599*", 3442, 26);
    };
   };
   Boundary("End 1");
  };
  Sequence("Sequence E PQ5")
  {
   Boundary("Start low ash under wall
widening");
   Phase("Phase Low ash under wall widening")
   {
    R_Date("RTD 8523**", 3587, 26);
   };
   Boundary("Transition 1/2");
   Phase("Phase Between ash layers under wall
widening")
   {
    R_Date("RTD 10217", 3431, 45);
   };
   Boundary("Transition 2/3");
   Phase("Phase Upper ash under wall
widening")
   {
    R_Date("RTD 10215", 3419, 24);
    R_Date("RTD 10218", 3387, 43);
   };
   Boundary("Transition 3/4");
   Boundary("End 5");
  };
  Label("Fill under wall widening");
  R_Date("RTD 10216", 3189, 24);
  R_Date("RTD 10528", 3485, 40);
  R_Date("RTD 10527", 3510, 26);
  R_Date("RTD 10446", 3558, 26);
  R_Date("RTD 10445", 3454, 29);
  R_Date("RTD 10447*", 3590, 28);
  R_Date("RTD 10444", 3513, 27);
  Label("Fill abutting the wall widening");
  R_Date("RTD 10300*", 3508, 48);
  R_Date("RTD 10302*", 3497, 28);
  R_Date("RTD 10301*", 3437, 28);
  Label("E T5 In Iron Age fill");
  R_Date("RTD 8524", 3303, 26);
  Line( );
  Sequence("Sequence U channel")
  {
   Boundary("Start 1");
   Phase("Phase Under channel")
```

```
 {
  R_Date("RTD 10293", 3497, 31);
  R_Date("RTD 9965", 3325, 19);
 };
 Boundary("Transition 1/2");
 Phase("Phase Above channel")
 {
  R_Date("RTD 9964", 3245, 31);
  R_Date("RTD 10292", 3216, 31);
 };
 Boundary("End 2");
};
R_Combine("Rcomb. U Ash layer")
{
 R_Date("RTD 9181", 3295, 17);
 R_Date("RTD 9962", 3279, 21);
};
Sequence("Sequence U Room W19049")
{
 Boundary("Start 1");
 Phase("Phase Under wall")
 {
  R_Date("RTD 10457", 3470, 27);
  R_Date("RTD 10191", 3486, 21);
 };
 Boundary("End 1");
 Boundary("Start 2");
 Phase("Phase Mud mortar")
 {
  R_Date("RTD 10456", 3290, 31);
  R_Date("RTD 10481", 3320, 33);
  R_Date("RTD 10192*", 3264, 26);
 };
 Boundary("End 2");
};
Line( );
Label("Spring Tower");
R_Date("RTD 7902mix", 3532, 28);
R_Date("RTD 7905mix", 3460, 26);
R_Date("RTD 8064", 3431, 22);
R_Date("RTD 7904mix", 3519, 25);
};
```

SM7 – OxCal model script of the MB sub-phases transitions (Figures 8 and S21).

```
Outlier_Model("General",T(5),U(0,4),"t");
 Plot()
 {
  Sequence()
  {
   Boundary("Start 1");
   Phase("MB 1")
   {
    R_Date("KIA-42708", 3619, 29)
    {
     Outlier(0.05);
    };
    R_Date("AA-1238*", 3600, 60)
    {
     Outlier(0.05);
    };
    R_Date("VERA-5574", 3575, 30)
    {
     Outlier(0.05);
    };
    R_Date("VERA-5579", 3565, 30)
    {
     Outlier(0.05);
    };
    R_Date("VERA-2038W", 3565, 30)
    {
     Outlier(0.05);
    };
    R_Date("KIA-26683", 3564, 25)
    {
     Outlier(0.05);
    };
    R_Date("VERA-5578", 3550, 35)
    {
     Outlier(0.05);
    };
    R_Date("OxA-5355 P", 3550, 65)
    {
     Outlier(0.05);
    };
    R_Date("OxA-10124", 3546, 36)
    {
     Outlier(0.05);
    };
    R_Date("OxA-5359 P", 3545, 50)
    {
     Outlier(0.05);
    };
    R_Date("VERA-5572", 3540, 30)
    {
     Outlier(0.05);
    };
    R_Date("VERA-5576", 3540, 30)
    {
     Outlier(0.05);
    };
    R_Date("VERA-5580", 3535, 30)
    {
     Outlier(0.05);
    };
    R_Date("GrA 46410", 3530, 35)
    {
     Outlier(0.05);
    };
    R_Date("VERA-5573", 3530, 25)
    {
     Outlier(0.05);
    };
    R_Date("VERA-2038", 3530, 60)
    {
     Outlier(0.05);
    };
    R_Date("GrA 34248", 3525, 40)
    {
     Outlier(0.05);
    };
    R_Date("VERA-2438", 3525, 35)
    {
     Outlier(0.05);
    };
    R_Date("OxA-10989", 3523, 39)
    {
     Outlier(0.05);
    };
    R_Date("RT-3632", 3522, 25)
    {
     Outlier(0.05);
    };
    R_Date("OxA-5357 P", 3505, 55)
    {
     Outlier(0.05);
    };
    R_Date("Oxa-10136", 3504, 38)
    {
     Outlier(0.05);
    };
    R_Date("OxA-10988", 3502, 37)
    {
```

