

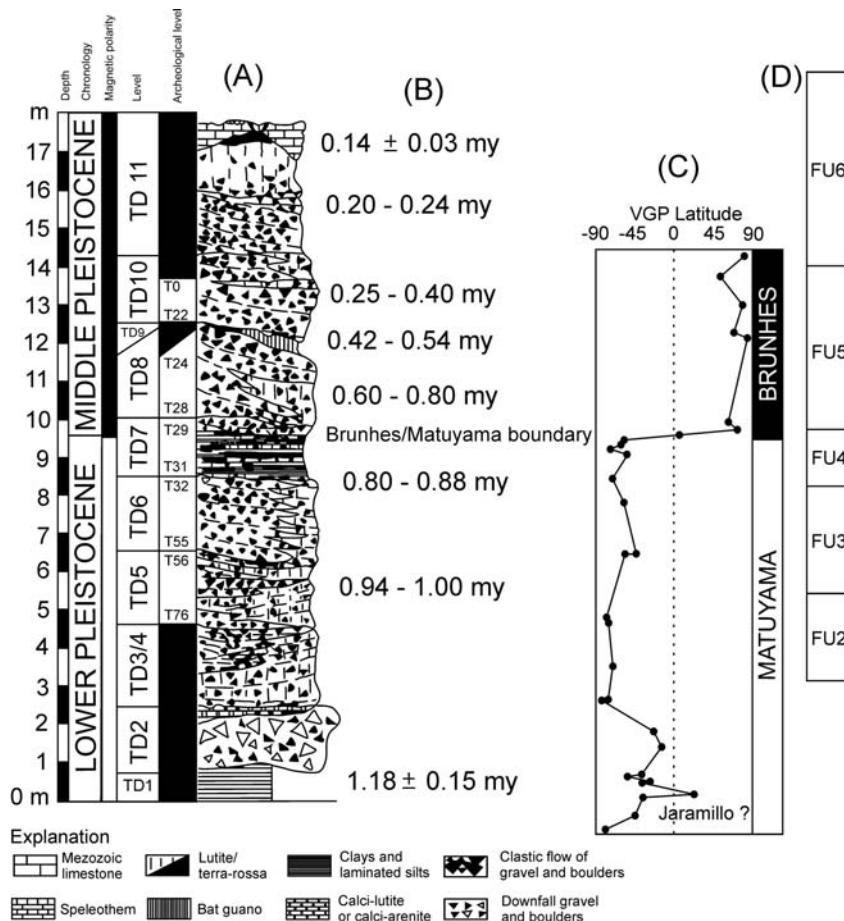
APPENDIX DR1: SUPPLEMENTARY INFORMATION TO GEOLOGICAL AND CHRONOLOGICAL SETTING


Figure DR1: Geological and chronological setting of the Gran Dolina cave. (A) Synthetic stratigraphic column of the cave sequence of Gran Dolina (from Parés and Pérez-González, 1995) with (B) numeric dates (from Falguères et al., 1999, 2001; Berger et al., 2008; Moreno García, 2011). (C) The Matuyama-Brunhes boundary is located within stratigraphic level TD7. The low and positive VGP latitude at the bottom of the section may correspond to the Jaramillo subchron (from Parés and Pérez-González, 1999). (D) Faunal Units (FU) based on the distribution of vertebrate faunal assemblages (from Cuenca-Bescós and García, 2007; Cuenca Bescós et al., 2010, 2011).

The section, 19 m thick, divided into 11 lithostratigraphic levels, represents a time span of nearly 700,000 years. The TD sequence was partially excavated from 1993 to 1999 during a preliminary evaluation of its archaeological and paleontological richness. Numeric dates give a range for the successive levels of the TD sequence: TD5 is estimated to be between 1 and 0.94 my, TD6 and TD7 between 800 and 880 ky, the lower part of TD8 ranges from 700 to 600 ky. TD10 has been placed between 420 and 330 ky by Falguères et al. (2001) and Moreno García (2011), but Berger et al. (2008) give a date by thermoluminescence of 244 ± 44 ky for

the upper part of TD10, which is consistent with the estimations of TD11, dated to be between 240 and 200 ky. During the extensive excavations started in 1996, level TD11 was found to be sterile in terms of fauna and archeo-artifacts. These results confirm the paleomagnetic studies of Parés and Pérez-González (1999), who found that the record of the Matuyama-Brunhes paleomagnetic boundary at level TD7 indicates an age of 780 ky. Biostratigraphy confirms an Early Pleistocene age for levels TD3/4 to TD6 (Cuenca-Bescós et al., 1995, 1999, 2001, 2011).

