The following supplement accompanies the article

Climate of the last millennium at the southern pole of the North Atlantic Oscillation: an inner-shelf sediment record of flooding and upwelling

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Table S1. Correlation coefficients found between proxies (rows) and instrumental data (columns). Values highlighted in **bold** represent the most significant correlation for each proxy (black: positive correlation; red: negative correlation). The statistical significance was estimated using a Student's *t*-test and is a function of the number of data points used (n = degrees of freedom) according to the Pearson product-moment correlation coefficient table of critical values for the considered level of significance. In this table (and in Table S2), the signal defines the type of relationship (direct or indirect) existing between the instrumental data and each proxy. This table contains the information that supports the confident use of the proxies that, although widely accepted and used, have been defined and calibrated elsewhere

	Douro flux							Upwelling index				
Proxies vs. environmental parameters	Annual	Winter (DJFM)	Winter (JFMA)	Spring	Summer	Fall	Upwelling	Annual	Summer	Upwelling	Fall	Winter
Fe (%)	–0.24	–0.14	–0.14	–0.28	–0.55	–0.33	**–0.57**	–0.20	–0.12	–0.08	**0.62**	–0.20
Ti (%)	–0.03	**–0.73**	0.04	–0.05	0.40	**0.56**	0.26	**0.55**	0.14	0.16	**–0.62**	**0.64**
Sand (wt%)	**–0.54**	–0.07	**–0.53**	–0.39	0.09	–0.29	–0.09	0.29	0.35	0.34	–0.24	0.13
Silt (wt%)	0.46	0.05	0.45	0.36	–0.03	0.30	0.13	–0.24	–0.30	–0.30	0.26	–0.08
Fine fraction (wt%)	**0.54**	0.07	**0.53**	0.39	–0.09	0.29	0.09	–0.29	–0.35	–0.34	0.24	–0.13
C_{org} (%)	0.24	0.12	0.26	0.01	–0.23	–0.05	–0.21	–0.27	–0.10	–0.09	**–0.62**	–0.39
Total phytoliths	0.34	0.35	0.47	**0.57**	–0.25	0.19	0.04	–0.34	–0.30	–0.28	0.03	–0.36
Freshwater diatoms	0.00	0.00	0.11	0.09	–0.40	**0.56**	–0.28	–0.14	–0.11	–0.09	0.26	–0.30
Marine diatoms	–0.41	–0.37	–0.37	–0.16	–0.25	–0.12	–0.18	0.15	0.13	0.13	**0.45**	–0.03
Leptocylindrus spp.	–0.42	–0.34	–0.36	–0.35	–0.28	–0.17	–0.30	–0.04	0.01	0.01	–0.01	–0.09
Chaetoceros spores	–0.27	–0.34	–0.37	–0.32	–0.02	–0.24	–0.14	**0.88**	**0.87**	**0.87**	–0.34	0.50
Total *Chaetoceros*	–0.27	–0.34	–0.37	–0.32	–0.02	–0.24	–0.14	**0.88**	**0.87**	**0.87**	–0.34	0.50
Total spp. (*Chaetoceros*, *Leptocylindrus*)	–0.44	–0.44	–0.47	–0.43	–0.19	–0.27	–0.28	**0.56**	**0.59**	**0.59**	–0.24	0.27
$U^{K'}_{37}$–SST (°C)	0.21	–0.11	0.22	0.12	–0.03	0.02	0.01	**–0.90**	**–0.86**	**–0.87**	–0.53	–0.06
[n-alkanes] (ng g^{-1})	0.27	0.16	0.25	–0.03	–0.08	0.19	–0.15	–0.25	–0.32	–0.33	0.01	0.20
[n-alcohols] (ng g^{-1})	0.17	0.03	0.13	–0.05	0.09	0.22	–0.01	–0.14	–0.21	–0.23	0.09	0.11
[alkenones] (ng g^{-1})	0.13	–0.15	0.12	0.02	0.12	0.33	0.07	–0.10	–0.18	–0.21	0.15	0.23
Globigerina bulloides												
$\delta^{13}C$ (‰ VPDB)	0.35	0.29	0.45	0.47	0.02	0.03	0.11	–0.53	–0.42	–0.40	–0.13	**–0.59**
$\delta^{18}O$ (‰ VPDB)	0.08	0.23	0.34	0.09	–0.35	0.16	–0.35	–0.64	**–0.70**	**–0.72**	0.24	–0.24
Globigerina inflata												
$\delta^{13}C$ (‰ VPDB)	0.18	0.17	0.22	0.24	–0.26	0.14	–0.07	–0.40	–0.37	–0.37	–0.09	–0.25
$\delta^{18}O$ (‰ VPDB)	0.27	0.23	0.29	–0.10	–0.30	–0.22	–0.39	0.14	–0.12	–0.09	0.34	0.35
Neogloboquadrina pachyderma var. sinistral												

