

This document contains supplementary material to

Puolamäki K, Fortelius M, Mannila H (2006) Seriation in Paleontological Data Using Markov Chain Monte Carlo Methods. PLoS Computational Biology.

Please see the article for discussion.

Summary of the data set with $n_t = 10$ and $n_s = 10$

We have used the eight chains with the smallest negative log-likelihood in the following analysis (log-likelihood within 1σ of the best chain). We give some statistics below.

$$E\{c\} = 0.0113 \pm 0.0016.$$

$$E\{d\} = 0.5182 \pm 0.0153.$$

$$E\{-\log P(X | \theta)\} = 3460.6 \pm 24.2.$$

$$E\{\text{corr}(\pi, MN)\} = 0.951.$$

$$E\{\text{corr}(\pi, DBAGE)\} = -0.946.$$

Out of randomly picked 1s, 7.7 % are false (1F).

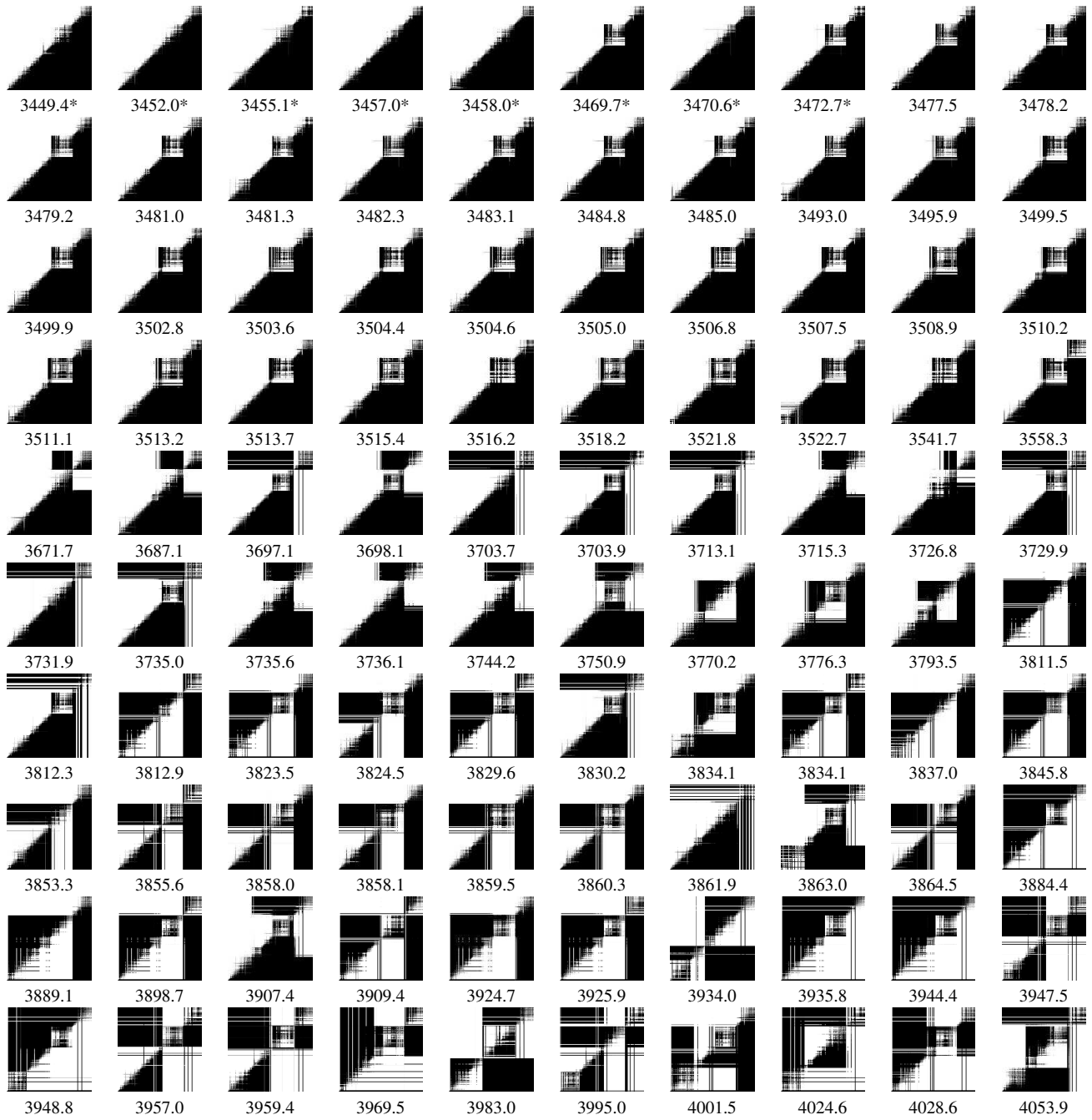
Out of randomly picked 0s, 12.9 % are false (0F).

Out of dead (sites,genera) pairs, 1.1 % are false (\hat{c}).

Out of alive (sites,genera) pairs, 51.9 % are false (\hat{d}).

8 chains, average Hellinger dispersion is 0.010230.

The Pair-Order Matrices $O_{ij} = P(\pi(i) < \pi(j))$ of the 100 original chains, ordered by the negative log-likelihood, $E\{-\log P(X | \theta)\}$. Black denotes a probability one and white denotes probability zero.



We list the fossil sites. First, we give the site index, used in the figures. Then we give the site name, followed by the MN classification and data base age. Star (“*”) denotes a hard site.

