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Supplement of

Measurement report: Characterization of uncertainties in fluxes and fuel sulfur content from ship emissions in the Baltic Sea

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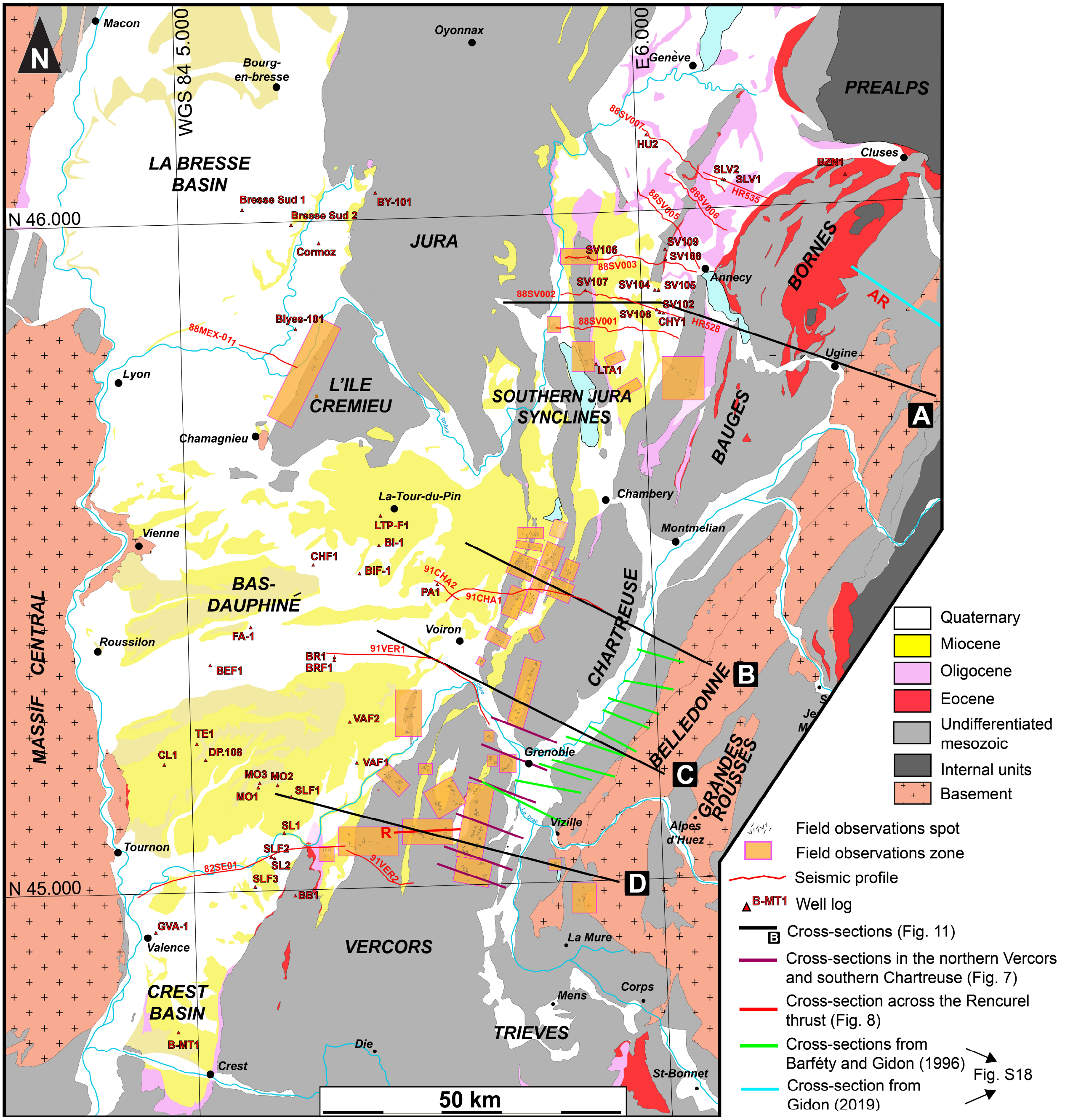
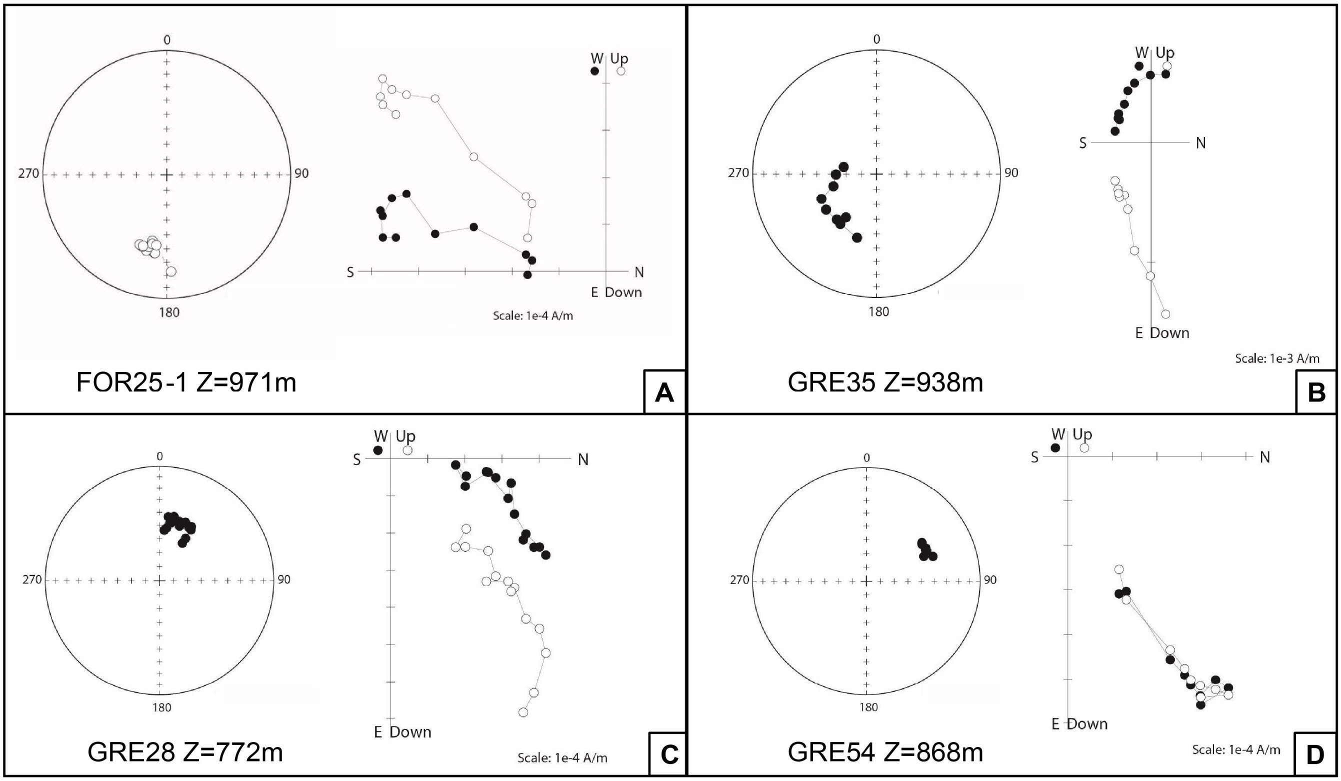


Figure S1: Dataset used for the structural study with localization of field observations, seismic lines, well logs, cross-sections presented in this study, and useful cross-sections available from the literature.

Figure S2 and S3: Paleomagnetic results



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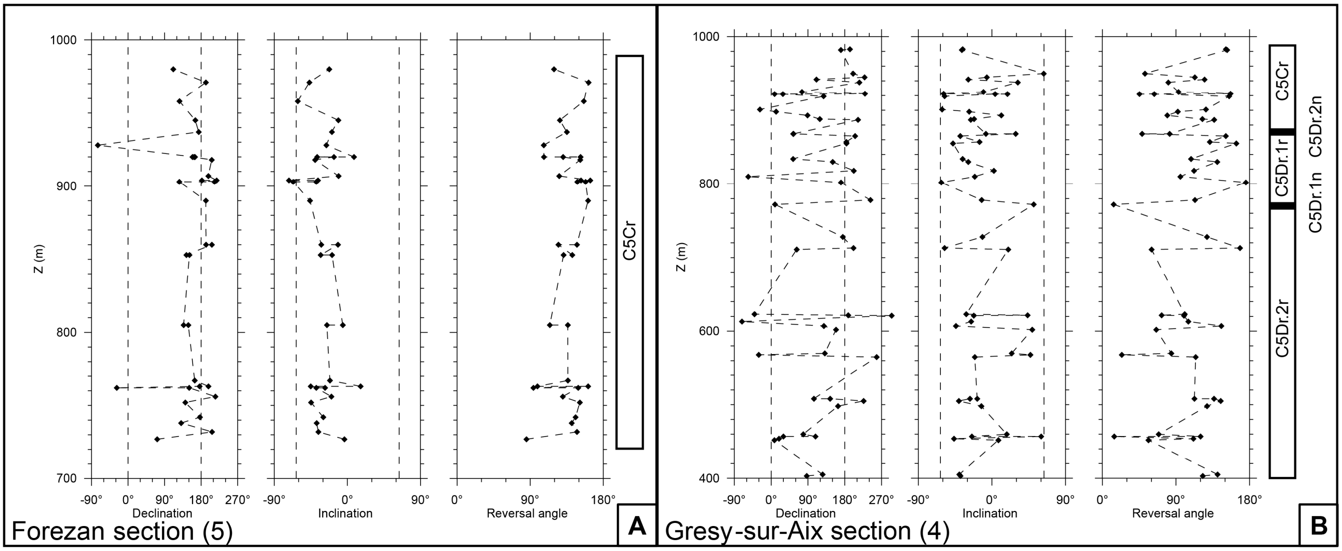

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Figure S4: Synthesis of the Miocene biostratigraphy of the subalpine massifs, southern Jura and adjacent basins

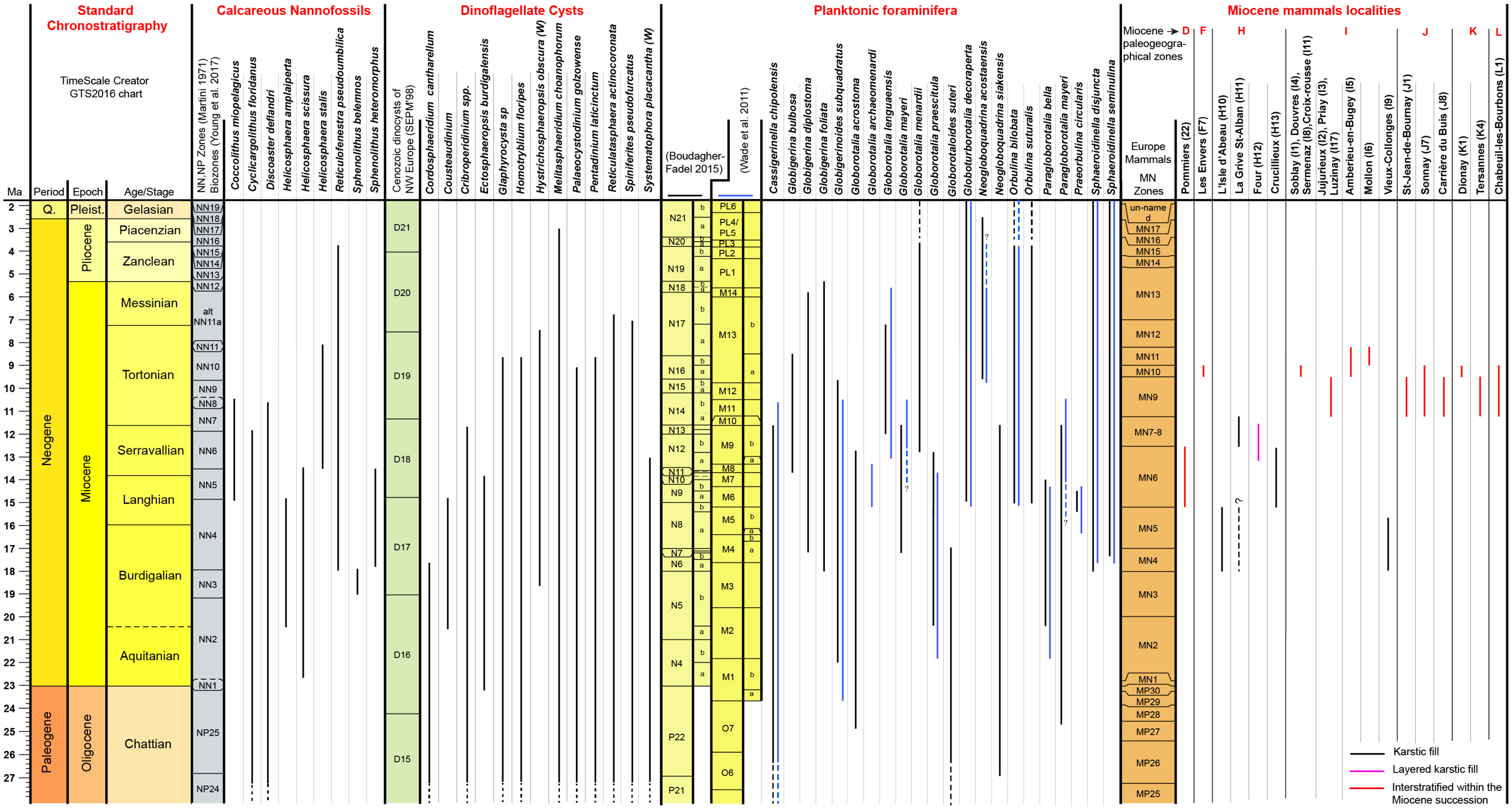
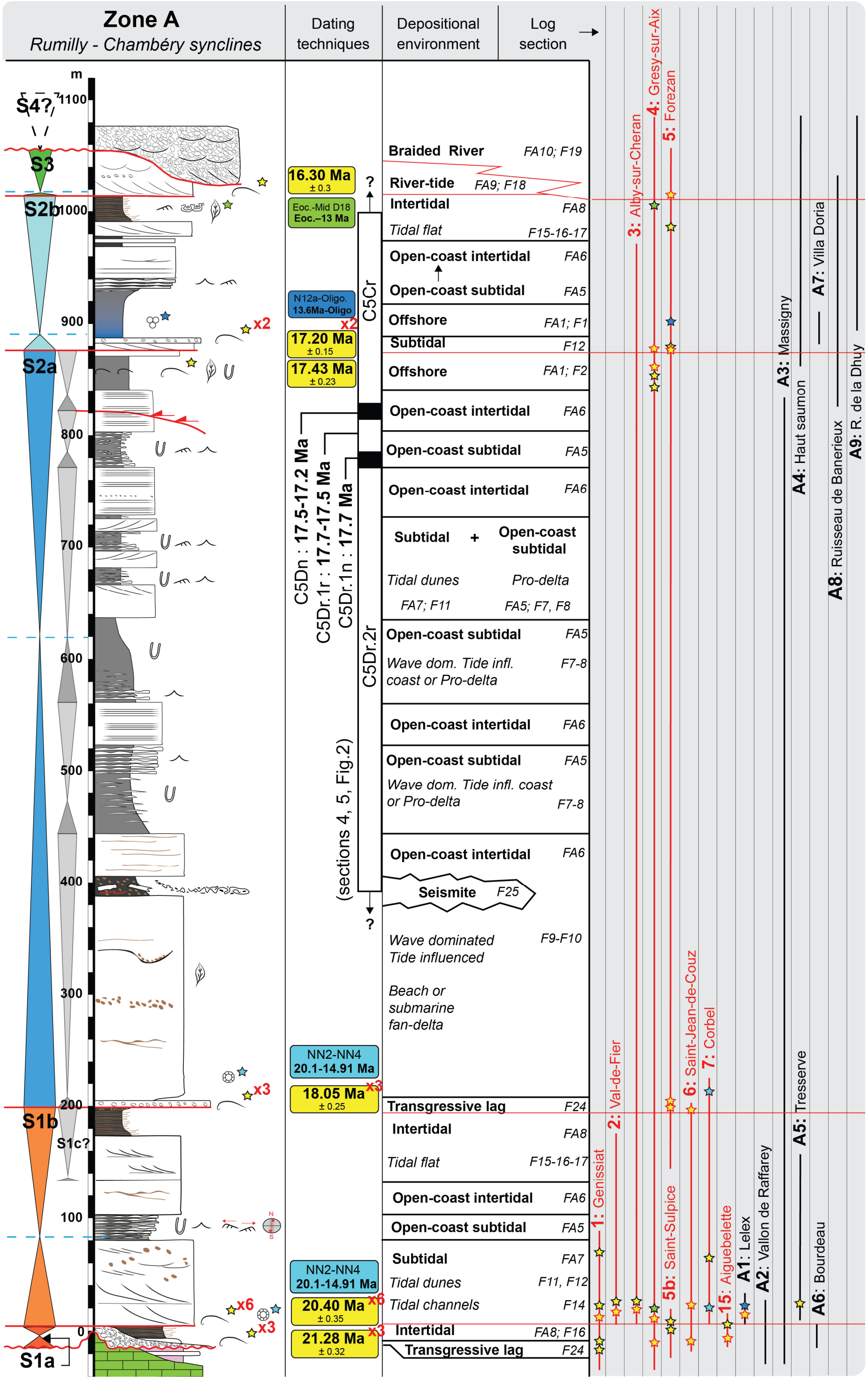


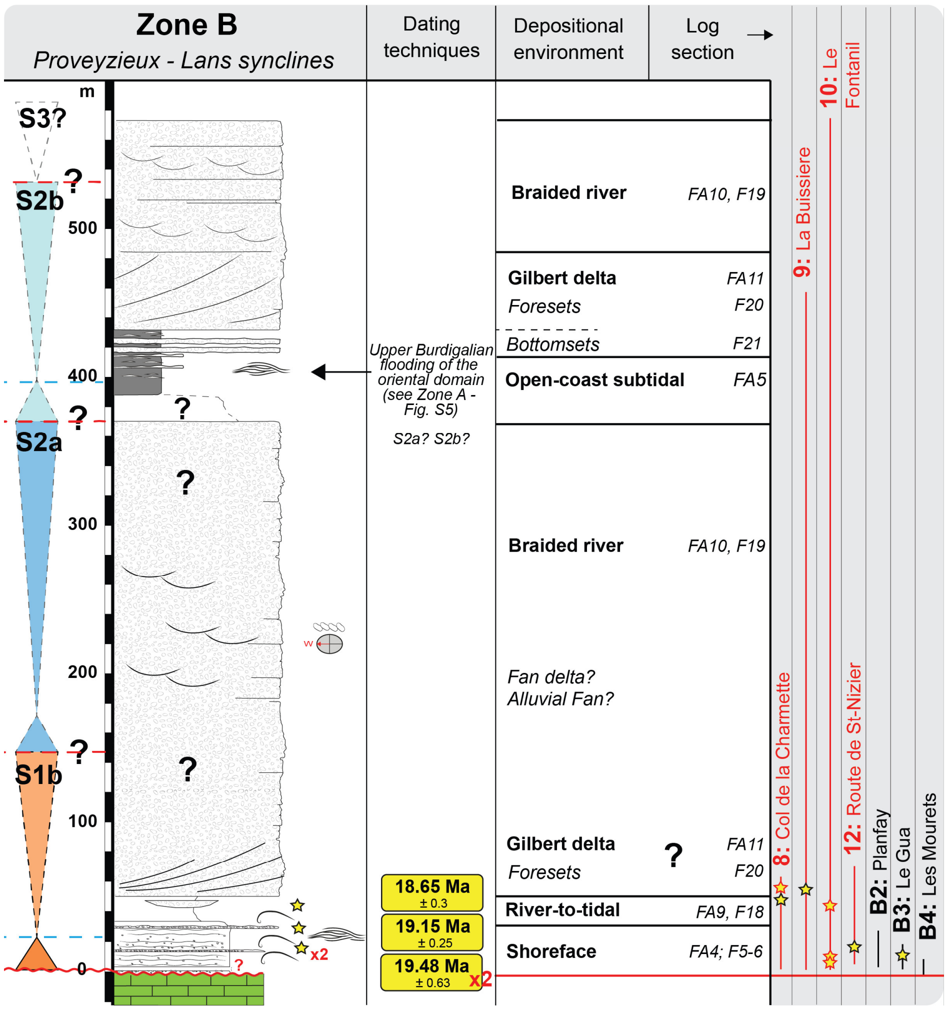
Figure S4: Synthesis of the Miocene biostratigraphy of the subalpine massifs, southern Jura and adjacent basins (Bas-Dauphiné, Crest, La Bresse). Geochronology calibrated on the GTS of Ogg et al. (2016). References for Miocene mammals datations: **D22, F7**: Clauzon (1990) ; **H9**: Truc (1975) ; **H10** : Guerin and Mein (1971), Costeur (2005); **H11** ; Mein and Guinsbourg (2002) ; **H12** ; Maridet et al. (2000, 2002), Maridet (2003) ; **H13**; Maridet (2003) ; **I1** : Ménouret and Mein (2008) ; **I3** : Combémorel et al. (1970), Ménouret and Mein (2008) ; **I4, I5, I6, I8** ; Guerin and Mein (1971), Mein et al. (1999) ; **I9** : Mein (1958), Guerin and Mein (1971), Mein and freudenthal (1971), Maridet (2003) ; **I11** : Mein et al. (1961), Guerin and mein (1971), Ménouret and Mein (2008) ; **I14, I17** : Guerin and Mein (1971) ; **J1, L1** : Guerin and Mein (1971) ; Ménouret and Mein (2008) ; **J7** : Depéret (1987), Guerin and Mein (1971) ; **J8** : Mein (1990) ; **K1** : Clauzon (1990), Mein et al. (1999), Lazzari et al. (2010) ; **K2** : Guerin and Mein (1971).

Figure S5 to S17: The Miocene chronostratigraphy of the subalpine massifs, southern Jura and adjacent basins (Bas-Dauphiné, La Bresse, Crest)



Zone A
Rumilly - Chambéry synclines
Dating techniques
Depositional environment
Log section
S4?
S3
S2b
S2a
S1b
S1c?
S1a
16.30 Ma ± 0.3
Eoc.-Mid D18 Eoc.–13 Ma
N12a-Oligo. 13.6Ma-Oligo
17.20 Ma ± 0.15
17.43 Ma ± 0.23
NN2-NN4 20.1-14.91 Ma
18.05 Ma ± 0.25
20.40 Ma ± 0.35
21.28 Ma ± 0.32
C5Dn : 17.5-17.2 Ma
C5Dr.1r : 17.7-17.5 Ma
C5Dr.1n : 17.7 Ma
(sections 4, 5, Fig.2)
C5Cr
C5Dr.2r
Braided River FA10; F19
River-tide FA9; F18
Intertidal FA8
Tidal flat F15-16-17
Open-coast intertidal FA6
Open-coast subtidal FA5
Offshore FA1; F1
Subtidal F12
Offshore FA1; F2
Subtidal + Open-coast subtidal
Tidal dunes FA7; F11
Pro-delta FA5; F7, F8
Wave dom. Tide infl. coast or Pro-delta F7-8
Seismite F25
Wave dominated Tide influenced F9-F10
Beach or submarine fan-delta
Transgressive lag F24
Subtidal FA7
Tidal dunes F11, F12
Tidal channels F14
Intertidal FA8; F16
1: Genissiat
2: Val-de-Fier
3: Alby-sur-Cheran
4: Gresy-sur-Aix
5: Forezan
5b: Saint-Sulpice
6: Saint-Jean-de-Couz
7: Corbel
15: Aiguebelette
A1: Lelex
A2: Vallon de Raffarey
A3: Massigny
A4: Haut saumon
A5: Tresserve
A6: Bourdeau
A7: Villa Doria
A8: Ruisseau de Banerieux
A9: R. de la Dhuy

Figure S5: Synthetic section of the Miocene of the Rumilly-Chambéry synclines (Zone A). See Fig. 3 for location of the sedimentological sections and Fig. S17 for legend. For more details, see section 6.3.1. and appendix 17 in Kalifi (2020) and references therein.



