

Supplement

AMO-like Variations of Holocene Sea Surface Temperatures in the North Atlantic Ocean

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This supplement file includes: Fig.S1, Tables S1 and S2, and the references.

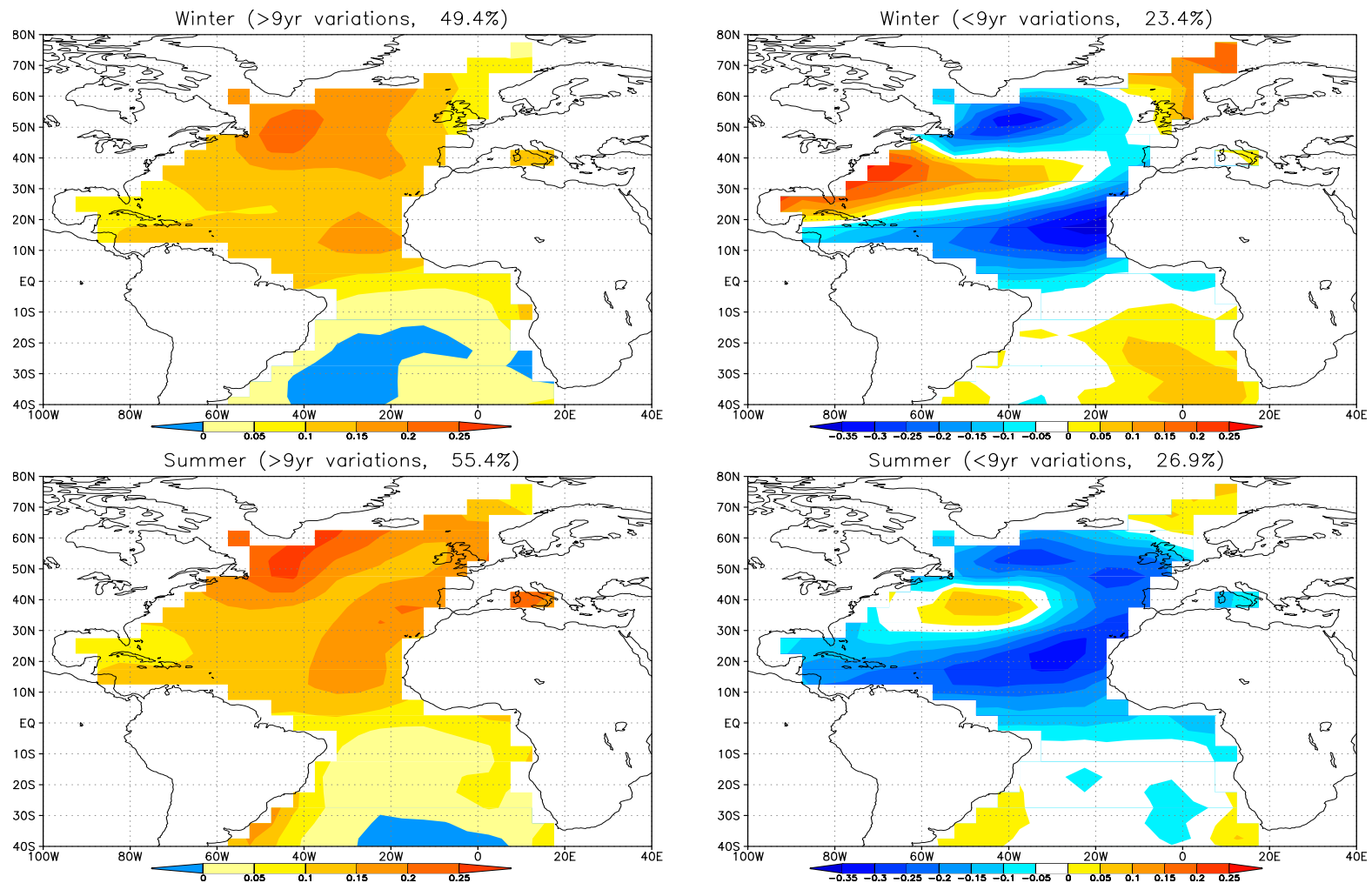


Fig. S1: The first EOF of the observed SST on interannual (right panels) and decadal and longer timescales (left panels) during 1870-2006. Winter (summer) is defined as December-January-February (June-July-August). The interannual variations in SST is filtered by a 9-point (year) binomial high-pass filter, which removes variations of period longer than 10 years. The decadal and longer timescale variations are the difference between the original values and the interannual variations. The variances explained by the first EOF are shown in the right column of the parenthesis.

Table S1: New proxy records for temperature changes at around 8.2ka BP in the North Atlantic realm. The exact locations of those records are shown in Fig.5a.

No.	Site	Area	Temperature anomalies (°C)	Reference
1	Core ASV 850	Northern Barents Sea	cold	Duplessy et al. (2001)
2	Hardangerjokulen	Norway	Cold	Dahl and Nesje (1996)
3	Silvretta Mountains	Austria	Cold	Kerschner et al. (2006)
4	Swiss Alps	Swiss	cold	Joerin et al. (2006)
5	PL-96-112	Southeastern Barents Sea	Cooler and extend sea ice	Voronina et al. (2001)
6	Seneca Lake	NY, USA	Cold	Ellis et al. (2004)
7	Lake Holzmaar	Germany	Cold	Prasad et al. (2006)
8	Lake Ontario	Canada	cold	McFadden et al. (2004)
9	ODP 1019	Coastal California	Cold	Barron et al. (2003)
10	Dry Lake	South California	Cold	Bird and Kirby (2006).
11	Lake Oberer Landschitzsee	Austria	-1.4	Schmidt et al. (2006)
12	Lake N14	Denmark Strait	Cold	Andresen and Bjorck (2005)
13	NW Iberia	Spain	Cold	Munoz Sobrino et al. (2005)
14	Chesapeake Bay	U.S.	Cold	Willard et al. (2005)
15	Labrador Sea		cold	Hillaire-Marcel and Bilodeau (2000)
16	Holmsa River	Iceland	Cold	Jackson et al. (2005)