Next we give an expectation and variance of the order number, $\pi(n)$. It is followed by number of ones in that site (1s). Next we give the expected number of genera alive on that site (AL). 1F and 0F denote the probability that any 0 or 1 associated with the site is false. \hat{c} and \hat{d} denote the probability of 1 or 0 when the species is dead or alive, respectively. $O_{n-1,n}$ denotes the probability that the site is actually older than the previous site. This number should usually be < 0.5 .

n	Site [MN,DBAGE]	$E\{\pi\}$	1s	AL	1F	0F	\hat{c}	\hat{d}	$O_{n-1,n}$
1	Laugnac [2,21.38] *	1.000 ± 0.000	13	11.905	0.273644	0.019541	0.027990	0.206819	-
2	Wintershof West [3,19] *	2.003 ± 0.057	10	16.571	0.107287	0.059254	0.008763	0.461276	0.000000
3	Esvres Continental Sands [3,19.5]	3.383 ± 0.591	18	23.087	0.042854	0.048412	0.006655	0.253736	0.003250
4	Savigné sur Lathan [5,16.1]	6.012 ± 5.196	13	26.850	0.192231	0.129758	0.022283	0.608909	0.287125
5	Artesilla [4,17.5]	6.118 ± 1.625	14	26.374	0.076884	0.107602	0.009557	0.509984	0.251000
6	Artenay [4,17.5]	6.427 ± 2.351	18	27.761	0.059597	0.089532	0.009644	0.390242	0.560375
7	Els Casots [4,17.5]	6.786 ± 1.536	11	26.695	0.087182	0.130113	0.008539	0.623869	0.370500
8	Buñol [4,17.5]	8.610 ± 1.697	12	28.321	0.010979	0.129549	0.001190	0.580938	0.194125
9	Erkertshofen 2 [4,17.5]	9.291 ± 2.908	12	28.525	0.016240	0.131653	0.001764	0.586148	0.413000
10	Rothenstein 1 [5,16.1]	10.341 ± 2.252	10	29.235	0.004338	0.149443	0.000395	0.659425	0.446625
11	Montreal du Gers [4,17.5]	10.790 ± 3.250	12	30.594	0.102167	0.156062	0.011309	0.647838	0.496000
12	Engelswies [5,16.6]	12.491 ± 4.497	10	30.282	0.095538	0.164631	0.008788	0.701320	0.381125
13	Bézian [4,17.5]	13.054 ± 1.940	20	32.230	0.029106	0.107666	0.005452	0.397524	0.390875
14	Pellecahus [4,17.5]	14.107 ± 1.755	20	32.471	0.029687	0.109790	0.005574	0.402356	0.378750
15	La Romieu [4,17.5] *	14.915 ± 2.763	17	32.344	0.057485	0.133779	0.009163	0.504611	0.388750
16	Baigneaux en Beauce [5,16.1]	16.092 ± 3.500	15	33.706	0.070308	0.159358	0.010016	0.586261	0.457875
17	Castelnaud d'Arbieu [6,13.85]	16.739 ± 3.156	11	33.314	0.010080	0.175194	0.001049	0.673137	0.437625
18	Hambach 6C [6,13.85]	19.113 ± 1.931	14	35.674	0.003696	0.173803	0.000501	0.609004	0.185250
19	Contres MN 5 [5,16.1]	19.803 ± 1.798	20	36.419	0.002763	0.138435	0.000539	0.452346	0.400875
20	Vieux Collonges [5,16.6]	19.828 ± 3.500	14	35.772	0.091080	0.184376	0.012352	0.644277	0.498250
21	Pontlevoy [5,16.1] *	20.297 ± 2.106	22	36.933	0.077585	0.142222	0.016723	0.450544	0.486125
22	Sandelzhausen [5,16.1]	22.724 ± 2.646	17	37.648	0.004397	0.169861	0.000738	0.550437	0.190500
23	Esvres Marine Faluns [5,16.1]	22.744 ± 2.314	37	39.942	0.086797	0.060328	0.032420	0.154061	0.525250
24	Thannhausen [6,13.85]	24.657 ± 1.993	13	38.854	0.057577	0.211135	0.007474	0.684683	0.211125
25	Neudorf Spalte [6,13.85]	25.029 ± 3.711	12	37.818	0.009542	0.204190	0.001132	0.685715	0.451500
26	Inönü I (AS 24A) [6,13.85]	25.446 ± 8.049	10	36.636	0.062775	0.211347	0.006133	0.744179	0.375750
27	Stätzling [6,13.85]	25.491 ± 1.767	16	39.271	0.009672	0.190457	0.001552	0.596520	0.725000