$\delta^{13}C$ (‰ VPDB)	0.41	0.31	0.36	0.07	0.17	–0.36	–0.11	0.10	0.02	0.02	–0.04	0.47
$\delta^{18}O$ (‰ VPDB)	0.30	0.24	0.21	0.26	–0.17	0.30	0.01	0.36	0.39	0.38	–0.25	0.15
Neogloboquadrina pachyderma var. dextral												
$\delta^{13}C$ (‰ VPDB)	0.03	–0.32	–0.29	–0.06	0.13	–0.19	0.17	–	–	–	–	–
$\delta^{18}O$ (‰ VPDB)	0.08	0.25	0.23	0.05	–0.41	0.51	–0.26	–	–	–	–	–
Uvigerina												
$\delta^{13}C$ (‰ VPDB)	0.53	0.63	**0.68**	0.47	–0.10	0.50	–0.02	–0.25	–0.38	–0.39	0.52	0.04
$\delta^{18}O$ (‰ VPDB)	0.11	–0.04	0.16	0.30	–0.23	–0.28	–0.08	–0.27	–0.13	–0.09	0.03	**–0.64**

Table S2. Correlation coefficients found between proxies (columns) and forcing factors (rows). Values highlighted in **bold** represent the most significant correlation for each proxy (black: positive correlation; red: negative correlation). The statistical significance was estimated using a Student's *t*-test and is a function of the number of data points used (n = degrees of freedom) according to the Pearson product-moment correlation coefficient table of critical values for the considered level of significance. REC: Reconstruction JD; TSI: total solar irradiance, reconstructed from ^{10}Be

