Supplement of E&G Quaternary Sci. J., 69, 165–186, 2020
https://doi.org/10.5194/egqsj-69-165-2020-supplement

Open Access E&G Quaternary Science Journal

Supplement of

Reconstruction of palaeoenvironmental variability based on an inter-comparison of four lacustrine archives on the Peloponnese (Greece) for the last 5000 years

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Supplementary Online Material

Figure S1: Updated Bayesian age-depth model for Asea. The model was constructed using the R package *rbacon* (Blaauw and Christen, 2011). The blue tie bars indicate the ^{14}C age distributions. Outliers are plotted in red and excluded from modelling. The greyscale of the line graph reflects the likelihood; the darker the more likely the model passes through that age. The red dotted line follows the mean ages. For the initial age-depth-model please refer to Unkel et al. (2014).

Figure S2: Comparison of uncertainty ranges of age-depth-models for all four sites.

Figure S3: Comparison of log(Ca/Ti) (left y-axes) and PC1 (right y-axes) proxies for all study sites. (a) Stymphalia, (b) Kaisari, (c) Pheneos, (d) Asea. For orientation, boxes with cultural periods (Table S6) are plotted on top. For the interpretation, the reader is referred to the text.

Table S1: Sedimentary units of core PHE1. The soil type classification follows the German ad-hoc Arbeitsgruppe Boden (2005); (UB = upper boundary, G = gradational).

Table S2: Sedimentary units of core KES2. The soil type classification follows the German ad-hoc Arbeitsgruppe Boden (2005); (UB = upper boundary, G = gradational).

Table S3: Cultural chronology of southern Greece (slightly modified after Weiberg et al., 2016; Bintliff, 2012; Manning, 2010).

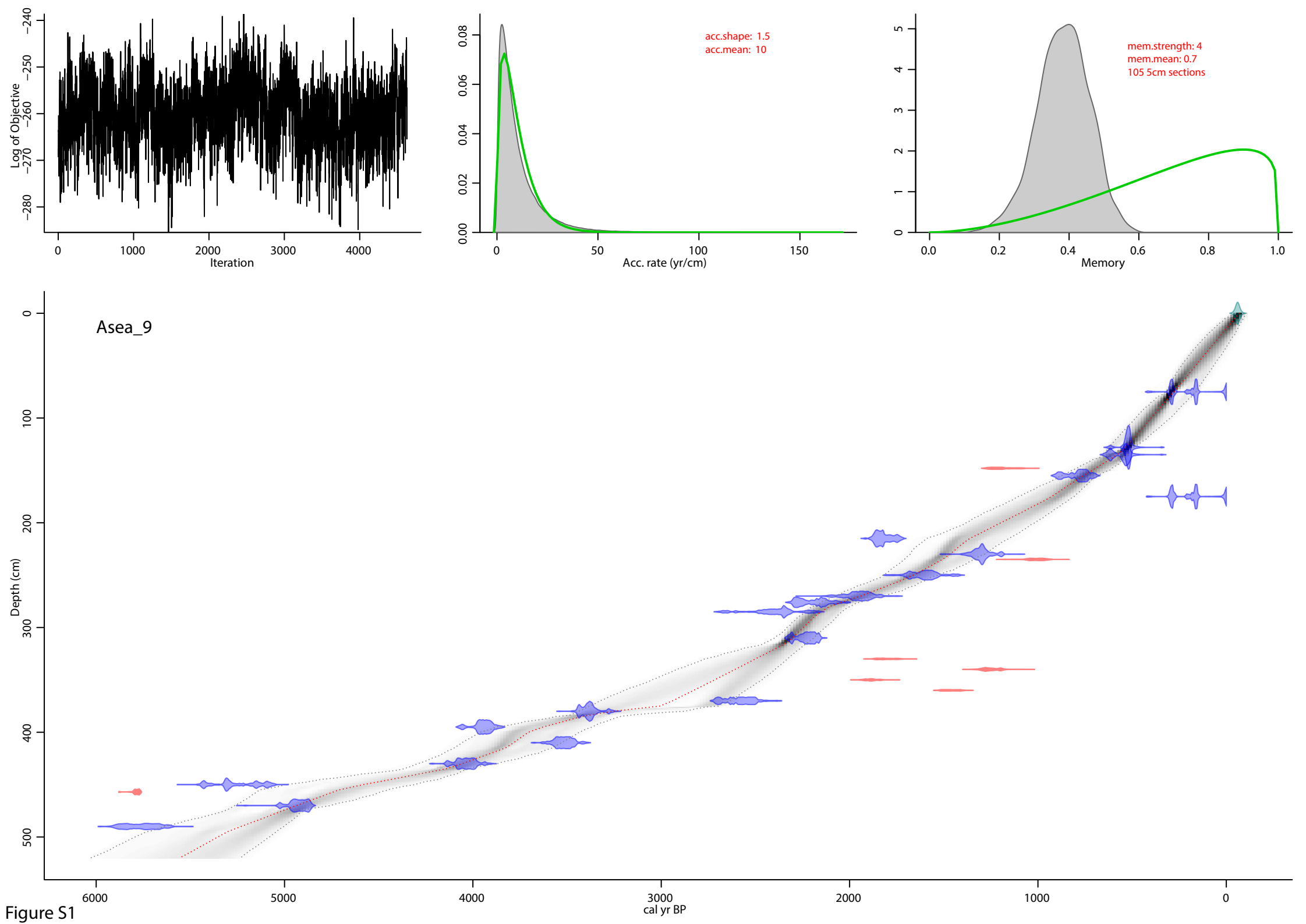
Log of Objective
−240
−250
−260
−270
−280
0
1000
2000
3000
4000
Iteration
0.00
0.02
0.04
0.06
0.08
acc.shape: 1.5
acc.mean: 10
0
50
100
150
Acc. rate (yr/cm)
0
1
2
3
4
5
mem.strength: 4
mem.mean: 0.7
105 5cm sections
0.0
0.2
0.4
0.6
0.8
1.0
Memory
Asea_9
Depth (cm)
0
100
200
300
400
500
6000
5000
4000
3000
2000
1000
0
cal yr BP