28	Göriach [5,16.1]	25.883 ± 2.526	18	38.767	0.070861	0.182166	0.012725	0.568585	0.412750
29	Belometchetskaja [5,16.1]	28.626 ± 3.219	12	38.800	0.126729	0.222994	0.015177	0.729913	0.316500
30	Sansan [6,13.85] *	30.273 ± 1.790	29	39.405	0.041504	0.105536	0.012085	0.294604	0.257500
31	Pasalar [6,14.75]	30.954 ± 1.272	25	39.352	0.084580	0.144445	0.021220	0.418445	0.344250
32	Çandır [6,13.85]	31.221 ± 1.771	20	39.317	0.085556	0.176710	0.017166	0.534840	0.419375
33	Simorre [6,13.2]	31.504 ± 1.944	14	39.389	0.071670	0.211142	0.010073	0.670047	0.484250
34	Steinheim [7,11.85]	33.969 ± 0.980	22	39.664	0.006716	0.152237	0.001487	0.449066	0.141625
35	La Grive St. Alban [7,11.85]	34.311 ± 0.921	30	40.615	0.103079	0.125758	0.031431	0.337499	0.385375
36	Wissberg [9,10.35]	37.364 ± 1.492	15	37.958	0.140508	0.202139	0.020859	0.660348	0.000000
37	Sant Quirze [7,11.85]	37.717 ± 1.211	23	38.410	0.056864	0.144119	0.013002	0.435246	0.396750
38	Massenhausen [9,11]	38.680 ± 1.620	12	37.655	0.006802	0.202653	0.000805	0.683487	0.368375
39	Esselborn [9,10.35]	38.964 ± 1.908	10	37.471	0.107250	0.221269	0.010564	0.761751	0.469625
40	Castell de Barberà [7,11.85]	39.316 ± 2.485	19	37.506	0.040151	0.160575	0.007516	0.513756	0.437375
41	Can Llobateres I [10,9.45] *	41.198 ± 2.186	33	37.500	0.120299	0.079901	0.039112	0.225856	0.254750
42	Eppelsheim [9,10.35]	41.556 ± 2.340	23	36.758	0.119337	0.142268	0.026846	0.448962	0.518875
43	Hostalets de Pierola Inferior [7,11.85]	43.520 ± 2.031	20	34.156	0.047656	0.126967	0.009091	0.442356	0.224250
44	Can Ponsic I [9,10.35]	44.365 ± 1.521	26	33.713	0.043418	0.078247	0.010722	0.262269	0.400250
45	Rudabánya [9,10.35]	44.818 ± 1.863	16	33.582	0.077469	0.153020	0.011758	0.560464	0.413500
46	Hostalets de Pierola Superior [9,10.35]	45.262 ± 1.842	13	32.586	0.005115	0.155975	0.000625	0.603101	0.426250
47	Can Ponsic [9,10.35]	45.529 ± 1.639	18	32.717	0.055556	0.129894	0.009409	0.480394	0.482125
48	Charmoille [9,10.35]	48.208 ± 1.247	14	30.426	0.082214	0.140619	0.010601	0.577702	0.095750
49	Los Valles de Fuentidueña [9,10.35]	49.307 ± 1.122	16	30.025	0.087586	0.125415	0.012860	0.513778	0.285500
50	Kalfa [9,10.35]	49.870 ± 0.912	16	29.368	0.251648	0.141421	0.036726	0.592295	0.335375
51	Buzhor 1 [9,10.35]	50.463 ± 0.989	13	28.892	0.155413	0.142165	0.018349	0.619982	0.342375
52	Dorn Dürkheim [11,8.6]	52.572 ± 1.000	26	30.029	0.148130	0.069741	0.035343	0.262435	0.062625
53	Villadecavalls [10,9.25]	54.394 ± 1.945	18	29.395	0.078174	0.105804	0.012838	0.435523	0.214750
54	Csakvar [11,8.6]	55.663 ± 5.725	13	29.742	0.306096	0.164455	0.036421	0.696701	0.556375
55	Puente Minero [11,8.6]	56.145 ± 2.091	14	28.960	0.047205	0.124963	0.006006	0.539387	0.297000
56	Terrassa [10,9.25]	56.148 ± 1.422	19	29.632	0.006138	0.089568	0.001066	0.362726	0.470000
57	Piera [11,8.6]	56.812 ± 2.695	10	28.899	0.006213	0.146984	0.000564	0.656116	0.426250
58	Crevillente 2 [11,8.6] *	57.407 ± 1.750	11	29.151	0.004909	0.142225	0.000492	0.624504	0.374875
59	La Roma 2 [10,9.25]	57.899 ± 1.975	10	29.476	0.095800	0.158400	0.008747	0.693238	0.371125
60	Montredon [10,9.25]	59.281 ± 1.795	13	29.980	0.017798	0.136597	0.002122	0.574093	0.271500

