On-line Supplementary material for:

Pre-treatment of culture media with an extremely low frequency magnetic field alters daily response of dinoflagellate cultures to space weather variables similar to direct magnetic exposure

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Fig. S1. The LED illumination wood structures, each equipped with one overhead warm-white LED spot (GU10 fitting), mounted on a wood frame attached on top of wooden tables to avoid ferromagnetic materials creating static magnetic fields close to the cultures. In the first plane, the cardboard cover was removed.
Reflecting covers were used to maximize light intensity while keeping at a distance lamps (emitting radiofrequency in the KHz region) and wires (emitting 50 Hz fields). Magnetic imprinting (not shown) was carried out on the shelf at the right.

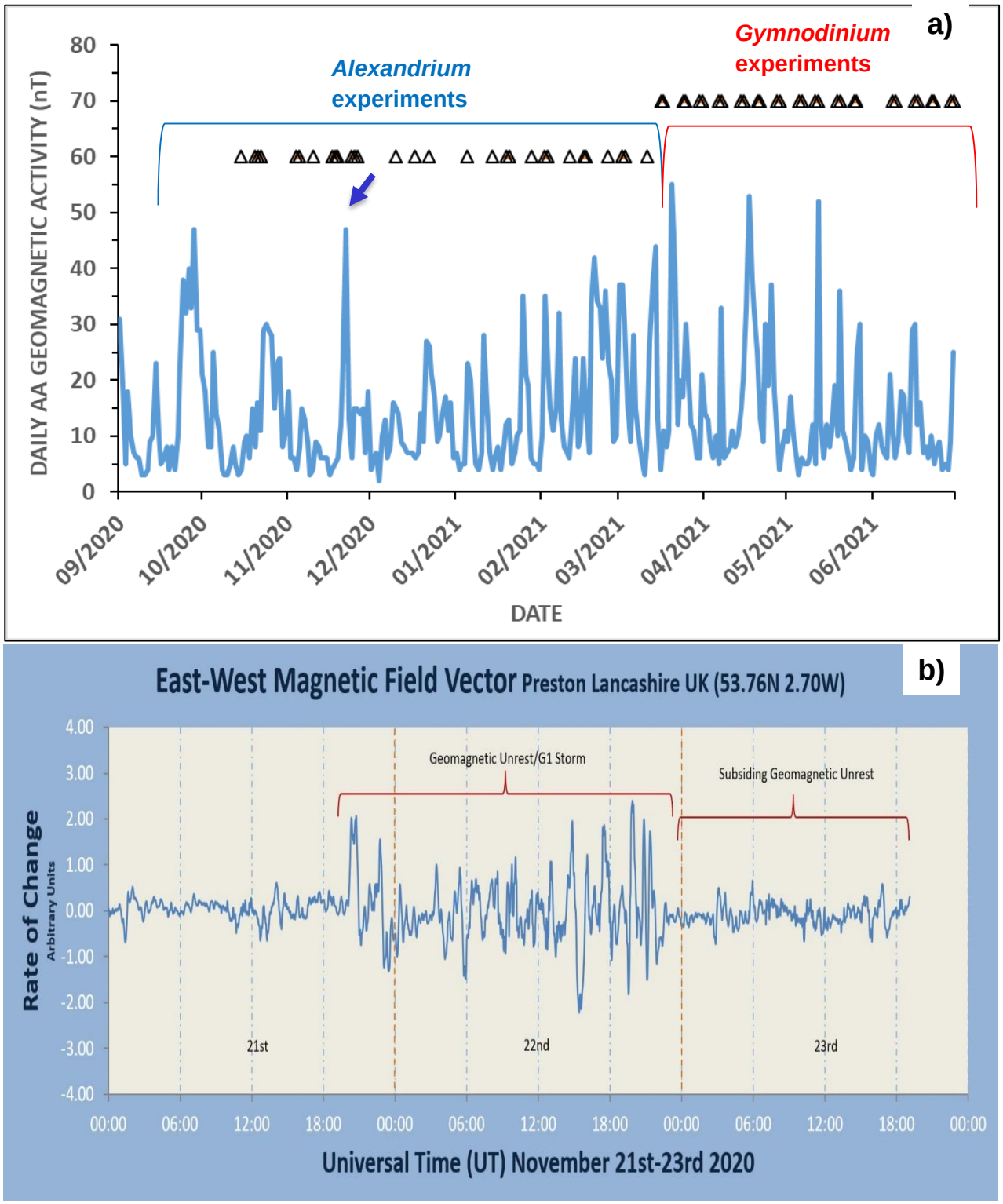

Fig. S2. a) Daily aa geomagnetic activity during the experimental period. It is calculated by averaging the daily eight 3-hour periods commonly reported. Days with experiments were marked with an Δ; b) example of the variation of the east-west magnetic field vector in Earth's northern hemisphere during a G1 storm (November 2020; marked by a blue arrow in a; source: https://spaceweather.com/).

