Supplementary Material for:

Bayesian modeling of a peripheral Middle Bronze Age settlement at Zahrat adh-Dhra‘ 1, Jordan

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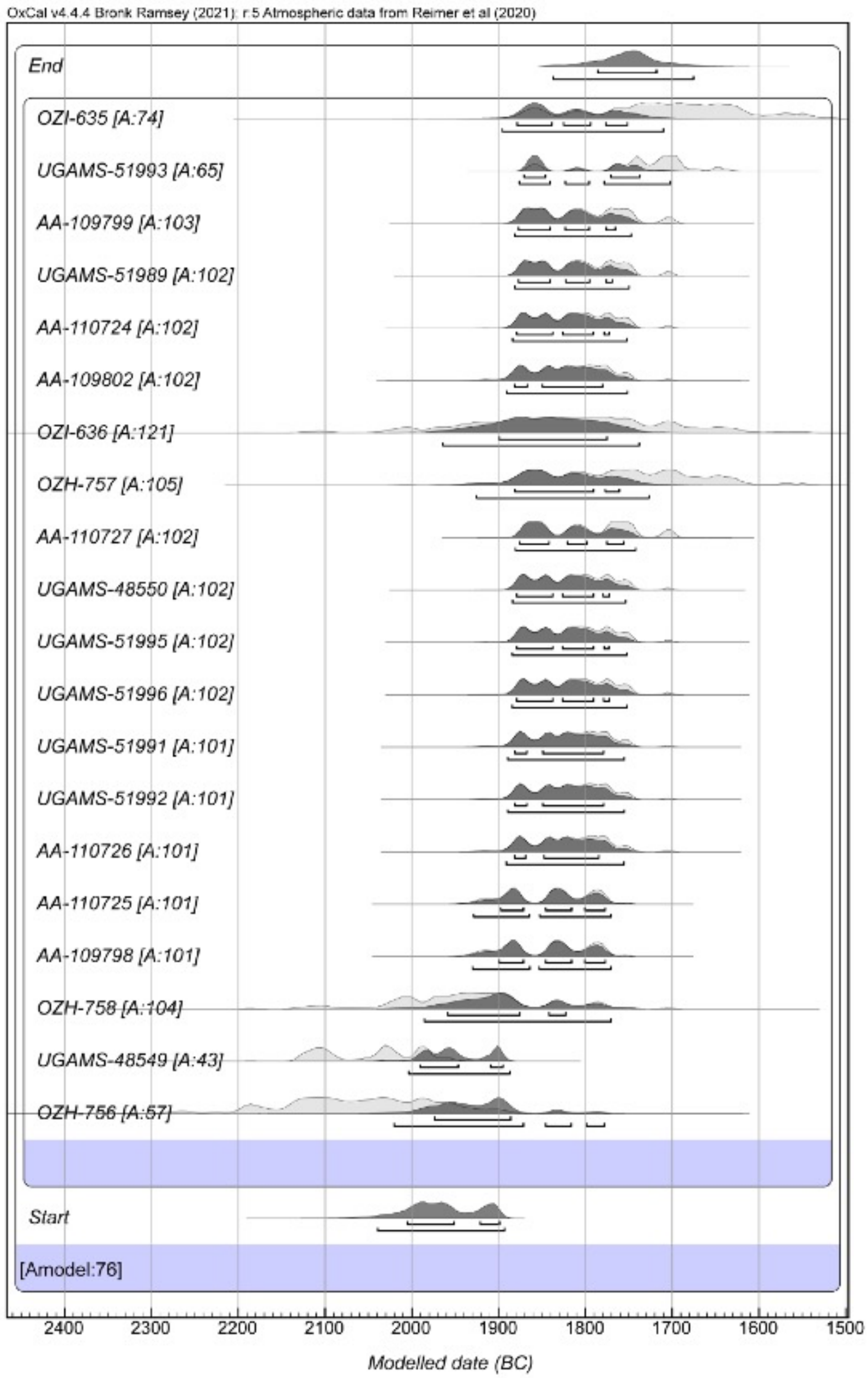
Supplementary Material