n	Site [MN,DBAGE]	$E\{\pi\}$	1s	AL	1F	0F	\hat{c}	\hat{d}	$O_{n-1,n}$
61	Los Mansuetos [12,7.65] *	60.807 ± 1.062	20	30.136	0.148375	0.110118	0.027259	0.434822	0.242000
62	Arquillo 1 [13,6.2]	62.968 ± 1.319	16	30.098	0.038461	0.119625	0.005651	0.488857	0.057625
63	Arquillo [13,6.2] *	63.154 ± 1.417	16	30.152	0.038102	0.120013	0.005601	0.489574	0.462000
64	Cerro de la Garita [12,7.65]	63.733 ± 1.499	23	30.860	0.087016	0.085012	0.018507	0.319552	0.369500
65	Concud [12,7.65]	64.469 ± 1.383	18	30.923	0.153931	0.129697	0.025637	0.507505	0.362125
66	Polgardi [13,6.75]	73.334 ± 13.264	11	29.719	0.194557	0.162963	0.019584	0.701880	0.220625
67	Belka [12,7.65]	74.250 ± 11.071	13	31.577	0.094317	0.157170	0.011414	0.627141	0.495375
68	Novaja Emetovka [12,7.65]	74.481 ± 9.019	16	32.541	0.039797	0.139653	0.005981	0.527875	0.412625
69	Chobruchi (Tchobroutchi) [12,7.65]	75.012 ± 10.908	16	32.485	0.128508	0.150743	0.019304	0.570763	0.483125
70	Poksheshty [10,9.25]	75.410 ± 10.112	11	32.235	0.095000	0.174066	0.009788	0.691179	0.538125
71	Novo Elizavetovka [12,8.05]	75.611 ± 8.776	16	33.269	0.004766	0.141015	0.000721	0.521358	0.472500
72	Pikermi [12,8.05]	76.321 ± 5.203	39	40.665	0.110689	0.059820	0.043900	0.147104	0.250000
73	Eldari I [9,9.55]	76.535 ± 9.111	15	33.391	0.132842	0.164382	0.018868	0.610450	0.750000
74	Maragheh [12,8.05]	76.850 ± 4.150	13	37.819	0.097500	0.207035	0.012527	0.689771	0.346500
75	Grebeniki [12,8.05]	77.093 ± 5.235	19	36.888	0.052368	0.157355	0.009744	0.511896	0.644500
76	Taraklia [13,6.75]	77.181 ± 8.328	22	34.927	0.032284	0.116562	0.006825	0.390459	0.555125
77	Chimishlija (Cimislia) [12,7.65]	77.264 ± 6.821	21	36.249	0.114833	0.149663	0.023469	0.487196	0.473750
78	Halmypotamos (HAL) [12,8.05]	78.256 ± 7.070	20	37.683	0.061913	0.159004	0.012222	0.502120	0.250000
79	Pikermi MNHN (PIK) [12,7.65]	79.264 ± 4.326	25	38.199	0.047335	0.126164	0.011740	0.376518	0.429250
80	Ravin de la Pluie (RPL) [10,9.25]	79.309 ± 4.545	12	36.631	0.071490	0.200703	0.008380	0.695831	0.487875
81	Samos [12,8.05]	80.254 ± 4.836	16	36.998	0.049695	0.177183	0.007795	0.589039	0.424375
82	Samos (A 1) [12,8.05]	80.591 ± 4.092	25	37.004	0.001835	0.105700	0.000450	0.325635	0.468625
83	Middle Maragheh [12,7.65]	81.541 ± 6.378	19	35.055	0.074796	0.145634	0.013672	0.498534	0.399875
84	Dytiko 1 (DTK) [13,6.2]	82.000 ± 4.543	13	35.437	0.006221	0.178710	0.000781	0.635430	0.510500
85	Samos Main Bone Beds [12,7.65]	82.611 ± 10.620	16	32.510	0.110664	0.148621	0.016627	0.562304	0.460750
86	Kemiklitepe A B [12,7.65]	82.973 ± 6.912	12	34.326	0.124823	0.187588	0.014310	0.694045	0.452750
87	Pentalophos 1 (PNT) [10,9.25]	83.139 ± 3.296	11	34.687	0.018273	0.186623	0.001927	0.688671	0.520000
88	Vathylakkos 3 (VAT) [11,8.6]	83.942 ± 7.166	20	33.018	0.088050	0.124197	0.016616	0.447613	0.430625
89	Middle Sinap [9,10.1]	84.490 ± 11.570	12	29.652	0.360427	0.173050	0.039554	0.741171	0.340125
90	Upper Maragheh [12,7.65]	86.456 ± 6.780	14	30.274	0.008464	0.131140	0.001090	0.541471	0.574875
91	Mahmutgazi [12,7.65]	86.937 ± 7.143	11	29.577	0.138273	0.157017	0.013900	0.679516	0.349750
92	Prochoma [11,8.6]	87.426 ± 7.129	14	29.198	0.087473	0.131383	0.011153	0.562461	0.545875
93	Gülpinar [10,9.25]	88.986 ± 4.417	11	28.530	0.020295	0.138701	0.002021	0.622273	0.444250
94	Ravin des Zouaves 5 [11,8.6]	89.426 ± 4.252	16	27.982	0.043984	0.103139	0.006339	0.453361	0.454000
95	Vathylakkos 2 (VTK) [11,8.6]	90.017 ± 6.247	10	27.228	0.010450	0.134364	0.000935	0.636576	0.393625
96	Çobanpinar (AS 42) [12,7.65]	91.529 ± 5.217	10	26.551	0.072150	0.133899	0.006416	0.650547	0.326375
97	Brisighella [13,6.2]	97.142 ± 1.042	10	22.088	0.232250	0.111709	0.019865	0.652413	0.022500
98	Baccinello V3 [13,5.65]	98.466 ± 0.849	10	21.718	0.234713	0.109035	0.020013	0.647631	0.116625
99	Venta del Moro [13,6.2]	98.722 ± 1.054	19	23.665	0.289711	0.084744	0.047726	0.429721	0.461375
100	Montpellier [14,4.75]	100.830 ± 1.564	16	23.442	0.151336	0.080187	0.020954	0.420747	0.104250
101	Kosyakino [14,4.75]	101.436 ± 1.392	12	22.649	0.128771	0.096014	0.013281	0.538391	0.327625
102	Weze 1 [15,3.8]	102.409 ± 2.436	10	23.035	0.246725	0.120173	0.021276	0.672989	0.398875
103	Vialette [16,3]	102.932 ± 1.560	11	23.457	0.005341	0.097783	0.000508	0.533571	0.374875
104	Perpignan [15,3.8] *	104.494 ± 1.370	18	25.506	0.011299	0.063714	0.001792	0.302257	0.208750
105	Kvabebi [16,3]	105.703 ± 2.410	13	25.350	0.098904	0.108221	0.011313	0.537902	0.381000
106	Triversa (Fornace RDB) [16,3]	106.547 ± 1.455	14	26.797	0.023089	0.104963	0.002881	0.489619	0.343250
107	Etouaires [16,3]	107.359 ± 1.295	21	27.087	0.033304	0.057511	0.006249	0.250536	0.253125
108	Kisláng [16,3]	107.816 ± 3.023	14	26.213	0.080429	0.106709	0.009983	0.508863	0.441625
109	Stavropol Kavkazskij [15,3.53]	112.264 ± 9.057	10	19.628	0.333800	0.100508	0.027963	0.660578	0.333000
110	Saint Vallier [17,2.26] *	113.761 ± 2.884	20	23.888	0.022537	0.036462	0.003916	0.181637	0.404500
111	Senèze [17,2.26]	114.002 ± 2.867	18	23.701	0.002514	0.047492	0.000392	0.242456	0.461375
112	Odessa Catacombs [15,3.8]	114.195 ± 6.190	14	22.576	0.213179	0.092485	0.025635	0.512073	0.547500
113	La Puebla de Valverde [17,2.26]	114.330 ± 2.851	19	23.552	0.002217	0.038283	0.000365	0.195059	0.447625
114	Villaroya [16,3]	114.695 ± 3.875	17	22.843	0.004625	0.048535	0.000677	0.259219	0.490500
115	Layna [13,5.65]	114.801 ± 4.924	10	22.007	0.010250	0.093874	0.000876	0.550262	0.499250
116	Çalta [15,3.8]	115.807 ± 4.974	11	21.349	0.105625	0.089928	0.009876	0.539174	0.421500
117	Varshets [16,2.66]	117.101 ± 4.540	12	20.727	0.130583	0.081057	0.013249	0.496653	0.419000
118	Sesklon (SES) [17,2.26]	117.231 ± 3.403	14	21.757	0.002768	0.062368	0.000331	0.358317	0.488500
119	Liventsovka (Rostov on Don) [17,2.04]	117.726 ± 4.517	13	20.918	0.052106	0.068219	0.005736	0.410915	0.427375
120	Chilhac [17,2.26]	117.728 ± 3.271	12	21.326	0.005562	0.073959	0.000567	0.440437	0.536625