The TD sequence has been divided into five Faunal Units (FU 2 to FU 6) from the seven total FU (FU 1 to FU 7) of the Atapuerca sequence, which were based on the distribution of the vertebrate faunal assemblages established for the Pleistocene sites of the Sierra de Atapuerca (Cuenca-Bescós and García, 2007; Cuenca-Bescós et al., 2010). Within the TD sequence, FU 5 is characterized by the last occurrences of primitive vole forms like *Mimomys savini*, a typical species of the late Early Pleistocene. The youngest Faunal Unit of Gran Dolina (FU 6) is characterized by the presence of species typical of the Middle Pleistocene like *Terricola atapuerquensis*, *Iberomys brecciensis*, and *Allocricetus correzensis*, the appearance of *Dama clactoniana*, an evolved form of *Cervus elaphus*, *Stephanorhinus hemitoechus*, *Equus ferus*, *Equus hydruntinus*, *Bison schoetensacki*, *Panthera leo*, *Canis lupus*, *Vulpes vulpes* and the subspecies *Cuon alpinus europaeus* (Cuenca-Bescós and García, 2007; Cuenca Bescós et al., 2010, 2011).

APPENDIX DR2: ESTIMATED CLIMATIC AND ENVIRONMENTAL PARAMETERS

Table DR1: Estimated climatic (from Blain et al., 2009) and environmental (from Blain et al., 2008 and Cuenca-Bescós et al., 2005) parameters for each T layer of the Gran Dolina sequence. Abbreviations: ΔMTC, difference between the mean temperature of the coldest month and present day; ΔMTW, difference between the mean temperature of the warmest month and present day; ΔMAT, difference between the mean annual temperature and present day; ΔDJF, difference between winter precipitation and present day; ΔJJA, difference between summer precipitation and present day; ΔMAP, difference between mean annual precipitation and present day; %Wood, representation in percentage of herpetile taxa linked with plant cover; %OD+R, representation in percentage of small-mammal taxa linked with open-dry environments; SD, Standard deviation.