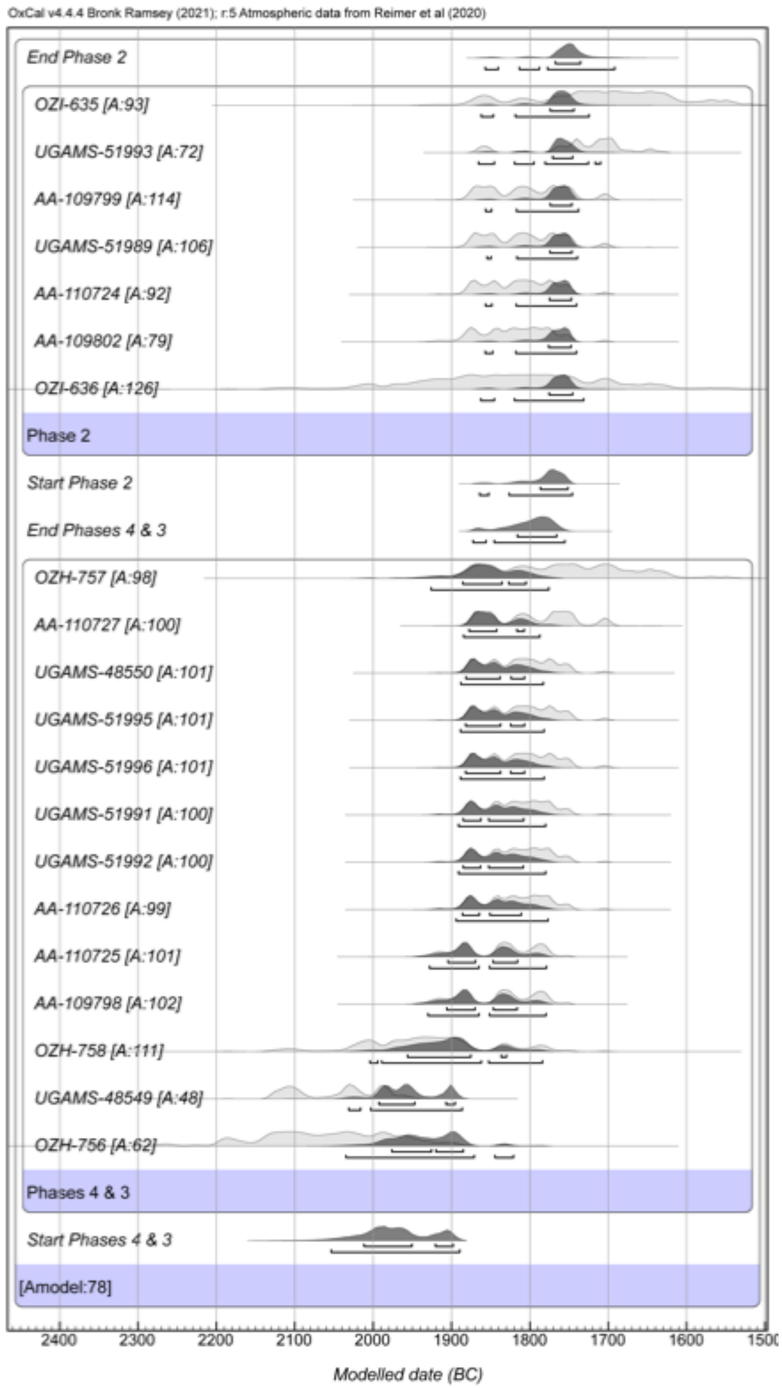
Our new Bayesian model for Zahrat adh-Dhra‘ 1 **(**ZAD 1), presented as Figure 4 in the main text, supersedes our previous analysis and strengthens our modeled appreciation of the occupational history of ZAD 1. A previous Bayesian analysis of 14 calibrated AMS ages from ZAD 1 proposed a model of four sequential phases (A_{model} = 85.7), including Phase 4 (based on 1 date), Phase 3 (6 dates from 6 structures), Phase 2 (5 dates from 4 structures) and Phase 1 (1 date) (Fall et al. 2019). Our current preferred model incorporates 20 AMS ages in three sequential phases (A_{model} = 101.9), including Phase 4 (3 dates from 2 structures), Phase 3 (10 dates from 7 structures) and Phase 2 (7 dates from 5 structures). Thus, our new model is based on a more robust dataset, which features an enhanced sample of AMS ages and greater numbers of ages in each phase. We do not include two ages (AA-109800 and OZH-759) from ZAD 1 in our current analyses for several reasons. The calibrated 2σ confidence interval for AA-109800 estimates the age for this sample between 2574 and 2461 cal BCE. This range spans the Early Bronze III/IV transition in accordance with the growing high chronology for the Southern Levantine Early Bronze Age (Fall et al. 2021, 2022). In light of the exclusively Middle Bronze Age ceramic repertoire of ZAD 1 and the absence of any Early Bronze Age ceramic wares or vessel forms, the anomalously early age for AA-109800 suggests that it predates the site's occupation. The presence of this carbonized *Triticum* sample (AA-109800) may not be surprising in light of the proximity of Early Bronze Age Bab edh-Dhra' about four km downstream along the Wadi Kerak. A second isolated date, OZH-759, was used to propose Phase 1 at ZAD 1 potentially corresponding to Middle Bronze III (Fall et al. 2019). However, OZH-759 comes from a disturbed depositional context and produces a calibrated 2σ range with an end date of 1417 cal BCE, well beyond the traditional date for the end of the Middle Bronze Age. While the earlier portion of this sample's calibration might be accommodated within Middle Bronze III, ZAD 1 offers none of the hallmark ceramic forms (e.g., chalice forms or highly profiled carinated bowls) that mark the Middle Bronze III subperiod definitively (Falconer in Edwards et al., 2002; Berelov 2006a: 92, 2006b; Fall et al. 2007). Thus, the age for OZH-759 appears to post-date the archaeological evidence associated with the latest occupation of ZAD 1. As another means of assessing our three-phase model, we also analyzed the 20 AMS ages from Phases 4-2 according to three additional models (Alternative Models 1-3; Supplementary Figures 1-3). These alternative models produce less parsimonious results than our preferred Bayesian model, with lower values of A_{model} and with additional dates rendered as statistical outliers (based on $A < 60$) (Supplementary Table 1).