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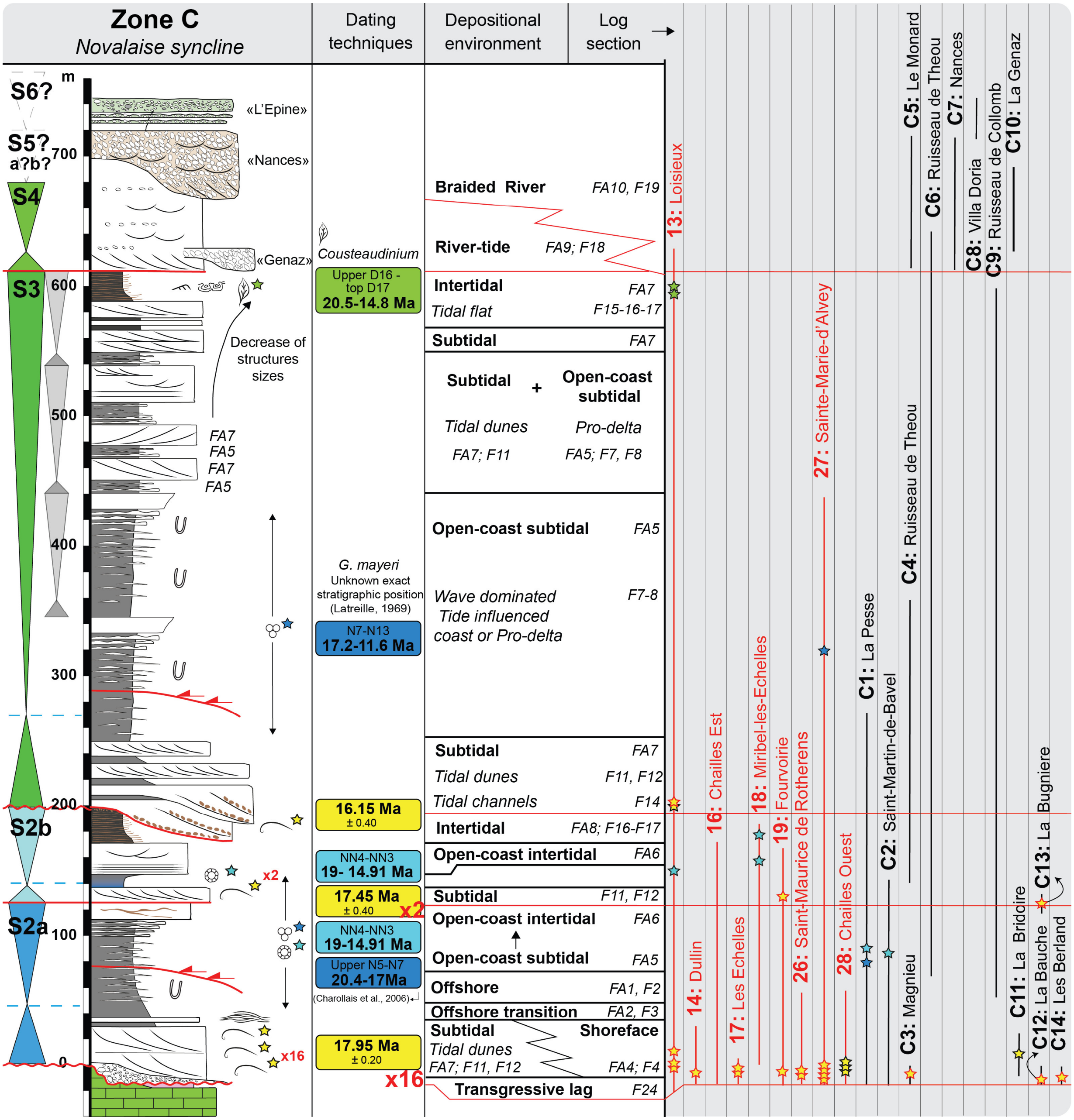
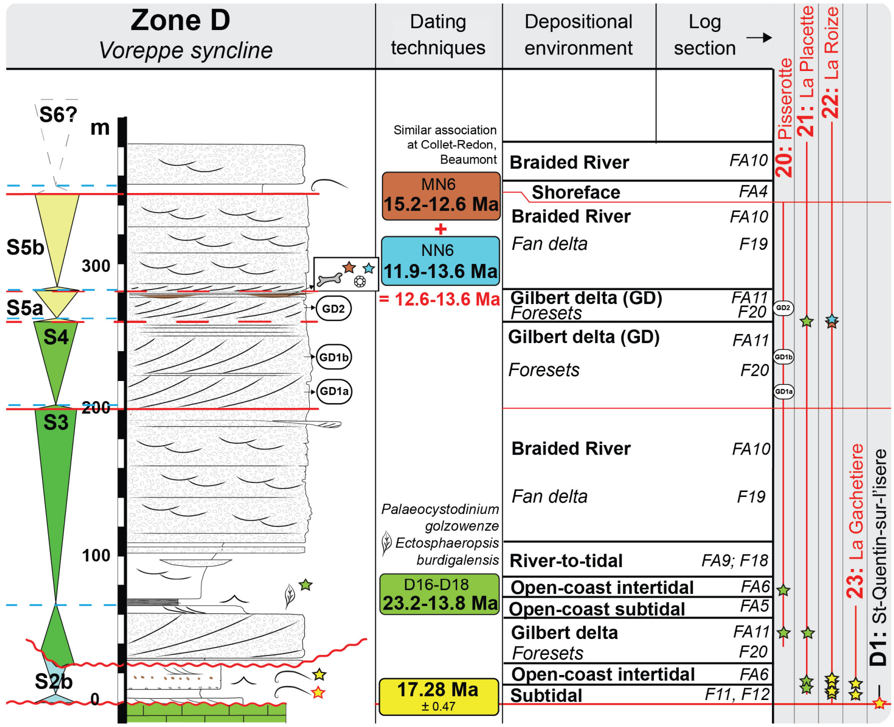


Figure S7: Synthetic section of the Miocene of the Novalaise syncline (Zone C). See Fig. 3 for location of the sedimentological sections and Fig. S17 for legend. For more details, see section 6.3.3. and appendix 30 in Kalifi (2020) and references therein.



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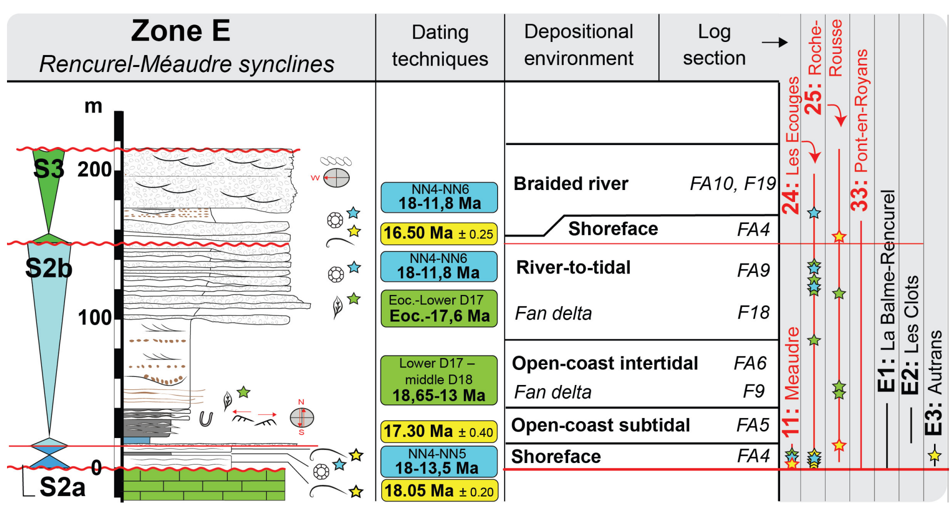

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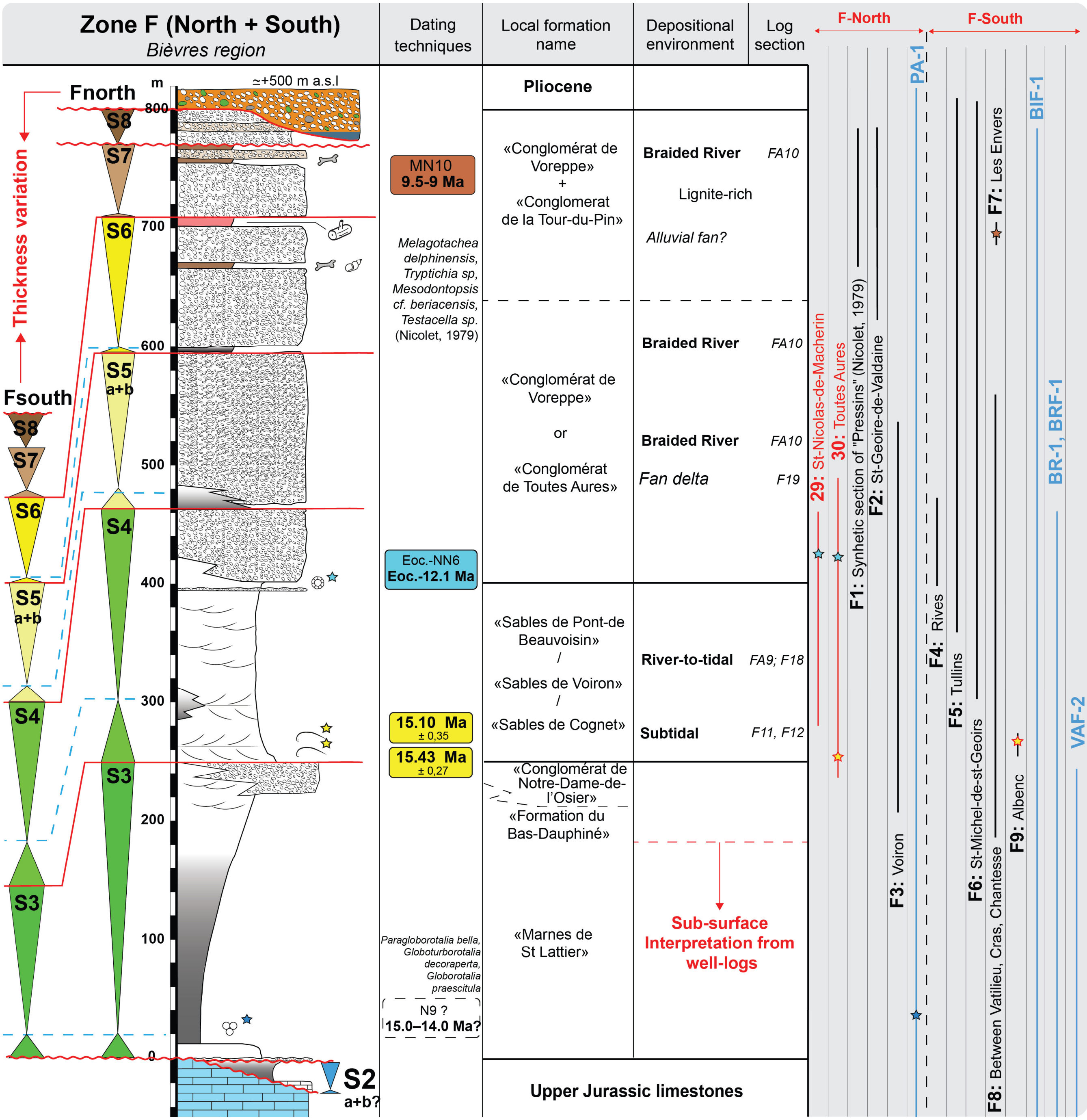

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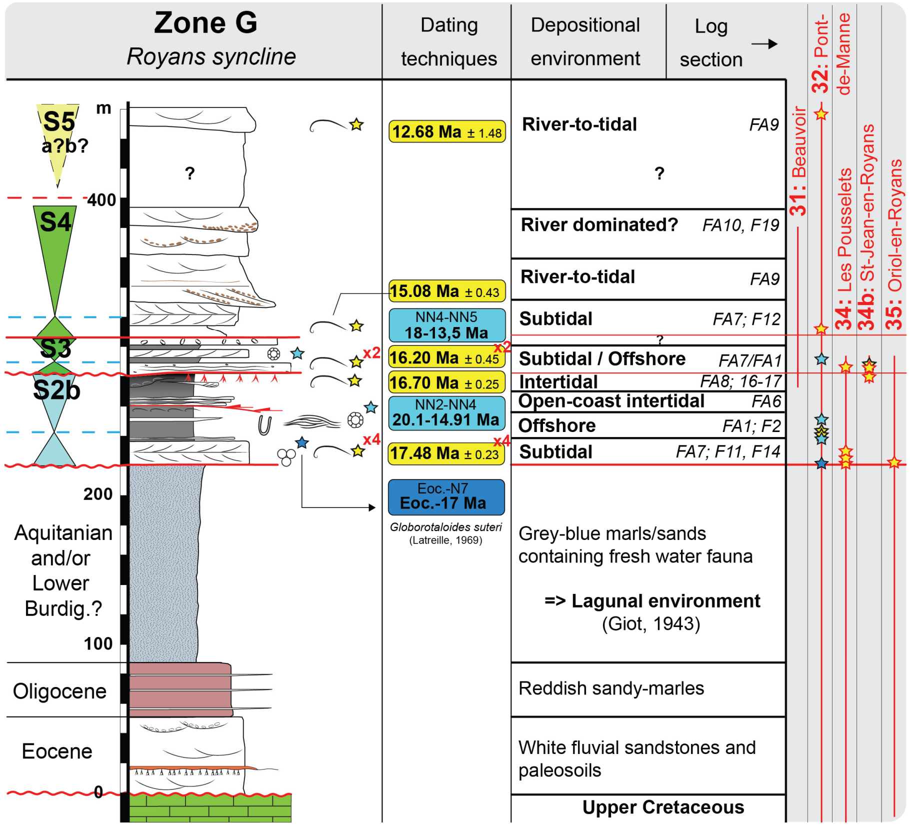

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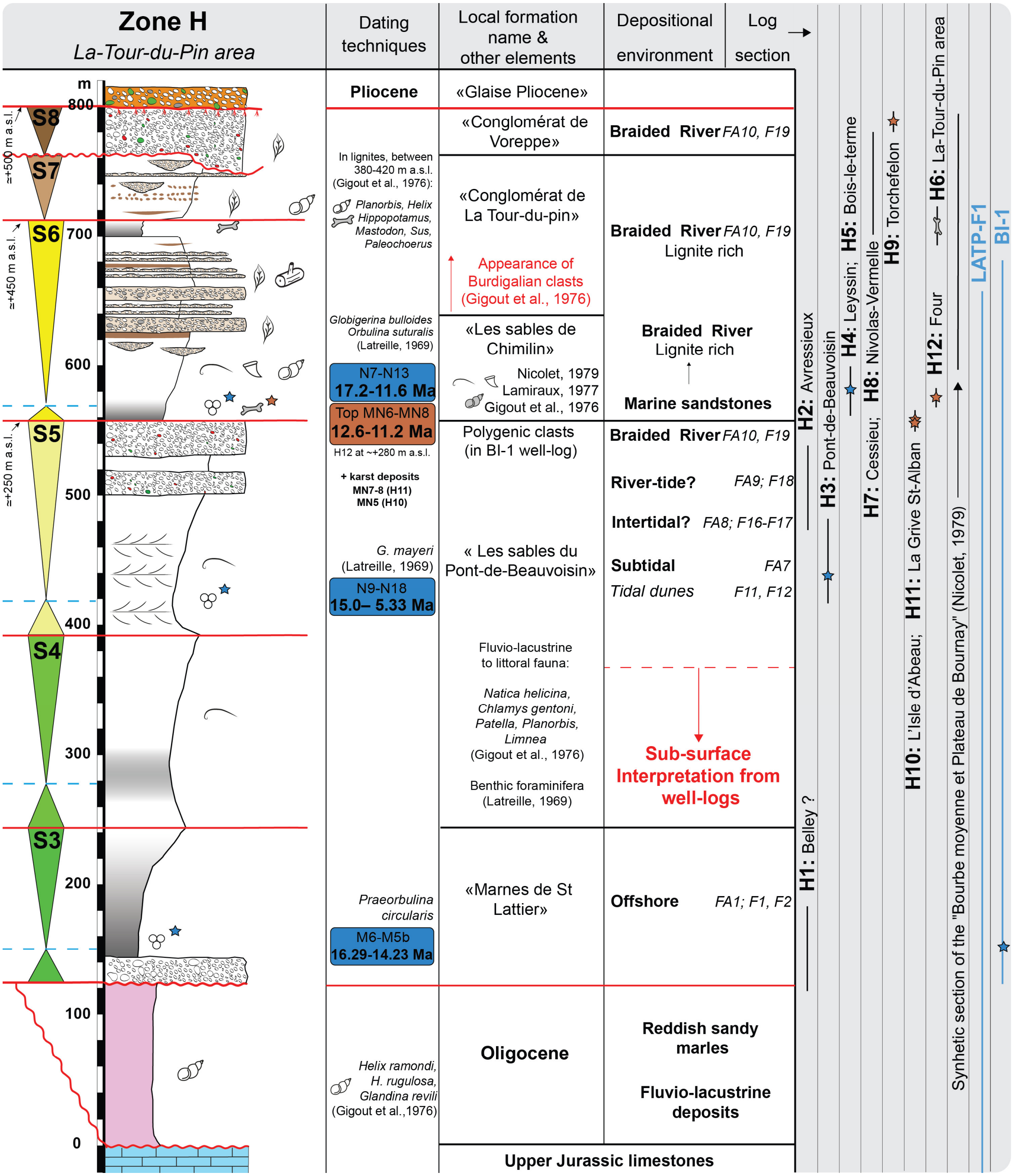


Figure S12: Synthetic section of the Miocene of the La-tour-du-Pin area (Zone H). See Fig. 3 for location of the sedimentological sections and Fig. S17 for legend. For more details, see section 6.4.1. and appendix 59 in Kalifi (2020) and references therein.

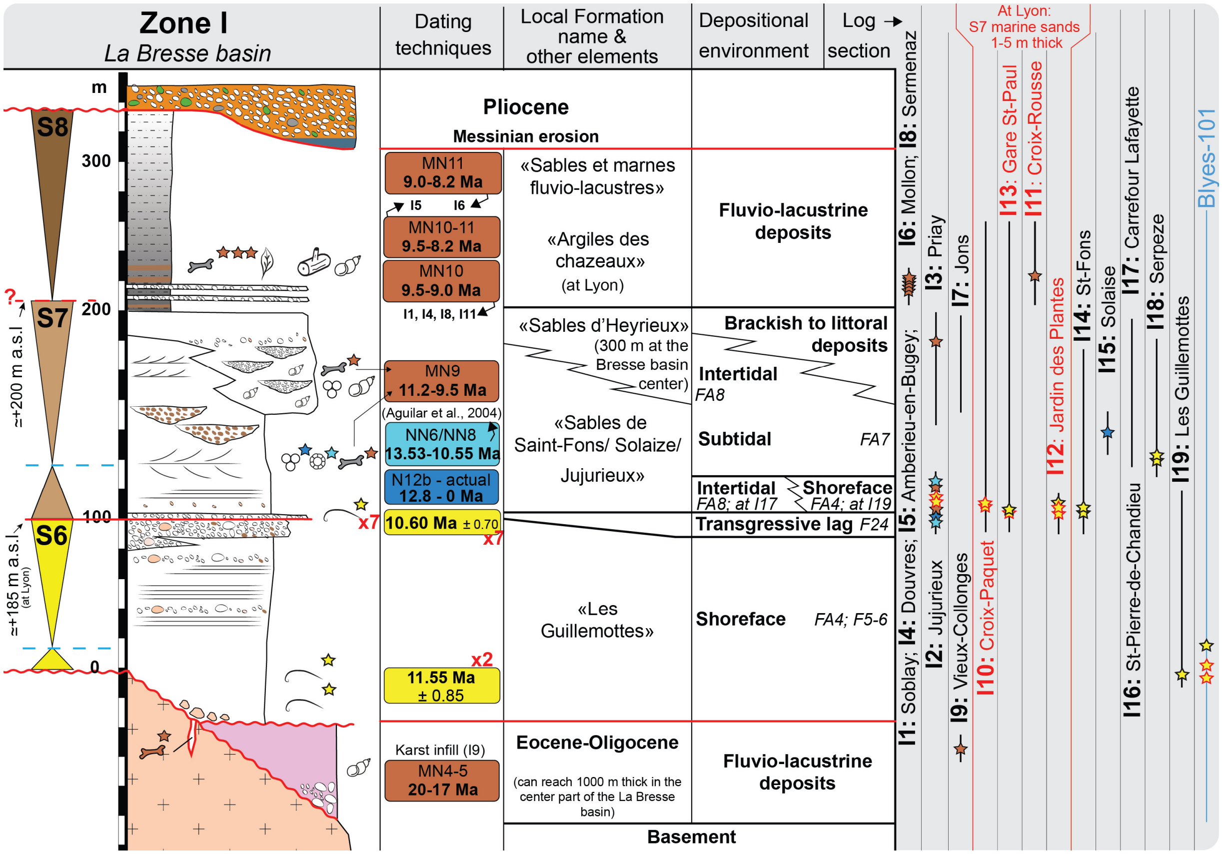


Figure S13: Synthetic section of the Miocene of the La Bresse basin (Zone I). See Fig. 3 for location of the sedimentological sections and Fig. S17 for legend. For more details, see section 6.4.2. and appendix 62 in Kalifi (2020) and references therein.

