COMBINING SMALL-VERTEBRATE, MARINE AND STABLE ISOTOPE DATA TO RECONSTRUCT PAST ENVIRONMENTS

Juan Rofes*, Naroa Garcia-Ibaibarriaga, Mikel Aguirre, Blanca Martínez-García, Luis Ortega, María Cruz Zuluaga, Salvador Bailon, Ainhoa Alonso-Olazabal, Jone Castaños & Xabier Murelaga

Supplementary Table 1. Number of identified specimens (NISP) and minimum number of individuals (MNI) of the small-mammal taxa from Antoliñako Koba. Values organized by cultural horizons and chrono-stratigraphic units. **Right:** Habitat weightings.

Cultural Horizon	Anc. Epipal.		Azilian		*		Upper Solutrean				Gravettian				Evolved Aurig.				Aurignacian						?				**Habitat distribution**			
Level	Lanc		up. Lgc		low. Lgc		Lmb		Lmc		Lab/Sab		**		low Lmbk/Smk				Sj/P		Sm-P		P		Lsm-P		Sm					
Sample	1-2		3-4		5		6-8		9-10		11-13		14-17		18-19		21-23		26		27-30		31		32-33		34		Fo	Me	Wa	Ro
	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI				
Talpa sp.	6	2	1	1	4	1	4	2	1	1	24	4	33	5	1	1	1	1			2	1			1	1	1	1	0.5	0.5		
Sorex cf. *coronaus*	4	2	5	2			5	1	4	1	14	4	29	7	6	2	2	1			2	2			12	2			0.5	0.5		
Sorex minutus	1	1																							1	1	1	1	0.5	0.5		
Neomys sp.	2	1																									2	1			1	
Crocidura russula	1	1																											0.5	0.5		
Arvicola amphibius	1	1	4	3			3	2			4	2	4	3	2	1									2	2	5	3	0.5	0.5		
Chionomys nivalis							1	1			1	1	2	2			1	1														1
Microtus (Terricola) lusitanicus	1	1	1	1	2	1			1	1	2	2	2	2					1	1			1	1	6	4	1	1	0.5	0.5		
Microtus (Alexandromys) oeconomus	2	2			2	1	1	1	2	2	6	4	4	2											6	3			0,5	0.5		
Microtus (Microtus) arvalis	1	1	2	1	1	1	7	3			17	9	17	10	2	1	1	1			1	1			14	11	6	3	0.5	0.5		
Microtus (Microtus) agrestis							1	1					6	4											3	2			0.2	0.8		
Pliomys lenki																					2	2			9	6	5	4	1			
Apodemus gr. *sylvaticus-flavicollis*	23	5	13	4	6	2	2	1	5	1	3	2	6	4	3	2					4	2			34	8	19	6	1			
Glis glis																									2	1			1			
Eliomys quercinus																											1	1	0.8	0.2		
Marmota marmota																											1	1				1
Totals	42	17	26	12	15	6	24	12	13	6	71	28	103	39	14	7	5	4	1	1	11	8	1	1	90	41	42	22				
Nº of species	7		3		5		4		5		6		7		4		3		1		1		1		6		10					

*late Lower Magdalenian; **upper Lmbk/Smbk. Fo, Forest; Me, Meadow; Wa, Water; Ro, Rocky.

Supplementary Table 2. Number of identified specimens (NISP) and minimum number of individuals (MNI) of the amphibian and reptile taxa from Antoliñako Koba. Values organized by cultural horizon and chrono-stratigraphic units. **Right:** Habitat weightings.