Figure S1

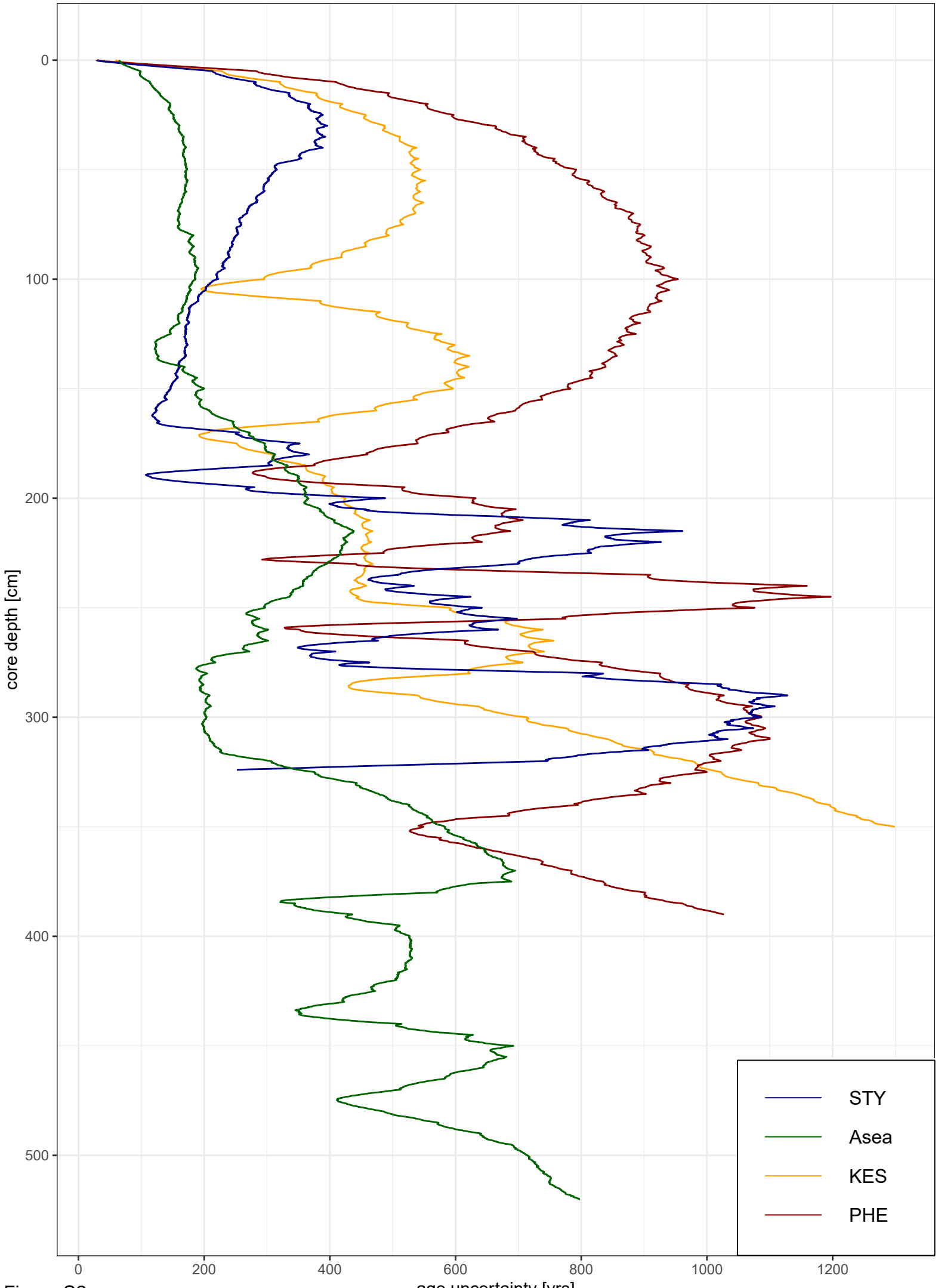
0
100
200
300
400
500
core depth [cm]
0
200
400
600
800
1000
1200
age uncertainty [yrs]
STY
Asea
KES
PHE