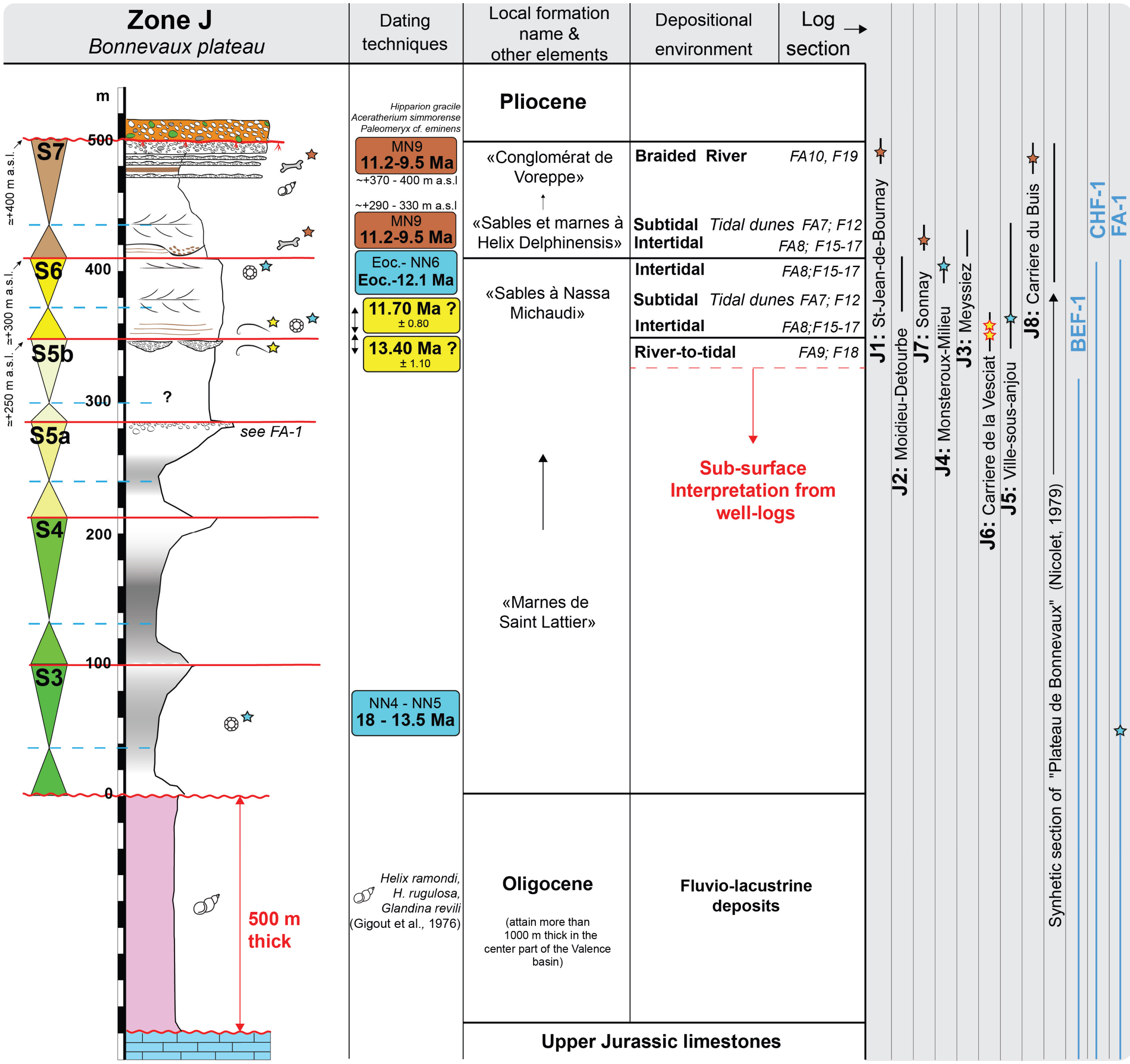


Figure S14: Synthetic section of the Miocene of the Bonnevaux plateau (Zone J). See Fig. 3 for location of the sedimentological sections and Fig. S17 for legend. For more details, see section 6.4.3. and appendix 65 in Kalifi (2020) and references therein.

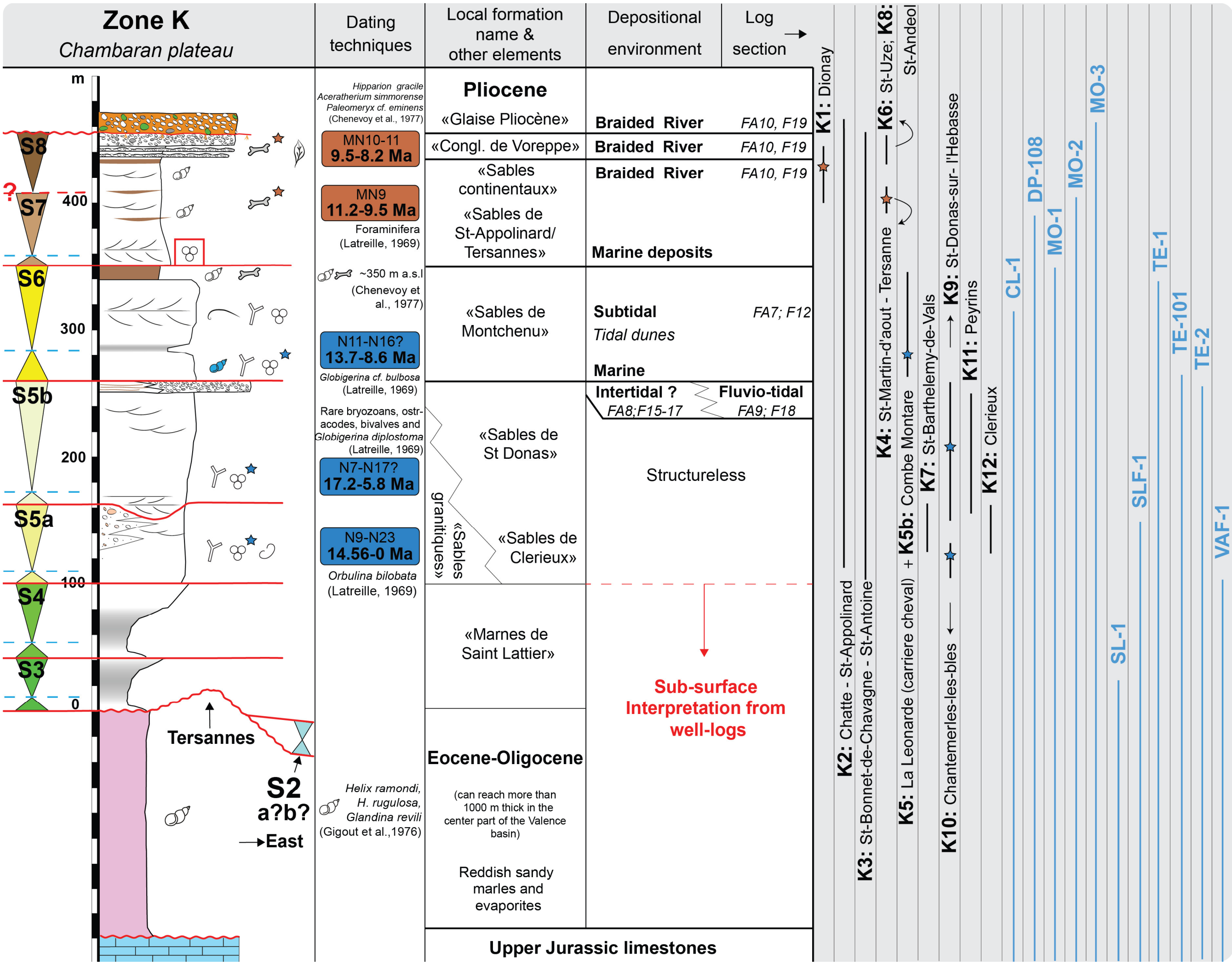


Figure S15: Synthetic section of the Miocene of the Chambaran plateau (Zone K). See Fig. 3 for location of the sedimentological sections and Fig. S17 for legend. For more details, see section 6.4.4. and appendix 69 in Kalifi (2020) and references therein.

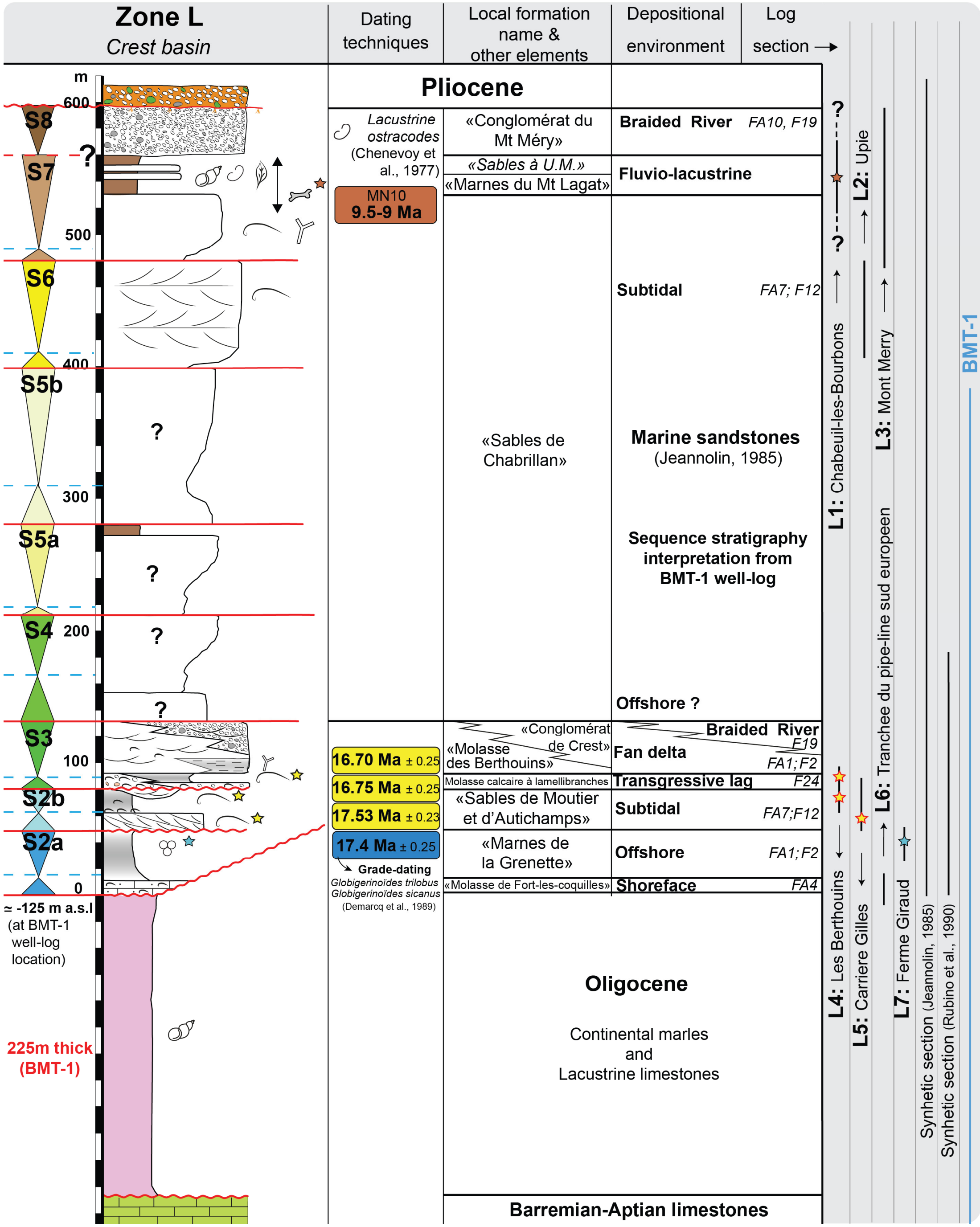
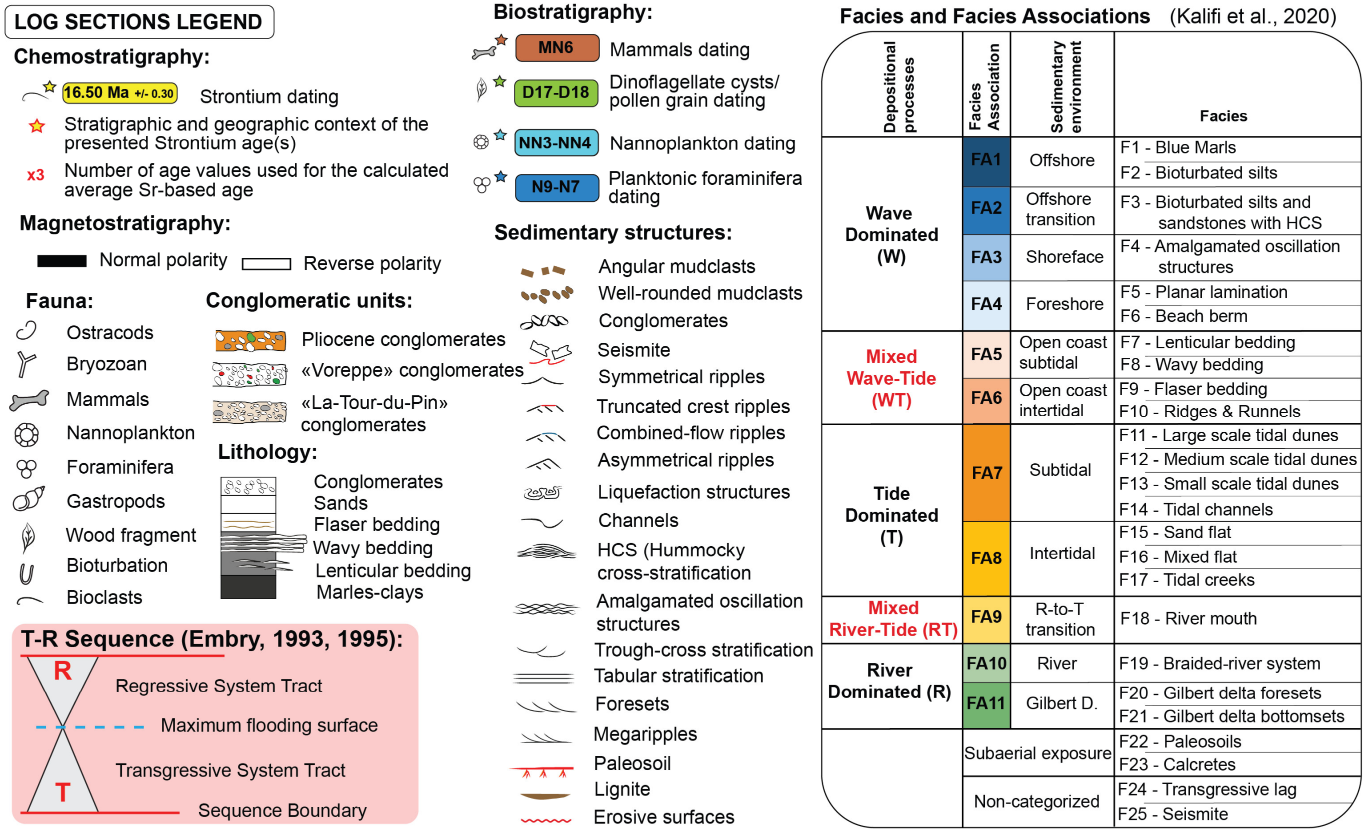


Figure S16: Synthetic section of the Miocene of the Crest basin (Zone L). See Fig. 3 for location of the sedimentological sections and Fig. S17 for legend. For more details, see section 6.4.5. and appendix 82 in Kalifi (2020) and references therein. U.M.= Unios de Montvendre.



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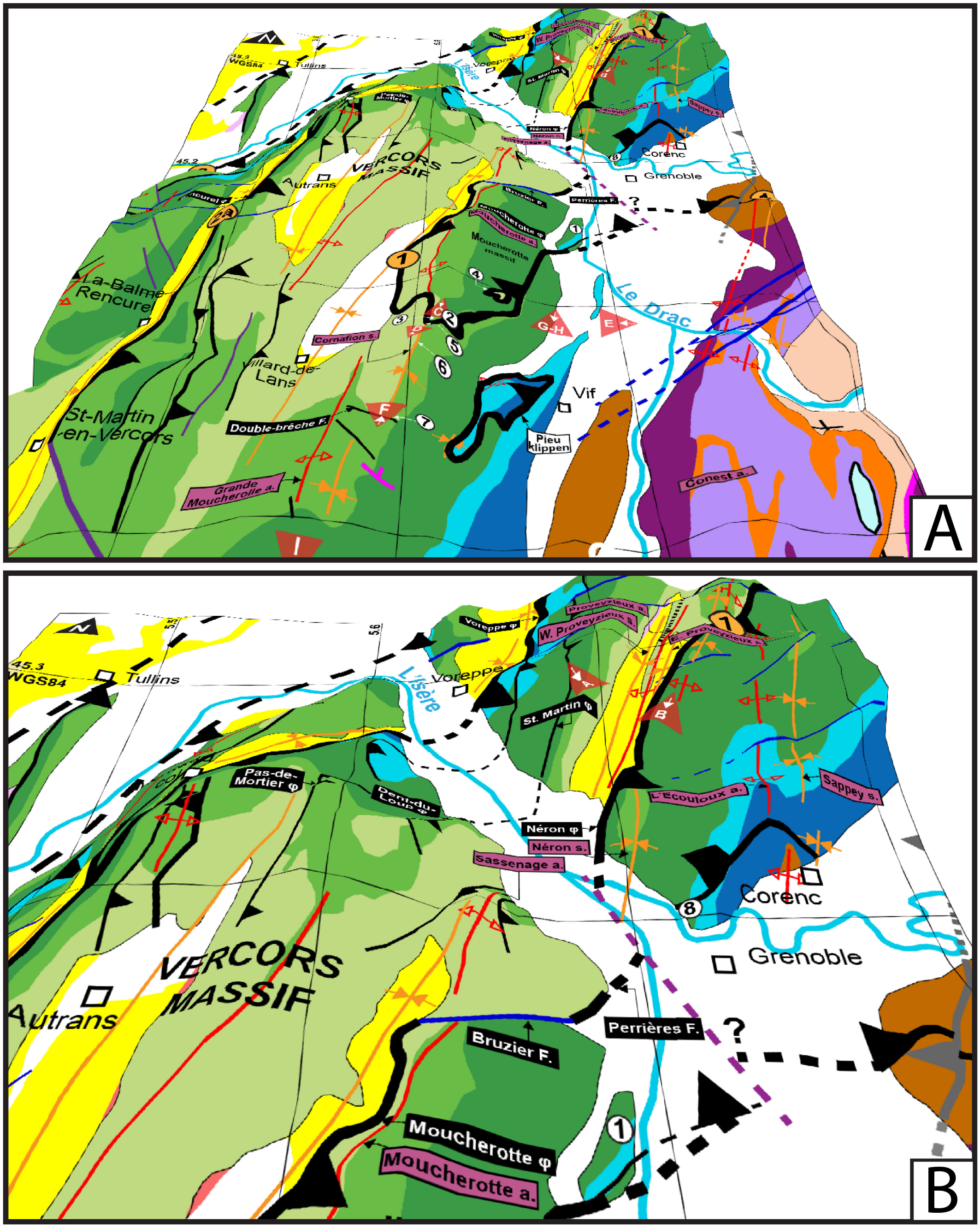

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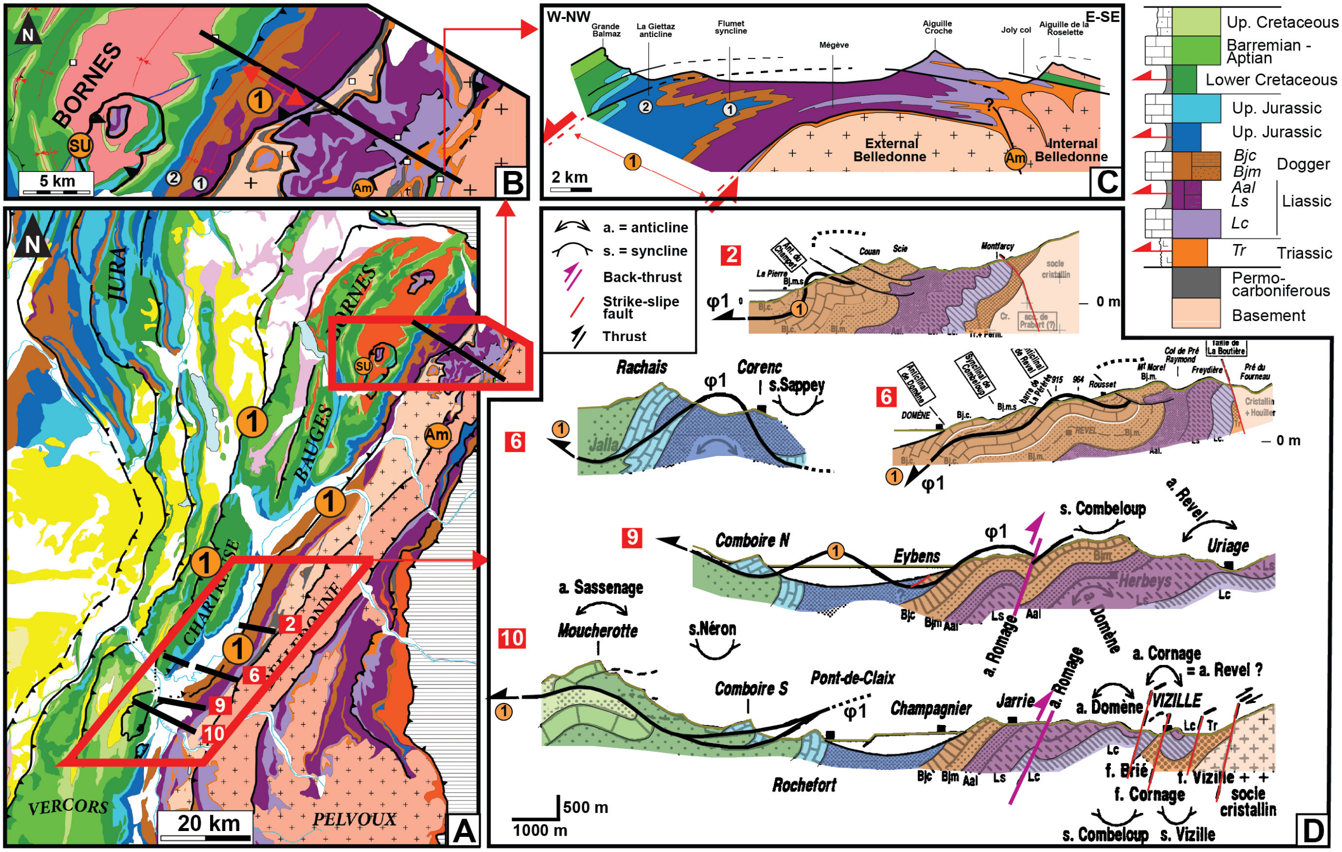

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Table S1: Magnetostratigraphy