Solar activity	Forcing factor	Sea surface temperature	Magnetic susceptibility	Fe (cps)	Total n-alcohols (ng g^{-1})	Total n-alkanes (ng g^{-1})	Fine fraction (%)	Phytoliths abundance (no. g^{-1})	Freshwater diatoms (no. g^{-1})	Total alkenones (ng g^{-1})	Total organic carbon (wt%)	Total diatoms (no. g^{-1})	Marine diatoms (no. g^{-1})	Spores total (no. g^{-1})	*Chaetoceros* spp. (no. g^{-1})	*Chaetoceros* total (no. g^{-1})	*Leptocylindrus* spp. (no. g^{-1})	δ^{13}C *G. bulloides* (‰VPDB)	δ^{18}O *G. bulloides* (‰VPDB)	δ^{13}C *G. inflata* (‰VPDB)	δ^{18}O *G. inflata* (‰VPDB)	δ^{13}C *N. pachyderma* (‰VPDB)	δ^{18}O *N. pachyderma* (‰VPDB)	δ^{13}C *Uvigerina* (‰VPDB)	δ^{18}O *Uvigerina* (‰VPDB)
Stuiver & Braziunas (1989)	^{14}C anomaly	**−0.62**	**0.67**	0.18	−0.02	−0.20	0.18	−0.43	−0.19	−0.37	−0.56	−0.44	−0.47	−0.35	−0.37	−0.37	−0.05	0.02	0.54	0.08	0.32	**−0.48**	**−0.55**	−0.16	−0.14
Instrumental insolation	Annual	**0.96**	0.30	0.49	**0.54**	0.35	**0.50**	**0.52**	**0.49**	0.18	0.41	0.50	0.46	−0.30	**−0.61**	**−0.61**	0.43	**−0.89**	**−0.77**	0.07	−0.35	−0.23	**0.94**	−0.46	**−0.59**
	Winter (Dec–Mar)	0.32	−0.10	0.16	0.28	**0.50**	0.33	**0.88**	0.43	0.51	0.51	0.50	0.56	−0.28	−0.35	−0.35	0.07	**−0.54**	**−0.54**	0.02	−0.18	−0.20	**0.79**	**−0.88**	−0.29
	Upwelling Season (May–Sep)	**0.84**	0.41	**0.52**	0.37	0.18	**0.52**	−0.13	0.29	0.03	0.16	0.24	0.09	−0.06	−0.55	−0.55	**0.73**	**−0.89**	**−0.72**	0.27	−0.27	0.03	**0.64**	0.23	**−0.64**
	Summer	**0.79**	0.44	**0.56**	**0.53**	**0.47**	**0.61**	0.06	0.38	0.35	0.10	0.18	−0.12	−0.20	**−0.66**	**−0.66**	**0.67**	**−0.88**	**−0.83**	0.52	−0.25	0.31	**0.58**	0.06	−0.40
	Spring	0.34	0.18	0.20	0.16	0.02	0.38	−0.38	0.13	−0.05	0.48	0.48	**0.61**	0.45	0.22	0.22	0.41	−0.42	−0.27	−0.03	0.23	−0.47	0.47	0.35	**−0.92**
Crowley (2000)	^{14}C residual/Lean splice	0.00	−0.12	−0.19	−0.43	−0.36	−0.01	−0.10	−0.25	−0.10	−0.18	−0.19	−0.14	−0.17	−0.17	−0.18	−0.12	0.15	−0.13	0.32	0.03	0.41	0.32	0.11	−0.08
	^{10}Be/Lean splice	0.14	−0.23	−0.32	−0.46	−0.41	−0.11	−0.13	−0.33	−0.18	−0.11	−0.21	−0.14	−0.19	−0.20	−0.21	−0.12	0.19	−0.15	0.22	−0.02	0.32	0.27	0.11	−0.05
	^{14}C Bard/Lean splice	**0.37**	**−0.67**	**−0.54**	−0.29	−0.30	−0.22	−0.19	−0.42	−0.18	0.19	−0.17	−0.04	−0.16	−0.19	−0.20	−0.07	0.22	−0.24	−0.01	−0.11	0.18	0.02	−0.04	−0.18
Esper et al. (2002)	REC_20LP	0.04	−0.02	0.28	−0.08	−0.01	0.10	−0.08	−0.16	0.22	−0.12	−0.15	−0.10	−0.17	−0.22	−0.23	−0.04	−0.02	0.03	0.23	0.08	0.39	**0.51**	0.24	0.00
	REC_2.5%	−0.12	0.18	0.26	−0.12	−0.06	0.20	−0.04	−0.09	0.18	−0.26	−0.18	−0.16	−0.19	−0.23	−0.23	−0.07	−0.08	0.00	0.25	0.11	0.35	**0.51**	0.22	0.03
	REC_97.5%	0.17	−0.19	0.24	−0.05	0.01	0.00	−0.13	−0.22	0.21	0.01	−0.15	−0.07	−0.17	−0.22	−0.22	−0.04	0.04	0.04	0.18	0.06	0.37	0.43	0.26	−0.02
Bond et al. (2001)	Raw ^{14}C	**0.55**	−0.26	−0.12	−0.28	−0.25	−0.33	−0.02	−0.09	−0.12	0.43	−0.27	−0.12	−0.51	−0.49	−0.51	−0.46	−0.39	**−0.68**	−0.23	−0.45	−0.22	0.37	0.06	0.03
	Detrended ^{14}C	0.30	0.03	−0.06	−0.26	−0.27	−0.04	0.00	−0.03	−0.05	0.05	−0.22	−0.07	−0.50	−0.39	−0.40	**−0.60**	**−0.47**	**−0.46**	−0.05	−0.38	−0.10	**0.59**	0.23	0.01
Bard et al. (2007)	^{10}Be anomaly	−0.27	0.18	0.02	0.31	0.35	0.02	0.24	0.45	0.30	**0.60**	**0.70**	**0.56**	**0.81**	**0.83**	**0.83**	**0.56**	0.06	−0.07	−0.44	−0.19	−0.40	**−0.50**	−0.12	0.41
	TSI (W m^{-2})	**0.36**	−0.24	0.02	−0.24	−0.21	0.22	0.05	−0.34	−0.17	**−0.77**	**−0.49**	**−0.59**	−0.35	**−0.51**	**−0.51**	−0.03	−0.11	0.04	**0.46**	0.42	0.19	0.44	0.20	0.00
Usoskin et al. (2003)	N (104 counts h^{-1})	−0.06	**0.49**	0.02	0.23	0.21	**0.50**	0.28	0.29	0.02	0.29	0.44	0.42	0.46	0.46	0.45	0.40	−0.31	0.00	−0.23	−0.06	−0.34	−0.16	−0.18	0.13
Muscheler et al. (2007)	Radionuclide Solar forcing	−0.03	0.14	−0.01	−0.24	−0.24	0.02	−0.03	−0.10	−0.15	−0.31	−0.15	−0.14	−0.13	−0.12	−0.13	−0.10	0.06	−0.06	0.24	0.05	0.28	0.25	0.26	0.07
	Run mean (3 yr)	−0.04	0.14	−0.01	−0.26	−0.25	0.02	−0.04	−0.12	−0.16	−0.32	−0.16	−0.15	−0.14	−0.13	−0.14	−0.11	0.07	−0.06	0.25	0.06	0.28	0.25	0.27	0.06