Figure S2

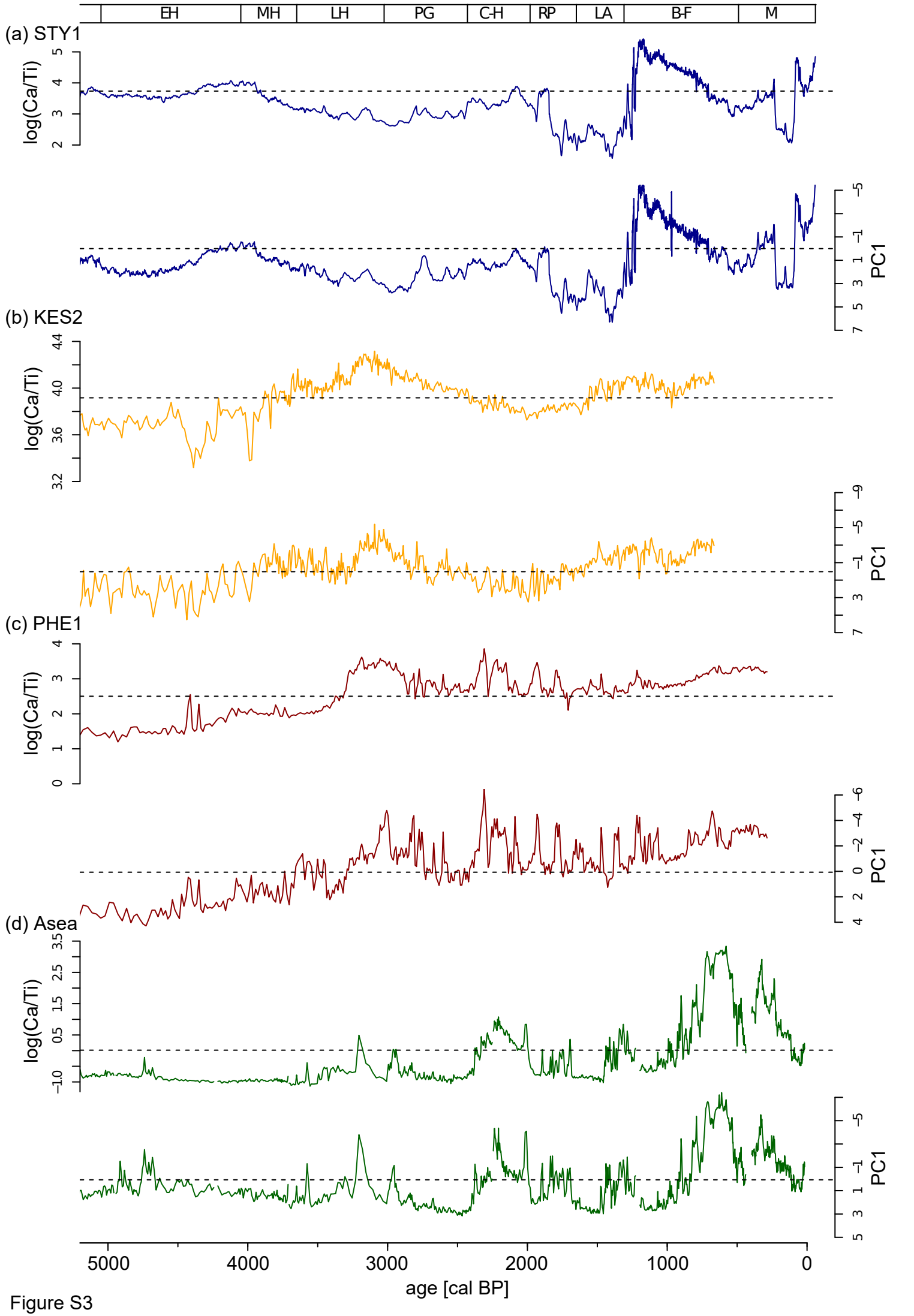
EH
MH
LH
PG
C-H
RP
LA
B-F
M
(a) STY1
log(Ca/Ti)
PC1
(b) KES2
log(Ca/Ti)
PC1
(c) PHE1
log(Ca/Ti)
PC1
(d) Asea
log(Ca/Ti)
PC1
5000
4000
3000
2000
1000
0
age [cal BP]