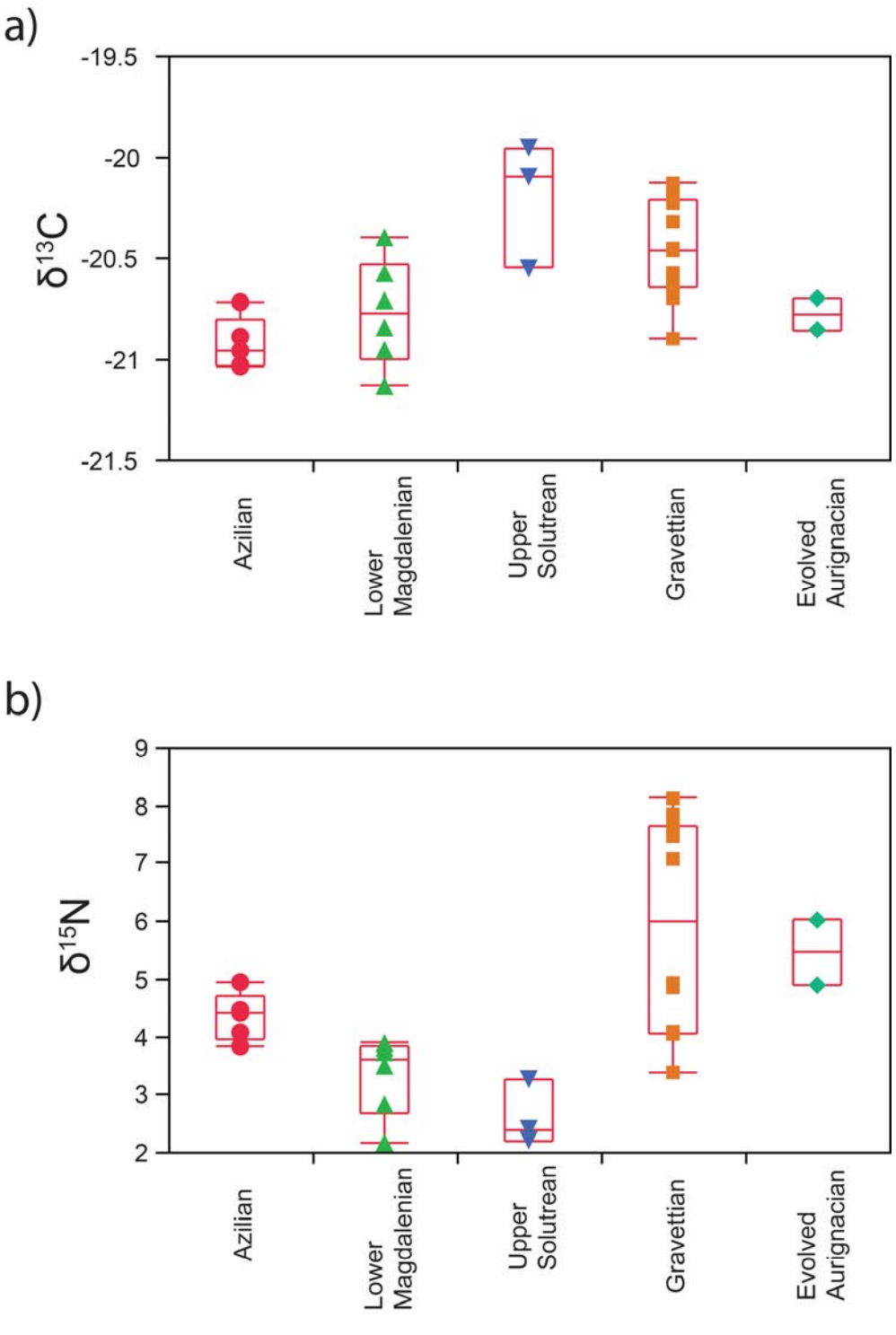
Cultural Horizon	Anc. Epipal.		Azilian		*		Upper Solutrean				Gravettian				Evol. Aurig.		?				**Habitat distribution**			
Level	Lanc		up. Lgc		low. Lgc		Lmb		Lmc		Lab/Sab		**		l. Lmbk/Smk		Sm							
Sample	1-2		3-4		5		6		9		11-13		14-17		20		34		36		Fo	Me	Wa	Ro
	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI				
Alytes obstetricans											2	1									0.5	0.3	0.2	
Bufo bufo	1	1									7	3	1	1	1	1					0.2	0.6	0.2	
Bufo calamita											1	1	2	2								0.8	0.2	
Rana gr. temporaria-iberica	2	2	1	1			2	1			22	6	29	7			2	2			0.5	0.5		
Triturus sp.	1	1	1	1																		0.5	0.5	
Lacertidae	2	1											1	1			1	1						
Anguis fragilis	2450	2	4504	2	1474	1	201	1	207	1	16	2	14	2			2	1	5	1	0.7	0.3		
Chalcides striatus	3	2																			0.2	0.5		0.3
Coronella girondica	3	2	3	2	2	1															0.2	0.6		0.2
cf. *Natrix*	1	1																						
Vipera sp.											1	1									0.3	0.5		0.3
Totals	2463	12	4509	6	1476	2	203	2	207	1	49	14	47	13	1	1	5	4	5	1				
Nº of species	8		4		2		2		1		6		5		1		3		1					

*late Lower Magdalenian; **upper Lmbk/Smbk. Fo: Forest; Me, Meadow; Wa, Water; Ro, Rocky.

Supplementary Table 3. Results of the isotopic analysis ($\delta^{15}N$ and $\delta^{13}C$) of collagen of red deer bones from Antoliñako Koba. Values organized by cultural horizons and chrono-stratigraphic units. Underlined bold values at the C/N ratio column were left aside from interpretations due to low concentrations of collagen. The levels other than those shown in Fig. 4 correspond to locally restricted facies of the main stratigraphic units.