N. Hemisphere temperature																												
Wilson et al. (2007)	Winter North Hemispheric2007	–0.11		–0.24	–0.27	–0.13	0.04	–0.15	0.09	0.14		0.09	0.09	–0.20	–0.29	–0.13	–0.18	–0.17	–0.01		–0.32	–0.24	0.05	0.13	0.34	0.29	–0.24	–0.03
Huang (2004)	Temperature anomaly	0.21		**–0.72**	–0.51	**–0.59**	**–0.47**	–0.34	–0.20	–0.33		0.10	–0.38	**–0.50**	–0.43	**–0.54**	**–0.55**	**–0.56**	–0.38		0.08	–0.32	0.45	0.04	**0.50**	**0.58**	0.39	–0.18
Moberg et al. (2005)	Temperature reconstruction	**0.48**		**–0.62**	0.02	–0.07	–0.07	–0.30	–0.17	–0.34		0.11	0.29	–0.08	0.05	–0.11	–0.18	–0.19	0.02		0.16	–0.20	0.04	–0.06	0.14	0.27	0.23	0.01
	3 yr mean	**0.47**		**–0.64**	0.03	–0.09	–0.08	–0.29	–0.24	–0.40		0.11	0.29	–0.13	0.02	–0.14	–0.22	–0.24	0.02		0.18	–0.22	0.06	–0.09	0.14	0.29	0.24	–0.08
	10 yr mean	**0.46**		**–0.68**	0.03	–0.13	–0.10	–0.26	–0.27	–0.37		0.11	0.25	–0.08	0.08	–0.12	–0.22	–0.23	0.06		0.21	–0.20	–0.07	–0.11	0.14	0.27	0.27	–0.18
J. Luterbach et al. (2004)/Xoplaki et al. (2005)	DJF	0.06		–0.33	–0.08	–0.27	–0.25	–0.39	–0.08	–0.13		–0.18	–0.07	–0.18	–0.10	–0.24	–0.24	–0.23	–0.20		0.12	0.01	0.23	0.03	0.36	0.24	0.07	0.06
(European seasonal temperature,	MAM	–0.01		**–0.46**	0.26	–0.25	–0.23	**–0.58**	–0.10	–0.22		–0.16	–0.13	–0.35	–0.30	–0.39	–0.32	–0.32	–0.45		0.17	–0.19	0.32	0.09	0.37	0.20	0.12	–0.15
10 yr mean)	JJA	**0.29**		–0.06	0.28	–0.21	–0.17	–0.33	–0.26	–0.22		–0.21	–0.19	–0.26	–0.22	–0.26	–0.24	–0.23	–0.26		0.18	–0.19	0.26	0.09	0.14	–0.11	0.03	–0.05
	SON	**0.27**		–0.23	–0.08	–0.18	–0.18	–0.30	–0.08	–0.24		–0.14	–0.10	–0.38	–0.38	–0.35	–0.34	–0.33	–0.32		0.06	–0.14	0.26	0.06	0.41	0.15	0.05	–0.18
	Annual	0.15		–0.30	–0.10	–0.29	–0.27	–0.45	–0.14	–0.20		–0.24	–0.14	–0.28	–0.24	–0.30	–0.28	–0.28	–0.30		0.13	–0.08	0.25	0.10	0.36	0.09	0.05	–0.11
	Seasonality	0.12		0.27	0.22	0.13	0.13	0.17	–0.09	–0.01		0.04	–0.06	0.02	–0.04	0.07	0.09	0.09	0.04		0.01	–0.13	–0.06	0.03	–0.24	–0.27	–0.05	–0.09
Teleconnections' indices																												
Gray et al. (2004)	Annual SST anomaly	0.01		0.06	–0.04	0.18	0.24	0.08	0.40	0.23		0.24	–0.09	0.20	0.10	0.24	0.22	0.21	0.26		–0.13	0.02	–0.10	–0.03	–0.09	0.09	–0.03	–0.14
	AMO index	0.01		0.11	–0.04	0.02	0.08	0.03	0.38	0.22		0.20	–0.13	0.19	0.08	0.25	0.22	0.21	0.26		–0.20	0.03	–0.17	0.02	0.00	0.01	–0.12	–0.20