n	Site [MN,DBAGE]	$E\{\pi\}$	1s	AL	IF	0F	\hat{c}	\hat{d}	$O_{n-1,n}$
121	Pardines [17,2.26]	118.308 ± 3.594	15	20.964	0.003975	0.048578	0.000505	0.287332	0.437750
122	Dafnero (DFN) [17,2.26]	118.786 ± 4.604	10	18.843	0.063425	0.073465	0.005278	0.502952	0.407125
123	Gerakarou 1 (GER) [16,3.02]	119.624 ± 3.710	10	18.914	0.018763	0.070556	0.001562	0.481214	0.480875
124	Volax (VOL) [17,2.26]	119.677 ± 3.548	11	18.942	0.012705	0.063143	0.001164	0.426673	0.497375

In the following table we list the genera, in the order they appear in the figures. As with sites, we show the index m , followed by the name of the genus. Next we show the number of 1s associated with the genus. Next we show the probabilities that a randomly picked 1 or 0 is false (1F and 0F, respectively), and the probabilities of false 1s and 0s, \hat{c} and \hat{d} . Finally, we show the expected number of sequences of consecutive zeros for a given order (L).

<i>m</i>	Genus	ls	AL	IF	OF	\hat{c}	\hat{d}	$E\{a\}$	$E\{b\}$	$E\{L\}$
1	Semigenetta	19	46.343	0.004289	0.261183	0.001049	0.591770	1.023	47.366	10.038
2	Cynelos	8	16.015	0.026516	0.070928	0.001964	0.513729	1.025	17.041	3.575
3	Cainotherium	6	11.318	0.068792	0.048567	0.003663	0.506345	1.028	12.346	2.466
4	Oriomeryx	4	5.325	0.042687	0.012461	0.001439	0.280841	1.028	6.353	0.463
5	Palaeogale	8	15.886	0.010516	0.068707	0.000778	0.501704	1.030	16.916	3.459
6	Andegameryx	4	5.329	0.044438	0.012554	0.001498	0.282712	1.033	6.361	0.463
7	Amphicyon	28	49.936	0.041509	0.240608	0.015693	0.462558	1.168	51.104	13.777
8	Diaceratherium	6	11.598	0.040271	0.049489	0.002150	0.503508	1.177	12.775	3.220
9	Protaceratherium	4	9.208	0.124594	0.047553	0.004342	0.619719	1.275	10.483	2.612
10	Procervulus	15	23.514	0.141458	0.097576	0.021116	0.452318	1.675	25.189	6.870
11	Martes	29	73.004	0.139267	0.505711	0.079197	0.658083	1.697	74.701	19.657
12	Aureliachoerus	11	23.389	0.008250	0.110440	0.000902	0.533573	1.720	25.109	5.754
13	Pseudaelurus	30	50.549	0.032742	0.229059	0.013373	0.425951	2.677	53.226	10.062
14	Pliothocyon	15	32.651	0.063733	0.170703	0.010465	0.569870	2.863	35.514	8.763
15	Hemicyon	16	34.144	0.004687	0.168692	0.000835	0.533590	2.867	37.011	6.477
16	Dorcatherium	30	60.508	0.080517	0.350254	0.038044	0.544121	3.273	63.782	17.181
17	Prosantorhinus	16	25.165	0.004531	0.085530	0.000734	0.367071	3.357	28.521	5.196
18	Palaeomeryx	20	37.441	0.004794	0.168626	0.001108	0.468390	3.638	41.080	9.120
19	Eotragus	9	27.773	0.025417	0.165230	0.002377	0.684178	3.686	31.459	5.785
20	Lagomeryx	16	27.482	0.075695	0.117525	0.012548	0.461863	3.740	31.222	7.347
21	Gomphotherium	22	38.892	0.007398	0.167202	0.001912	0.438514	3.835	42.727	8.941
22	Amphimoschus	8	21.073	0.015687	0.113778	0.001219	0.626318	4.129	25.201	4.140
23	Taucanamo	17	32.544	0.002904	0.145729	0.000540	0.479141	4.367	36.911	8.208
24	Bunolistriodon	13	29.469	0.008163	0.149330	0.001123	0.562467	4.519	33.988	6.138
25	Hyainailouros	6	10.300	0.415646	0.057571	0.021934	0.659583	4.525	14.824	3.800
26	Ursavus	20	53.943	0.145613	0.354380	0.041570	0.683227	4.545	58.488	13.489
27	Hyootherium	14	23.397	0.056259	0.092588	0.007829	0.435296	6.070	29.467	5.748
28	Plesiaceratherium	13	21.847	0.062510	0.087027	0.007955	0.442158	6.682	28.529	5.099
29	Anchitherium	24	34.886	0.002724	0.109514	0.000734	0.313919	6.974	41.860	6.514
30	Lartetotherium	19	41.173	0.004888	0.212054	0.001121	0.540785	7.523	48.696	10.304
31	Ischyriactis	13	32.976	0.031048	0.183601	0.004434	0.618015	9.210	42.186	7.601
32	Brachypotherium	20	33.585	0.010963	0.132738	0.002425	0.411033	9.348	42.933	7.150
33	Brachyodus	2	4.204	0.189125	0.021169	0.003157	0.614271	9.576	13.781	0.704
34	Amphitragulus	2	3.566	0.185375	0.015875	0.003078	0.543116	10.512	14.078	0.421
35	Trochictis	9	28.164	0.135986	0.177289	0.012771	0.723902	10.793	38.957	6.566
36	Pseudocyon	12	25.656	0.005760	0.122549	0.000703	0.534974	11.211	36.868	5.783
37	Protictitherium	25	52.287	0.107275	0.302717	0.037397	0.573162	12.518	64.805	13.610
38	Prodeinotherium	8	28.181	0.119453	0.182217	0.009973	0.750035	12.829	41.010	5.404
39	Pseudarctos	9	25.837	0.077208	0.152454	0.007079	0.678562	13.187	39.024	6.076
40	Trocharion	10	28.386	0.024600	0.163442	0.002573	0.656384	14.856	43.243	5.610
41	Hispanotherium	5	12.440	0.329375	0.076357	0.014762	0.730448	16.371	28.811	3.278
42	Pliopithecus	10	21.561	0.045988	0.105443	0.004489	0.557521	16.854	38.415	5.004
43	Dicrocerus	13	25.511	0.139183	0.129014	0.018371	0.561343	17.092	42.603	7.088
44	Chalicotherium	26	42.379	0.078923	0.188071	0.025141	0.434909	17.739	60.118	11.542
45	Heteroprox	7	16.876	0.025321	0.085925	0.001655	0.595713	19.346	36.222	4.085
46	Micromeryx	21	40.577	0.012518	0.192617	0.003151	0.488939	20.220	60.797	10.086
47	Euprox	20	41.436	0.014800	0.208958	0.003585	0.524467	20.319	61.755	9.394
48	Stehlinoceros	7	17.239	0.214643	0.100351	0.014073	0.681094	21.025	38.263	4.225
49	Deinotherium	41	69.305	0.088143	0.384560	0.066073	0.460554	21.854	91.158	17.823
50	Sansanosmilus	15	28.403	0.024767	0.126369	0.003886	0.484962	22.804	51.207	5.426
51	Listriodon	18	23.964	0.021590	0.059929	0.003885	0.265087	24.924	48.888	3.359
52	Agnotherium	8	23.156	0.187781	0.143601	0.014897	0.719386	26.570	49.726	5.841
53	Conohyus	4	7.877	0.323531	0.043092	0.011144	0.656479	26.868	34.745	2.467
54	Hoploaceratherium	10	20.858	0.122213	0.105965	0.011849	0.579158	27.150	48.008	5.515
55	Alicornops	18	33.008	0.005729	0.142554	0.001133	0.457796	28.826	61.834	7.241
56	Tethytragus	3	7.030	0.036792	0.034215	0.000944	0.588936	29.186	36.216	1.214
57	Dicerorhinus	6	18.468	0.208063	0.116244	0.011829	0.742716	30.808	49.276	4.056
58	Aceratherium	30	52.103	0.074592	0.258941	0.031124	0.467163	31.784	83.886	11.815
59	Parachleuastochoerus	13	17.508	0.005212	0.041220	0.000636	0.261336	33.007	50.515	1.982
60	Dryopithecus	9	15.414	0.007000	0.056324	0.000580	0.420212	33.375	48.789	3.176