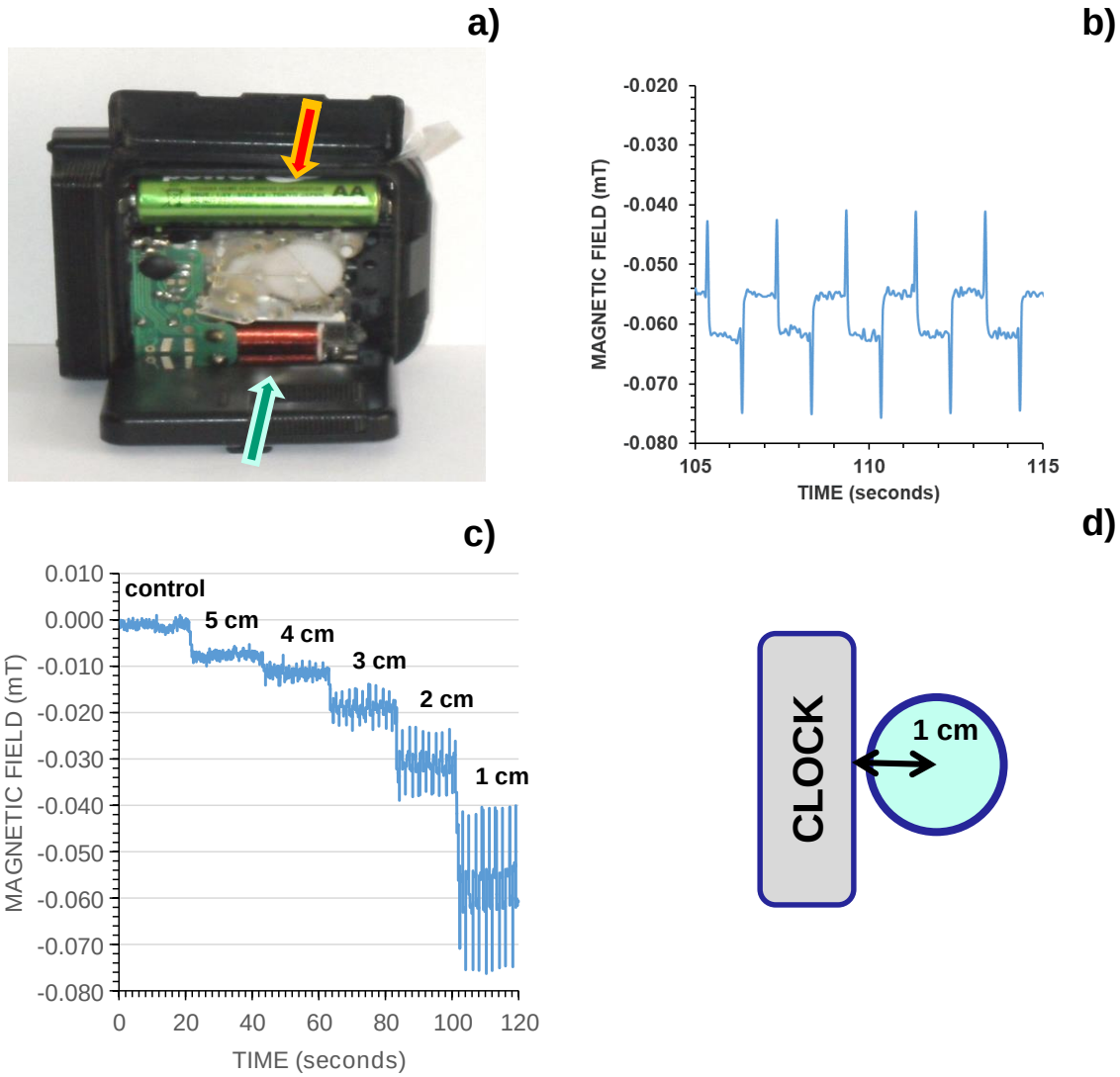

Fig. S3. Description of the extremely low frequency magnetic field apparatus: a) Backside of the battery (red arrow) alarm clock. The solenoid (green arrow) generating the magnetic field was placed towards the shelf, and flask (blue circle) receiving the magnetic field exposure placed close to it; b) time detail at 1 cm, polarity reversal occurs every second; c) Horizontal east-west magnetic field at 1 cm shelf height and its variation between 1-5 cm from the clock backside; d) Upper view of clock and flask placement for water 'magnetic imprint'.

N	DATE	Temp. (ºC)	GMA (nT)	Radio flux (F-units)	Nº Flares (C+M+X)	CC-0 (cells/mL)	CC-CON (cells/mL)	CC-MTCM (cells/mL)	DIFERENCE (%)	GROWTH-CON (%)	GROWTH-MTCM (%)	Notes
1	15/10/2020	21.0	2.0	75	0	5 309	5 640	6 133	109	106	116	
2	20/10/2020	20.5	12.3	75	0	5 091	5 747	5 700	99	113	112	
3	21/10/2020	20.5	17.3	75	0	6 133	6 533	6 813	104	107	111	
4	22/10/2020	20.5	14.0	74	0	6 315	6 760	7 107	105	107	113	
5	04/11/2020	19.5	4.3	83	1	6 782	7 880	7 240	92	116	107	
6	05/11/2020	19.5	2.8	88	5	7 600	7 880	8 427	107	104	111	
7	10/11/2020	21.0	4.3	90	0	7 345	9 573	9 540	100	130	130	
8	17/11/2020	21.0	2.0	77	0	4 752	5 973	6 013	101	126	127	
9	18/11/2020	21.0	5.8	79	0	6 606	7 733	6 800	88	117	103	
10	19/11/2020	21.0	5.0	77	0	4 709	5 973	5 413	91	127	115	
11	24/11/2020	20.5	7.5	96	1	4 061	5 653	5 813	103	139	143	
12	25/11/2020	20.5	8.3	100	2	4 933	5 413	6 213	115	110	126	
13	26/11/2020	20.5	15.8	104	1	4 727	5 067	5 387	106	107	114	