Figure S3

Table S1: Sedimentary units of core PHE1. The soil type classification follows the German ad-hoc Arbeitsgemeinschaft Boden (2005).
(UB = upper boundary, G = gradational)

Core Depth [cm]	Sediment Unit	Unit Thickness [cm]	Munsell Color	Soil Type	Description
0–46	9	46	10YR 5/3 brown	Tu4	homogeneous brown, hardly mottled, well mixed, very compact, plough horizon → excluded from analysis
46–83	8	37	10YR 4/4 brown (slight greyish touch)	Ut3	similar to unit 7 without red colour, few shell fragments, fewer blackish mottles and more homogeneous than unit 7, blackish clasts at 83-73 cm, (UB = G)
83–156	7	73	10YR 4/3 brown	Ut4	slightly brighter than unit 6 but with reddish patches (decreasing towards top), slightly more blackish/charcoal flitter, few shell fragments (gastropods), absence of clasts - only fine matrix, (UB = very G)
156–192	6	36	10YR 4/3 brown	Ut4	yellow-grey-mottled, fine charcoal particles intensely visible up to 180 cm, absence of clasts - only fine matrix, very few shell fragments, (UB = G)
192–235	5	43	10 YR 3/2 very dark greyish brown	Ut3	sub-angular clasts of up to 1 cm diameter decreasing towards top, sediment getting brighter, continuous charcoal particles, very tiny shell fragments, (UB = G)
235–300	4	65	10 YR 4/3 dark yellowish brown	Ut4	fewer clasts but darker colour and larger than in unit 2+3, all clasts are subangular, colour is similar to unit 3 with lots of orange mottles and gets slightly darker towards top, continuous charcoal particles/slightly fewer than in unit 3, some very tiny shell fragments, (UB = very G)
300–329	3	29	10 YR 4/3 or 4/4 dark yellowish brown	Ut4	more abundant small, in situ formed carbonate nodules <55 mm than in unit 2, clay matrix but less clayey than in unit 2 - dull surface (similar to unit 2 but brighter colour), water holes at 3.28 and 3.23 m, orange patches e.g. 3.46 m, darker in central part of the unit, (UB = G)
329–360	2	31	10 YR 3/1 very dark grey	Ut4	clayey matrix, darkest unit, occasional orange spots (oxidation), occasional gravel clasts with max. 5 mm diameter, 346-360 cm: minor charcoal particles, (UB = G)
360–390	1	30	10YR 4/4 dark yellowish brown	Ut3	mix of grey-brown-yellow and white-orange-oxidized mottles, brightest unit, fine matrix with clasts and carbonate nodules of up to 1 cm diameter, clasts are subangular and unsorted, gravel content decreases upwards, increase in organic content (= black colour intensifies, charcoal flitter visible), fining upwards, (UB = G)

