

Supplementary online material

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The calibrated radiocarbon dates are compatible with the prior archaeological information included in the chronological model for Vinča-Belo Brdo, and so the overall model is statistically plausible. But other readings of the data are possible. Radiocarbon calibration is constantly being refined and further radiocarbon determinations could be obtained from this sequence. Other interpretations of the archaeological sequence could be made. As George Box (1979: 202) famously averred, “All models are wrong, some models are useful”.

A critical step in the construction of robust Bayesian models is assessing the effect of such differing interpretations by the process of constructing and comparing alternative models (Bayliss *et al.* 2013: fig. 2.40). These alternative models are known as sensitivity analyses. One component of a model is changed and it is rerun. The posterior density estimates from the original model and its variant are then compared. When these outputs are very similar, the model can be regarded as insensitive to the component of the model that has been varied. When the

outputs differ markedly, the model is sensitive to that component. Sensitivity analyses are useful not only in determining how far the outputs of a model are stable, but also in helping to identify which components of a model are most critical.

In the case of Vinča-Belo Brdo, we have chosen to examine the effect of accepting the archaeological phasing of buildings and other features into structural horizons, rather than simply relying on vertical stratigraphy. Our alternative model is shown in Figure S1. This incorporates the direct stratigraphic sequences between house 03/03 and kiln 01/02, and between houses 02/06 and 8, but does not include the interpretations that houses 1–9 are all contemporary, and later than kiln 01/02 and house 02/01, and that these are both later than houses 03/03, 01/06 and 02/06.

<FIGURE S1>

This model suggests that the dated sequence in sector II began in *4625–4550 cal BC (95% probability; start sector II; Figure S1)*, probably in *4600–4550 cal BC (68% probability)*, and that Vinča culture occupation at Belo Brdo ended in *4545–4485 cal BC (95% probability; end Belo Brdo; Figure S1)*, probably in *4540–4505 cal BC (68% probability)*. The dated activity therefore probably represents occupation over two or three generations in the forty-sixth century cal BC.

Critically, the date estimate produced for the end of Vinča culture occupation on the tell by the sensitivity analysis shown in Figure S1 is practically identical to that produced by the preferred model (see main text, Figure 8). We can thus be confident that our results are robust in the face of the site phasing. For reasons explained in the main text, however, we find the structural horizons proposed by the excavation team plausible, and so our preferred model is that which incorporates this narrative (see main text, Figure 8).

References

- BOX, G.E.P. 1979. Robustness in scientific model building, in R.L. Launer & G.N. Wilkinson (ed.), *Robustness in statistics*: 201–203. New York: Academic Press.
- BAYLISS, A., J. HINES, K. HØILUND NIELSEN, F.G. MCCORMAC & C. SCULL. 2013. *Anglo-Saxon graves and grave goods of the sixth and seventh centuries AD: a chronological framework* (Society of Medieval Archaeology Monograph). London: Maney.

Figure captions

Figure S1. Probability distribution of dates from sector II at Vinča-Belo Brdo, according to alternative model described in supplementary information.