14	10/12/2020	18.0	18.0	82	0	4 558	4 760	4 440	93	104	97	
15	17/12/2020	18.0	6.8	82	0	3 782	4 573	4 227	92	121	112	
16	22/12/2020	19.0	36.8	80	0	4 279	5 120	4 613	90	120	108	
17	05/01/2021	*19.0*	9.3	78	0	5 467	6 080	5 880	97	111	108	
18	14/01/2021	*19.0*	5.3	73	0	5 370	6 693	6 733	101	125	125	
19	19/01/2021	*19.0*	15.3	75	0	5 600	6 587	6 680	101	118	119	
20	20/01/2021	20.0	9.3	78	1	5 927	6 733	6 560	97	114	111	
21	28/01/2021	21.0	13.8	76	0	6 412	6 240	6 160	99	**97**	**96**	* sismo Oeiras, 31/1, **2,7**
22	02/02/2021	19.0	37.0	74	0	4 703	4 973	5 307	107	106	113	
23	03/02/2021	19.0	16.0	73	0	5 212	5 853	6 173	105	112	118	
24	11/02/2021	18.5	4.3	74	0	5 952	5 667	5 640	100	**95**	**95**	* sismo Rio Maior, 12/2, 22 hs, **3,6**
25	16/02/2021	18.0	28.5	70	0	5 430	6 240	6 253	100	115	115	
26	17/02/2021	18.5	9.0	71	0	5 479	6 787	6 507	96	124	119	? Outlier, no explanation
27	25/02/2021	18.5	27.5	81	0	5 655	7 320	7 020	96	129	124	
28	02/03/2021	18.5	12.0	71	0	4 691	6 813	6 500	95	145	139	
29	03/03/2021	18.5	45.5	75	1	5 152	6 360	6 320	99	123	123	
30	11/03/2021	18.5	2.8	79	0	5 333	6 480	6 387	99	122	120	

Fig. S4. Raw data for *Alexandium pacificum* experiments. CC = cell concentration; CC-0 = cell concentration at the start of the experiment. Notes marked yellow explain outliers removed in selected MAA data treatment. Notes describe the Earthquake's ('sismo') epicenter location, day+hour and intensity. During nearby earthquakes, no growth was observed, cell loss took place instead (numbers in bold).