Hurrell (1995)	NAO index	–0.18		**–0.46**	–0.19	0.01	0.03	**–0.51**	0.21	–0.01		0.16	–0.34	0.24	0.20	0.33	0.23	0.23	0.24		0.11	0.12	0.33	0.31	0.02	0.29	–0.40	0.14
Seasonal NAO (UCAR - Hurrell)[a]	DJF	0.00		–0.36	–0.07	–0.01	0.00	**–0.52**	0.06	–0.23		0.05	–0.43	0.00	–0.01	0.12	0.09	0.09	0.09		0.26	0.22	0.28	0.35	–0.05	0.48	–0.28	0.16
	JFM	–0.05		–0.38	–0.17	0.14	0.14	–0.35	–0.03	–0.07		0.19	–0.26	0.25	0.17	0.42	0.27	0.27	0.33		0.09	0.04	0.28	0.29	–0.27	0.24	–0.14	0.20
	FMA	–0.09		–0.31	–0.21	0.16	0.18	–0.23	–0.22	–0.05		0.28	–0.32	0.38	0.30	**0.50**	0.44	0.44	0.31		0.11	0.07	0.37	0.32	–0.22	0.06	0.11	0.30
	MAM	–0.35		–0.21	–0.18	0.04	–0.04	–0.13	–0.37	–0.11		0.11	–0.48	0.17	0.22	0.09	0.40	0.40	–0.14		0.45	0.22	0.37	0.30	–0.04	–0.40	0.13	0.16
	AMJ	–0.14		0.06	0.04	0.03	0.04	–0.07	–0.28	–0.23		0.10	–0.44	–0.02	0.08	–0.12	0.20	0.20	–0.27		0.46	0.36	0.18	0.31	0.03	–0.22	0.17	–0.03
	MJJ	–0.03		0.04	0.08	–0.12	–0.07	–0.14	–0.33	–0.15		–0.14	0.11	–0.42	–0.40	–0.32	–0.30	–0.30	–0.19		0.14	0.19	0.44	0.32	**0.53**	–0.53	–0.22	–0.29
	JJA	0.02		–0.10	–0.05	–0.25	0.00	0.13	–0.11	0.05		–0.06	0.38	–0.21	–0.38	0.16	–0.32	–0.32	0.39		–0.27	–0.26	0.25	0.19	0.35	–0.05	**–0.50**	–0.19
	JAS	0.24		–0.01	0.07	–0.12	0.07	0.15	0.10	0.31		–0.03	0.41	–0.33	–0.51	–0.06	**–0.60**	**–0.60**	0.30		**–0.56**	–0.47	0.33	–0.06	0.46	–0.09	**–0.58**	0.02
	ASO	*0.35*		0.06	0.07	–0.27	–0.16	–0.06	–0.13	0.11		–0.35	0.27	**–0.55**	**–0.65**	–0.38	**–0.60**	**–0.60**	–0.08		–0.14	–0.18	0.29	0.27	0.24	0.28	–0.23	–0.10
	SON	*0.39*		0.05	–0.02	0.02	–0.12	0.09	–0.23	0.07		–0.26	0.42	–0.44	–0.56	–0.23	–0.49	–0.49	0.03		–0.27	–0.24	0.18	0.18	0.14	**0.57**	–0.13	–0.13
	OND	0.08		–0.02	–0.10	–0.23	–0.34	0.09	–0.20	–0.07		–0.40	0.13	–0.40	–0.51	–0.14	–0.36	–0.36	0.05		–0.04	–0.14	0.18	0.48	0.06	**0.49**	0.00	–0.03
	NDJ	–0.17		–0.21	–0.17	**–0.50**	**–0.48**	0.08	–0.15	–0.09		**–0.49**	–0.25	–0.21	–0.30	–0.04	–0.17	–0.17	0.06		0.23	0.00	0.06	0.26	–0.24	0.15	0.01	–0.04
Luterbacher et al.(2002)	NAO Luterbacher	0.20		**–0.57**	**–0.43**	–0.46	–0.41	–0.25	–0.10	**–0.31**		–0.08	–0.42	–0.20	–0.13	–0.17	–0.19	–0.18	–0.14		0.17	–0.05	0.16	–0.12	0.07	0.38	0.35	–0.05
Cook et al. (2004)	NAO Cook	0.09		0.11	0.13	0.19	0.22	0.08	**0.46**	0.30		0.00	0.19	0.37	0.34	0.39	0.36	0.37	0.35		–0.03	0.05	–0.26	–0.11	–0.19	0.01	0.01	0.09