Z (m)	Id	Treatement	Statistics	Demag field	Demag steps	Declination (°)	Inclination (°)	MAD (°)	Reversal angle (°)
				[A] Forezan section					
727	FOR01-1	Therm+AF	DirOKir	200-350	4	71.6	-3.7	7.5	85.3
732	FOR02FD	Therm+AF	DirOKir	010-035	5	206.7	-35.7	7.9	147.6
738	FOR03-1	Therm+AF	DirOKir	200-350	4	130.6	-37.9	4	141.1
742	FOR04FD	Therm+AF	DirOKir	200-300	3	176.9	-29.7	3.4	145.8
752	FOR05-1	Therm+AF	DirOKir	250-015	6	140.9	-44.7	13.9	151.0
756	FOR06-1	Therm+AF	Dir Kir	250-030	5	214.9	-19.7	16.3	130.0
762	FOR07FD	Therm+AF	Dir Kir	300-400	5	150.4	-38.3	14.6	149.0
762	FOR07-1	Therm+AF	Dir Kir	005-060	5	-27.9	-27.5	8.6	93.9
763	FOR08-1	Therm+AF	Dir Kir	300-030	5	176	-45.2	25	161.3
763	FOR10-1	Therm+AF	Dir Kir	250-025	6	197.9	16.2	20.1	98.8
767	FOR11	Therm+AF	Dir Kir	010-050	7	164	-21.5	14.1	136.4
805	FOR12-1	Therm+AF	DirOKir	030-040	3	148.4	-25.2	16.3	136.2
805	FOR12-2	Therm+AF	DirOKir	020-030	3	136.8	-5.7	10.7	114.2
853	FOR13-1	Therm+AF	DirOKir	005-040	8	151.1	-18.9	4.3	131.0
853	FOR13-2	Therm+AF	DirOKir	020-030	3	143.6	-32.9	3.3	141.8
860	FOR14FD	Therm+AF	DirOKir	250-610	11	206.3	-11.6	3.1	124.6
860	FOR14-1	Therm+AF	Dir Kir	300-130	21	191.9	-32.2	4.6	147.5
890	FOR15-1	Therm+AF	DirOKir	200-040	7	191.5	-46.1	9.9	161.2
903	FOR16FD	Therm+AF	Dir Kir	250-400	6	126.1	-66.8	9.9	158.0
903	FOR16	Therm+AF	DirOKir	030-060	5	212.8	-38.3	13	147.9
904	FOR17-1	Therm+AF	Dir Kir	250-090	6	181.6	-36.3	12.9	152.5
904	FOR17-2	Therm+AF	DirOKir	150-010	4	218	-72	6.4	163.9
907	FOR18-1	Therm+AF	Dir Kir	250-030	7	197.6	-10.9	12.5	125.7
918	FOR19-1	Therm+AF	DirOKir	300-120	17	205.9	-39.8	3.7	151.6
920	FOR20AFD	Therm+AF	Dir Kir	250-425	6	158.5	-16.6	6.2	130.5
920	FOR20BF	Therm+AF	Dir Kir	250-375	4	164.7	-37.3	6.6	151.9
920	FOR20-1	Therm+AF	Dir Kir	250-025	8	162.3	8.1	13.1	106.9
928	FOR21-1	Therm+AF	DirOKir	200-040	9	-74.6	-25.9	15.6	106.6
937	FOR22	Therm+AF	DirOKir	250-035	6	173.8	-19.1	3.5	135.1
945	FOR23-1	Therm+AF	Dir Kir	250-080	13	165.6	-11.2	11.8	126.4
958	FOR24	Therm+AF	DirOKir	000-020	5	126.5	-61.1	8	155.8
971	FOR25-1	Therm+AF	Dir Kir	250-080	8	191.5	-46.8	9.9	161.8
980	FOR26-1	Therm+AF	DirOKir	005-015	3	111.2	-22.3	6.3	119.2

Z (m)	Id	Treatement	Statistics	Demag field	Demag steps	Declination (°)	Inclination (°)	MAD (°)	Reversal angle (°)
[B] Grésy-sur-aix section									
403	GRE02-1	AF	DirOKir	055-070	3	86.9	-38.5	12.3	122.7
405	GRE03-1	AF	DirOKir	045-050	2	125.9	-40	18	140.8
452	GRE04	Thermal+AF	Dir Kir	015-025	3	7.9	7.8	9	56.3
454	GRE05-1	Thermal+AF	DirOKir	150-020	6	19.1	-46.4	21.8	111.2
457	GRE06	Thermal+AF	DirOKir	020-025	2	29.9	60.1	7.8	14.4
457	GRE06FD	Thermal	Dir Kir	400-580	4	108.3	-24.6	17.7	120.0
460	GRE07-1	Thermal+AF	DirOKir	050-065	4	78.5	18.1	15.8	68.8
498	GRE08-1	Thermal+AF	Dir Kir	200-400	5	163.4	-13	7.1	127.9
505	GRE09-1	AF	DirOKir	000-025	3	226.1	-40.5	30.8	144.6
508	GRE11-2	Thermal+AF	DirOKir	010-030	3	144.1	-26.9	6.4	136.5
508	GRE11-3	Thermal+AF	Dir Kir	020-030	3	104.5	-18	20.5	112.5
565	GRE12	Thermal+AF	DirOKir	020-030	3	258	-21	13.4	114.0
568	GRE13-2	Thermal+AF	Dir Kir	100-010	5	-30.4	47	9.8	23.7
570	GRE14-1	Thermal+AF	DirOKir	025-050	5	131.2	24.1	24.5	84.2
602	GRE15	AF	DirOKir	020-030	4	158.6	49.2	4.8	65.8
607	GRE16-1	Thermal+AF	DirOKir	010-045	5	128.8	-44.1	4.9	145.4
613	GRE17	AF	DirOKir	036-050	4	-71.5	-25.5	11	105.1
621	GRE18	Thermal+AF	DirOKir	000-025	3	294.6	-22.2	9.4	99.7
621.5	GRE19	AF	DirOKir	060-063	2	188.4	43.6	1.9	72.4
623	GRE20-1	Thermal+AF	DirOKir	015-030	4	-40.9	-31.5	12	100.6
711	GRE25	AF	DirOKir	038-064	8	62.4	19.9	10.8	60.1
713	GRE26	Thermal	Dir Kir	300-475	5	201.2	-58	23.7	168.2
728	GRE27-1	Thermal	DirOKir	250-300	2	175.1	-11.7	9	127.8
772	GRE28	AF	DirOKir	018-068	8	9.3	51	10.4	13.7
778	GRE30-1	Thermal	DirOKir	300-350	2	242.8	-12.6	12.4	113.1
802	GRE39-1	Thermal+AF	DirOKir	005-025	5	170.7	-62	8.1	175.4
810	GRE41	Thermal	DirOKir	200-250	2	-56.1	-21.1	1.3	95.4
818	GRE42-1	Thermal	DirOKir	200-350	2	201.9	2.3	4.2	111.9
830	GRE44-1	Thermal	DirOKir	150-300	4	150.4	-29	7.4	140.4
834	GRE45-1	Thermal+AF	DirOKir	100-030	5	53.7	-35.9	10.9	108.3
855	GRE48-1	Thermal+AF	DirOKir	150-030	4	184.2	-47.7	8.5	163.7
857	GRE49	Thermal	DirOKir	200-350	4	183.8	-15.2	13.4	131.3
865	GRE52-1	Thermal+AF	DirOKir	300-350	2	205.2	-38.8	0.4	150.9
868	GRE54	AF	Dir Kir	017-035	7	53.8	29	23.7	48.5
870	GRE55	AF	Dir Kir	026-090	28	54.6	-7.5	9.7	82.2
887	GRE57	Thermal+AF	DirOKir	000-030	5	212.4	-25.9	16.2	136.7
888	GRE58	AF	DirOKir	020-027	4	119	-21.9	6.4	122.2

893	GRE59	Thermal+AF	DirOKir	015-025	3	88.9	11.4	10.5	79.3
898	GRE60-1	Thermal+AF	DirOKir	030-080	6	12	-27.9	13.6	92.2
901	GRE61-1	Thermal+AF	DirOKir	300-035	8	-27.6	-61	5.4	126.5
919	GRE62-1	Thermal	DirOKir	250-400	3	128.1	-58	10.7	154.9
922	GRE63-1	AF	DirOKir	040-100	4	28.6	3.9	16.2	63.4
922	GRE63-2	Thermal+AF	Dir Kir	020-060	12	8.2	18.9	14	45.2
922.5	GRE64	AF	Dir Kir	027-052	5	229.3	-59.1	18	156.6
925	GRE65-1	Thermal+AF	DirOKir	200-025	7	75.2	-10.4	5.9	92.9
938	GRE35	Thermal+AF	DirOKir	020-030	2	215.6	31.6	6.6	80.5
942	GRE32	Thermal+AF	DirOKir	250-015	3	110.7	-29	18.7	124.9
945	GRE33	AF	DirOKir	042-045	2	228.5	-6.3	6.3	112.9
950	GRE34	Thermal	DirOKir	150-300	4	200.4	63.3	8.6	52.0
982	GRE36	Thermal+AF	DirOKir	000-100	13	170.4	-36.9	3.3	152.5
983	GRE37	Thermal+AF	DirOKir	150-300	4	192.6	-35.8	3.7	151.0

Table S1: Paleomagnetic results (A and B for the Forezan and Grésy sections) with sample location in the section, sample name, demagnetization treatment, statistics of PCA or PCA anchored to the origin (Kirschvink, 1980), demagnetization field (in black for AF and grey for thermal) and steps used for statistical calculations, declination and inclination of the characteristic Remanent Magnetization, Maximal Angle Deviation and reversal angle.

Table S2: Chemostratigraphy

Zone// Locality	Z (m) ; e=elevation (m a.s.l.)	Sample name	Lat.	Long.	$^{87}Sr/^{86}Sr$	±	Mean age (Ma)	±	% $CaCO_3$	$\delta^{13}C_{V\text{-PDB}}$	±	$\delta^{18}O_{V\text{-PDB}}$	±
A// 1	20*	GE4	46.044659	5.811738	0.708487	0.000040	**19.00**	**0.55**	64.68	-1.39	0.03	-5.69	0.04
	8*	GE1	46.044688	5.811436	0.708421	0.000041	**20.00**	**0.75**	57.02	-2.08	0.02	-6.77	0.03
	7*	GE3b	46.044698	5.811331	0.708399	0.000043	**20.38**	**0.82**	84.68	-0.87	0.01	-1.53	0.02
	5*	GE9	46.04516	5.811855	0.708356	0.000006	**21.15**	**0.15**	100.22	-3.16	0.01	-3.67	0.02
	3	GE8	46.045133	5.811817	0.708252	0.000005	23.03	0.17	97.19	-5.57	0.02	-4.46	0.02
	4*	GE12	46.0497	5.814697	0.708345	0.000006	**21.35**	**0.15**	90.88	-3.64	0.03	-3.73	0.03
A// 2	38	Vdf2b	45.934869	5.847306	0.708420	0.000020	**19.95**	**0.40**	98.95	-2.19	0.01	-0.38	0.02
	27*	2Vdf1	45.934671	5.847678	0.708473	0.000021	19.15	0.30	101.48	-2.09	0.01	-4.22	0.01
	Dupl.	2Vdf1b			0.708407	0.000016	**20.20**	**0.35**	94.65	-0.70	0.01	-3.51	0.02
A// 3	25*	ALC3	45.819964	6.028747	0.708418	0.000016	19.55	0.40	91.72	-1.32	0.00	-4.34	0.02
	Dupl.	ALC3b			0.708418	0.000016	**19.98**	**0.33**	97.36	-1.22	0.01	-4.85	0.02
	14*	ALC3b	45.819948	6.028854	0.708388	0.000017	**20.55**	**0.40**	103.54	-0.27	0.02	-2.70	0.02
A// 4	937*	5GRE1	45.740527	5.970701	0.708635	0.000011	**17.20**	**0.15**	98.13	0.46	0.02	-0.34	0.03
	925*	3GRE2	45.738774	5.969089	0.708611	0.000016	**17.50**	**0.20**	93.06	-0.05	0.01	-0.21	0.01
	908*	GRE4	45.736996	5.967655	0.708618	0.000017	**17.43**	**0.23**	63.37	0.36	0.02	-0.66	0.02
	872*	2GRE26	45.734728	5.965678	0.708627	0.000022	**17.33**	**0.28**	85.93	-0.40	0.01	-1.49	0.02
	5*	GRE6	45.725952	5.935587	0.708381	0.000029	**20.65**	**0.60**	99.02	-1.33	0.01	-4.24	0.03
	Dupl.	GRE6b			0.708467	0.000016	19.25	0.25	99.35	-2.20	0.01	-5.85	0.02
	1*	3GRE1	45.725956	5.93541	0.708338	0.000017	**21.45**	**0.30**	91.75	0.79	0.02	-0.16	0.02
A// 5	990*	2FOR3	45.555797	5.867708	0.708696	0.000021	**16.30**	**0.30**	93.94	-1.01	0.02	-1.21	0.02

	965*	2FOR1	45.559248	5.871866	0.708705	0.000020	**16.25**	**0.30**	91.53	-2.32	0.01	-3.40	0.02
	Dupl.	2FOR1b			0.708838	0.000016	11.95	0.90	99.38	-4.25	0.01	-4.79	0.02
	965*	FOR6	45.554873	5.863917	0.708641	0.000021	**17.13**	**0.27**	83.78	0.68	0.02	-2.01	0.03
	707*	FORW1	45.552427	5.858426	0.708633	0.000021	**17.23**	**0.28**	92.81	0.63	0.02	-1.05	0.03
	707*	FOR10a	45.558547	5.87551	0.708648	0.000040	**17.03**	**0.53**	96.56	-3.66	0.02	-0.56	0.03
	175*	FOR9d	45.557722	5.881748	0.708575	0.000029	**17.95**	**0.35**	71.81	0.39	0.01	-2.42	0.02
	173*	4FOR1	45.557744	5.88207	0.708576	0.000020	**17.95**	**0.25**	81.07	0.32	0.01	-2.71	0.03
A// 5b	20*	SUP1	45.571086	5.837066	0.708419	0.000015	**19.98**	**0.33**	98.10	-4.28	0.02	-0.79	0.02
	18*	SUP2	45.583325	5.833628	0.708402	0.000018	**20.30**	**0.40**	99.81	-1.46	0.03	-2.18	0.03
A// 6	65*	SJC4	45.464902	5.821749	0.708545	0.000011	**18.30**	**0.15**	94.63	-0.48	0.02	-2.95	0.01
	39*	SJC3	45.464737	5.822243	0.708416	0.000013	**20.03**	**0.28**	101.27	-0.70	0.02	-1.47	0.02
	26*	SJC1	45.464665	5.822412	0.708361	0.000017	**21.05**	**0.35**	77.22	-0.18	0.01	-2.29	0.02
A// 7	34	Scouz4	45.435249	5.815086	0.708461	0.000040	19.40	0.60	99.37	-0.38	0.01	-4.25	0.03
	Dupl.	Scouz4b			0.708459	0.000019	**19.35**	**0.30**	99.44	-0.26	0.01	-5.40	0.02
A// 15	10*	2AI1	45.546041	5.820634	0.708395	0.000021	**20.40**	**0.45**	148.16	-0.20	0.03	-1.87	0.01
	10*	AIG2	45.546041	5.820634	0.708347	0.000026	**21.28**	**0.53**	97.99	-0.01	0.02	-2.13	0.02
A// A1	~10	S55	46.309153	5.949013	0.708379	0.000020	**20.70**	**0.45**	98.19	-0.19	0.01	-2.29	0.02
A// A5	~50 +/- 20	TRE1	45.694009	5.898134	0.708417	0.000112	**20.25**	**1.80**	54.31	-0.43	0.05	-4.97	0.05
B// 8	~85	Spro13	45.316045	5.736087	0.708577	0.000016	**17.95**	**0.20**	?	?	?	?	?
	75	PROW1	45.326768	5.743066	0.708514	0.000024	**18.65**	**0.30**	88.96	0.18	0.01	-2.30	0.01
B// 9	9	S13	45.27207	5.717649	0.708511	0.000020	**18.70**	**0.25**	91.98	-0.60	0.01	-3.37	0.02
B// 10	28	PROW2	45.248726	5.686425	0.708519	0.000021	**18.60**	**0.25**	86.47	-0.12	0.01	-2.26	0.01
	12	S12a	45.248622	5.686038	0.708474	0.000017	**19.15**	**0.25**	86.79	0.44	0.01	-2.47	0.02
	8*	2PRO1	45.244397	5.684753	0.708436	0.000025	**19.70**	**0.45**	94.90	-0.66	0.02	-3.36	0.02
B// 12	59	LA1	45.158352	5.619567	0.708395	0.000004	**20.25**	**0.15**	43.05	-1.22	0.03	-6.55	0.08
B// B2	e=1157	PLA1	45.283554	5.727017	0.708425	0.000050	19.98	0.88	pollution?	pollution	268.29	pollution	1356.31

B// B3	e=689	LG1	45.276945	5.705126	0.708517	0.000041	**18.65**	**0.50**	48.11	0.04	0.02	-6.49	0.02
C// 13	228*	2LOI8	45.649776	5.732652	0.708690	0.000023	16.45	0.35	82.71	-5.49	0.01	-3.33	0.01
	228*	LOI9	45.649776	5.732652	0.708712	0.000028	**16.15**	**0.40**	104.74	-3.77	0.02	-2.91	0.03
	218.5*	LOI8	45.64957	5.732135	0.708671	0.000005	**16.73**	**0.08**	98.74	-4.72	0.01	-5.63	0.02
	210*	2LOI7	45.649492	5.732041	0.708692	0.000021	16.45	0.30	104.07	-6.28	0.02	-2.94	0.02
	208*	2LOI6	45.649393	5.731447	0.708687	0.000025	16.50	0.35	98.99	-6.64	0.02	-3.07	0.02
	17*	LOI5	45.646419	5.725466	0.708586	0.000043	**17.83**	**0.53**	69.97	0.20	0.02	-1.34	0.02
	15*	LOI6	45.646396	5.725428	0.708610	0.000028	**17.53**	**0.38**	87.84	0.01	0.02	-3.75	0.03
	13*	2LOI2	45.646393	5.725264	0.708615	0.000024	**17.45**	**0.30**	60.40	0.00	0.01	-1.01	0.02
C// 14	19*	DUL2	45.538171	5.739849	0.708573	0.000025	**17.98**	**0.28**	111.59	0.11	0.01	-1.18	0.03
C// 16	92*	CH4e	45.472272	5.740843	0.708653	0.000023	16.95	0.30	88.58	-15.38	0.01	-0.52	0.02
C// 17	0.1*	ECH2	45.436423	5.75495	0.708563	0.000025	**18.10**	**0.30**	95.09	-0.02	0.02	-3.09	0.02
	0.1*	ECH1	45.436423	5.75495	0.708536	0.000024	**18.40**	**0.30**	84.37	-0.19	0.02	-2.20	0.02
C// 19	264	FOUR2	45.380068	5.743982	0.708607	0.000029	**17.58**	**0.38**	88.01	-0.66	0.02	-1.36	0.02
	10	FOUR 2f	45.37647	5.746103	0.708541	0.000021	**18.35**	**0.25**	94.43	0.38	0.01	-4.11	0.02
C// 26	31	SMR3	45.608863	5.693207	0.708601	0.000046	**17.63**	**0.57**	82.93	-0.74	0.02	-2.14	0.02
	18	SMR1	45.608288	5.695065	0.708572	0.000036	**17.98**	**0.42**	86.91	-0.14	0.02	-1.96	0.02
C// 27	22	SMA3	45.599657	5.719722	0.708592	0.000025	**17.73**	**0.33**	95.33	0.30	0.01	-1.12	0.02
	18.5	SMA2	45.600529	5.715867	0.708591	0.000046	**17.73**	**0.58**	98.38	0.35	0.02	-6.44	0.02
	13	SMA1	45.602036	5.713924	0.708585	0.000017	**17.85**	**0.20**	82.22	0.20	0.02	-3.01	0.02
	12	SMA4	45.601012	5.719301	0.708549	0.000015	**18.28**	**0.17**	89.71	0.11	0.01	-2.50	0.01
C// 28	27	2CHA2	45.475578	5.715016	0.708635	0.000027	**17.20**	**0.35**	93.92	0.30	0.01	-1.61	0.01
	18	CH3	45.487805	5.721297	0.708611	0.000029	**17.53**	**0.38**	93.48	-1.31	0.02	-2.02	0.03
	8	S44-45	45.487513	5.719013	0.708480	0.000017	**19.08**	**0.23**	93.00	-0.68	0.05	-2.59	0.05
	1	2CHA1	45.484589	5.71556	0.707538	0.000017	78.15		102.75	-0.82	0.01	-3.85	0.02
	1	S44	45.486894	5.719315	0.707456	0.000018	82.70		56.17	0.63	0.03	-2.14	0.03

C// C3	e=314*	ME1	45.779875	5.714786	0.708566	0.000027	**18.08**	**0.32**	98.80	-0.18	0.01	-1.69	0.01
C// C1	e=1246	S54a	46.280278	5.856558			74.90		93.98	-3.23	0.03	-5.99	0.03
	Dupl.	S54b	46.280278	5.856558			85.40		49.47	1.55	0.02	-3.07	0.03
C// C11	e=340	BRI1	45.533262	5.748309	0.708514	0.000065	**18.70**	**0.80**	73.99	0.03	0.02	-4.99	0.04
	e=380	AIG1	45.541711	5.758291	0.708528	0.000022	**18.50**	**0.25**	71.58	-0.23	0.02	-4.89	0.04
C// C12	e=636	BAUCH1	45.480421	5.772074	0.708571	0.000020	**18.00**	**0.25**	129.59	-0.54	0.02	-4.59	0.03
C// C13	80+/-10m	BOB1	45.460511	5.761243	0.708636	0.000021	**17.20**	**0.30**	93.40	-2.66	0.01	-3.54	0.02
C// C14	0-5m	CHAT1	45.43035	5.776594	0.708549	0.000017	**18.25**	**0.20**	64.01	0.08	0.01	-6.07	0.02
D// 22	308	S40a	45.306255	5.665337	0.708615	0.000017	17.48	0.23	96.25	-3.53	0.02	-4.94	0.03
	20*	VORW2a	45.309528	5.641654	0.708628	0.000015	**17.30**	**0.20**	99.70	-4.36	0.02	-3.87	0.02
	20*	VORW2b	45.309528	5.641654	0.708621	0.000017	**17.38**	**0.23**	99.27	-4.31	0.02	-4.11	0.02
	19	VORW3	45.309499	5.641742	0.708577	0.000025	17.95	0.30	97.78	-5.34	0.02	-5.61	0.02
	9*	VORW1	45.309784	5.641278	0.708640	0.000009	**17.13**	**0.13**	87.37	-2.95	0.02	-2.08	0.02
	9	VORW1	45.309784	5.641278	0.708635	0.000026	**17.25**	**0.35**	?	?	?	?	?
D// 23	15	ROI 2B	45.292763	5.646007	0.708665	0.000015	16.80	0.20	99.24	-7.28	0.02	-1.42	0.02
	15*	ROI 2A	45.292763	5.646007	0.708626	0.000017	**17.33**	**0.23**	98.14	-4.19	0.02	-2.83	0.02
	8*	ROI 1	45.29265	5.645351	0.708625	0.000020	**17.33**	**0.28**	99.62	-3.17	0.01	-2.47	0.02
D// D1	0-5	STQL1	45.273458	5.553916	0.708630	0.000036	**17.28**	**0.48**	93.54	-0.17	0.02	-1.66	0.01
E// 24	15	SR1	45.17737	5.497853	0.708610	0.000020	**17.75**	**0.35**	?	?	?	?	?
	9	SR02	45.177441	5.49782	0.708575	0.000008	**18.19**	**0.15**	?	?	?	?	?
	5	SR4(2)	45.17752	5.497818	0.708583	0.000007	**18.08**	**0.15**	?	?	?	?	?
E// 25	153*	2EC9	45.164006	5.494036	0.708685	0.000018	**16.50**	**0.25**	78.66	-0.34	0.02	-4.06	0.01
	14*	ECO1	45.163518	5.489769	0.708628	0.000031	**17.30**	**0.40**	100.15	0.49	0.02	-1.76	0.02
E// 11	10	ME3	45.155937	5.554002	0.708581	0.000025	**17.90**	**0.30**	93.08	-0.88	0.01	-4.14	0.02
	10	ME3b	45.155937	5.554002	0.708566	0.000017	**18.05**	**0.20**					
E// E3	0-5m	AUT1	45.171352	5.548853	0.708603	0.000018	**17.60**	**0.25**	97.38	0.02	0.01	-2.15	0.02
F// 30	e=532	TA1	45.270438	5.346267	0.708760	0.000016	**15.43**	**0.27**	88.88	-2.83	0.01	-8.76	0.02