N	DATE	Temp. (ºC)	GMA (nT)	Radio flux (F-units)	Nº Flares (C+M+X)	CC-0 (cells/mL)	CC-CON (cells/mL)	CC-MTCM (cells/mL)	DIFERENCE (%)	GROWTH-CON (%)	GROWTH-MTCM (%)	Notes
1	16/03/2021	18.5	3.5	75	0	1 533	1 730	1 910	110	113	125	
2	17/03/2021	18.5	8.8	79	0	1 882	1 877	2 017	107	100	107	
3	24/03/2021	19.0	18.0	79	0	1 873	1 950	2 013	103	104	108	
4	25/03/2021	19.0	42.0	84	0	1 821	1 707	1 623	95	**94**	**89**	* sismo Loures, 28/3, 10 hs, **3,4**
5	30/03/2021	19.0	3.8	74	0	1 415	2 143	1 933	90	151	137	
6	31/03/2021	19.0	13.0	80	0	2 003	2 217	1 880	85	111	**94**	
7	06/04/2021	20.5	2.0	72	0	1 786	2 070	1 923	93	116	108	
8	07/04/2021	20.5	17.3	74	0	1 673	2 013	1 820	90	120	109	
9	14/04/2021	20.5	10.3	73	0	2 155	2 543	1 790	70	118	**83**	
10	15/04/2021	20.5	36.0	74	0	2 164	2 533	2 243	89	117	104	
11	20/04/2021	21.0	23.3	86	1	1 842	1 957	1 977	101	106	107	
12	21/04/2021	21.0	17.0	80	0	2 039	2 197	1 657	75	108	**81**	
13	27/04/2021	21.0	18.0	80	1	2 100	2 317	2 000	86	110	**95**	
14	28/04/2021	21.0	3.5	79	0	2 191	2 130	2 313	109	**97**	106	
15	05/05/2021	21.0	3.5	70	0	2 818	2 613	2 950	113	**93**	105	
16	06/05/2021	21.0	4.3	70	0	2 718	2 980	2 460	83	110	**91**	
17	11/05/2021	21.0	6.0	77	0	2 597	2 817	2 680	95	108	103	
18	12/05/2021	21.0	14.5	76	0	2 415	2 750	2 633	96	114	109	
19	19/05/2021	22.0	6.5	76	1	2 694	2 573	2 407	94	**96**	**89**	
20	20/05/2021	22.0	19.0	76	0	2 385	2 600	2 623	101	109	110	* sismo Braga, 20/5, 22 hs, **3.7**; excessive debris
21	25/05/2021	21.5	2.0	73	0	2 232	2 630	2 740	104	118	123	
22	26/05/2021	21.5	8.3	84	0	2 530	2 637	3 137	119	104	124	
23	08/06/2021	21.5	15.0	81	0	2 636	2 540	3 075	121	**96**	117	
24	09/06/2021	21.5	6.5	80	3	2 397	2 730	2 847	104	114	119	
25	16/06/2021	22.5	42.0	76	0	2 121	3 050	2 703	89	144	127	mucilage in inocula and control, not in MTCM
26	17/06/2021	22.5	18.0	76	0	2 748	2 923	2 647	91	106	**96**	mucilage in inocula and control, not in MTCM
27	22/06/2021	21.5	10.3	79	0	2 042	1 883	2 063	110	**92**	101	
28	23/06/2021	21.5	7.5	81	0	2 082	2 210	2 190	99	106	105	
29	29/06/2021	21.5	5.8	89	2	2 432	2 610	2 423	93	107	100	
30	30/06/2021	21.0	9.0	93	0	2 061	2 013	2 123	105	**98**	103	

Fig. S5. Raw data for *Gymnodinium catenatum* experiments. CC = cell concentration; CC-0 = cell concentration at the start of the experiment. Notes marked yellow explain outliers removed in selected MAA data treatment. Notes describe the Earthquake's ('sismo') epicenter location, day+hour and intensity. Other outliers were related to excessive mucilage, no explanation found. During nearby earthquakes (Loures), no growth was observed, cell loss took place instead (numbers in bold). Several other instances of cell losses were observed both in control and MTCM, but were unrelated to M3 earthquakes (numbers in bold).