[a]Data from J. W. Hurrell, Climate Analysis Section, NCAR, Boulder, USA, available et www.cgd.ucar.edu/cas/jhurrell/indices.html

LITERATURE CITED

Bard E, Raisbeck G, Yiou F, Jouzel J (2007) Comment on 'Solar activity during the last 1000 yr inferred from radionuclide records' by Muscheler et al. (2007). Quat Sci Rev 26:2301–2308

Bond G, Kromer B, Beer J, Muscheler R and others (2001) Persistent solar influence on North Atlantic climate during the Holocene. Science 294:2130–2136

Cook ER, Esper J, D'Arrigo RD (2004) Extra-tropical Northern Hemisphere land temperature variability over the past years. Quat Sci Rev 23:2063–2074

Crowley TJ (2000) Causes of climate change over the past 1000 years. Science 289:270–277

Esper J, Cook ER, Schweingruber FH (2002) Low-frequency signals in long tree-ring chronologies for reconstructing past temperature. Science 295:2250–2253

Gray ST, Graumlich LJ, Betancourt JL, Pederson GT (2004) A tree-ring based reconstruction of the Atlantic Multidecadal Oscillation since 1567 A.D. Geophys Res Lett 31:L12205 doi:12210.11029/12004GL019932

Huang S (2004) Merging information from different resources for new insights into climate change in the past and future. Geophys Res Lett 31:L13205 doi:13210.11029/12004GL019781

Hurrell JW (1995) Decadal trends in the North Atlantic Oscillation: regional temperatures and precipitation. Science 269:676–679

Luterbacher J, Xoplaki E, Dietrich D, Jones PD and others (2002) Extending North Atlantic Oscillation reconstructions back to 1500. Atmos Sci Lett 2:114–124

Moberg A, Sonechkin DM, Holmgren K, Datsenko NM, Karlén WH (2005) Highly variable Northern Hemisphere temperatures reconstructed from low- and -high-resolution data. Nature 433:613–617

Muscheler R, Joos F, Beer J, Müller SA, Vonmoos M, Snowball I (2007) Solar activity during the last 1000 yr inferred from radionuclide records. Quat Sci Rev 26:82–97

Stuiver M, Braziunas T (1989) Atmospheric ^{14}C and century-scale solar oscillations. Nature 338:405–408

Usoskin JG, Solanki SK, Schüssler M, Mursula K, Alanko K (2003) Millennium-scale sunspot number reconstruction: evidence for an unusually active sun since the 1940s. Phys Rev Lett 91:211101 doi: 10.1103/PhysRevLett.91.211101

Xoplaki E, Luterbacher J, Paeth H, Dietrich D, Steiner N, Grosjean M, Wanner H (2005) European spring and autumn temperature variability and change of extremes over the last half millennium. Geophys Res Lett 32:L15713 doi: 10.1029/2005GL023424