Table S2: Sedimentary units of core KES2. The soil type classification follows the German ad-hoc Arbeitsgemeinschaft Boden (2005).
(UB = upper boundary, G = gradational)

Core Depth [cm]	Sediment Unit	Unit Thickness [cm]	Munsell Color	Soil Type	Description
0–50	7	50	10YR 4/4 dark yellowish brown	Ut4	plough horizon, plant remains and roots in upper 15 cm visible, core segment strongly damaged - difficult to delimit boundaries → excluded from analysis
50–125	6	75	10YR 5/4 yellowish brown	Ut4	similar to unit 5 but black speckles become fewer, gets brighter towards top, less mottled, silt content increasing upwards, patches of red soil and brick/loam? (e.g. 1.10 m; 1.00 m; 0.87 m), unit becomes brighter towards top, (UB=G)
125–165	5	40	2.5 Y 4/3 olive brown	Ut3	darker olive-grey colour, black speckles, higher organic content, strongly mottled, (UB=G)
165–205	4	40	2.5 Y 6/4 light yellowish brown	Ut4	brightest unit of the core, yellowish-beige colour, especially visible in 2c while 2b resembles more unit 3, unit has a very different morphostructure: matt, airy, very high carbonate content, (UB=seepage water shift?)
205–240	3	35	10YR 5/3 brown	Ut4	similar to unit 2 but less reddish instead more greyish colour, high carbonate content, few shell fragments (UB=G)
240–310	2	70	7.5 YR 4/4 brown	Ut4	reddish colour dominates, contains most black speckles in whole core sequence, very strongly mottled, very clayey adhesive but matt surface, no shell fragments visible, (UB=G)
310–350	1	40	2.5Y 5/3 light olive brown	Ut3	matrix beige-yellowish-greenish-gley shimmer with black and yellow-orange speckles, some shell fragments throughout the unit, black spots look finely dotted, (UB=G)

Table S3. Cultural chronology of southern Greece (slightly modified after Weiberg et al., 2016; Bintliff, 2012; Manning, 2010).

Time (BP)	Time (BC/AD)	Periods	Event	Abbreviation
490 – -60	AD 1460 – 2010	Ottoman Empire to Modern Period	Start: Ottoman conquest of the Peloponnese	M
1309 – 490	AD 641 – 1460	Medieval: Early Byzantine to Byzantine-Frankish	Start: Death of Emperor Heraclius and the collapse of the Late Roman political order.	B-F
1650 – 1309	AD 300 – 641	Late Antiquity/ Late Roman	Start: Founding of the city of Constantinople and the parting of ways between the Western and Eastern parts of the Roman Empire.	LA
1981 – 1650	31 BC – AD 300	Roman	Start: Destruction of Corinth and end of Achaian war.	RP
2429 – 1981	479 – 31 BC	Classical, Hellenistic	Start: Greek victory over the Persians in the battle of Plataea; Persian invasion of Greece repelled.	C-H
3025 – 2429	1075 – 479 BC	Proto-Geometric, Early Iron Age, Archaic	Start: End of Mycenaean culture	PG
3650 – 3025	1700 – 1075 BC	Late Helladic/Mycenean	Periodization modelled on Minoan Crete, which in turn was modelled on the Old, Middle and New Kingdom of ancient Egypt	LH
4050 – 3650	2100 – 1700 BC	Middle Helladic		MH
5050 – 4050	3100 – 2100 BC	Early Helladic	Beginning of the Bronze Age	EH
6450 – 5050	4500 – 3100 BC	Final Neolithic	Start: Introduction of a farming economy in Greece	FN
7400 – 6450	5450 – 4500 BC	Late Neolithic		LN
7900 – 7400	5950 – 5450 BC	Middle Neolithic		MN
8750 – 7900	6800 – 5950 BC	Initial and Early Neolithic		EN