F// F9	e=351	ALC1	45.231009	5.455807	0.708777	0.000016	**15.10**	**0.35**	95.60	-0.91	0.01	-2.09	0.02
G// 32	222	BLU1	45.077025	5.302765	0.708828	0.000022	**12.68**	**1.48**	94.30	-0.91	0.02	-1.76	0.03
	76	LAB1	45.062015	5.291672	0.708787	0.000005	**15.08**	**0.43**					
	15	2PM1a	45.061528	5.279986	0.708636	0.000017	**17.18**	**0.23**	97.54	1.22	0.01	-0.72	0.02
	15	PM1	45.061528	5.279986	0.708501	0.000040	**18.85**	**0.50**	65.45	0.02	0.03	-5.12	0.02
G// 34	61*	LMF3	45.036525	5.277152	0.708693	0.000044	**16.40**	**0.60**	97.27	0.51	0.02	-1.85	0.02
	22*	LMF6b	45.032675	5.272878	0.708605	0.000020	**17.60**	**0.25**	70.33	0.25	0.01	-1.73	0.02
	15*	LMF7	45.032856	5.273061	0.708631	0.000043	**17.25**	**0.55**	68.32	0.41	0.01	-0.20	0.02
	1	LMF4	45.033255	5.271637	0.708592	0.000022	17.75	0.30	85.70	0.18	0.02	-0.96	0.01
	Dupl.	LMF4b			0.708610	0.000018	**17.53**	**0.23**	88.27	0.44	0.02	-1.25	0.02
G// 34b	18	SJR2	45.022723	5.289174	0.708723	0.000017	**15.98**	**0.23**	96.73	-1.02	0.03	0.22	0.03
	18	SROY18	45.024022	5.289132	0.708686	0.000008	**16.57**	**0.25**	?	?	?	?	?
	10	SJR1	45.024022	5.289132	0.708671	0.000017	**16.70**	**0.25**	97.52	-4.58	0.01	-1.93	0.03
G// 35	5	ORI2	44.992483	5.270015	0.708608	0.000016	**17.55**	**0.20**	98.25	1.69	0.02	0.74	0.03
H// H3	E=243	PB2	45.542244	5.681604	0.708275	0.000026	22.60	0.55	93.49	-6.41	0.01	-1.91	0.02
	Dupl.	PB2b			0.708290	0.000023	22.30	0.45					
I// I2	2.5	JU4	46.050342	5.406278	0.708872	0.000016	**10.40**	**0.65**	98.27	-1.58	0.01	-3.48	0.01
	2.5	LD	46.050333	5.406277	0.708860	0.000016	**10.90**	**0.70**	141.16	2.15	0.02	0.32	0.02
I// BLYES-101 (well-log)	-185	BLY185	45.839639	5.248694	0.708833	0.000017	**12.18**	**0.98**	99.64	-0.57	0.02	-0.77	0.02
	Dupl.	BLY185b							94.11	-0.52	0.02	-0.94	0.02
	-200	BLY200	45.839639	5.248694	0.708847	0.000036	11.73	1.78	88.19	-0.27	0.02	-1.16	0.02
	Dupl.	BLY200b			0.708850	0.000029	**11.45**	**1.40**	93.39	-0.20	0.02	-0.96	0.03
	-230	BLY230	45.839639	5.248694	0.708841	0.000015	**11.78**	**0.88**	97.13	0.11	0.01	-0.86	0.01
	Dupl.	BLY230b							96.12	0.24	0.01	-0.62	0.03
I// I14		LE	45.70188	4.85472	0.708841	0.000016	**11.80**	**0.90**	192.04	-4.61	0.02	-5.10	0.02
	Dupl.	LEb							94.75	-4.72	0.02	-5.31	0.01
		LF	45.70188	4.85472	0.708914	0.000040	8.58	1.78	120.78	-2.33	0.02	-5.05	0.01

	Dupl.	LFb			0.708901	0.000029	**9.10**	**1.30**					
I// I10	e= ~180	LH	45.771105	4.836536	0.708883	0.000017	**10.03**	**0.63**	128.82	0.61	0.02	-2.12	0.02
	e= ~180	LI	45.771105	4.836536	0.708845	0.000019	**11.63**	**1.03**	100.25	-0.27	0.02	-1.62	0.02
I// 13	e= ~180	LJ	45.765734	4.826936	0.708863	0.000021	**10.80**	**0.90**	101.64	0.16	0.01	-1.41	0.02
	e= ~180	LK	45.765734	4.826936	0.708867	0.000022	**10.65**	**0.90**	91.36	-3.33	0.01	-3.27	0.02
I// I12	e= ~185	LM	45.770011	4.829643	0.708877	0.000017	**10.25**	**0.65**	121.37	0.45	0.01	-0.99	0.02
	e= ~185	LL	45.770011	4.829643	0.708913	0.000018	**8.70**	**0.95**	98.04	-0.39	0.01	-4.39	0.02
	e= ~185	LN	45.770011	4.829643	0.708872	0.000019	**10.45**	**0.75**	96.23	0.21	0.01	-0.46	0.02
I// I18	e= 230	LG	45.565257 ?	5.001824 ?	0.708892	0.000046	9.45	2.10	95.56	-2.41	0.01	-4.64	0.03
	Dupl.1	LGb			0.708903	0.000019	**9.13**	**0.88**	96.55	-2.36	0.01	-4.30	0.02
	Dupl.2	LGc							97.79	-2.34	0.01	-4.48	0.02
I// I19	e= ~233	GUI1	45.536745	4.887846	0.708853	0.000020	**11.25**	**1.00**	81.88	-2.46	0.02	-3.62	0.03
I// I19b	e= ~250	LA	45.539003	4.91077	0.708910	0.000013	8.93	0.68	88.68	-6.04	0.02	-6.54	0.02
J// J6 - niv 1	e= ~220-260	LB	45.360033	4.864411	0.708815	0.000013	13.40	1.10	74.57	-6.05	0.01	-6.13	0.02
	Dupl.	LBb							69.98	-5.93	0.02	-6.35	0.01
J// J6 - niv 4	e= ~220-260	LC	45.360033	4.864411	0.708843	0.000014	11.70	0.80	93.60	-5.65	0.01	-5.90	0.01
	Dupl.1	LCb							94.41	-5.69	0.02	-5.67	0.02
	Dupl.2	LCc							98.41	-5.63	0.01	-5.69	0.02
L// L4	e= 257	CREST 4	44.693664	5.006701	0.708673	0.000018	**16.70**	**0.25**	100.08	-2.05	0.01	-1.40	0.03
	e= 254	CREST 7	44.692545	5.005975	0.708668	0.000017	**16.75**	**0.25**	98.44	-2.15	0.02	-2.99	0.02
L// L5	e= 349	CREST 10	44.685163	4.989701	0.708610	0.000019	**17.53**	**0.23**	98.97	-0.27	0.01	-1.63	0.02

Table S2: $^{87}Sr/^{86}Sr$, $\delta^{18}O$ and $\delta^{13}C$ analyses and corresponding $^{87}Sr/^{86}Sr$ dating. Ages (Ma) are listed in the "mean age" column and appear in bold red when they are included in the stratigraphic study. "±" indicates the uncertainty. The background coloured lines correspond to excluded samples: Pink for samples with high diagenetic effect ($\delta^{13}C$<-5‰), green for the reworked samples. The stratigraphic position (Z) or the elevation (e) of the samples framed in colour refer to the duplicated (blue) and bulk (beige) samples. See Fig. 3 for samples locations and appendix B for the stratigraphic context. Samples marked with asterisks (*) represent the ages already published in Kalifi et al. (2020), completed here with $\delta^{18}O$ and $\delta^{13}C$ analyses.

Table S3: Nannoplankton biostratigraphy

Zone// Log	Z (m); e= elevation (m a.s.l)	NANNOPLANKTON BIOSTRATIGRAPHY	Interpretations
A// 3	620	Miocene taxa: *Sphenolithus belemnos, Coccolithus pelagicus, Sphenolitus moriformis, Cyclicargolithus floridanus, Helicosphaera* sp., *Helicosphaera euphratis* (reworked?), *Reticulofenestra minuta*. Reworked: Paleogene to Cretaceous nannoplankton (139/177)	**NN3** **Burdigalian** **18-19 Ma**
A// 4	1060	Miocene taxa: *Cy. floridanus, C. pelagicus, Sphenolithus* sp. Reworked: Paleogene to Cretaceous (70/94)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
	1045	Miocene taxa: absent Reworked: One Cretaceous taxa	Undetermined
	8	Miocene taxa: *Cy. floridanus*, *C. pelagicus, Sphenolithus* sp. Reworked: Paleogene to Cretaceous nannoplankton (70/96)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
A// 5	980	Miocene taxa: absent Reworked: *Quadrum gartneri, Micula decussata* (Cretaceous) and *Watznaueria britannica* (Jurassic) (4/4)	Undetermined
A// 7	141.5	Miocene taxa: *Helicosphaera ampliaperta*, *H. scissura* Reworked: *R. bisecta, R. umbilica, H. compacta* (Olig.-Eoc.) and *W. barnesiae, Micula decussata* (Cretaceous)	**NN2 - NN4** **Aquitanian to Langhian** **(20.1-14.91 Ma)**
	65	Miocene taxa: *Sphenolitus heteromorphus, H. ampliaperta* Reworked: *R. bisecta, Ericsonia. formosa* (Paleogene) to Upper Cretaceous *(Aspidolithus parcus parcus, A. parcus constrictus*)	**NN4** **Late Burd. - Langhian** **17.95-14.9Ma**
	6.5	Miocene taxa: *Helicosphaera ampliaperta* Reworked: *R. bisecta, R. umbilica* (Olig.-Eoc.) to *W. barnesiae, W. britannica* (Jurassic and Cretaceous)	**NN2 - NN4** **Aquitanian to Langhian** **20.1-14.91Ma**

B// 8	16.5	Miocene taxa: absent Reworked: *E. formosa*, *R. bisecta* (Olig.-Eoc.), *Fasciculithus tympaniformis* (Pal.), and *W. barnesiae, M. decussata, Nannoconus truittii truittii, A. parcus parcus* (Cret.)	Undetermined
B// B2		Miocene taxa: absent	Undetermined
B// B3	112	Miocene taxa: absent Reworked: *E. formosa*, *R. umbilica* (Olig.-Eoc.)	Undetermined
	5	Miocene taxa: absent Reworked: *E. formosa*, *R. bisecta* (Olig.-Eoc.), *W. barnesiae, M. decussata* (Cretaceous)	Undetermined
C// 13	620	Miocene taxa: absent Reworked: Paleogene and Cretacaceous nannoplankton (6/6)	Undetermined
	590	Miocene taxa: *Cy. floridanus, C. pelagicus, Discoaster* sp., Reworked: Eoc. and Upper Cretaceous nannoplankton (50/74)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
	580	Miocene: *Cy. floridanus, C. pelagicus, Discoaster* sp., *H. carteri*. Reworked: Eoc. and Upper Cretaceous nannoplankton (69/110).	
C// 16	196	Miocene taxa: absent Reworked: *R. bisecta*, *R. umbilica* (Olig.-Eoc.) to *W. barnesiae, W. britannica* (Jur. to Cret.)	Undetermined
	86	Miocene taxa: absent Reworked: *R. hillae* (Olig.-Eoc.) and *W. barnesiae* (Jur. to Cret.)	Undetermined
C// 18	170	Miocene taxa: *Sphenolitus heteromorphus* Reworked: abundant *Reinhardtites levis, A. cymbiformis, Broinsonia. matalosa* (upper Cretaceous) and *R. umbilica*, *Ch. solitus* (Eoc.)	**NN4 - NN5** **Burd. to Serravalian** **18-13.5 Ma**
	129	Miocene taxa: absent	**Undetermined**
	125	Miocene taxa: *S. heteromorphus, Cy. floridanus, C. pelagicus*. Reworked: *R. bisecta, E. formosa* (Olig.-Eoc.) and *W. barnesiae, Ark. cymbiformis* (Cret.)	**NN4 - NN5** **Burd. to Serravalian** **18-13.5 Ma**

D// 22	255	Miocene taxa: *Cy. floridanus, D. deflandrei, H. stalis, C. pelagicus*. Reworked: Paleogene and Mesozoic nannoplankton (26/51)	**NN6** **13.6-11.9Ma**
	60	Miocene taxa: *C. pelagicus, Cy. floridanus, Helicosphaera sp., Sphenolithus sp., Reticulofenestra lockeri* (reworked?). Reworked: Paleogene and Cretaceous nannoplankton (19/31)	Undetermined
	14	Miocene taxa: absent Reworked: *S. obtusus*, *H. gartneri* (Olig.-Eoc.)	Undetermined
E// 11	20	Miocene taxa: *S. heteromorphus*, *H. scissura* Reworked: Paleogene, Cret. and Upper Jur. nannoplankton (98/159)	**NN4 - NN5** **Burd. to Serravalian** **18-13.5 Ma**
E// 24	212	Miocene taxa: *R. pseudoumbilica, Cy. floridanus, C. pelagicus, R. pseudoumbilica (small), Helicosphaera carteri.* Reworked: Paleogene and Cret. nannoplankton (15/25)	**NN4-NN6** **Late Burd. to Serrav.** **18-11.8 Ma**
	180	Miocene taxa: *R. pseudoumbilica, Cy. floridanus, C. pelagicus, R. pseudoumbilica (small), H. carteri, Sphenolithus* sp. Reworked: Paleogene and Cretaceous nannoplankton (35/92)	**NN4-NN6** **Late Burd. to Serrav.** **18-11.8 Ma**
	165	Miocene taxa: *R. pseudoumbilica, Cy. floridanus, C. pelagicus* Reworked: Paleogene and Cretaceous nannoplankton (6/11)	**NN4-NN6** **18-11.8 Ma**
	117	Miocene taxa: Absent	Undetermined
	102	Miocene taxa: Absent	Undetermined
	16.5	Miocene taxa: Absent Reworked: *R. bisecta* (Olig.-Eoc.) and *W. barnesiae* (Mesozoic)	Undetermined
	16.5	Miocene taxa: *H. obliqua* (?)*, H. carteri* (?) Reworked: *R. umbilica, E. formosa, Towieus* sp. (Eoc.) and *W. barnesiae, Micula decussata* (Cret.)	**NN1?- NN6?** **Aquitanian? to Serrav.?** **23.2-11,8Ma**
	9.5	Miocene taxa: *S. heteromorphus*, *R. pseudoumbilica*, *Cy. floridanus, C. pelagicus*. Reworked: *W. barnesiae, W. britannica* (Mesozoic)	**NN4 - NN5** **Burd. to Serravalian**

			18-13.5 Ma
E// 25	175	Miocene taxa: absent	Undetermined
	158	Miocene taxa: absent	
	108	Miocene taxa: absent Reworked: *M. decussata, Watznaueria* sp. (Paleogene and Cret.)	
	48	Miocene taxa: absent	
	40	Miocene taxa: absent	
F// 29	230	Miocene taxa: *Cy. floridanus* Reworked: Cretaceous nannoplankton (8/9)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
F// 30	95	Miocene taxa: *Cy. floridanus, C. pelagicus* Reworked: Paleogene and Cretaceous (520/529) nannoplankton	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
F// PA-1 (well-log)	e= +363	Miocene taxa : absent Reworked: *W. britannica, W. barnesiae*, *W. fossacincta, Zygodiscus embergeri* (Jur. to Cret.)	Undetermined
	e= +253	Miocene taxa : absent Reworked: *W. britannica* (Jur. to Cret.)	Undetermined
	e= -57	Miocene taxa : absent Reworked: *W. britannica* (Jur. to Cret.)	Undetermined
	e= -158	Miocene taxa : *C. pelagicus* Reworked: *Toweius callosus* (Eoc.) and *W. britannica, W. barnesiae* (Jur. to Cret.)	Undetermined
	e= -168	Miocene taxa : *Cy. floridanus*, *C. pelagicus* Reworked: *T. occulatus* (Eoc.) and *W. britannica, W. barnesiae* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
	e= -173	Miocene taxa : *Cy. floridanus* Reworked: *W. britannica, W. barnesiae, A. cymbiformis* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
	e= -290	Miocene taxa : *C. pelagicus* Reworked: *W. barnesiae* (Jur. to Cret.)	Undetermined

	e= -312	Miocene taxa : absent Reworked: *R. bisecta* (Eoc.) and *W. fossacincta, W. barnesiae* (Jur. to Cret.)	Undetermined
G// 31	27	Miocene taxa: absent	Undetermined
	9.5	Miocene taxa: absent	Undetermined
G// 32	80	Miocene taxa: *S. heteromorphus, Cy. Floridanus, C. pelagicus* Reworked: *H. compacta, R. bisecta, E. formosa* (Paleogene) and *W. barnesiae, Eiffellithus eximius* (Cret.) (520/529)	**NN4 - NN5** **Burd. to Serrav.** **18-13.5 Ma**
	52.5	Miocene taxa: *H. ampliaperta, H. scissura* Reworked: *E. formosa, R. bisecta* (Eoc.) and *W. barnesiae, W. fossacincta* (Jur. to Cret.)	**NN2 - NN4** **Aquitanian to Langhian** **20.1-14.91Ma**
	15	Miocene taxa : *H. ampliaperta, H. scissura* Reworked: *E. formosa, R. hillae* (Eoc.) and *W. barnesae, M. decussata, A. cymbiformis* (Jur. to Cret.)	**NN4 - NN2** **Langhian to Aquitanian** **(14.91-20.1Ma)**
G// 33	294	Miocene taxa: absent	Undetermined
G// 34b	17	Miocene taxa: absent Reworked: *R. bisecta* (Eoc.) and *W. barnesiae* (Mesozoic)	Undetermined
H// BI-1 (well-log)	e= +392.8	Miocene taxa : absent Reworked: *R. dictyoda* (Eoc.) and *Watznaueria sp., W. barnesiae, W. fossacincta* (Jur. to Cret.)	Undetermined
	e= +287.8	Miocene taxa : absent Reworked: *W. Britannica, W. barnesiae, W. fossacincta* (Jur. to Cret.)	Undetermined
	e= +19.8	Miocene taxa : absent Reworked: *W. Britannica, W. barnesiae, W. fossacincta* (Jur. to Cret.)	Undetermined
	e= -0.2	Miocene taxa : *Cy. floridanus* Reworked: *W. britannica, W. barnesiae* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
	e= -60.2	Miocene taxa : absent Reworked: *R. bisecta, E. formosa* (Eoc.) and *Eiffellithus eximius*, *W. barnesiae, W.*	Undetermined

		fossacincta (Jur. to Cret.)	
J// FA-1 (well-log)	e= +35	Miocene taxa: absent Reworked: *R. bisecta* (Eoc.) and *W. barnesiae*, *Eprolithus moratus* (Jur. to Cret.)	Undetermined
	e= -7	Miocene taxa : *Cy. floridanus,* *H. mediterranea* Reworked: *R. bisecta* (Eoc.) and *W. barnesiae*, *W. britannica, W. fossacincta* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6 Eoc. - 11.9 Ma**
	e= -60	Miocene taxa : *Cyclicargolithus floridanus,* *Coccolithus pelagicus, Reticulofenestra pseudoumbilica (small)* Reworked: *R. bisecta, Toweius cf. serotinus* (Eoc.) and *Watznaueria barnesiae*, *W. britannica, W. fossacincta, Arkhangelskiella cymbiformis, Eiffellithus turriseiffelii, Prediscosphaera sp.* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6 Eoc. - 11.9 Ma (Top Serravalian)**
	e= -101	Miocene taxa : *Cy. floridanus,* *C. pelagicus* Reworked: *R. bisecta, Ericonia. formosa, Nannotetrina fulgens, R. umbilica, Tribrachiatus orthostylus* (Eoc.) and *W. barnesiae*, *W. fossacincta, A. cymbiformis, Eprolithus sp., Nannoconus sp.* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6 Eoc. - 11.9 Ma (Top Serravalian)**
	e= -116	Miocene taxa : *S. heteromorphus,* *Cy. floridanus, C. pelagicus, H. mediterranea, H. carteri, R. pseudoumbilica (small)* Reworked: *R. bisecta, Chiasmolithus oamaruensis, C. eopelagicus, Cribrocentrum reticulatum, S. radians* (Eoc.) and *W. britannica, W. barnesiae*, *W. fossacincta, A. cymbiformis, Eprolithus sp., Nannoconus sp., Eiffelithus gorkae, Microrhabdulus decorus, Rhagodiscus asper, Stradneria crenulata, Tranolithus phacelosus* (Jur. to Cret.)	**NN4 - NN5 Burdigalian to Serravalian (18-13.5 Ma)**
J// CHF-1 (well-	e= +511	Miocene taxa : absent Reworked: *W. barnesiae*, *W. britannica, W. fossacincta, A. cymbiformis, Cyclagelosphaera margelii* (Jurassic to Paleocene)	Undetermined
	e= +154	Miocene taxa : *Reticulofenestra pseudoumbilica (small)* Reworked: *W. barnesiae*, *Cyclicargolithus sp.* (Jur. to Cret.)	Undetermined

log)	e= +29	Miocene taxa : *Cy. floridanus* Reworked: *W. barnesiae* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma**
J// BEF-1 (well-log)	e= +182-183	Miocene taxa : *C. pelagicus, Helicopsphaera sp.* Reworked: *R. bisecta, T. callosus* (Eoc.) and *W. britannica, W. barnesiae* (Jur. to Cret.)	Undetermined
	e= +94	Miocene taxa : *Cy. floridanus, Discoaster deflandrei, C. pelagicus, R. pseudoumbilica (small), H. carteri* Reworked: *R. bisecta, E. formosa* (Eoc.) and *M. decussata, H. trabeculatus*, *W. britannica, W. barnesiae, W. fossacincta, R. asper* (Jur. to Cret.)	**NN1 - Top NN6** **Top Chattien - Top Serrav.** **23.1 – 11.9 Ma**
	e= -47-48	Miocene taxa : absent Reworked: *W. britannica, W. barnesiae, W. fossacincta, Cy. margelii* (Jur. to Cret.)	Undetermined
	e= -50	Miocene taxa : *C. pelagicus* Reworked: *W. barnesiae, Cy. margelii* (Jur. to Cret.)	Undetermined
	e= -100-101	Miocene taxa : *Discoaster deflandrei* Reworked: *Eprolithus sp., W. britannica, W. barnesiae* (Jur. to Cret.)	**NP17 (Eoc.) - Top NN7** **Eoc. – 10.8 Ma**
	e= -111-112	Miocene taxa : *Discoaster deflandrei* Reworked: *W. barnesiae, W. fossacincta, Cy. margelii, Zeugrhabdotus diplogrammus* (Jur. to Cret.)	**NP17 (Eoc.) - Top NN7** **Eoc. – 10.8 Ma**
	e= -180	Miocene taxa : *Cy. floridanus, C. pelagicus, Reticulofenestra pseudoumbilica* Reworked: *Chiasmolithus grandis, Ch. solitus, C. eopelagicus, Criobrocentrum reticulatum, Discoaster sp., R. umbilica, T. callosus, Toweius sp.* (Eoc.) and *E. turriseiffelii, M. decussata, Prediscophaera sp., Rhagodiscus achlyostaurion, Stradneria crenulata, Tranolithus phacelosus, W. britannica, W. barnesiae, W. fossacincta, Z. diplogrammus* (Jur. to Cret.)	**NP15 (Eoc.) - Top NN6** **Eoc. - 11.9 Ma (Top Serravalian)**

Table S3: Calcareous nannoplankton biostratigraphic data. Biozonation from Young et al. (2017). In red, the taxa or assembling taxa used for datings. The ages that appear in bold black characters are the ages exploited during the study. See Fig. 3 for locations. Burd.= Burdigalian, Cret.= Cretaceous, Eoc.= Eocene, Jur.= Jurassic, Serrav.= Serravalian.

