

Supplementary data, Bayesian modelling of AMS dates

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We have modelled the start and end dates of the three sites of Nebelivka, Majdanetske and Taljanky in OxCal (Bronk Ramsey (2009a), using IntCal13 (Reimer et al. 2013) in a simple model which treats all dates from a site as coming from a single phase of occupation between a start date and an end date for the site (Fig. 4). These start and end dates can then be compared to evaluate the information that the radiocarbon dates provide about the sequence of occupation. As outlying dates could strongly affect the estimation of start and end dates, outlier analysis was conducted, using the charcoal outlier model or the general outlier model of Bronk Ramsey (2009b) for charcoal and bone samples respectively. With a prior outlier probability for each radiocarbon date of 5%, only two samples showed large posterior outlier probabilities (>10%), one from Nebelivka and one from Majdanetske. The OxCal model agreement index was 75%, which is above the acceptable minimum of 60% (Bronk Ramsey 1995). The model can therefore be considered robust.

References:

- Bronk Ramsey, C. 1995. "Radiocarbon calibration and analysis of stratigraphy: The OxCalprogram." *Radiocarbon*, 37(2): 425-430.
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- Bronk Ramsey, C. 2009b. "Dealing with outliers and offsets in radiocarbon dating." *Radiocarbon*, 51(3): 1023-1045.
- Reimer, P. J., Bard, E., Bayliss, A., Beck, J. W., Blackwell, P. G., Bronk Ramsey, C., Grootes, P. M., Guilderson, T. P., Hafflidason, H., Hajdas, I., Hatt, C., Heaton, T. J., Hoffmann, D. L., Hogg, A. G., Hughen, K. A., Kaiser, K. F., Kromer, B., Manning, S. W., Niu, M., Reimer, R. W., Richards, D. A., Scott, E. M., Southon, J. R., Staff, R. A., Turney, C. S. M., & van der Plicht, J. 2013. "IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0-50,000 Years calBP." *Radiocarbon*, 55(4):1869-1887.

Supplementary data, Model A

Table 3: Number of new houses, their abandonment index, the house continuity index and the total number of houses in use from the 1st to the 4th generation, Model A.

QUARTER K						
GENERATION	1ST	2ND	3RD	4TH	5TH	
NEW HOUSES	32	18	23	18	10	
BURNT (INTRA)	12	15	19	15	12	
CONTINUITY	0	20	23	26	29	
TOTAL IN USE	20	23	26	29	27	
UNBUILT	68	50	28	10	0	
GENERATION	1ST	2ND	3RD	4TH	5TH	
NEW HOUSES	37	159	186	349	737	
BURNT (INTRA)	14	17	98	187	791	
CONTINUITY	0	23	93	134	94	
TOTAL IN USE	23	165	195	309	104	
UNBUILT	78	294	385	622	0	
2ND GENERATION	QU B	QU D	QU H	QU K	QU A	n
NEW HOUSES	48	35	35	21	20	159
BURNT (INTRA)	0	0	0	17	0	17
CONTINUITY	0	0	0	23	0	23
TOTAL IN USE	48	35	35	27	20	165
UNBUILT	105	64	67	58	35	329

3RD GENERATION	QU	QU	QU	QU	QU	QU	QU	QU	QU									
	B	D	H	K	A	C	F	I	M	n								
NEW HOUSES	27	18	19	26	15	31	26	12	12	186								
BURNT (INTRA)	23	15	24	22	14	0	0	0	0	98								
CONTINUITY	25	20	20	22	6	0	0	0	0	93								
TOTAL IN USE	29	23	15	26	21	31	26	12	12	195								
UNBUILT	76	50	51	32	20	42	39	28	47	385								
4TH GENERATION	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU						
	B	D	H	K	A	C	F	I	M	G	J	L	n					
NEW HOUSES	35	23	34	20	10	28	45	31	21	45	18	39	349					
BURNT (INTRA)	29	19	25	17	13	25	31	16	12	0	0	0	187					
CONTINUITY	23	19	9	31	8	3	14	15	12	0	0	0	134					
TOTAL IN USE	29	23	18	34	18	6	28	30	21	45	18	39	309					
UNBUILT	46	84	24	11	10	51	95	57	29	96	37	82	622					
5TH GENERATION	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU	QU			
	B	D	H	K	A	C	F	I	M	G	J	L	E	H	N	n		
NEW HOUSES	46	23	24	11	10	41	69	57	29	96	37	82	56	51	105	737		
BURNT (INTRA)	57	36	35	29	12	49	80	58	47	121	35	91	40	33	68	791		
CONTINUITY	0	0	0	0	6	0	15	0	0	0	2	0	16	18	37	94		
TOTAL IN USE	0	0	0	0	16	0	15	0	0	0	2	0	16	18	37	104		
UNBUILT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
TOTAL BURNT HOUSES	109	70	84	85	39	74	111	74	18	121	35	91	40	33	68	1052		
TOTAL HOUSES	153	99	102	115	55	100	140	100	59	141	55	121	56	51	105			