Cultural Horizon	Level	Sample ID	$\delta^{15}N$	$\delta^{13}C$	C/N
Azilian	E1 (Lanc)	AK-05	4.45	-20.89	3.4
Azilian	E1 (Lanc)	AK-05A	4.39	-21.04	3.45
Azilian	E1 (Lanc)	AK-03	3.94	-21.44	**4.07**
Azilian	E1 (Lanc)	AK-03A	3.81	-20.72	3.39
Azilian	Up. Lgc	AK-02	2.71	-22.14	**5.52**
Azilian	Up. Lgc	AK-2A	4.05	-21.03	3.33
Azilian	Up. Lgc	AK-2B	4.93	-20.96	3.46
Lower Magdalenian	Low. Lgc	AK-36	3.88	-20.71	3.41
Lower Magdalenian	Low. Lgc (lamc)	AK-08	3.71	-20.58	3.39
Lower Magdalenian	Low. Lgc (lamc)	AK-09	3.46	-20.84	3.35
Lower Magdalenian	Low. Lgc	AK-35	3.81	-21.76	**3.8**
Lower Magdalenian	Low. Lamc	AK-10	3.79	-20.40	3.29
Lower Magdalenian	Low. Lgc	AK-06	2.83	-21.13	3.33
Lower Magdalenian	Lzg	AK-04	2.15	-20.96	3.25
Upper Solutrean	Lmb	AK-20	3.24	-20.55	3.41
Upper Solutrean	Lmb	AK-21	2.37	-20.10	3.26
Upper Solutrean	H3-Lmc	AK-13	2.18	-19.96	3.3
Gravettian	Lab	AK-14 ext	7.84	-20.17	3.34
Gravettian		AK-14 int	7.66	-20.21	3.3
Gravettian	Lab (roof)	AK-12	7.43	-20.13	3.38
Gravettian	Lmb	AK-01	4.00	-20.47	3.5
Gravettian	Lab	AK-07	4.92	-20.61	3.31
Gravettian	Up. Lmbk	AK-11	8.12	-20.46	3.34
Gravettian	Lmcb	AK-18	4.01	-20.66	3.42
Gravettian	Lmcb	AK-19	4.83	-20.90	3.29
Gravettian	Lmck	AK-17	7.53	-20.23	3.38
Gravettian	Lmck	AK-15	4.08	-20.70	3.45
Gravettian	Lmck	AK-16	7.05	-20.32	3.4
Gravettian	Up. Smbk	AK-30	3.36	-20.58	3.56
Evol. Aurignacian	Smb+Sm	AK-31	6.02	-20.70	3.5
Evol. Aurignacian	Lsrb	AK-26	6.14	-21.38	**3.81**
Evol. Aurignacian	Lsrb	AK-28	6.63	-21.51	**4.26**
Evol. Aurignacian	Lsrb	AK-29	4.88	-20.86	3.54
Evol. Aurignacian	Lsrb	AK-23	3.89	-20.47	**3.78**
Aurignacian	Sr-E	AK-37	3.45	-22.73	**5.19**
Aurignacian	Sr-E	AK-39	3.28	-21.90	**3.73**
Aurignacian	P+Sm-P	AK-33	3.49	-22.40	**4.39**
Aurignacian	P+Sm-P	AK-34	3.62	-21.81	**4.14**

Supplementary Figure 1. Boxplot of $\delta^{13}C$ (a) and $\delta^{15}N$ (b) collagen values for red deer bones from Antoliñako Koba. Ranges distributed by cultural horizons.



Supplementary Table 4. Composite marine record of cores KS04-16 and KS05-05 (Basque shelf). Estimated age is based on the stratigraphic framework explained in the Methods chapter.

Estimated age (years BP)	*Neogloboquadrina pachyderma* sin. (%)	"Northern guest" ostracod species (%)	$\delta^{18}O$ (PDB) *Lobatula lobatula*	$\delta^{18}O$ (PDB) *Globigerina bulloides*
7887	33.64	14.29	1.826	1.986
9356	36.39	22.22	2.423	1.452
12539	40.43	0	2.062	1.676
14988	53.55	38.64	2.098	2.144
15969	61.94	9.68	1.971	1.976
16530	60.49	18.18	1.930	2.262
17090	56.97	17.78	2.146	2.279
17651	70.68	15	2.623	2.427
18554	70.23	14.29	2.747	2.096
19306	78.62	0	2.658	2.330
20058	88.01	0	2.722	2.477
20810	36.48	13.33	2.806	2.628
21313	32.04	33.33	3.121	2.804
21648	33.22	10	2.710	2.786
22485	31.17	10	2.527	2.854
22779	82.22	0	3.198	3.274
23170	86.26	0	2.889	2.163
23855	90.94	0	-	3.262
27700	30.22	14.95	2.452	2.602
29871	46.39	22.05	2.169	2.509
30100	82.91	26.73	3.130	2.767
31708	73.16	3.93	2.760	2.618
33316	52.37	1.23	2.280	2.374
34293	51.52	1.54	2.582	2.457
36898	48.46	0.26	2.339	2.164
38200	38.59	0	3.087	2.606
40373	54.84	0	2.188	2.226
41300	40.45	0.24	2.181	2.269
43133	41.1	0.92	1.899	2.364
44967	41.23	0	2.355	2.144

"Northern guest" ostracod species referred as accumulative % of *A. dunelmensis, C. testudo* and "*Trachyleberis*" sp.