Supplementary Table S1. Statistical parameters of the Modern Analog Technique (MAT), Weighted Averaging Partial Least Squares regression (WA-PLS), Boosted Regression Trees (BRT), Random Forest (RF) and Climatic Amplitude Method (CAM) methods applied on the European and Mediterranean pollen dataset. Six climatic parameters have been reconstructed: MAAT (mean annual air temperature), MTWA (mean temperature of the warmest month), MTCO (mean temperature of the coldest month), PANN (mean annual precipitation), Pwinter (mean winter precipitation), and Psummer (mean summer precipitation). The coefficient of determination (R^2) and the root mean square error (RMSE) for each method are represented.

Method	Climate parameter	R^2	RMSE
MAT	MAAT (°C)	0.81	2.31
	MTWA (°C)	0.82	2.41
	MTCO (°C)	0.81	2.66
	PANN ($mm.year^{-1}$)	0.82	142.07
	P_{summer} ($mm.year^{-1}$)	0.87	46.05
	P_{winter} ($mm.year^{-1}$)	0.65	69.26
WA-PLS	MAAT (°C)	0.55	3.12
	MTWA (°C)	0.57	3.2
	MTCO (°C)	0.52	3.66
	PANN ($mm.year^{-1}$)	0.52	195.39
	P_{summer} ($mm.year^{-1}$)	0.61	69.2
	P_{winter} ($mm.year^{-1}$)	0.21	88.85
BRT	MAAT (°C)	0.89	2.05
	MTWA (°C)	0.89	2.14
	MTCO (°C)	0.9	2.32
	PANN ($mm.year^{-1}$)	0.89	126.63
	P_{summer} ($mm.year^{-1}$)	0.92	42.46
	P_{winter} ($mm.year^{-1}$)	0.78	62.63
RF	MAAT (°C)	0.67	2.63
	MTWA (°C)	0.67	2.75
	MTCO (°C)	0.69	2.93
	PANN ($mm.year^{-1}$)	0.65	163.76
	P_{summer} ($mm.year^{-1}$)	0.75	55.01
	P_{winter} ($mm.year^{-1}$)	0.43	75.18
CAM	MAAT (°C)	0.87	3.4
	MTWA (°C)	0.68	2.9
	MTCO (°C)	0.86	5.5
	PANN ($mm.year^{-1}$)	0.45	257

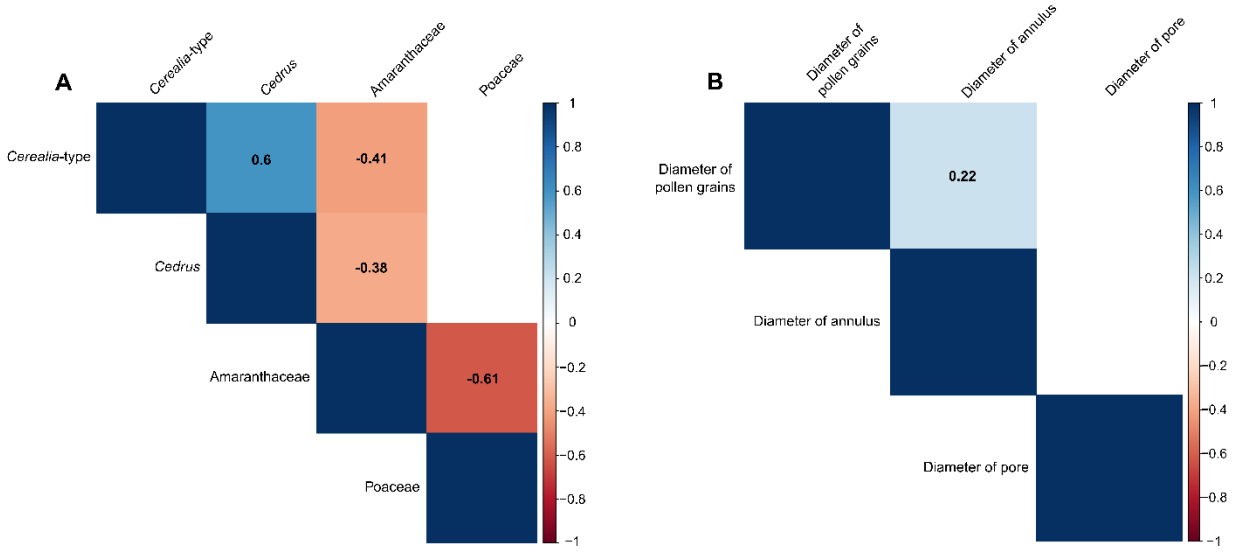
Supplementary Table S2. Measurements of diameter of pollen grains, annulus and pores of large pollen grains of Poaceae from the core BS-87 Burdur against core depth.