Supplementary data, Model B

Table 4: Number of new houses, their abandonment index, the house continuity index and the total number of houses in use from the 1st to the 5th generation, Model B.

GENERATION	1st QU K	1st QU B	1st QU D	1st QU H	1st QU C	n										
NEW HOUSES	35	50	35	35	31	186										
ABANDONED	0	0	0	0	0	0										
CONTINUITY	0	0	0	0	0	0										
TOTAL IN USE	35	50	35	35	31	186										
UNBUILT	80	103	64	67	69	383										

GENERATION	2nd QU K	2nd QU B	2nd QU D	2nd QU H	2nd QU C	1st QU F	1st QU I	1st QU L	1st QU G	1st QU A	n					
NEW HOUSES	35	40	30	30	25	50	40	45	50	22	367					
ABANDONED	15	20	15	25	25	0	0	0	0	0	100					
CONTINUITY	20	30	20	10	6	0	0	0	0	0	86					
TOTAL IN USE	40	70	50	40	31	50	40	45	50	22	438					
UNBUILT	45	63	34	37	44	90	60	76	91	33	573					

GENERATION	3rd QU K	3rd QU B	3rd QU D	3rd QU H	3rd QU C	2nd QU F	2nd QU I	2nd QU L	2nd QU G	2nd QU A	1st QU J	1st QU M	1st QU E	1st QU N	n
NEW HOUSES	25	33	20	22	24	50	30	40	50	11	30	32	30	55	452
ABANDONED	20	30	15	22	20	40	20	36	40	13	0	0	0	0	256
CONTINUITY	20	40	35	18	11	10	20	9	10	9	0	0	0	0	182

TOTAL IN USE	45	73	55	40	35	60	50	49	60	20	30	32	30	55	634
UNBUILT	20	30	14	15	20	40	30	36	41	22	25	27	26	50	396
GENERATION	4th QU K	4th QU B	4th QU D	4th QU H	4th QU C	3rd QU F	3rd QU I	3rd QU L	3rd QU G	3rd QU A	2nd QU J	2nd QU M	2nd QU E	2nd QU N	n
NEW HOUSES	20	30	14	15	20	40	30	36	41	11	25	27	26	50	385
ABANDONED	30	45	20	20	16	40	16	32	47	14	20	16	15	40	371
CONTINUITY	15	28	35	20	19	20	34	17	13	6	10	16	15	15	263
TOTAL IN USE	35	58	49	35	39	60	64	53	54	17	35	43	41	65	648
UNBUILT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATION	5th QU K	5th QU B	5th QU D	5th QU H	5th QU C	4th QU F	4th QU I	4th QU L	4th QU G	4th QU A	3rd QU J	3rd QU M	3rd QU E	3rd QU N	n
NEW HOUSES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ABANDONED	24	29	18	17	13	39	12	28	40	11	16	13	12	30	302
CONTINUITY	11	29	31	18	26	21	52	25	14	12	19	30	29	35	352
TOTAL IN USE	11	29	31	18	26	21	52	25	14	16	19	30	29	35	356
UNBUILT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TARGET NO. OF HOUSES	115	153	99	102	100	140	100	121	141	55	55	59	56	105	1401
TARGET NO. OF BURNT HOUSES	89	124	68	84	74	119	48	96	127	39	19	29	27	70	1013