Supplementary Table 1. Results of alternative Bayesian models of the 20 AMS ages from Phases 4-2 at Zahrat adh-Dhra‘ 1 which produced lower values of A_{model} and outlying ages in comparison to the preferred Bayesian model shown in Figure 4 in the main text.

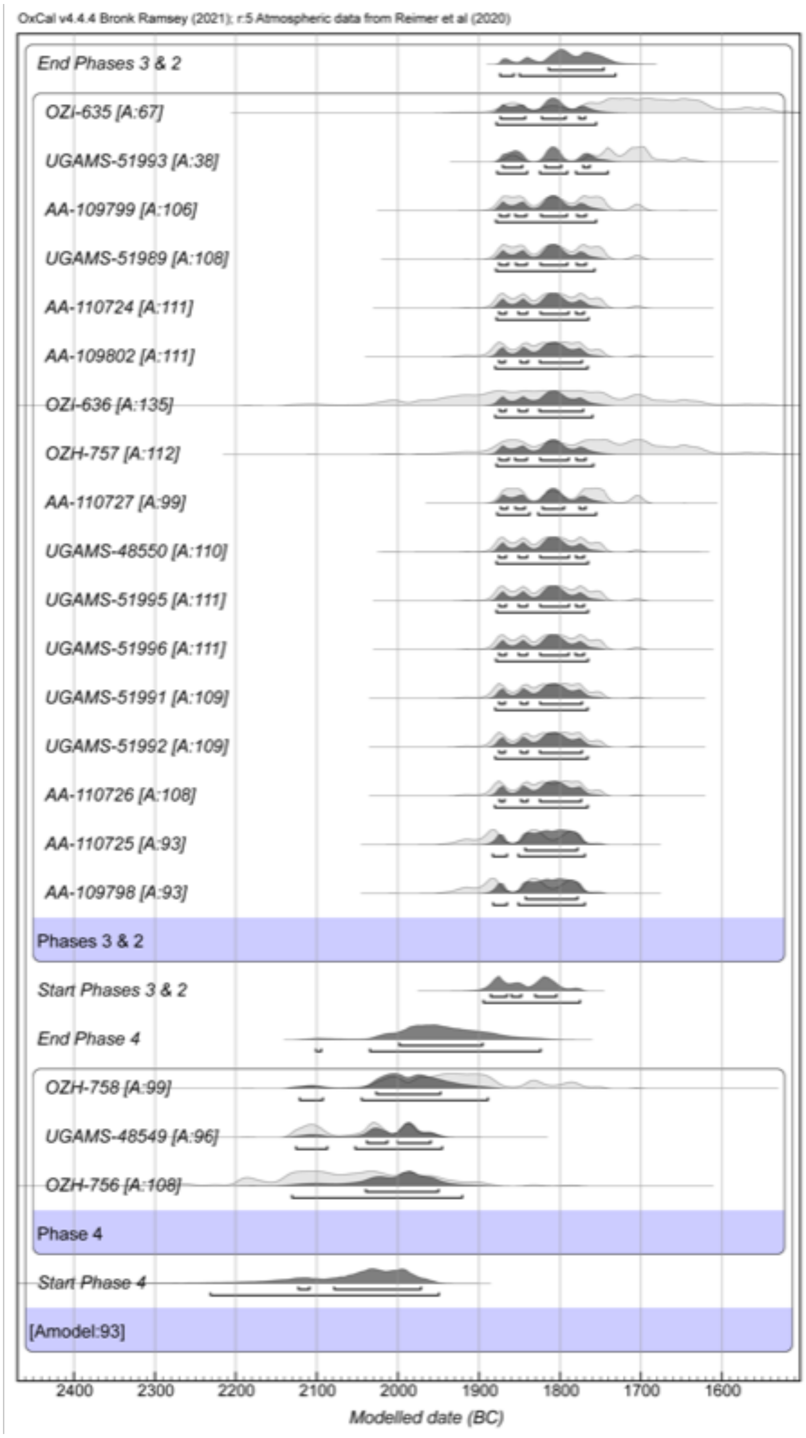
Alternative Model	**Model Description**	$\mathbf{A_{model}}$	**Outlying Ages**
Model 1	One-phase model, 20 ages from Phases 4-2	76.4	UGAMS-48549, OZH-756
Model 2	Two sequential phases, 13 ages from Phases 4 & 3 vs. 7 ages from Phase 2	77.8	UGAMS-48549
Model 3	Two sequential phases, 3 ages from Phase 4 vs. 17 ages from Phases 3 & 2	93.0	UGAMS-51993



Supplementary Figure 1. Bayesian sequencing of 20 calibrated ^{14}C ages for seed samples from Phases 4-2 at Zahrat adh-Dhra‘ 1, Jordan modeled in a single phase with two outlying samples (UGAMS-48549, OZH-756). A_{model} = 76.4. Light gray curves indicate single-sample calibration distributions; dark curves indicate modeled calibration distributions. Calibrations and Bayesian modeling based on OxCal 4.4.4 (Bronk Ramsey 2009) using the IntCal20 atmospheric curve (Reimer et al. 2020; van der Plicht et al. 2020).



Supplementary Figure 2. Bayesian sequencing of 20 calibrated ^{14}C ages for seed samples from Phases 4-2 at Zahrat adh-Dhra‘ 1, Jordan modeled in two sequential phases (Phases 4 & 3 combined vs. Phase 2) with one outlying sample (UGAMS-48549). A_{model} = 77.8. Light gray curves indicate single-sample calibration distributions; dark curves indicate modeled calibration distributions. Calibrations and Bayesian modeling based on OxCal 4.4.4 (Bronk Ramsey 2009) using the IntCal20 atmospheric curve (Reimer et al. 2020; van der Plicht et al. 2020).



Supplementary Figure 3. Bayesian sequencing of 20 calibrated ^{14}C ages for seed samples from Phases 4-2 at Zahrat adh-Dhra‘ 1, Jordan modeled in two sequential phases (Phase 4 vs. Phases 3 & 2 combined) with one outlying sample (UGAMS-51993). A_{model} = 93.0. Light gray curves indicate single-sample calibration distributions; dark curves indicate modeled calibration distributions. Calibrations and Bayesian modeling based on OxCal 4.4.4 (Bronk Ramsey 2009) using the IntCal20 atmospheric curve (Reimer et al. 2020; van der Plicht et al. 2020).