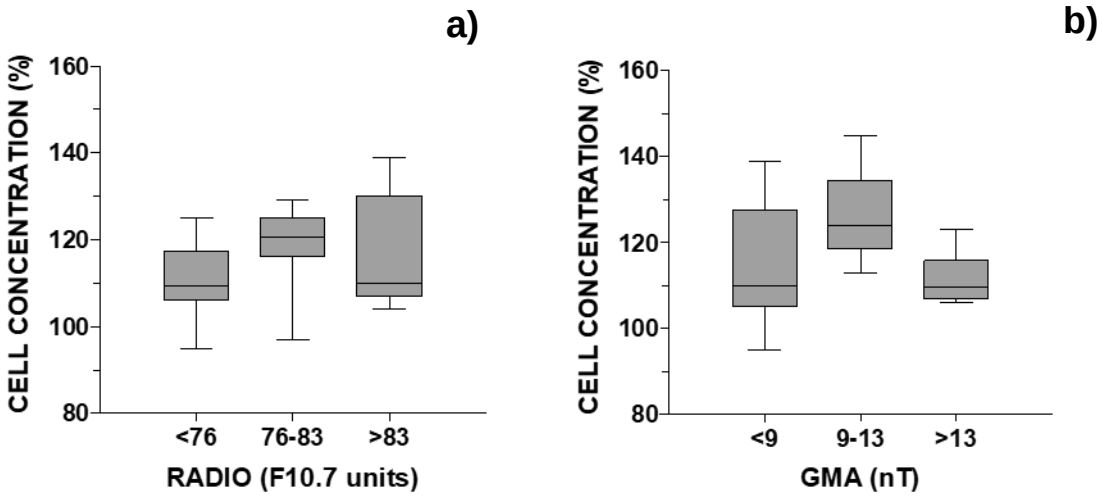

Fig. S6. Daily growth for *A. pacificum* observed in the control (non-treated) distributed accordingly with the a) daily RADIO flux (N=25; when GMA <9 or >13 nT), b) GMA activity (N=18; when RADIO <76 or >83 $F_{10.7}$ units).

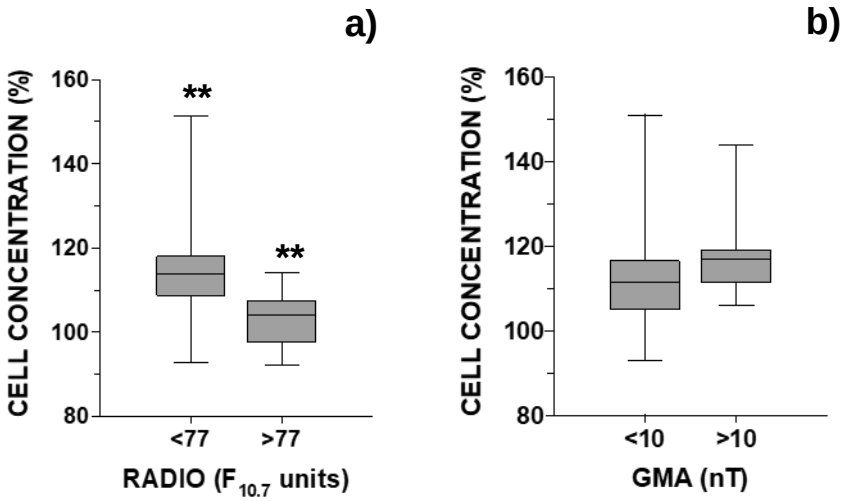

Fig. S7. Daily growth for *G. catenatum* observed in the control distributed accordingly with the a) RADIO flux (N=30); b) GMA activity (N=15; when RADIO <77 $F_{10.7}$ units).