Depth (m)	Diameter of pollen grains (µm)	Diameter of annulus (µm)	Diameter of pore (µm)
8.6	42	8.69	3.62
13.6	43.86	10.36	3.37
13.6	59.06	12.07	4.08
13.6	47.42	12.15	3.92
13.6	43.17	10.5	3.47
13.6	43.55	4.79	12.21
13.6	53.96	17.77	4.83
13.6	44.73	11.84	4.08
13.6	41.79	9.2	3.7
13.6	48.9	12.48	3.5
27.3	49.02	7.45	2.89
27.3	40.82	7.85	3.25
32.8	41.19	9.07	3.54
32.8	42.02	6.7	2.45
32.8	48.55	9.89	3.24
32.8	45.27	9.95	5.14
32.8	43.8	11.01	3.27
45.3	46.91	7.89	4.09
52.1	43.81	8.71	2.89
52.1	42.1	6.86	2.73
52.1	43.61	11.47	4.1
52.1	46.21	4.74	8.85
55.38	44.52	11.39	4.52
60.96	41.95	10	4.16
69.6	41.45	9.83	3.81
69.6	49.05	3.65	9.67
69.6	45.69	3.02	8.43
69.6	43.46	3.56	9.08
73	50.35	9.92	4.74
73	41.13	9.88	3.96
73	45.46	9.27	4.91
81.35	47.04	8.37	4.09
85.2	45.06	12.12	5.46
95.15	43.64	11.12	4.44
95.15	41.15	7.51	3.09
105.5	54.04	9.6	4.09
109.75	47.76	11.16	3.21
109.75	45.62	8.43	3.46
109.75	46.73	9.95	3
109.75	40.08	8.35	3.47
109.75	50.01	9.71	4.03

109.75	41.43	9.24	3.93
113.77	44.96	7.21	5.39
113.77	54.81	10.36	4.75
113.77	46.31	9.55	4.32
113.77	44.09	10.02	3.94
113.77	42.28	13.41	5.85
121.2	45.92	9.81	3.63
121.2	50.21	9.08	3.82
121.2	40.83	7.98	3.45
121.2	45.92	8.33	5.1
121.2	45.79	7.55	3.23
121.2	45.52	9.64	4.5
121.2	46.07	11.45	4
121.2	47.44	10.26	3.8
121.2	46.93	8.56	3.59
121.2	46.57	6.11	3.21
121.2	42.76	9.83	4.27
121.2	43.98	10.04	4.29
124.75	45.79	7.3	3.66
124.75	50.42	9.37	4.48
124.75	46.8	10.66	4.19
124.75	60.15	10.36	4.98
124.75	46.78	9.66	4.96
124.75	50.74	12.4	7.79
124.75	46.86	10.6	5.06
129.6	50.4	11.4	5
129.6	46.72	9.61	4.77
129.6	40.99	10.26	3.59
129.6	47.94	10.76	4.5
129.6	46.55	7.87	2.73
129.6	45.27	7.71	5.26
129.6	44.68	11.68	4.2
137.86	48.17	9.83	4.42
137.86	40.95	9.94	3.41
137.86	45.26	9.4	5.38
143.55	45.12	8.71	4.43
143.55	41.4	9.59	5.05
152.75	46.46	7.97	3.52
156.65	41.16	10.53	5.35
156.65	51.93	13.11	4.16
156.65	41.16	10.75	5.46
156.65	41.74	12.57	6.32
162	41.7	9.19	3.94
162	44.96	8.6	3.97
162	43.19	10.54	4.25
162	45.68	8.85	3.8