m	Genus	1s	AL	1F	0F	\hat{c}	\hat{d}	$E\{a\}$	$E\{b\}$	$E\{L\}$
61	Protragocerus	6	13.791	0.030813	0.067592	0.001677	0.578339	33.826	47.617	2.857
62	Propotamochoerus	24	73.111	0.003870	0.492038	0.001825	0.673002	35.012	108.123	9.279
63	Tetralophodon	32	54.373	0.031637	0.254193	0.014540	0.430096	35.155	89.528	11.493
64	Miotragocerus	16	20.232	0.068828	0.049382	0.010613	0.263605	36.215	56.447	2.978
65	Dremotherium	1	1.420	0.644500	0.008651	0.005258	0.749582	36.611	38.030	0.000
66	Machairodus	20	45.920	0.116931	0.271718	0.029952	0.615388	37.251	83.171	9.948
67	Dihoplus	19	32.577	0.087355	0.145117	0.018155	0.467723	37.445	70.022	7.052
68	Hippotherium	24	50.479	0.006750	0.266413	0.002203	0.527766	38.940	89.419	11.547
69	Thalassictis	15	26.774	0.181067	0.132938	0.027935	0.541201	39.032	65.806	8.450
70	Palaeotragus	25	57.402	0.013020	0.330583	0.004888	0.570148	39.201	96.603	10.238
71	Indarctos	14	33.041	0.110607	0.187176	0.017024	0.623149	40.870	73.911	7.996
72	Simocyon	9	28.146	0.247597	0.185861	0.023248	0.759408	44.567	72.713	6.524
73	Eomellivora	10	19.794	0.272950	0.109851	0.026193	0.632682	44.664	64.458	5.375
74	Hipparion	32	71.965	0.007562	0.437030	0.004651	0.558701	46.697	118.662	16.108
75	Dinocrocuta	5	6.308	0.400600	0.027820	0.017019	0.524861	48.396	54.704	2.791
76	Plioverperops	17	44.278	0.218279	0.289618	0.046546	0.699870	50.255	94.534	12.106
77	Paramachairodus	15	34.659	0.119050	0.196740	0.019988	0.618734	50.722	85.381	9.039
78	Adcrocuta	27	46.143	0.001500	0.197771	0.000520	0.415743	50.887	97.030	10.746
79	Microstonyx	35	46.925	0.000943	0.134355	0.000428	0.254826	50.897	97.822	7.385
80	Tragoptax	37	48.877	0.003020	0.137802	0.001488	0.245284	51.530	100.407	7.957
81	Creomhipparion	26	42.944	0.002144	0.173471	0.000688	0.395864	53.898	96.842	8.494
82	Amphimachairodus	16	37.695	0.104953	0.216432	0.019457	0.620093	54.852	92.547	8.424
83	Zygodolophodon	16	28.801	0.393750	0.176863	0.066177	0.663209	54.896	83.697	9.887
84	Gazella	49	68.618	0.009551	0.267815	0.008450	0.292723	56.265	124.883	11.677
85	Metaillurus	18	38.874	0.080958	0.210671	0.017119	0.574451	56.307	95.181	8.500
86	Lycyaena	10	23.352	0.221950	0.136589	0.022052	0.666811	57.492	80.843	6.028
87	Ictitherium	19	42.569	0.009408	0.226174	0.002195	0.557870	57.789	100.358	9.088
88	Hispanodorcus	7	10.400	0.168054	0.039118	0.010355	0.440056	59.566	69.967	2.394
89	Palaeoryx	12	27.111	0.008135	0.135790	0.001008	0.560974	62.265	89.376	5.979
90	Helladotherium	15	31.356	0.013183	0.151867	0.002135	0.527926	65.821	97.177	7.610
91	Choerolophodon	16	30.029	0.069375	0.140181	0.011812	0.504154	66.462	96.491	7.524
92	Stephanorhinus	32	57.282	0.035254	0.287071	0.016909	0.461058	66.736	124.019	10.804
93	Samotherium	13	29.277	0.010712	0.147894	0.001470	0.560722	66.929	96.206	6.548
94	Chilotherium	11	27.984	0.023170	0.152553	0.002654	0.616021	68.438	96.421	6.186
95	Protragelaphus	10	21.368	0.015537	0.101082	0.001514	0.539282	68.472	89.841	4.362
96	Hyaenictitherium	8	12.752	0.243266	0.057741	0.017494	0.525256	69.982	82.734	4.165
97	Mesopithecus	15	38.325	0.105333	0.228489	0.018442	0.649839	70.108	108.433	10.220
98	Orycteropus	10	21.965	0.291850	0.130554	0.028603	0.677595	70.341	92.306	7.251
99	Felis	15	38.665	0.148642	0.237563	0.026128	0.669715	70.352	109.016	9.874
100	Pliocervus	8	14.483	0.155438	0.066605	0.011354	0.533475	70.911	85.394	3.154
101	Cervavitus	7	11.088	0.157821	0.044378	0.009784	0.468298	70.986	82.074	2.988
102	Prostrepsiceros	14	23.834	0.010366	0.090719	0.001449	0.418693	70.995	94.829	4.917
103	Ceratotherium	15	24.868	0.013242	0.092352	0.002004	0.404796	71.211	96.079	5.569
104	Palaeoreas	12	23.846	0.020177	0.107931	0.002418	0.506927	71.389	95.235	5.623
105	Hyaenotherium	9	22.883	0.028708	0.122971	0.002555	0.617990	72.304	95.187	5.055
106	Bohlinia	6	13.873	0.057979	0.069673	0.003159	0.592596	73.079	86.952	3.140
107	Protoryx	8	15.826	0.364500	0.092606	0.026957	0.678762	73.188	89.015	5.750
108	Mustela	6	8.726	0.509750	0.049020	0.026532	0.662899	73.333	82.059	4.333
109	Ancylotherium	9	16.599	0.111944	0.074842	0.009381	0.518506	73.427	90.026	3.945
110	Oioceros	9	19.538	0.063653	0.096614	0.005484	0.568675	73.807	93.345	4.726
111	Pliohyrax	8	11.613	0.268344	0.049653	0.019101	0.495974	74.345	85.958	4.040
112	Baranogale	8	11.433	0.556125	0.067945	0.039523	0.689398	85.438	96.871	5.996
113	Plesiogulo	9	8.625	0.625597	0.045703	0.048801	0.609341	93.933	102.558	6.550
114	Procacpreolus	10	14.848	0.261837	0.065493	0.023988	0.502850	94.998	109.845	5.931
115	Parabos	5	9.540	0.103525	0.042498	0.004522	0.530131	95.844	105.383	1.515
116	Agriotherium	8	13.584	0.305219	0.069192	0.022114	0.590839	96.867	110.451	5.160
117	Tapirus	16	13.043	0.526305	0.050593	0.075893	0.418918	96.905	109.948	8.943
118	Anancus	19	26.175	0.108651	0.087990	0.021103	0.352975	97.496	123.671	7.120
119	Canis	14	24.701	0.225929	0.126033	0.031853	0.561266	97.752	122.453	8.364
120	Nyctereutes	18	26.301	0.008639	0.079782	0.001592	0.321537	98.084	124.386	4.711