Table S4: Dinoflagellate cysts biostratigraphy

Zone// Log	Z (m)	DINOFLAGELLATE CYSTS BIOSTRATIGRAPHY	Interpretations
A// 3	620	Miocene taxa: *Systematophora placacantha, Cribroperidinium tenuitabulatum* Reworked: *Deflandrea phosphoritica* (Eocene-Oligocene)	**Eocene - middle D18** **Eocene - 13 Ma**
A// 4	1060	Miocene taxa: *Systematophora placacantha, Classopollis* Reworked: *Cribroperidinium, Cyclonephelium distinctum* (Cretaceous)	**Eocene - middle D18** **Eocene - 13 Ma**
	1045	Reworked: *Classopollis* (Cretaceous)	Undetermined
	8	Miocene taxa: *Systematophora placacantha*, *Cribroperidinium tenuitabulatum* Reworked: *Wetzeliella sp.* (Eocene), *Meiourogonyaulax* (Cretaceous), *G. jurassica* (Jurassic)	**Eocene - middle D18** **Eocene - 13 Ma**
A// 5	980	Reworked: *Enneadocysta* sp. (Early Oligocene-Eocene)*, Classopollis, Quadrum gartneri, Micula decussata* (Cretaceous)	Undetermined
C// 13	580	Miocene taxa: *Systematophora placacantha*, *Cousteaudinium* Reworked: *Apectodinium* sp. (Eocene), *Classopollis* sp.*, Odontochitina* sp.*, Muderongia* sp.*, Kleithriasphaeridium simplicispinum* (Cretaceous), *Gonyaulacysta jurassica* (Jurassic)	**Top D17 - Upper D16** **20,55-14,8Ma**
	590	Miocene taxa: *Reticulatasphaera actinocoronota*, *Cribroperidinium tenuitabulatum* Reworked: *Apectodinium homomorphum* (Eocene)	**Eocene - top D18** **Eocene – 11.7 Ma**
	620		Undetermined
D// 20	76	Miocene taxa: *Spiniferites pseudofurcatus*, *Pentadinium laticinctum* Reworked: *Enneadocysta arcuata* (middle Eocene-early Rupelian), *Meiourogonyaulax* sp. (Jurassic to Cretaceous), *Classopollis* (upper Trias to Cretac.), *Phoberocysta neocomica* (Berriasian to Aptian)	**Eocene - middle D19** **Eocene – 8.6 Ma**
	120	Miocene taxa: *Ectosphaeropsis burdigalensis*, *Homotryblium* Reworked: *Areoligera* cf. *gippingensis* (Paleocene), *Apectodinium* sp. (upper Paleocene to	**D16- D18** **Lower Aquitanian -**

		lower Eocene)	**Top Langhian; 23.2 - 13.8 Ma**
D// 21	50	Miocene taxa: *Spiniferites pseudofurcatus*, *Homotryblium*, *Systematophora placacantha*	**Eocene - middle D18 Eocene - 13 Ma**
	22	Miocene taxa: *Spiniferites pseudofurcatus*, *Systematophora placacantha*	
D// 22	255	Reworked: *Classopollis* (upper Trias to Cretaceous)	Undetermined
	225	Miocene taxa: *Holotryblium floripes* Reworked: *Homotryblium pallidum, Ericsonia formosa* (Eocene), *Classopollis, Micula decussata, Arkhangelskiella cymbiformis* (Cretaceous)	**Tortonian or ante-Tortonian**
	70	Miocene taxa: *Palaeocystodinium golzowenze* Reworked: *Wetzeliella sp., Homotryblium pallidum*, *Classopollis* (Cretaceous)	**Eocene - middle D19 Eocene – 8.6 Ma**
E// 11	20	Miocene taxa: *Reticulatasphaera actinocoronota*, *Cribroperidinium tenuitabulatum* Reworked: *Apectodinium homomorphum* (Eocene)	**Eocene - top D18 Eocene – 11.7 Ma**
E// 24	212		Undetermined
	175	Miocene taxa: *Systematophora placacantha*, *Spiniferites pseudofurcatus* Reworked: *Deflandrea phosphoritica* (Eocene-Oligocene), *Achomosphaera alcicornu* (lower Eocene - Oligocene)	**Eocene - middle D18 Eocene - 13 Ma**
	158	Miocene taxa: *Cribroperidinium tenuitabulatum*, *Spiniferites pseudofurcatus* Reworked: *Deflandrea phosphoritica* (Eocene-Oligocene), *Achomosphaera alcicornu* (lower Eocene - Oligocene), *Homotryblium pallidum* (Eocene), *Wetzeliella varielongituda* (Eocene), *Florentinia* sp. (Cretaceous)	**Eocene - top D18 Eocene – 11.7 Ma**
	180	Miocene taxa: *Spiniferites pseudofurcatus*, *Melitasphaeridium choanophorum* Reworked: *Wetzeliella articulata* (Eocene), *Muderongia* sp., *Cribroperidinium* sp. (Cretaceous)	**Eocene - lower D20 Eocene - 6.8 Ma**
	165	Reworked: *Wetzeliella articulata* (Eocene), *Chatangiella* sp. (Cretaceous)	Undetermined
	102	Miocene taxa: *Cribroperidinium tenuitabulatum* Reworked: *Deflandrea phosphoritica* (Eocene-Oligocène), *Homotryblium pallidum* (Eocene), *Cribroperidinium* sp. (Cretaceous)	**Eocene - top D18 Eocene – 11.7 Ma**

E// 25	108	Miocene taxa: *Cordosphaeridium cantharellum*, *Cribroperidinium tenuitabulatum* Reworked: *Wetzeliella sp.* (Eocene), *Classopollis* (Cretaceous)	**Eocene - lower D17** **Eocene -17.6 Ma**
	48	Reworked: *Classopollis* (Cretaceous)	Undetermined
	40	Miocene taxa: *Hystrichosphaeropsis obscura*, *Cribroperidinium tenuitabulatum*, *Systematophora placacantha* Reworked: *Charlesdwoniea* sp. (lower Oligocene to Eocene), *Classopollis* (Cretaceous)	**Lower D17 – middle D18 18.65 – 13 Ma**
F// 29	230		Undetermined
F// 30			Undetermined
I// I2	7	Miocene taxa: *Homotryblium* Reworked: *Wetzeliella* sp. ou *Apectodinium* sp. (upper Paleocene to Oligocene)	**Miocene**
	1,8	Miocene taxa: *Glaphyrocysta* sp. Reworked: *Deflandrea phosphoritica* (Eocene-Oligocene)	**Ante-Tortonian**
	0,6	Miocene taxa: *Homotryblium floripes* Reworked: *Cyclonephelium distinctum* (Cretaceous)	**Ante-Tortonian**
	0,2	Reworked: *Cyclonephelium distinctum* (Cretaceous)	Undetermined
I// I3	6,8		Undetermined
	2,6		Undetermined
	2,2		Undetermined

Table S4: Dinoflagellate cysts biostratigraphic data. Ages based on Hardenbol et al. (1998; SEPM Chart). calibrated in Ogg et al. (2016) geochronology using TimeScale Creator 7.4. In red, the taxa (or assembling taxa) used for dinoglagellate cysts datings. The ages that appear in bold black characters are the ages exploited during the study. See Fig. 3 for location of the analyzed samples.

Table S5: Foraminiferal biostratigraphy

Zone// Log	Z (m); e= elevation (m a.s.l.)	FORAMINIFERAL BIOSTRATIGRAPHY	Interpretation:
A// 3	620		Undetermined
A// 4	635		Undetermined
	650		Undetermined
A// 5	375		Undetermined
	710		Undetermined
A// 5	720		Undetermined
	755		Undetermined
	820		Undetermined
A// 5 (Lamiraux, 1977)	710-760	*Globorotalia acrostoma*, *Trilobatus trilobus*	**Oligocene - N12a Oligocene - 13.6 Ma**
C// 13	180		Undetermined
	215		Undetermined
	220		Undetermined
	280	Rare benthic foraminifera (Milliolidae, *Elphidium* sp., Nodosariidae, *Lenticulina* sp.) –Very poor preservation	Undetermined
C// 16	20		Undetermined
C// 19	245		Undetermined
	270		Undetermined
	295		Undetermined
C// 27 (Latreille, 1969)	0-10	*Globorotalia* cf. *mayeri, Globigerina* cf. *concinna, Trilobatus trilobus*	**N7-N13 ? 17.2– 11.6 Ma**
D// 22	68		Undetermined

D// 23	10		Undetermined
	15		Undetermined
E// 24	5	Benthic forams: Rotaliida (e.g., *Elphidium* spp., *Lenticulina* spp.), Textulariidae (e.g., *Triplasia* sp.) –Very poor preservation	Undetermined
	5	Rare benthic foraminifera (Textulariidae, *Lenticulina* spp.)	Undetermined
	9	Rare benthic foraminifera	Undetermined
	20		Undetermined
	20		Undetermined
	165		Undetermined
	180		Undetermined
G// 33 (Latreille, 1969)	5	*Globorotaloïdes* cf. *suteri*, *Globocassidulina oblonga*, *Globigerina* sp.	**P12 ? - N7- Middle Eocene - 17 Ma**
G// 34	20		Undetermined
F// VAF-2 (well-log)	e= +184		Undetermined
F// PA-1 (well-log)	e= -290	*Paragloborotalia bella*, *Globoturborotalia decoraperta*, *Globorotalia praescitula*, *Trilobatus trilobus*, *Globigerinoides subquadratus*, *Globigerinita glutinata*, *Globoturborotalia woodi* – Poor to moderate preservation	**N9 ? Langhian 15.0- 14.0 Ma**
	e= -312	*Globigerinita glutinata*, *Globigerinoides* sp.	Undetermined
H// H4-H5 (Latreille, 1969)	e= 265	*Globorotalia* cf. *Mayeri*, *Globigerina microstoma*, *Globigerina woodi*, *Trilobatus trilobus*	**N7- N13 ? 17.2 – 11.6 Ma**
H// H3 (Latreille, 1969)	e= 255	*Globigerina foliata*, *Orbulina suturalis*, *Globorotalia pseudopachyderma*, *Globigerina* ex. gr.*bulloïdes*	**N9-N18 15.0 – 5.33 Ma**
H// LTP-1 (well-log)	e= -160	*Praeorbulina circularis*, *Globorotalia siakensis*, *Sphaeroidinella seminulina*, *Sphaeroidinella disjuncta*, *Trilobatus trilobus*, *Globoturborotalia woodi* – Poor to moderate preservation	**M6 – M5b 16.29 – 14.23 Ma** (biozonation from Lirer et

			al., 2019)
I// I2 (Mein, 1985)	Unknown exact stratigraphic position	*Cassigerinella chipolensis, Globorotalia* cf. *archaeomenardi* (reworked?), *Globigerina* gr. *pseudociperoensis, Globigerina* sp., *Turborotalia* cf. *quinqueloba,*	**P18 - N13** **Rupelian - Serravalian** **Oligocene -11.61 Ma**
I// I2 (Aguilar et al., 2004)	2,3-10,6	*Neogloboquadrina siakensis*, *Neogloboquadrina acostaensis*, *Globrotalia menardii*	**MMi8 ?** (biozonation from Lirer et al., 2019) **11.78 Ma-11.19 Ma**
	0-2,3	*Cassigerinella chipolensis, Paragloborotalia mayeri, Globorotalia lenguaensis*	**N13** **12– 11.6Ma**
I// I15 (Sample 13, Latreille, 1969)	e= 160	*Globrotalia menardii, Globigerina bulloides, Globigerina quinqueloba*, *Globigerina globorotaloidea*, *Globigerina parabulloides*, *Globorotalia menardii, Orbulina universa*, *Orbulina suturalis*	**N12b- actual** **Upper Serravalian – actual** **12.8 -0 Ma**
I// I14 (Latreille, 1969)	e= 155-175	*Globigerinoides bulloides, Globigerinoides Parabulloides*, *Trilobatus trilobus*	**Unusable**
I// BLYES-101 (well-log)	e= +57.7		Undetermined
	e= +12.7		Undetermined
	e= -42.3		Undetermined
	e= -42.3	Rare benthic foraminifera	Undetermined
	e= -47	Rare benthic foraminifera	Undetermined
K// K5b (Latreille, 1969)	e= 280-340	*Globigerina* cf. *bulbosa*, *Globigerina* cf. *diplostoma, Globigerina bulloides, Globoturborotalia woodi, Globorotalia hirsuta* (?), *Trilobatus trilobus, Globorotalia scitula scitula*	**N11 to N16 ?** **Langhian to Tortonian** **13.7– 8.6Ma**
K// K6 (Latreille, 1969)	e= 250	*Globigerina diplostoma*, *Globigerinoides* ex. gr. *bulloides*, *Globorotalia incompta* (?)	**N7 ? to N17** **Burdigalian to Tortonian** **17.2– 5.8 Ma**

K// K10 (Latreille, 1969)	e= 215-225	*Orbulina bilobata*	**N9 to N23** **14.56 – 0 Ma**
K// MO-2 (well-log)	e= -245 +/- 10	Rare benthic forams (*Lenticulina* sp., Textulariidae, Miliolidae, *Ammonia* sp.)	Undetermined
K// SL-2 (well-log)	e= -98 +/- 10		Undetermined
K// SLF-1 (well-log)	e= -354	Rare reworked Eocene planktonic foraminifera	Undetermined
L// GVA-1 (well-log)	e= -127 +/- 10		Undetermined

Table S5: Planktonic foraminiferal biostratigraphic data. Grey colored lines correspond to data from the literature. Biozonation from Boudagher-Fadel (2015). In red, the key taxa (or assembling taxa) used for datings. The ages that appear in bold black characters are the ages exploited during the study. See Fig. 3 for location of the analyzed samples.

Table S6: Bedding strike and dip measurement

Station	Latitude (N)	Longitude (E)	Az (RHR)	Dip	Stratigraphy
1	45.491775	5.7144722	0	0	Miocene
2	45.48805	5.7213417	**205**	**80**	Miocene
3	45.4877889	5.721375	205	82	Miocene
4	45.4869972	5.7212168	190	70	Lower Cretaceous
5	45.472675	5.7360222	43	5	Urgonian/Miocene
6	45.4730084	5.7360194	10	20	Miocene
6	45.4730084	5.7360194	52	47	Miocene
7	45.4733111	5.7353777	38	37	Urgonian
8	45.4829333	5.7227778	235	15	Berriasian
9	45.4854805	5.7215028	36	90	Lower Cretaceous
10	45.4846139	5.7157028	336	25	Miocene
11	45.4846361	5.7156694	337	24	Miocene
12	45.4844805	5.7160916	153	50	Miocene
13	45.4844805	5.7160916	143	47	Miocene
14	45.483075	5.7138194	80	22	Lower Cretaceous
15	45.4820362	5.7148138	214	38	Lower Cretaceous
16	45.4755777	5.7150167	250	10	Miocene
17	45.4748111	5.7387222	24	40	Miocene
18	45.4709945	5.7338555	5	30	Miocene
19	45.4727612	5.7284499	8	30	Miocene
20	45.4738444	5.719	260	5	Miocene
21	45.4793055	5.7192471	260	5	Lower Cretaceous
22	45.481914	5.7128556	310	30	Lower Cretaceous
23	45.4848167	5.7144945	214	85	Miocene
24	45.4791166	5.7113888	205	80	Lower Cretaceous
25	45.4892388	5.7223361	205	80	Miocene
26	45.4847333	5.7367917	20	5	Miocene
27	45.4891	5.7300528	200	25	Miocene
28	45.4818778	5.7467416	15	50	Miocene
29	45.4737583	5.7454806	35	15	Miocene

30	45.433311	5.7219333	350	25	Miocene
31	45.4306972	5.7113444	25	25	Miocene
32	45.4292167	5.7094334	35	15	Miocene
33	45.4281083	5.7080111	19	16	Miocene
34	45.4263667	5.7066666	23	23	Urgonian
35	45.4340111	5.7098833	20	15	Urgonian
36	45.4341389	5.7149889	23	27	Miocene
37	45.4339583	5.7148971	330	28	Miocene
38	45.4370361	5.7082334	345	19	Urgonian
39	45.450925	5.7121167	30	9	Urgonian
40	45.4763611	5.7154972	240	8	Lower Cretaceous
41	45.4782445	5.7125945	190	32	Lower Cretaceous
42	45.4846139	5.7157028	336	25	Miocene
43	45.4832972	5.7122306	50	85	Miocene
44	45.4711834	5.6986999	200	75	Urgonian
45	45.4464416	5.6671444			Miocene
46	45.5071472	5.7390306	150	47	Miocene
47	45.505961	5.7384944	215	35	Miocene
48	45.5055084	5.7391945	215	20	Lower Cretaceous
49	45.5106944	5.7411723	193	20	Lower Cretaceous
50	45.5105416	5.7427805	250	10	Lower Cretaceous
51	45.5098695	5.7425834	320	8	Lower Cretaceous
52	45.4973166	5.7322861	40	52	Miocene
53	45.4970445	5.7323472	210	43	Miocene
54	45.4970832	5.7326112	170	70	Miocene
55	45.4967555	5.7327471	205	75	Miocene
56	45.4968778	5.7327472	**35**	**80**	Miocene
57	45.4967528	5.7328112	**180**	**85**	Miocene
58	45.4968	5.7334667	240	62	Lower Cretaceous
59	45.4969833	5.73375	235	9	Lower Cretaceous
60	45.4971666	5.7338501	30	10	Lower Cretaceous
61	45.4968834	5.7338834	0	0	Lower Cretaceous
62	45.4968833	5.73485	130	6	Miocene

63	45.49795	5.7350334	70	6	Miocene
64	45.5261333	5.7454666	85	22	Miocene
65	45.5249832	5.7498833	0	25	Lower Cretaceous
66a	45.5226027	5.7571306	355	27	Miocene
66b	45.5226138	5.7568695	340	52	Miocene
67	45.5228667	5.7553833	0	32	Lower Cretaceous
68	45.5230499	5.75395	5	26	Lower Cretaceous
69	45.523	5.7533805	1	45	Lower Cretaceous
70	45.5229666	5.7529333	20	46	Lower Cretaceous
72	45.5221639	5.7511055	192	26	Miocene
73	45.5228639	5.7519362	0	0	Lower Cretaceous
74	45.5247361	5.7507362	170	10	Lower Cretaceous
75	45.4853545	5.7179519	225	80	Miocene
76	45.4978284	5.7334147	195	40	Miocene
77	45.5021763	5.7387165	190	20	Lower Cretaceous
78	45.5034997	5.7454113	8	20	Miocene
79	45.5044922	5.7489303	8	30	Miocene
80	45.502477	5.7551102	6	30	Miocene
81	45.5130357	5.7418493	190	20	Lower Cretaceous
82	45.5262963	5.7564406	15	30	Lower Cretaceous
83	45.519471	5.7483296	188	5	Miocene
84	45.5238909	5.7488875	184	5	Miocene
85	45.5244321	5.7432226	186	20	Miocene
86	45.5219667	5.7412056	180	45	Miocene
87	45.5139915	5.7309173	12	40	Miocene
88	45.5148035	5.7339214	190	20	Miocene
89	45.5185323	5.7363674	190	30	Miocene
90	45.5187728	5.7343934	190	40	Miocene
91	45.5216292	5.7266764	185	80	Miocene
92	45.5226818	5.7326768	10	85	Miocene
93	45.5293906	5.7279097	185	10	Miocene
94	45.4704083	5.6982	185	70	Urgonian
95	45.4663083	5.6954277	192	80	Miocene

96	45.4658861	5.7004194	20	5	Urgonian
97	45.4531889	5.7130611	22	10	Urgonian
98	45.4503222	5.6838416	210	70	Urgonian
99	45.4311722	5.6990277	20	10	Urgonian
100	45.4140722	5.6801195	10	10	Urgonian
101	45.4135278	5.6765973	195	45	Urgonian
102	45.4074806	5.6766916	15	5	Urgonian
103	45.4115722	5.6940694	15	10	Urgonian
104	45.4443917	5.75575	193	15	Urgonian
105	45.4335111	5.7381416	17	20	Miocene
106	45.4306305	5.7396805	20	25	Miocene
107	45.4287	5.7444778	200	80	Miocene
108	45.4313083	5.7224333	25	20	Miocene
109	45.4301084	5.7295833	23	25	Miocene
110	45.4270139	5.7338389	20	20	Miocene
111	45.4237444	5.7445083	210	85	Miocene
112	45.4268805	5.7146167	20	20	Miocene
113	45.4214361	5.7340611	95	5	Miocene
114	45.4212444	5.7405555	200	80	Miocene
115	45.4191722	5.7374444	15	50	Miocene
116	45.4221472	5.7176554	20	30	Miocene
117	45.4163305	5.7399001	200	60	Miocene
118	45.4155555	5.7359	185	5	Miocene
119	45.414325	5.7364833	200	80	Miocene
120	45.4154944	5.727425	25	30	Miocene
121	45.4117916	5.7217805	25	30	Miocene
122	45.4094361	5.7274028	20	20	Miocene
123	45.4054917	5.7156584	20	30	Miocene
124	45.5370055	5.8046918	186	80	Miocene
125	45.5367861	5.811675	345	60	Miocene
126	45.5305389	5.7610333	5	30	Miocene
127	45.5296083	5.8005472	350	60	Miocene
128	45.5264778	5.7883723	10	20	Miocene