173	46.08	8.98	3.39
173	50.47	12.03	4.81
182.25	48.2	12.13	4.5
182.25	47.85	9.72	5.17
185.5	40.92	8.28	4.87
185.5	40.83	7.87	3.79
185.5	40.44	9.93	4.1
185.5	43.22	8.84	3.35
185.5	40.83	8.83	3.71
185.5	50.08	8.14	5.69
185.5	42.85	9.35	3.52
185.5	45.56	8.41	3.43
189.65	42.67	11.34	4.75
189.65	45.8	9.88	3.18
189.65	47.73	10.8	4.98
189.65	41.82	13.42	7.54
189.65	55.24	10.86	5.57
189.65	51.93	11.04	5.12
189.65	48.07	8.72	3.34
189.65	50.55	11.02	3.94
189.65	46.96	7.68	3.14
189.65	43.61	12.66	5.24
189.65	48.85	9.6	4.75
189.65	44.07	10.82	3.66
196.04	41.37	9.1	4.08
196.04	40.91	11.08	2.77
196.04	44.02	10.13	5.47
196.04	43.67	9.68	4.22
196.04	48.64	13.66	7.28
196.04	48.92	13.76	6.02
196.04	55.09	8.44	4.14
196.04	41.05	5.99	3.16
196.04	47.39	11.49	5.46
196.04	42.75	10.27	3.72
196.04	51.64	9.85	4.43
199.05	47.77	12.48	5.18
199.05	50.84	10.09	4.63
230.88	46.75	8.94	4.19
230.88	42.52	7.98	2.52
230.88	48.88	10.03	4.5
230.88	45.38	10.28	5.79
246.6	43.76	9.07	3.76
246.6	52.62	10.33	5.3
246.6	44.06	13.15	4.85
246.6	40.93	9.84	5.74
246.6	43.95	11.1	4.01

Supplementary Figure S1. Pearson's correlation matrix showing significant correlations ($p \leq 0.05$), with a color gradient denoting the Pearson correlation coefficient. The analysis was applied between (A) selected pollen taxa and (B) measurements performed on *Cerealia*-type pollen grains.



Supplementary Table S3. Results of the climatic quantification based on the Climatic Amplitude Method (CAM, Fauquette et al., 1998). The estimates are given, for each parameter, as a minimum and a maximum value and a Most Likely Value which corresponds to a weighted mean.

Sample	MAAT (°C)			MTCO (°C)			MTWA (°C)			PANN (mm.yr^{-1})		
4.4	10	14.4	20	-1	0.5	2	22	24.4	27.5	500	620	700
6.65	10	14.8	20	-1	0.7	2	22	24.8	28	500	617	700
8.6	7	12.3	20	-1	4.4	11	20	23.4	28	1000	1126	1300
13.6	8.5	13.9	23	-4	0.1	5	21.5	23.4	27.5	500	620	700
20.2	3	12.1	25	-3	0.9	5	22	24.3	27.5	350	563	700
23.9	10	14.9	25	-3	-0.7	2	21	23.6	27.5	500	608	700
27.3	10	14.1	20	-1	2.1	5	22	24.3	27.5	500	619	700
32.8	3	11.9	25	-3	0.7	5	20	22.9	27.5	300	562	700
36.3	10	14.4	25	-3	1.3	5	22	24.6	27.5	300	454	700
39.45	10	15.7	25	-3	-0.2	2	22	24.7	27.5	350	567	700
45.3	8.5	14.2	25	-3	1.1	5	22	24.4	27.5	350	569	700
52.1	10	15.1	25	-3	-0.4	2	21	23.9	27.5	500	640	700
55.38	10	15.5	25	-3	2	6	22	24.7	27.8	396	589	700
60.96	10	15.1	25	-3	1.4	5	21.5	24.1	27.5	396	592	700
65.85	8.5	14.1	25	-3	0.9	5	21.5	23.7	27.5	300	560	700
69.6	8.5	13.9	23	-4	0.3	5	21.5	23.5	27.5	500	669	1000
73	10	15.7	25	-3	1	5	22	24.2	27	400	585	700
78.1	3.1	12.4	25	-3	1	5	20	23.1	27.5	396	584	700
81.35	10	13.4	16	-1	2.1	5	22	24.7	27.5	500	640	700
85.2	3.1	11.7	25	-3	1	5	22	24.3	27.5	350	467	700
90.1	10	14.8	25	-3	0.9	5	22	24.5	27.5	350	454	700
95.15	3	12.1	25	-3	0.9	5	20	23.1	27.5	300	549	700
97.65	10	14.8	20	-1	0.6	2	22	24.3	27	500	626	700
105.05	10	14.1	20	-1	2.1	5	20	23.4	27.5	500	617	700
109.75	10	14.3	20	-1	0.6	2	22	24.4	27.5	500	622	700
113.77	10	14.1	20	-1	0.5	2	22	24.4	27.5	500	618	700
117.28	8.5	14.4	25	-3	1.1	5	21.5	23.9	27.5	396	587	700
121.2	13	16.1	20	2.5	3.7	5	23	24.8	27	350	557	700
124.75	7	12.9	20	-1	2	5	20	23.1	27.5	500	622	700
129.6	13	15.8	20	2.5	3.7	5	23	24.7	27	500	560	700
137.86	10	14.5	20	-1	0.6	2	22	24.4	27.5	500	623	700
141.7	10	14.7	25	-3	-0.4	2	21	24.4	27.5	500	624	700
143.55	10	13.8	20	-1	2.1	5	22	24.4	27.5	500	662	900
152.75	10	14.4	20	-1	0.7	2	22	24.5	27.5	500	630	700
156.65	8.5	13.4	20	-1	1.8	5	21.5	23.5	27.5	500	626	700
162	10	14.7	20	-1	0.7	2	22	24.6	27.5	500	619	700
173	7	12.8	20	-1	1.9	5	20	23	27.5	500	670	1000
182.25	10	14.4	25	-3	1.3	5	20	23.6	27.5	300	439	500
185.5	10	14.1	20	-1	2.1	5	20	23.3	27.5	500	667	1000
189.65	10	14.8	20	-1	0.6	2	22	24.5	27.5	500	617	700
196.04	10	15	20	-1	0.7	2	22	24.6	27.5	500	619	700
199.05	10	15.1	20	-1	0.7	2	22	24.8	27.5	500	615	700
206.5	10	14.5	20	-1	0.6	2	22	24.5	27.5	500	617	700
218.41	10	16.4	25	-3	1	5	22	24.8	27.5	500	615	700
230.88	7	12.9	20	-1	2	5	20	23.1	27.5	500	622	700
246.6	7	12.3	20	-1	2	5	20	23.2	27.5	300	549	700