	T15	3.70	2.00	1.10	19.90	1.44	1.50	11.60	1.83	1.70	178	44	10	145	26	53	876	153	304	40.0%	92.5%
	T16	3.75	0.35	1.15	19.75	0.35	1.35	11.75	0.35	1.85	167	53	-2	134	5	42	750	212	178	39.4%	
	T17 (MIS11)	5.67	1.41	3.07	20.00	1.37	1.60	12.89	0.68	2.99	161	53	-7	154	27	62	867	101	295	39.5%	89.6%
	T18	2.98	1.89	0.38	19.32	1.51	0.92	11.18	1.92	1.28	189	53	21	152	33	60	955	116	383	40.7%	88.2%
	T19	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	36.3%	65.8%
	T20	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	35.2%	
	T21 (MIS13)	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	36.8%	
	T22																			36.2%	84.8%
	T24																				42.1%
TD8	T26																				50.0%
	T27																				21.1%
	T28 (MIS19)	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	21.1%	25.0%
TD7	T30	3.43	1.46	0.83	20.27	0.80	1.87	12.07	1.08	2.17	167	50	-1	148	25	56	907	169	335	30.0%	0.0%
	T32	3.13	2.10	0.53	18.50	2.05	0.10	11.58	1.46	1.68	178	49	10	145	30	53	976	103	404	26.2%	22.0%
	T33	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	28.1%	
	T34	3.82	2.16	1.22	19.76	1.50	1.36	11.98	1.42	2.08	175	51	7	146	27	54	880	148	308	34.6%	30.4%
	T35	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	32.8%	
	T36	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	28.1%	19.1%
	T37	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	29.9%	
	T38	3.49	1.95	0.89	19.59	1.67	1.19	11.45	1.94	1.55	187	44	19	140	28	48	975	206	403	27.1%	
	T40	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	28.6%	
	T41	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	28.6%	21.9%
	T42																			28.6%	66.7%
TD6	T43 (MIS21)	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	27.5%	23.1%
	T44	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	30.3%	51.7%
	T45	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	36.3%	30.6%
	T47	3.25	2.17	0.65	20.13	1.16	1.73	12.38	1.30	2.48	148	41	-20	153	27	61	1025	46	453	41.5%	
	T48	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	31.8%	10.3%
	T49	2.98	1.89	0.38	19.32	1.51	0.92	11.18	1.92	1.28	189	53	21	152	33	60	955	116	383	32.3%	30.0%
	T50 (MIS23?)	3.75	1.87	1.15	20.25	1.16	1.85	12.56	1.18	2.66	148	41	-20	153	27	61	981	46	409	29.4%	5.4%
	T51	3.72	1.65	1.12	19.56	1.28	1.16	11.47	1.59	1.57	192	58	24	156	36	64	983	162	411	31.9%	
	T52	2.76	2.31	0.16	18.98	1.79	0.58	10.74	2.31	0.84	198	57	30	159	36	67	943	137	371	33.3%	
	T53	2.91	2.16	0.31	19.30	1.64	0.90	11.05	2.14	1.15	185	51	17	152	33	60	961	102	389	28.5%	
	T54	2.91	2.16	0.31	19.30	1.64	0.90	11.05	2.14	1.15	185	51	17	152	33	60	961	102	389	30.6%	22.6%
	T55	3.19	2.01	0.59	18.88	1.58	0.48	10.74	2.14	0.84	203	51	35	156	38	64	1049	193	477	33.7%	
	T56																			35.0%	
	T57																			40.0%	
	T58	3.70	2.00	1.10	19.90	1.44	1.50	11.60	1.83	1.70	178	44	10	145	26	53	876	153	304	31.3%	15.4%
	T59	3.70	2.00	1.10	19.90	1.44	1.50	11.60	1.83	1.70	178	44	10	145	26	53	876	153	304	38.1%	45.5%
	T60	2.98	1.89	0.38	19.32	1.51	0.92	11.18	1.92	1.28	189	53	21	152	33	60	955	116	383	35.8%	29.3%
	T61	2.98	1.89	0.38	19.32	1.51	0.92	11.18	1.92	1.28	189	53	21	152	33	60	955	116	383	38.0%	45.7%
	T62	3.53	1.97	0.93	19.42	1.51	1.02	11.26	2.02	1.36	193	48	25	150	32	58	984	207	412	36.7%	
	T63	2.98	1.89	0.38	19.32	1.51	0.92	11.18	1.92	1.28	189	53	21	152	33	60	955	116	383	34.1%	
TD5	T64	2.98	1.89	0.38	19.32	1.51	0.92	11.18	1.92	1.28	189	53	21	152	33	60	955	116	383	36.0%	
	T65 (MIS27?)	3.32	1.75	0.72	19.95	0.93	1.55	12.18	0.96	2.28	146	39	-22	143	18	51	977	117	405	33.7%	
	T66	3.31	1.89	0.71	20.00	1.02	1.60	11.77	1.49	1.87	161	51	-7	151	26	59	981	101	409	32.0%	
	T67	3.13	2.10	0.53	18.50	2.05	0.10	11.58	1.46	1.68	178	49	10	145	30	53	976	103	404	38.2%	
	T68 (MIS29?)	3.32	1.75	0.72	19.95	0.93	1.55	12.18	0.96	2.28	146	39	-22	143	18	51	977	117	405	30.9%	50.0%
	T69	3.70	2.00	1.10	19.90	1.44	1.50	11.60	1.83	1.70	178	44	10	145	26	53	876	153	304	27.9%	
	T70	3.13	2.10	0.53	18.50	2.05	0.10	11.58	1.46	1.68	178	49	10	145	30	53	976	103	404	28.0%	44.4%
	T71	3.31	1.89	0.71	20.00	1.02	1.60	11.77	1.49	1.87	161	51	-7	151	26	59	981	101	409	28.0%	0.0%
	T72	2.56	1.84	-0.04	18.56	1.76	0.16	9.96	2.25	0.06	196	35	28	165	39	73	928	220	356	28.0%	

T73																	28.0%	33.3%		
T74	3.31	1.96	0.71	20.00	1.02	1.60	12.15	1.25	2.25	155	42	-13	141	17	49	938	160	366	28.0%	16.7%
T75																			9.1%	
T76																			14.3%	

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