129	45.5248139	5.7913499	20	10	Miocene
130	45.5208583	5.7944249	195	30	Miocene
131	45.5133917	5.7704694	19	20	Miocene
132	45.5084445	5.7871	21	80	Miocene
133	45.5054694	5.7765833	15	60	Miocene
134	45.5016694	5.7595333	9	30	Miocene
135	45.5013	5.802636	70	10	Lower Cretaceous
136	45.4937805	5.7908361	26	90	Urgonian
137	45.4915527	5.7759888	28	80	Miocene
138	45.4913306	5.7923	7	30	Lower Cretaceous
139	45.4853694	5.7849223	222	40	Urgonian
140	45.4849222	5.7896056	182	5	Urgonian
141	49.8355	5.7927639	3	5	Urgonian
142	45.480325	5.7726832	210	70	Miocene
143	45.4802194	5.7766334	182	40	Urgonian
144	45.4778639	5.7713028	215	60	Urgonian
145	45.4783806	5.7752805	208	20	Urgonian
146	45.4761194	5.7742417	185	10	Urgonian
147	45.4801527	5.7883388	5	25	Miocene
148	45.4782806	5.7854028	42	30	Urgonian
149	45.4758666	5.8061916	18	20	Urgonian
150	45.4730584	5.7879221	185	85	Urgonian
151	45.4673139	5.7920054	60	20	Urgonian
152	45.4645583	5.784325	90	15	Urgonian
153	45.4657805	5.7715555	42	20	Urgonian
154	45.4573862	5.7684611	3	25	Urgonian
155	45.4573639	5.7650972	184	20	Urgonian
156	45.4524583	5.7658693	9	25	Urgonian
157	45.4490666	5.7621583	193	10	Urgonian
158	45.4434083	5.7601805	20	80	Urgonian
159	45.4595667	5.7629639	192	20	Miocene
160	45.4587416	5.7726417	99	15	Miocene
161	45.4570639	5.7770667	102	10	Miocene

162	45.4575112	5.7871556	103	15	Miocene
163	45.4516944	5.7675889	16	5	Miocene
164	45.4522611	5.7937972	16	10	Urgonian
165	45.4490778	5.8069028	10	45	Upper Cretaceous
166	45.4453917	5.8061528	205	70	Upper Cretaceous
167	45.4436861	5.7994111	198	20	Miocene
168	45.4418555	5.8011944	201	60	Miocene
169	45.4407805	5.7977638	27	35	Upper Cretaceous
170	45.4382389	5.7989222	27	30	Upper Cretaceous
171	45.4408972	5.7822138	210	60	Urgonian
172	45.4399444	5.7829139	83	5	Urgonian
173	45.4369361	5.7899167	350	30	Bedoulian
174	45.4348805	5.7909555	0	30	Upper Cretaceous
175	45.4342361	5.7992806	**25**	**80**	Urgonian
176	45.4306333	5.7957834	195	70	Urgonian
177	45.4332694	5.8020279	2	40	Lower Cretaceous
178	45.4276694	5.8011111	1	30	Lower Cretaceous
179	45.4356334	5.7985805	203	80	Miocene
180	45.4331277	5.7898417	30	30	Miocene
181	45.4321528	5.7814471	72	25	Miocene
182	45.4298333	5.7878666	65	20	Miocene
184	45.934221	5.842449	159	8	Miocene
185	45.9351439	5.8440001	160	9	Miocene
186	45.9349991	5.8469081	160	10	Miocene
187	45.934804	5.847494	210	40	Miocene
188	45.934679	5.84766	190	40	Miocene
189	45.934499	5.84799	170	45	Miocene
190	45.933558	5.849995	185	75	Oligocene
191	45.933449	5.851097	180	80	Urgonian
192	45.9333601	5.851345	190	85	Urgonian
193	45.933595	5.854507	**35**	**85**	Lower Cretaceous
194	45.93357	5.854783	32	85	Lower Cretaceous
195b	45.933685	5.85559	20	84	Lower Cretaceous

201	45.9331189	5.858125	180	85	Upper Jurassic
202	45.9328141	5.862697	198	60	Upper Jurassic
203	45.932675	5.8631691	218	70	Upper Jurassic
204	45.93255	5.863571	24	59	Upper Jurassic
205	45.932587	5.8647771	208	68	Oxfordian
206	45.932915	5.866439	341	33	Oxfordian
207	45.933583	5.884877	2	27	Upper Jurassic
208	45.930261	5.8919221	345	67	Urgonian
209	45.930057	5.893572	11	53	Urgonian
210	45.73324	5.964292	340	16	Miocene
211	45.733313	5.964529	340	9	Miocene
212	45.7332451	5.9639691	344	17	Miocene
213	45.7334721	5.9635221	338	12	Miocene
214	45.733235	5.961814	343	14	Miocene
215	45.723251	6.102832	0	20	Urgonian
215	45.723251	6.102832	49	29	Urgonian
217	45.72543	6.0949241	19	18	Urgonian
218	45.7307169	6.096225	45	28	Lower Cretaceous
219	45.7430719	6.09758	30	25	Lower Cretaceous
220	45.746085	6.089659	80	26	Lower Cretaceous
222	45.7532829	6.074513	200	76	Lower Cretaceous
222	45.7532829	6.074513	132	6	Lower Cretaceous
224	45.763433	6.061974	346	36	Lower Cretaceous
225	45.764319	6.060332	**30**	**35**	Lower Cretaceous
226	45.764681	6.0599081	15	72	Lower Cretaceous
227	45.766141	6.058623	31	59	Lower Cretaceous
228	45.766983	6.058686	0	25	Lower Cretaceous
229	45.765007	6.0570461	**250**	**75**	Lower Cretaceous
230	45.7657	6.057068	**215**	**61**	Lower Cretaceous
231	45.734949	5.893988	180	80	Urgonian
232	45.743629	5.887944	132	65	Urgonian
233	45.773554	5.867494	81	12	Upper Jurassic
234	45.778953	5.8648991	160	56	Upper Jurassic

236	45.8279171	5.8117949	342	40	Urgonian
237	45.8077831	5.857072	**340**	**50**	Lower Cretaceous
240	45.796161	5.8627489	173	86	Upper Jurassic
241	45.796547	5.862797	0	90	Upper Jurassic
242	45.797061	5.862697	210	79	Upper Jurassic
244	45.7976861	5.862523	345	63	Upper Jurassic
245	45.791154	5.862864	182	86	Upper Jurassic
246	45.7894741	5.8632369	340	12	Upper Jurassic
247	45.7868421	5.8652349	10	38	Lower Cretaceous
248	45.7797681	5.8706419	0	24	Lower Cretaceous
249	45.77732	5.87203	330	38	Urgonian
250	45.775706	5.872542	325	16	Urgonian
251	45.776705	5.872577	317	14	Urgonian
252	45.774707	5.874561	311	10	Urgonian
254	45.772309	5.8745881	0	0	Urgonian
256	45.777359	5.8754419	345	25	Urgonian
257	45.779582	5.876768	90	15	Urgonian
258	45.780842	5.883823	325	15	Urgonian
259	45.77939	5.886923	325	25	Urgonian
260	45.775074	5.9240311	322	35	Miocene
261	45.7818111	5.935087	0	0	Miocene
M263	45.16456702	5.425157994	120	5	Lower Cretaceous
M264	45.16513598	5.424107993	230	28	Lower Cretaceous
M265	45.16528803	5.423416989	225	36	Lower Cretaceous
M266	45.16530404	5.422865041	15	25	Lower Cretaceous
M267	45.16553597	5.421943031	205	35	Urgonian
M268	45.16574803	5.421177009	223	31	Urgonian
M269	45.16621004	5.421118001	220	35	Urgonian
M270	45.16646703	5.420695972	220	37	Urgonian
M271	45.16754804	5.419972027	205	32	Urgonian
M272	45.16786102	5.419656029	222	33	Urgonian
M274	45.16763303	5.418028012	220	12	Urgonian
M275	45.16754603	5.417863978	10	80	Urgonian

M276	45.16723498	5.416411981	95	12	Urgonian
M277	45.16800703	5.415541017	216	76	Urgonian
M278	45.16839604	5.41476896	234	84	Urgonian
M279	45.16842999	5.414678017	230	86	Urgonian
M280	45.17118101	5.417701034	217	81	Urgonian
M281	45.17173598	5.418910962	209	77	Urgonian
M282	45.17173	5.418906	39	20	Urgonian
M283	45.171792	5.419033	245	47	Urgonian
M284	45.174319	5.427655	240	35	Urgonian
M285	45.172296	5.424211	220	35	Urgonian
M286	45.171855	5.422325	240	59	Urgonian
M287	45.170847	5.42031	245	24	Urgonian
M288	45.170053	5.419369	225	17	Urgonian
M289	45.170491	5.422653	230	42	Urgonian
M290	45.168992	5.420294	207	38	Urgonian
M291	45.168513	5.42095	233	33	Urgonian
M293	45.15787901	5.437161969	75	14	Urgonian
M294	45.156241	5.437206	0	0	Urgonian
M295	45.156323	5.441293	50	23	Lower Cretaceous
M296	45.156417	5.441581	19	30	Lower Cretaceous
M298	45.155251	5.444343	226	56	Lower Cretaceous
M299	45.15535	5.445132	280	15	Lower Cretaceous
M300	45.156615	5.442111	40	30	Lower Cretaceous
M301	45.15588	5.441386	40	24	Lower Cretaceous
M303	45.152952	5.438053	18	86	Lower Cretaceous
M304	45.152016	5.439562	315	10	Lower Cretaceous
M305	45.148122	5.44211	30	43	Lower Cretaceous
M307	45.063187	5.349648	30	60	Lower Cretaceous
M308	45.060668	5.347524	170	60	Lower Cretaceous
M309	45.060573	5.347172	182	65	Lower Cretaceous
M310	45.060805	5.347962	20	60	Lower Cretaceous
M311	45.061454	5.348994	160	59	Lower Cretaceous
M313	45.065675	5.357433	140	18	Lower Cretaceous

M314	45.066058	5.363377	180	65	Lower Cretaceous
M315	45.066536	5.358383	165	8	Lower Cretaceous
M316	45.068889	5.365225	170	45	Lower Cretaceous
M317	45.068494	5.366741	185	28	Lower Cretaceous
M318	45.071296	5.365696	208	20	Lower Cretaceous
M319	45.075236	5.365074	160	21	Lower Cretaceous
M320	45.06995	5.373799	0	0	Lower Cretaceous
M321	45.068736	5.380932	116	5	Lower Cretaceous
M322	45.066747	5.392628	280	6	Lower Cretaceous
M323	45.059616	5.411239	313	8	Lower Cretaceous
M324	45.075543	5.491212	5	42	Urgonian
M325	45.076202	5.490726	24	35	Lower Cretaceous
M326	45.07327803	5.492015993	45	16	Urgonian
M327	45.07509699	5.489988998	235	25	Urgonian
M328	45.074164	5.490916	160	87	Urgonian
M329	45.083728	5.478957	355	19	Urgonian
M330	45.082751	5.48128	200	5	Urgonian
M331	45.082293	5.482162	195	85	Urgonian
M332	45.081774	5.482326	200	85	Urgonian
M333	45.081315	5.48251	35	55	Lower Cretaceous
M334	45.081005	5.48263	296	5	Lower Cretaceous
M335	45.079744	5.484816	5	30	Lower Cretaceous
M336	45.079304	5.486227	15	33	Lower Cretaceous
M337	45.07853	5.486785	330	28	Lower Cretaceous
M338	45.078094	5.48715	10	47	Lower Cretaceous
M339	45.077543	5.487889	180	5	Lower Cretaceous
M340	45.076738	5.488448	230	40	Lower Cretaceous
M341	45.076509	5.488476	0	0	Lower Cretaceous
M343	45.079736	5.485473	40	65	Lower Cretaceous
M344	45.07989	5.483777	189	84	Lower Cretaceous
M345	45.079802	5.48306	170	77	Lower Cretaceous
M346	45.069609	5.507935	193	34	Urgonian
M347	45.069552	5.508344	10	76	Urgonian

M348	45.069374	5.509077	55	38	Lower Cretaceous
M349	45.123628	5.524294	65	45	Upper Cretaceous
M350	45.121786	5.525957	327	35	Upper Cretaceous
M351	45.120004	5.527602	345	35	Upper Cretaceous
M352	45.115026	5.524723	1	30	Upper Cretaceous
M353	45.12443	5.525845	350	32	Upper Cretaceous
M354	45.148951	5.552277	190	43	Upper Cretaceous
M355	45.147957	5.550743	186	56	Miocene
M356	45.147983	5.550909	195	49	Miocene
M360	45.073862	5.545828	15	80	Upper Cretaceous
M361	45.073272	5.543453	28	80	Upper Cretaceous
M362	45.073828	5.54226	10	73	Upper Cretaceous
M363	45.074051	5.541174	7	54	Upper Cretaceous
M364	45.076543	5.537119	210	5	Upper Cretaceous
M365	45.086624	5.53662	352	13	Upper Cretaceous
M366	45.085911	5.536601	352	20	Upper Cretaceous
M367	45.079379	5.536387	30	15	Upper Cretaceous
M368	45.0782583	5.536422222	336	15	Upper Cretaceous
M369	45.084306	5.53063	336	10	Upper Cretaceous
M370	45.100975	5.526829	315	15	Upper Cretaceous
M371	45.101106	5.527601	340	20	Upper Cretaceous
M372	45.142682	5.557524	175	20	Upper Cretaceous
M373	45.141969	5.558052	59	2	Upper Cretaceous
M374	45.136188	5.557842	0	5	Upper Cretaceous
M375	45.126571	5.559189	130	4	Upper Cretaceous
M376	45.121193	5.561445	359	13	Upper Cretaceous
M377	45.121937	5.571128	6	42	Upper Cretaceous
M392	45.69970996	5.155610992	320	10	Bajocian
M393	45.71824	5.225999029	0	0	Bajocian
M398	45.743061	5.246304022	175	13	Bajocian
M400	45.74553601	5.249972027	196	28	Bajocian
M401	45.74506997	5.24943701	194	12	Bajocian
M402	45.74472397	5.248059025	180	20	Bajocian

M403	45.74072597	5.248640981	232	8	Bajocian
M404	45.75697102	5.255515985	179	23	Bathonian
M405	45.760372	5.256418	235	25	Bathonian
M406	45.78248997	5.28664696	10	8	Bajocian
M407	45.78466902	5.289036976	50	5	Bajocian
M408	45.78484302	5.285241986	5	8	Bajocian
M409	45.79632103	5.291900989	19	15	Bajocian
M410	45.79633503	5.292245988	160	6	Bajocian
M411	45.79709896	5.291281985	135	12	Bajocian
M412	45.81943204	5.308794966	212	86	Oxfordian
M413	45.83018099	5.321147041	90	12	Bajocian
M418	45.490129	5.717223	35	77	Miocene
M419	45.48773197	5.718805986	225	65	Miocene
M420	45.48465396	5.720877992	**210**	**76**	Lower Cretaceous
M421	45.48390697	5.720523018	**210**	**80**	Lower Cretaceous
M422	45.48373204	5.720890984	280	10	Lower Cretaceous
M424	45.47734	5.72975996	44	16	Lower Cretaceous
M427	45.37617302	5.74579102	210	85	Miocene
M429	45.37712596	5.74928904	198	80	Urgonian
M432	45.37509	5.749931009	235	60	Upper Jurassic
M433	45.37493301	5.750158997	220	50	Oxfordian
M435	45.371394	5.749988006	30	70	Oxfordian
M436	45.370275	5.749123	20	35	Oxfordian
M443	45.18078	5.648094	10	20	Upper Cretaceous
M444	45.19006502	5.641762968	170	37	Upper Cretaceous
M445	45.19046601	5.640832996	178	80	Upper Cretaceous
M446	45.19024003	5.640053982	180	60	Upper Cretaceous
M448	45.18789302	5.638780016	15	43	Upper Cretaceous
M449	45.18688099	5.63671899	40	32	Upper Cretaceous
M450	45.18760996	5.635447958	333	20	Upper Cretaceous
M456	45.333643	5.625654962	10	28	Urgonian
M457	45.33293196	5.626074979	218	70	Urgonian
M460	45.363274	5.675772	32	20	Urgonian

M461	45.36451103	5.665831016	305	10	Urgonian
M463	45.36981996	5.663712993	10	5	Urgonian
M465	45.37321497	5.660167029	15	90	Urgonian
M468	45.28989701	5.482886005	330	28	Urgonian
M469	45.26809501	5.479180031	335	25	Urgonian
M470	45.25549801	5.473094014	10	23	Urgonian
M471	45.25850996	5.47207796	15	26	Urgonian
M472	45.26685297	5.467291977	2	7	Lower Cretaceous
M473	45.26581999	5.463103037	215	30	Urgonian
M474	45.24919599	5.462090001	135	10	Urgonian
M476	45.25521504	5.465758005	0	32	Oligocene
M478	45.23308103	5.464513963	85	24	Urgonian
M479	45.23336199	5.463763028	60	30	Oligocene
ALV1	45.1792433	5.4959064	30	34	Urgonian
ALV2	45.1774949	5.4980573	30	34	Miocene
ALV3	45.1773235	5.4980753	50	20	Miocene
ALV4	45.1771959	5.498146	90	28	Miocene
ALV5	45.1792016	5.4994557	15	50	Miocene
ALV6	45.1780571	5.4986928	20	38	Miocene
ALV7	45.1770574	5.4983054	30	25	Miocene
ALV8	45.1754219	5.50475	55	62	Miocene
ALV10	45.1241673	5.6028549	230	44	Upper Cretaceous
ALV11	45.1255049	5.6026233	245	33	Upper Cretaceous
ALV12	45.1832482	5.6481374	15	30	Upper Cretaceous
ALV13	45.1660712	5.6248307	10	22	Miocene
ALV14	45.1660524	5.624868	20	25	Miocene
ALV15	45.166021	5.6250575	300	23	Miocene
ALV16	45.1660573	5.6250464	270	25	Miocene
ALV17	45.1660396	5.6250329	330	60	Miocene
ALV18	45.1660381	5.6250964	20	23	Miocene
ALV19	45.1660105	5.6251206	330	31	Miocene
ALV20	45.1659821	5.6251829	330	23	Miocene
ALV21	45.1658448	5.6256729	325	24	Miocene

ALV22	45.1658262	5.6256975	345	35	Miocene
ALV23	45.1658065	5.6257729	332	25	Miocene
ALV24	45.1583331	5.6195895	325	21	Miocene
ALV25	45.1426959	5.6153241	280	25	Miocene
ALV26	45.1416466	5.6072883	315	24	Miocene
ALV27	45.1395078	5.6063386	95	10	Miocene
ALV28	45.1361975	5.6054501	290	30	Miocene
ALV29	45.142704	5.5944644	215	10	Miocene
ALV30	45.1218245	5.5711899	10	20	Miocene
ALV31	45.1557497	5.5544593	320	35	Miocene
ALV33	45.1430754	5.5151361	340	31	Miocene
ALV34	45.1247128	5.5187663	40	30	Miocene
ALV35	45.0612576	5.2780788	0	18	Miocene
ALV36	45.0612996	5.2782329	5	15	Miocene
ALV38	45.061296	5.281116	25	5	Miocene
ALV39	45.0612164	5.2814938	30	5	Miocene
ALV40	45.0612098	5.2818238	300	5	Miocene
ALV41	45.0611632	5.2814536	300	5	Miocene
ALV42	45.0611769	5.2816701	290	11	Miocene
ALV43	45.0611836	5.2817847	295	9	Miocene
ALV44	45.0612094	5.2822937	300	9	Miocene
ALV45	45.0611156	5.282036	300	10	Miocene
ALV46	45.0611719	5.2823685	305	11	Miocene
ALV47	45.0611077	5.2824294	290	15	Miocene
ALV48	45.0611486	5.2826343	315	14	Miocene
ALV49	45.0610322	5.2826042	320	16	Miocene
ALV50	45.0610454	5.2828461	320	12	Miocene
ALV51	45.0159397	5.2709753	350	31	Miocene
ALV52	45.0835476	5.3328273	18	34	Miocene
ALV53	45.0835669	5.3327646	350	35	Miocene
ALV54	45.0628414	5.3408378	160	52	Miocene
ALV55	45.0625397	5.3344746	170	55	Miocene
ALV56	44.9654502	5.2663311	55	28	Miocene

ALV57	44.9664002	5.2679029	40	15	Miocene
ALV59	44.9538329	5.2615759	20	25	Miocene
ALV60	44.9713582	5.2811097	342	30	Miocene
ALV62	44.993058	5.270921	115	18	Miocene
ALV63	44.9924642	5.2699968	110	24	Miocene
ALV64	44.994225	5.2724387	32	29	Miocene
ALV65	45.069377	5.3364299	175	80	Miocene
ALV66	45.0693588	5.3364418	180	60	Miocene
ALV67	45.0693408	5.3364411	170	65	Miocene
ALV68	45.0692535	5.3363105	188	70	Miocene
ALV69	45.0692267	5.3362967	185	70	Miocene
ALV70	45.0691024	5.3362154	160	49	Miocene
ALV71	45.069068	5.3361378	194	52	Miocene
ALV72	45.068987	5.3361345	195	75	Miocene
ALV73	45.0687981	5.3361268	195	78	Miocene
ALV74	45.0228516	5.2890823	195	19	Miocene
ALV76	45.0013218	5.4346839	352	20	Miocene
ALV77	45.2825163	5.7258298	230	80	Miocene
ALV78	45.2834864	5.7270494	**50**	**88**	Miocene
ALV79	45.291631	5.7263687	40	29	Miocene
ALV80	45.291741	5.7262847	38	30	Miocene
ALV81	45.2913316	5.7264692	20	47	Miocene
ALV82	45.2914782	5.7263614	10	30	Miocene
ALV83	45.2914521	5.7263219	20	34	Miocene
ALV84	45.2669243	5.7077338	190	60	Miocene
ALV85	45.2680063	5.7087923	194	63	Miocene
ALV87	45.2680249	5.7091501	195	66	Miocene
ALV88	45.2711161	5.7078568	190	60	Miocene
ALV89	45.2767543	5.7050652	20	65	Miocene
ALV90	45.2591964	5.6961373	25	53	Miocene
ALV91	45.4729861	5.7360271	355	28	Miocene
ALV92	45.4735607	5.7353385	45	38	Miocene
ALV93	45.4735934	5.7347259	30	39	Miocene