Supplementary Table S4. Description of ecological classification and associated pollen taxa presented in Figure 7 (modified from Jiménez-Moreno et al., 2007).

Ecological classification	Taxa
Megathermic (= tropical) elements	*Avicennia, Amanoa, Alchornea, Fothergilla, Exbucklandia,* Euphorbiaceae, Sapindaceae, Loranthaceae, Arecaceae, Acanthaceae, *Canthium*-type, Passifloraceae, etc
Mega-mesothermic (= subtropical) elements	Taxodiaceae, *Engelhardia, Platycarya, Myrica,* Sapotaceae, *Microtropis fallax, Symplocos, Rhoiptelea, Distylium* cf. *sinensis, Embolanthera, Hamamelis,* Cyrillaceaeae-Clethraceae, Araliaceae, *Nyssa, Liriodendron*, etc
Cathaya (altitudinal conifer)	*Cathaya,* an altitudinal conifer living today in Southern China
Mesothermic (= warm-temperate) elements	*Quercus pubescens*-type, *Carya, Pterocarya, Carpinus, Juglans, Celtis, Zelkova, Ulmus, Tilia, Acer, Parrotia* cf. *persica, Liquidambar, Alnus, Salix, Populus, Fraxinus, Buxus sempervirens*-type, *Betula, Fagus, Ostrya, Parthenocissus* cf. *henryana, Hedera, Lonicera, Elaeagnus, Ilex, Tilia,* etc
Pinus and poorly preserved Pinaceae pollen grains	*Pinus* and poorly preserved Pinaceae pollen grains
Meso-microthermic (= mid-altitude) trees	*Tsuga, Cedrus*
Microthermic (= high-altitude) trees	*Abies, Picea*
Non-significant pollen grains	Undetermined ones, poorly preserved pollen grains, some cosmopolitan or widely distributed elements such as Rosaceae and Ranunculaceae
Cupressaceae	Cupressaceae
Mediterranean xerophytes	*Quercus ilex*-type, *Carpinus* cf. *orientalis, Olea, Phillyrea, Ligustrum, Pistacia, Ziziphus, Cistus,* etc
Herbs including some subdesertic elements	Poaceae, *Erodium, Geranium, Convolvulus,* Asteroideae, Cichorioideae, Lamiaceae, *Plantago, Euphorbia,* Brassicaceae, Apiaceae, *Knautia, Helianthemum, Rumex, Polygonum, Asphodelus,* Campanulaceae, *Centaurea,* Ericaceae, Amaranthaceae, Caryophyllaceae, Plumbaginaceae, Cyperaceae, *Potamogeton, Sparganium, Typha,* Nympheaceae, *Lygeum, Neurada, Nitraria, Calligonum*
Steppe elements	*Artemisia, Ephedra*