m	Genus	1s	AL	1F	0F	\hat{c}	\hat{d}	$E\{a\}$	$E\{b\}$	$E\{L\}$
121	Cervus	18	26.469	0.050250	0.088425	0.009274	0.354119	98.220	124.689	6.072
122	Croizetocerus	13	25.564	0.015356	0.114985	0.002028	0.499276	98.372	123.936	6.119
123	Ursus	20	25.324	0.002844	0.051742	0.000576	0.212489	98.696	124.020	3.305
124	Vulpes	14	24.850	0.022393	0.101488	0.003162	0.449238	99.179	124.029	5.490
125	Lynx	17	24.491	0.006610	0.071057	0.001129	0.310449	99.853	124.344	4.251
126	Sus	10	23.306	0.020562	0.118519	0.002042	0.579740	100.080	123.386	5.325
127	Mammut	7	9.599	0.301375	0.040247	0.018441	0.490546	101.376	110.975	3.645
128	Paracamelus	4	5.635	0.555500	0.032144	0.018772	0.684486	102.950	108.585	2.817
129	Homotherium	12	19.877	0.007094	0.071092	0.000818	0.400574	103.289	123.166	4.199
130	Chasmaporthetes	12	20.172	0.010219	0.074064	0.001181	0.411210	103.309	123.482	4.239
131	Pliocrocuta	13	20.608	0.010673	0.069789	0.001342	0.375906	103.694	124.302	4.466
132	Macaca	5	13.306	0.153125	0.076228	0.006917	0.681758	104.527	117.832	3.035
133	Acinonyx	9	15.906	0.128333	0.070096	0.010685	0.506790	105.172	121.078	4.318
134	Leptobos	11	18.724	0.007545	0.069085	0.000788	0.416940	105.180	123.903	3.975
135	Eucladoceros	8	18.478	0.045219	0.093447	0.003428	0.586633	105.806	124.284	4.019
136	Mammuthus	8	16.435	0.037203	0.075283	0.002767	0.531350	106.164	122.599	3.671
137	Megantereon	9	17.083	0.017875	0.071687	0.001505	0.482581	106.382	123.465	3.917
138	Equus	12	17.138	0.017573	0.047753	0.001973	0.312086	107.444	124.582	2.733
139	Gazellospira	13	15.920	0.004202	0.026798	0.000505	0.186848	108.773	124.693	1.619

The strongest of false 1s.