ALV94	45.4730304	5.7360548	355	25	Miocene
ALV95	45.4729815	5.7384705	356	29	Miocene
ALV96	45.472668	5.739159	40	31	Miocene
ALV97	45.472601	5.739322	357	35	Miocene
ALV98	45.4724888	5.7394957	18	29	Miocene
ALV99	45.4724867	5.7395852	32	34	Miocene
ALV100	45.4723413	5.7396421	35	36	Miocene
ALV101	45.4724483	5.7396856	24	31	Miocene
ALV102	45.4723362	5.7402303	22	26	Miocene
ALV103	45.4722963	5.7407657	0	31	Miocene
ALV104	45.4722681	5.7408155	35	25	Miocene
ALV105	45.4723053	5.7407662	30	24	Miocene
ALV106	45.4723475	5.7408834	23	31	Miocene
ALV107	45.4722347	5.7410826	25	29	Miocene
ALV109	45.4723345	5.741049	15	29	Miocene
ALV110	45.472324	5.7411125	22	27	Miocene
ALV111	45.4723309	5.7412024	27	25	Miocene
ALV112	45.4723656	5.7412553	19	16	Miocene
ALV113	45.4723916	5.7412949	22	20	Miocene
ALV114	45.4728186	5.7415075	32	26	Miocene
ALV115	45.4729432	5.7415647	31	26	Miocene
ALV116	45.4729439	5.7415392	11	20	Miocene
ALV117	45.4730505	5.7415955	40	24	Miocene
ALV118	45.4730328	5.7415819	28	17	Miocene
ALV119	45.4731141	5.741573	32	27	Miocene
ALV121	45.473408	5.7417024	28	29	Miocene
ALV122	45.4734248	5.7417544	23	30	Miocene
ALV123	45.4735107	5.7419249	22	24	Miocene
ALV124	45.4740981	5.7188729	215	20	Miocene
ALV126	45.4805096	5.7323353	65	20	Miocene
ALV127	45.4863026	5.7358788	270	16	Miocene
ALV128	45.4864151	5.7356923	275	15	Miocene
ALV129	45.4832875	5.7343635	210	8	Miocene

ALV130	45.4852935	5.7231228	155	2	Lower Cretaceous
ALV131	45.4849742	5.7232994	145	7	Lower Cretaceous
ALV132	45.46172	5.7779871	90	21	Miocene
ALV133	45.4594852	5.776611	75	16	Miocene
ALV135	45.4603896	5.7753251	115	15	Miocene
ALV136	45.3049723	5.6358934	25	15	Miocene
ALV137	45.3062577	5.6363612	24	35	Miocene
ALV138	45.3069957	5.6371481	29	24	Miocene
ALV139	45.3075314	5.6373388	35	24	Miocene
ALV140	45.3098633	5.6412103	45	14	Miocene
ALV141	45.3098267	5.6412341	32	17	Miocene
ALV142	45.3097527	5.64132	30	17	Miocene
ALV143	45.3097066	5.6413689	15	25	Miocene
ALV144	45.3096227	5.6414925	35	17	Miocene
ALV145	45.3096041	5.6415172	30	18	Miocene
ALV146	45.3095556	5.641668	17	18	Miocene
ALV147	45.3094219	5.6416108	25	16	Miocene
ALV148	45.3093749	5.6416979	10	25	Miocene
ALV149	45.3093569	5.6416971	0	22	Miocene
ALV150	45.3092217	5.6417035	15	21	Miocene
ALV151	45.3092899	5.6418725	20	10	Miocene
ALV152	45.309261	5.6423432	10	18	Miocene
ALV153	45.3099934	5.643755	30	8	Miocene
ALV154	45.3103209	5.6443826	355	30	Miocene
ALV155	45.3031184	5.6483206	0	10	Miocene
ALV156	45.3292351	5.7430788	25	51	Miocene
ALV157	45.3288186	5.7424334	22	54	Miocene
ALV158	45.3279837	5.7415891	10	40	Miocene
ALV160	45.3271513	5.7428888	34	34	Miocene
ALV161	45.3265233	5.7431775	32	24	Miocene
ALV162	45.3254284	5.7426652	65	23	Miocene
ALV163	45.319984	5.7388553	210	40	Miocene
ALV164	45.3170941	5.7369935	200	60	Miocene

ALV165	45.3161501	5.7361953	205	75	Miocene
ALV166	45.3159055	5.7362601	200	70	Miocene
ALV167	45.3157888	5.735119	208	60	Miocene
ALV168	45.3164355	5.7348056	210	64	Miocene
ALV170	45.3165106	5.7350517	200	72	Miocene
ALV171	45.316718	5.7350361	120	19	Miocene
ALV172	45.3156546	5.7343343	205	80	Miocene
ALV173	45.3140716	5.7342836	230	60	Miocene
ALV174	45.3140421	5.7343842	205	75	Miocene
ALV175	45.3127619	5.7333403	205	62	Miocene
ALV176	45.3098476	5.7309932	207	65	Miocene
ALV177	45.3051455	5.7284966	35	45	Miocene
ALV178	45.3027172	5.7269005	40	45	Miocene
ALV179	45.297055	5.6605499	35	25	Miocene
ALV180	45.2975622	5.6546174	190	21	Miocene
ALV181	45.2986677	5.6573985	205	22	Miocene
ALV182	45.4178243	5.7017005	95	4	Miocene
ALV183	45.4180241	5.702004	330	21	Miocene
ALV184	45.4111218	5.7099048	335	48	Miocene
ALV185	45.406457	5.7111256	0	24	Miocene
ALV186	45.4063272	5.7112855	15	28	Miocene
ALV187	45.4062148	5.7114718	25	28	Miocene
ALV188	45.4057551	5.7122548	0	45	Miocene
ALV189	45.4056667	5.7121867	50	20	Miocene
ALV190	45.4056643	5.7122888	22	21	Miocene
ALV191	45.4055654	5.7122841	21	21	Miocene
ALV192	45.4054922	5.7123317	15	19	Miocene
ALV193	45.4054712	5.7124585	15	27	Miocene
ALV194	45.4054607	5.7125219	25	21	Miocene
ALV195	45.4052776	5.7126536	20	20	Miocene
ALV196	45.4038217	5.7133123	18	21	Miocene
ALV197	45.403848	5.7133391	20	21	Miocene
ALV198	45.404063	5.7130044	35	22	Miocene

ALV199	45.4049574	5.7128683	20	23	Miocene
ALV200	45.2671073	5.7083671	190	66	Miocene
ALV201	45.2671073	5.7083671	190	60	Miocene
ALV202	45.2673302	5.7088366	180	68	Miocene
ALV203	45.2673302	5.7088366	185	55	Miocene
ALV204	45.2609719	5.707833	185	61	Miocene
ALV205	45.261286	5.7078734	180	70	Miocene
ALV206	45.2554353	5.7051991	190	60	Miocene
ALV207	45.2475241	5.6994458	203	26	Miocene
ALV208	45.3677706	5.7076409	343	24	Miocene
ALV209	45.3679585	5.7076882	330	23	Miocene
ALV210	45.3678178	5.7079241	333	25	Miocene
ALV211	45.3765936	5.7030173	26	25	Miocene
ALV212	45.4350213	5.8158497	25	25	Miocene
ALV213	45.4351096	5.8151893	25	23	Miocene
ALV216	45.435207	5.8148873	10	17	Miocene
ALV218	45.4355592	5.8148409	15	27	Miocene
ALV219	45.4648062	5.8209791	211	76	Miocene
ALV220	45.1282939	5.3249617	325	12	Miocene
ALV221	45.1272213	5.3241424	241	13	Miocene
ALV222	45.0468269	5.263182	0	30	Miocene
ALV223	45.0513174	5.2804397	345	25	Miocene
ALV224	45.051712	5.2787155	0	24	Miocene
ALV225	45.0293939	5.28424	0	25	Miocene
ALV226	45.4736303	5.8234155	9	30	Miocene
ALV227	45.4349552	5.8159743	32	27	Miocene
ALV228	45.4335382	5.8164919	27	25	Miocene
ALV231	45.4309777	5.8181158	35	25	Miocene
ALV232	45.4312162	5.817936	0	25	Miocene
ALV233	45.0607396	5.2904674	25	12	Miocene
ALV234	45.0607396	5.2904674	5	12	Miocene
ALV235	45.0602811	5.2886455	3	13	Miocene
ALV236	45.1080259	5.2724647	205	15	Miocene

ALV237	45.0901938	5.4691993	17	38	Miocene
ALV238	45.1808768	5.5006491	18	28	Miocene
ALV239	45.1795903	5.4993836	30	38	Miocene
ALV240	45.1780498	5.4986161	28	30	Miocene
ALV241	45.1773922	5.4986383	24	31	Miocene
ALV242	45.1780043	5.5031578	40	26	Miocene
ALV243	45.1753009	5.5053429	40	38	Miocene
ALV244	45.0887887	5.4746411	**24**	**68**	Miocene
ALV245	45.0887887	5.4746411	**21**	**81**	Miocene
ALV246	45.0830337	5.4760188	15	45	Miocene
ALV247	45.3013882	5.7263903	55	20	Miocene
ALV250	45.3013882	5.7263903	245	74	Miocene
ALV251	45.3139935	5.734535	203	68	Miocene
ALV254	45.3268113	5.7431787	13	31	Miocene
ALV255	45.2691037	5.7080669	190	70	Miocene
ALV256	45.244205	5.6848388	0	56	Miocene
ALV257	45.0797826	5.4661078	28	21	Miocene
ALV258	45.0794583	5.4661192	8	24	Miocene
M485	45.184343	5.684033	245	17	Upper Cretaceous
M486	45.184695	5.684502	85	5	Upper Cretaceous
M487	45.181667	5.685993	208	65	Upper Cretaceous
M489	45.176938	5.677461	305	20	Upper Cretaceous
M490	45.173614	5.676377	250	25	Upper Cretaceous
M493	45.169709	5.66566	220	76	Urgonian
M494	45.172727	5.669191	10	55	Upper Cretaceous
M495	45.171652	5.668117	16	65	Upper Cretaceous
M496	45.171737	5.667959	270	47	Upper Cretaceous
M497	45.171671	5.667166	200	20	Upper Cretaceous
M499	45.493072	5.791412	15	89	Urgonian
M500	45.492885	5.791205	208	87	Miocene
M501	45.492897	5.790613	197	77	Miocene
M503	45.438515	5.756918	15	57	Urgonian
M504	45.437938	5.755453	125	15	Urgonian

M505	45.417684	5.740655	195	68	Miocene
M506	45.417052	5.73541	0	0	Miocene
M507	45.418826	5.736896	0	0	Miocene
M508	45.418927	5.736749	25	73	Miocene
M510	45.456181	5.786988	200	85	Miocene
M511	45.455589	5.787338	40	28	Miocene
M512	45.453408	5.792106	63	18	Urgonian
M513	45.455355	5.802694	60	36	Urgonian
M514	45.466786	5.81514	23	40	Urgonian
M515	45.460235	5.819524	195	72	Urgonian
M516	45.463668	5.82353	195	63	Upper Cretaceous
M517	45.464059	5.824434	27	20	Lower Cretaceous
M518	45.461528	5.825758	210	58	Miocene
M519	45.435586	5.814445	20	25	Miocene
M520	45.43296	5.816532	80	20	Miocene
M521	45.432603	5.816669	120	87	Miocene
M522	45.431965	5.816321	15	15	Miocene
M523	45.431361	5.817495	310	27	Miocene
M524	45.429691	5.820438	200	80	Urgonian
M528	45.104038	5.605984	5	78	Upper Cretaceous
M529	45.094641	5.602653	201	50	Upper Cretaceous
M530	45.087897	5.60444	78	35	Urgonian
M533	45.082585	5.610889	189	9	Lower Cretaceous
M534	45.083099	5.610765	350	55	Lower Cretaceous
M535	45.083375	5.61134	197	25	Urgonian
M537	45.084218	5.614472	350	40	Lower Cretaceous
M538	45.083752	5.613616	200	30	Lower Cretaceous
M540	45.081188	5.613867	355	67	Lower Cretaceous
M541	45.080896	5.613716	332	32	Lower Cretaceous
M542	45.082378	5.613513	194	48	Lower Cretaceous
M543	45.082768	5.613528	201	32	Lower Cretaceous
M544	45.0824	5.612546	202	25	Lower Cretaceous
M545	45.07775	5.611297	187	45	Lower Cretaceous

M547	45.070603	5.609105	85	55	Urgonian
M548	45.069824	5.60855	72	54	Urgonian
M549	45.068922	5.60803	58	55	Urgonian
M550	45.068289	5.608235	88	64	Urgonian
M551	45.068547	5.608175	80	57	Urgonian
M552	45.1057	5.606264	172	78	Upper Cretaceous
M553	45.10759	5.606469	345	68	Urgonian
M554	45.109378	5.606333	195	15	Urgonian
M555	45.111049	5.606265	200	20	Urgonian
M556	45.11273	5.60628	180	5	Urgonian
M557	45.111557	5.605789	220	40	Urgonian
M558	45.121703	5.60366	225	45	Upper Cretaceous
M559	45.124515	5.60296	225	33	Upper Cretaceous
M560	45.056757	5.575464	272	20	Urgonian
M561	45.056621	5.576324	2	57	Urgonian
M562	45.056268	5.576192	210	19	Urgonian
M563	45.051807	5.576029	150	30	Upper Cretaceous
M566	45.047733	5.57724	197	24	Upper Cretaceous
M568	45.045435	5.577832	214	13	Upper Cretaceous
M569	45.04817	5.583975	180	20	Upper Cretaceous
M573	45.052432	5.596048	27	80	Upper Cretaceous
M574	45.052419	5.596616	345	55	Urgonian
M575	45.052493	5.59665	60	35	Urgonian
M577	45.052636	5.596871	48	60	Urgonian
M578	45.052804	5.597308	28	46	Urgonian
M579	45.054023	5.598245	40	40	Urgonian
M580	45.055468	5.600389	87	40	Urgonian
M582	45.057451	5.601371	75	45	Urgonian
M583	45.059572	5.60247	50	45	Urgonian
M584	45.060942	5.603439	30	47	Urgonian
M585	45.061081	5.602263	84	50	Urgonian
M586	45.062435	5.60263	70	50	Urgonian
M587	45.063601	5.602967	55	45	Urgonian

M588	45.068493	5.608246	215	47	Urgonian
M589	45.072003	5.609423	184	80	Urgonian
M590	45.072429	5.609319	0	88	Urgonian
M591	45.073307	5.60805	220	35	Urgonian
M592	45.084892	5.603428	295	15	Upper Cretaceous
M593	45.080312	5.601668	175	50	Upper Cretaceous
M594	45.076682	5.600112	215	30	Upper Cretaceous
M595	45.074464	5.599316	190	60	Upper Cretaceous
M596	45.074167	5.597799	235	40	Upper Cretaceous
M597	45.071712	5.593799	260	45	Upper Cretaceous
M598	45.047879	5.574588	335	15	Upper Cretaceous
M599	45.047762	5.572854	157	25	Upper Cretaceous
M600	45.987973	5.379891	65	18	Bajocian
M605	46.06649	5.369786	37	12	Lower Cretaceous
M606	46.056841	5.365613	32	15	Upper Jurassic
M607	46.074089	5.44214	215	75	Oxfordian
M480	45.778936	5.284636	215	15	Bajocian
M481	45.779769	5.284167	205	15	Bajocian
M611	46.17663	5.321596	350	55	Bajocian
M612	46.177161	5.321219	330	77	Bajocian
M613	46.177266	5.322125	350	58	Bajocian
M614	46.175625	5.321145	10	25	Miocene
M615	46.250342	5.360179	210	42	Upper Jurassic
M616	46.253313	5.362698	205	42	Upper Jurassic
M617	46.255402	5.363166	184	48	Upper Jurassic
M619	46.257632	5.361529	200	45	Oligocene
M620	46.254415	5.362064	200	52	Oligocene
M621	46.387091	5.341504	30	27	Upper Jurassic (Upper Oxfordian)
M622	45.975817	5.369348	42	45	Upper Jurassic (Breccia)
M623	45.97809	5.371971	65	30	Bajocian
M634	45.028121	5.570968	315	18	Urgonian
M635	45.026868	5.573852	318	18	Urgonian
M636	45.025219	5.57451	340	30	Urgonian

M637	45.023866	5.575381	340	30	Urgonian
M638	45.022993	5.575895	323	16	Urgonian
M639	45.021407	5.576791	217	14	Urgonian
M640	45.022071	5.577468	7	25	Urgonian
M642	45.021977	5.580976	208	37	Urgonian
M644	45.020456	5.583317	183	43	Urgonian
M645	45.016774	5.58423	178	42	Urgonian
M647	45.015343	5.584388	180	25	Urgonian
M650B	45.070482	5.545719	175	45	Upper Cretaceous
M654	45.013436	5.583816	207	40	Urgonian
M658	45.006884	5.585208	185	45	Lower Cretaceous
M659	45.221547	5.635957	20	70	Upper Cretaceous
M660	45.221579	5.634959	15	50	Urgonian
M661	45.221579	5.635962	5	54	Upper Cretaceous
M662	45.219592	5.640547	340	21	Upper Cretaceous
M664	45.030339	5.61041	200	62	Lower Cretaceous
M665	45.031115	5.614139	205	50	Lower Cretaceous
M666	45.03103	5.614875	8	75	Lower Cretaceous
M667	45.031521	5.615147	215	47	Upper Jurassic
M668	45.031459	5.615346	60	90	Upper Jurassic
M669	45.012153	5.617593	210	50	Lower Cretaceous
M670	45.011452	5.618113	200	43	Upper Jurassic
M671	45.011339	5.619575	202	40	Upper Jurassic
M672	45.007594	5.620267	200	50	Upper Jurassic
M673	45.007288	5.620015	178	68	Upper Jurassic
M674	45.006548	5.620612	200	65	Upper Jurassic
M680	45.059115	5.630231	**22**	**55**	Lower Cretaceous
M681	45.054389	5.625327	**7**	**47**	Lower Cretaceous
M684	45.072726	5.740614	195	55	Trias
M684	45.072726	5.740614	250	55	Trias
M685	45.072801	5.740153	8	85	Trias
M687	45.072288	5.739732	125	80	Trias
M689	45.072456	5.738751	155	60	Toarcian

M690	45.072507	5.738993	155	40	Toarcian
M691	45.07272	5.739279	185	55	Toarcian
M696	45.041229	5.692048	45	30	Bathonian-Bajocian
M697	45.040368	5.69156	355	55	Bathonian-Bajocian
M698	45.038094	5.690966	204	50	Bathonian-Bajocian
M699	45.032364	5.690499	350	65	Bathonian-Bajocian
M700	45.029316	5.689881	175	65	Bathonian-Bajocian
M701	45.028276	5.689116	180	50	Bathonian-Bajocian
M702	45.027333	5.687996	205	55	Aalenian
M703	45.044526	5.692428	170	75	Aalenian
M704	45.038082	5.705444	180	70	Aalenian
M705	45.033805	5.713515	182	80	Toarcian
M706	45.033988	5.718633	345	60	Toarcian
M708	45.033256	5.719065	345	55	Toarcian
M711	45.031958	5.721036	342	45	Toarcian
M715	45.025389	5.723288	322	75	Hettangian-Sinemurian
M716	45.02571	5.727715	325	75	Hettangian-Sinemurian
M717	45.066397	5.753825	180	47	Hettangian-Sinemurian
M718	45.022376	5.77872	90	25	Hettangian-Sinemurian
M718	45.022376	5.77875	83	20	Trias
M722 (t)	44.985867	5.82756	**355**	**80**	Lower Jurassic
M723	44.989221	5.829942	180	80	Lower Jurassic
M728	44.97915	5.833152	215	62	Permo-carboniferous
M729	44.976127	5.829807	175	75	Sinemurian
M730	44.975594	5.828667	358	85	Sinemurian
M731	44.975216	5.828214	350	55	Sinemurian
M732	44.97475	5.827773	355	80	Sinemurian
M733	44.97396	5.827109	358	65	Sinemurian
M734	44.972078	5.821764	150	15	Sinemurian
M735	44.972188	5.820226	147	25	Sinemurian
M736	44.96396	5.817746	165	20	Sinemurian
M737	45.027818	5.771891	197	55	Trias

Table S6: Bedding strike and dip measurement. RHR= Right-hand-rule. Azimuth and dip measures in bold correspond to overturned bedding.

Table S7: Shortening and offset amounts deduced from balanced cross-sections.

Cross-section	**B**										
Phase	**Phase 2**							**Phase 1**			
Fault zone	**FZ4**	**FZ3**	**FZ2**	FZ2-2c	FZ2-2b	FZ2-2a	**GF**	**FZ1 total**	FZ1	FZ1-b	**Total**
True displacement along the fault [m]	508	1049	4195	1293	1728	1174	860	10206	9400	806	16818
Offset [m]	249	366	2660	850	1050	760	660	2160		2160	6095
Folding [m]	140	686	1197	179	496	522	887	4978		4978	7888
Heave [m]	435	983	3229	970	1363	896	550	9154	8654	500	14351
Total horizontal shortening = folding+heave [m]	575	1669	4426	1149	1859	1418	1437	14132	8654		**22239**
Total horizontal shortening by phase	**6670**							**14132**			
Onset (Ma)	15	16.3	16.3	16.3	16.3	16.3	17.35	29	29	29	
Uncertainty (Ma)	0.15	0.4	0.4	0.4	0.4	0.4	0.15	2	2	2	
End (Ma)	12	15	15	15	15	15	16.3	17.35	17.35	17.35	
Uncertainty (Ma)	?	?	?	?	?	?	?	0.15	0.15	0.15	
Period of activity [Ma]	3	1.3	1.3	1.3	1.3	1.3	1.05	11.65	11.65	11.65	
Displacement rate [mm yr^{-1}]	0.169	0.807	3.227	0.995	1.329	0.903	0.819	0.876	0.807	0.069	
Shortening rate [mm yr^{-1}]	0.192	1.284	3.405	0.884	1.430	1.091	1.369	1.213	0.000	0.000	

Cross-section	C										
Phase	**Phase 2**							**FZ1**	**Late phase**		
Fault zone	**FZ4**	**FZ3**	**FZ2**	FZ2-2a	FZ2-2a1	FZ2-2a2	**GF**	**FZ1**	bkt2	bkt1	Total
True displacement along the fault [m]	200	493	4281	2879	897	505	181	4758	165	150	10047
Offset [m]	134	312	2853	1723	677	453	148	?	?		3299
Folding [m]	140	1050	1250	700	0	550	650	2326	1031	326	6123
Heave [m]	347	381	3147	2302	589	256	104	3475	150	101	7601
Total horizontal shortening = folding+heave [m]	487	1431	4397	3002	589	806	754	5801	1181	427	**13724**
Total horizontal shortening by phase [m]	**6315**							**5801**	**1608**		
Onset (Ma)	15	16.3	16.3	16.3	16.3	16.3	17.35	29	?	?	
Uncertainty (Ma)	0.15	0.4	0.4	0.4	0.4	0.4	0.15	2	?	?	
End (Ma)	12	15	15	15	15	15	16.3	17.35	?	?	
Uncertainty (Ma)	?	?	?	?	?	?	?	0.15	?	?	
Period of activity [Ma]	3	1.3	1.3	1.3	1.3	1.3	1.05	11.65	?	?	
Displacement rate [mm yr^{-1}]	0.067	0.379	3.432	2.215	0.690	0.388	0.172	0.408	?	?	
Shortening rate [mm yr^{-1}]	0.116	0.293	2.501	1.771	0.453	0.197	0.099	0.298	?	?	

Table S7: Table of shortening and offset amounts deduced from the cross-sections restoration. The grey background columns correspond to individual branches of a single fault (see Fig. 18).

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