```
 Outlier(0.05);
};
R_Date("VERA-2040", 3500, 35)
{
 Outlier(0.05);
};
R_Date("OxA-11765", 3498, 32)
{
 Outlier(0.05);
};
R_Date("OxA-10987", 3497, 37)
{
 Outlier(0.05);
};
R_Date("VERA-2439W", 3495, 35)
{
 Outlier(0.05);
};
R_Date("VERA-2039", 3495, 35)
{
 Outlier(0.05);
};
R_Date("VERA-5576", 3490, 30)
{
 Outlier(0.05);
};
R_Date("OxA-10284", 3490, 65)
{
 Outlier(0.05);
};
R_Date("VERA-2435", 3490, 30)
{
 Outlier(0.05);
};
R_Date("OxA-10115", 3487, 35)
{
 Outlier(0.05);
};
R_Date("VERA-2438W", 3485, 35)
{
 Outlier(0.05);
};
R_Date("OxA-10153", 3480, 23)
{
 Outlier(0.05);
};
R_Date("VERA-1558 ", 3480, 30)
{
 Outlier(0.05);
};
R_Date("OxA-10986", 3470, 36)
{
 Outlier(0.05);
};
R_Date("VERA-2439W", 3465, 35)
{
 Outlier(0.05);
};
R_Date("AA-1236*", 3460, 100)
{
 Outlier(0.05);
};
R_Date("GrA 46488", 3455, 35)
{
 Outlier(0.05);
};
R_Date("RT-3631", 3430, 25)
{
 Outlier(0.05);
};
};
Boundary("Transition 1/2");
Phase("MB 2")
{
 R_Date("OxA-32459", 3496, 27)
 {
  Outlier(0.05);
 };
 R_Date("OxA-32465", 3457, 27)
 {
  Outlier(0.05);
 };
 R_Date(" OxA-32464", 3449, 29)
 {
  Outlier(0.05);
 };
 R_Date("OxA-26514", 3446, 31)
 {
  Outlier(0.05);
 };
 R_Date("GrA 46423", 3445, 35)
 {
  Outlier(0.05);
 };
 R_Date("GrA 40730", 3440, 30)
 {
  Outlier(0.05);
 };
 R_Date("OxA-26517*", 3433, 30)
 {
  Outlier(0.05);
 };
```

```
 R_Date("GrA 40731", 3430, 30)
 {
  Outlier(0.05);
 };
 R_Date("OxA-32461", 3425, 27)
 {
  Outlier(0.05);
 };
 R_Date("Beta 467201", 3420, 30)
 {
  Outlier(0.05);
 };
 R_Date("OxA-32269", 3405, 55)
 {
  Outlier(0.05);
 };
 R_Date("OxA-32460", 3403, 29)
 {
  Outlier(0.05);
 };
 R_Date("OxA-32462", 3401, 29)
 {
  Outlier(0.05);
 };
 R_Date("GrA 40728", 3400, 30)
 {
  Outlier(0.05);
 };
 R_Date("GrA 34267", 3390, 35)
 {
  Outlier(0.05);
 };
 R_Date("RTD 7655", 3377, 29)
 {
  Outlier(0.05);
 };
 R_Date("GrA 46409", 3330, 35)
 {
  Outlier(0.05);
 };
};
Boundary("Transition 2/3");
Phase("MB 3")
{
 R_Date("RTK 67151, 2, 3", 3448, 44)
 {
  Outlier(0.05);
 };
 R_Date("GrA 46407", 3440, 35)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6399-2", 3380, 55)
 {
  Outlier(0.05);
 };
 R_Date("GrN-19064", 3375, 25)
 {
  Outlier(0.05);
 };
 R_Date("OZS876", 3355, 30)
 {
  Outlier(0.05);
 };
 R_Date("AA-108793", 3352, 27)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6735", 3343, 43)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6399-1", 3340, 55)
 {
  Outlier(0.05);
 };
 R_Date("GrN-18543", 3331, 18)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6717", 3325, 43)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6736", 3320, 43)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6718", 3315, 42)
 {
  Outlier(0.05);
 };
 R_Date("GrN-18544", 3312, 15)
 {
  Outlier(0.05);
 };
 R_Date("GrN-18539", 3312, 14)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6751", 3310, 43)
 {
```

```
 Outlier(0.05);
};
R_Date("RTK 6737", 3310, 43)
{
 Outlier(0.05);
};
R_Date("GrA 34459", 3310, 60)
{
 Outlier(0.05);
};
R_Date("RTK 6716", 3300, 43)
{
 Outlier(0.05);
};
R_Date("RTK 6734", 3290, 44)
{
 Outlier(0.05);
};
R_Date("GrN-22535", 3290, 20)
{
 Outlier(0.05);
};
R_Date("GrN-18542", 3288, 20)
{
 Outlier(0.05);
};
R_Date("RTD 7658", 3289, 27)
{
 Outlier(0.05);
};
R_Date("OxA 37869", 3267, 29)
{
 Outlier(0.05);
};
R_Date("RTK 6285", 3263, 26)
{
 Outlier(0.05);
};
R_Date("OZS877", 3260, 25)
{
 Outlier(0.05);
};
R_Date("OxA 37944", 3255, 25)
{
 Outlier(0.05);
};
R_Date("RTK 6399", 3250, 55)
{
 Outlier(0.05);
};
R_Date("RTK 6748", 3250, 44)
 {
  Outlier(0.05);
 };
 R_Date("GrN-19063", 3240, 18)
 {
  Outlier(0.05);
 };
 R_Date("RTK 6749", 3217, 43)
 {
  Outlier(0.05);
 };
 R_Date("RTK 64001, 2, 3", 3157, 52)
 {
  Outlier(0.05);
 };
 };
 Boundary("End 3");
};
};
```