	Site	Genus	P(1 is wrong)
1	(1)Laugnac [2,21.38] *	(76)Plioiverrops	1.000000
2	(2)Wintershof West [3,19] *	(69)Thalassictis	1.000000
3	(31)Pasalar [6,14.75]	(113)Plesiogulo	1.000000
4	(29)Belometchetskaja [5,16.1]	(92)Stephanorhinus	1.000000
5	(31)Pasalar [6,14.75]	(111)Pliohyrax	1.000000
6	(65)Concud [12,7.65]	(119)Canis	1.000000
7	(109)Stavropol Kavkazskij [15,3.53]	(7)Amphicyon	1.000000
8	(65)Concud [12,7.65]	(118)Anancus	1.000000
9	(52)Dorn Dürkheim [11,8.6]	(118)Anancus	1.000000
10	(32)Çandir [6,13.85]	(98)Orycteropus	1.000000
11	(64)Cerro de la Garita [12,7.65]	(119)Canis	1.000000
12	(36)Wissberg [9,10.35]	(97)Mesopithecus	1.000000
13	(61)Los Mansuetos [12,7.65] *	(114)Procacpreolus	1.000000
14	(61)Los Mansuetos [12,7.65] *	(119)Canis	1.000000
15	(99)Venta del Moro [13,6.2]	(69)Thalassictis	1.000000
16	(98)Baccinello V3 [13,5.65]	(64)Miotragocerus	1.000000
17	(72)Pikermi [12,8.05]	(127)Mammut	0.999875
18	(117)Varshets [16,2.66]	(11)Martes	0.999875
19	(51)Buzhor 1 [9,10.35]	(10)Procervulus	0.999875
20	(99)Venta del Moro [13,6.2]	(67)Dihoplus	0.999875
21	(50)Kalfa [9,10.35]	(10)Procervulus	0.999875
22	(54)Csakvar [11,8.6]	(20)Lagomeryx	0.999875
23	(28)Göriach [5,16.1]	(117)Tapirus	0.999750
24	(51)Buzhor 1 [9,10.35]	(113)Plesiogulo	0.999500
25	(41)Can Llobateres I [10,9.45] *	(113)Plesiogulo	0.999375
26	(20)Vieux Collonges [5,16.6]	(76)Plioiverrops	0.999125
27	(112)Odessa Catacombs [15,3.8]	(101)Cervavitus	0.998250
28	(50)Kalfa [9,10.35]	(91)Choerolophodon	0.997750
29	(73)Eldari I [9,9.55]	(75)Dinocrocata	0.997750
30	(37)Sant Quirze [7,11.85]	(108)Mustela	0.996875
31	(77)Chimishlija (Cimislija) [12,7.65]	(133)Acinonyx	0.996250
32	(52)Dorn Dürkheim [11,8.6]	(117)Tapirus	0.993500
33	(36)Wissberg [9,10.35]	(117)Tapirus	0.993375
34	(54)Csakvar [11,8.6]	(116)Agriotherium	0.993375
35	(35)La Grive St. Alban [7,11.85]	(76)Plioiverrops	0.993250
36	(92)Prochoma [11,8.6]	(44)Chalicotherium	0.993000
37	(41)Can Llobateres I [10,9.45] *	(117)Tapirus	0.992625
38	(48)Charmoille [9,10.35]	(117)Tapirus	0.992625
39	(45)Rudabánya [9,10.35]	(117)Tapirus	0.992625
40	(42)Eppelsheim [9,10.35]	(117)Tapirus	0.992625
41	(44)Can Ponsic I [9,10.35]	(117)Tapirus	0.992625
42	(77)Chimishlija (Cimislija) [12,7.65]	(127)Mammut	0.991375
43	(102)Weze 1 [15,3.8]	(11)Martes	0.990500
44	(105)Kvabebi [16,3]	(107)Protoryx	0.982750
45	(116)Çalta [15,3.8]	(82)Amphimachairoidus	0.982375
46	(35)La Grive St. Alban [7,11.85]	(25)Hyainailourus	0.976750
47	(100)Montpellier [14,4.75]	(111)Pliohyrax	0.972625
48	(47)Can Ponsic [9,10.35]	(53)Conohyus	0.958500
49	(73)Eldari I [9,9.55]	(44)Chalicotherium	0.954625
50	(49)Los Valles de Fuentidueña [9,10.35]	(96)Hyaenictitherium	0.948750
51	(89)Middle Sinap [9,10.1]	(13)Pseudaelurus	0.943625
52	(89)Middle Sinap [9,10.1]	(75)Dinocrocata	0.941250
53	(72)Pikermi [12,8.05]	(113)Plesiogulo	0.940625
54	(112)Odessa Catacombs [15,3.8]	(108)Mustela	0.936250
55	(12)Engelswies [5,16.6]	(54)Hoploaceratherium	0.927250
56	(109)Stavropol Kavkazskij [15,3.53]	(63)Tetralophodon	0.913000
57	(5)Artesilla [4,17.5]	(49)Deinotherium	0.894500
58	(7)Els Casots [4,17.5]	(49)Deinotherium	0.893000
59	(15)La Romieu [4,17.5] *	(83)Zygodon	0.885500
60	(86)Kemiklitepe A B [12,7.65]	(116)Agriotherium	0.882125

Site	Genus	P(1 is wrong)
61 (50)Kalfa [9,10.35]	(43)Dicrocerus	0.881000
62 (4)Savigné sur Lathan [5,16.1]	(48)Stehlinoceros	0.880750
63 (54)Csakvar [11,8.6]	(98)Orycteropus	0.876500
64 (102)Weze 1 [15,3.8]	(108)Mustela	0.874500
65 (43)Hostalets de Pierola Inferior [7,11.85]	(14)Plithocyon	0.872125
66 (42)Eppelsheim [9,10.35]	(77)Paramachairodus	0.870000
67 (21)Pontlevoy [5,16.1] *	(83)Zygodolophodon	0.867000
68 (52)Dorn Dürkheim [11,8.6]	(99)Felis	0.866750
69 (23)Esvres Marine Faluns [5,16.1]	(83)Zygodolophodon	0.866250
70 (30)Sansan [6,13.85] *	(83)Zygodolophodon	0.865375
71 (33)Simorre [6,13.2]	(83)Zygodolophodon	0.865375
72 (39)Esselborn [9,10.35]	(83)Zygodolophodon	0.865125
73 (4)Savigné sur Lathan [5,16.1]	(43)Dicrocerus	0.862625
74 (53)Villadecavalls [10,9.25]	(99)Felis	0.860000
75 (97)Brisighella [13,6.2]	(86)Lycyaena	0.851750
76 (69)Chobruchi (Tchobroutchi) [12,7.65]	(121)Cervus	0.847000
77 (83)Middle Maragheh [12,7.65]	(88)Hispanodorcas	0.846875
78 (91)Mahmutgazi [12,7.65]	(37)Protictitherium	0.839375
79 (70)Poksheshty [10,9.25]	(113)Plesiogulo	0.813875
80 (54)Csakvar [11,8.6]	(96)Hyaenictitherium	0.801875
81 (80)Ravin de la Pluie (RPL) [10,9.25]	(37)Protictitherium	0.800375
82 (59)La Roma 2 [10,9.25]	(107)Protoryx	0.800375
83 (89)Middle Sinap [9,10.1]	(73)Eomellivora	0.791500
84 (109)Stavropol Kavkazskij [15,3.53]	(49)Deinotherium	0.781000
85 (88)Vathylakkos 3 (VAT) [11,8.6]	(16)Dorcatherium	0.777000
86 (50)Kalfa [9,10.35]	(85)Metailurus	0.775500
87 (81)Samos [12,8.05]	(16)Dorcatherium	0.773625
88 (79)Pikermi MNHN (PIK) [12,7.65]	(16)Dorcatherium	0.771125
89 (88)Vathylakkos 3 (VAT) [11,8.6]	(113)Plesiogulo	0.767500
90 (89)Middle Sinap [9,10.1]	(37)Protictitherium	0.765875
91 (101)Kosyakino [14,4.75]	(58)Aceratherium	0.764500
92 (1)Laugnac [2,21.38] *	(28)Plesiaceratherium	0.763875
93 (67)Belka [12,7.65]	(114)Procapreolus	0.763375
94 (99)Venta del Moro [13,6.2]	(77)Paramachairodus	0.762250
95 (100)Montpellier [14,4.75]	(66)Machairodus	0.755250
96 (85)Samos Main Bone Beds [12,7.65]	(26)Ursavus	0.753375
97 (72)Pikermi [12,8.05]	(26)Ursavus	0.752250
98 (78)Halmyropotamos (HAL) [12,8.05]	(26)Ursavus	0.751375
99 (66)Polgardi [13,6.75]	(114)Procapreolus	0.750500
100 (99)Venta del Moro [13,6.2]	(58)Aceratherium	0.750125