17	lake Vanndalsvatnet	Norway	Cold	Nesje et al. (2006)
18	Korallgrottan	Sweden	Cold	Sundqvist et al. (2007)
19	Lake Arapisto	Finland	cold	Sarmaja-Lorjonen and Seppä (2007)
20	Hawes Water	NW England	Cold	Marchall et al. (2007)
21	Lake Nautajarvi	Finland	Cold	Ojala and Alenius (2005)
22	Lake Flarken	Sweden	Cold	Seppa et al.(2005)
23	MD02-2550	GOM	Cold	LoDico et al. (2006)
24	Front Range	Colorado	Cold	Benson et al. (2007)
25	RC12-10	GOM	Cold	Poore et al. (2003)
26	Sangre de Cristo Mountains	New Mexico	Cold	Jimenez-Moreno et al. (2008)
27	Ionian Sea	Greece	Cold	Geraga et al. (2008, in press)
28	MD03-2707	Gulf of Guinea	Cold	Weldeab et al., (2007b)
29	Lake Trehörningen	Sweden	Cold	Seppä et al. (2007)
30	Lake Holtjärnen	Sweden	Cold	Seppä et al. (2007)
31	Lake Laihalampi	Finland	Cold	Seppä et al. (2007)
32	Lake Klotjärnen	Sweden	Warm	Seppä et al. (2007)
33	KP lake	Russia	Cold (July)	Seppä et al. (2007)
34	Lake Dalmutladdo	Norway	Warm (July)	Seppä et al. (2007)
35	Lake Toskaljavri	Finland	Warm (July)	Seppä et al. (2007)
36	GeoB6007-2	Northwest Africa	Cold	Kim et al. (2007)

37	Lake Malawi	East Africa	Cold	Powers et al. (2005)
38	Medina River	Texas	Cold	Nordt et al. (2002)
39	Lake Bezymiannoe	Belarus	Cold	Makhnach et al. (2004)
40	Lake Rulia	Estonia	~-2.0	Seppä and Poska (2004)
41	Lake Raigastvere	Estonia	~-1.6	Seppä and Poska (2004)
42	PL-96-125	Southeastern Barents Sea	Cooler and extend sea ice	Voronina et al. (2001)
43	Lake Hinterburgsee	Swiss	-1C	Heiri et al. (2004)
44	U.S. and Canada	North America	Cold	Viau et al. (2006)
45	MD99-2251	North Atlantic	Cold	Ellison et al. (2006).
46	Soylegrotta Cave	Norway	Cold	Lauritzen and Lundberg (1999)
47	Congo River Basin/Congo Fan	Tropical central Africa	Cold	Weijers et al. (2007)
48	Lake 850	Abisko Valley, Northern Sweden	Cold (July)	Larocque and Hall (2004)
49	Lake Njulla	Abisko Valley, Northern Sweden	Cold (July)	Larocque and Hall (2004)
50	Lough Inchiquin	Ireland	Cold	Diefendorf et al. (2008)
51	Bat Cave	Grand Canyon, Arizona	Cold	Wurster et al. (2008)
52	Holebudalen lake	Southern Norway	-2C (July)	Panizzo et al. (2008)

53	MD99-2305	Svalbard	Cold	Hald and Korsun (2008)
54	ODP984	Subpolar North Atlantic	-2C	Came et al. (2007).

Table S2: Proxy records for temperature changes at medieval times in the North Atlantic realm. The exact locations of those records are shown in Fig.5b. '0' means neutral or no changes.

No.*	Site	Region	Temperature anomalies	Reference
1	MD952011	Northeast Atlantic	Warm	Kim and Schneider, 2006
2	MD952015	North Atlantic	Warm	Kim and Schneider, 2006
3	IOW225514	Northeast Atlantic	Warm	Kim and Schneider, 2006
4	SU81-18	East Atlantic	Warm	Bard, 2002
5	MD952043	East Atlantic	Warm	Kim and Schneider, 2006
6	Sargasso Sea	West central Atlantic	Warm	Keiwign, 1996
7	GeoB6007-2	Northwest Africa	Warm	Kim et al., 2007
8	ODP658c	East tropical Africa	Warm	Kim and Schneider, 2006
9	M35003-4	West tropical Atlantic	Warm	Kim and Schneider, 2006
10	PL07-39PC	West tropical Atlantic	Warm	Lea et al., 2003
11	MD03-2707	Gulf of Guinea	0	Weldeab et al., 2007
12	GeoB3129-1	Western tropical south Atlantic	0	Weldeab et al., 2006
13	ODP1078c 11.92°S 13.40°E	Eastern tropical south Atlantic	0	Kim and Schneider, 2006
14	GeoB1023-5 17.16°S 11.01°E	Eastern tropical south Atlantic	0	Kim and Schneider, 2006
15	Agassiz Ice Cap	Canada	0	Koerner and Fisher (1990)
16	GRIP Borehole	Greenland	Warm	Dahl-Jensen et al. (1998)
17	Conroy Lake	Eastern U.S.	Warm	Gajewski (1988)
18	Chesapeake Bay	Eastern U.S.	Warm	Cronin et al. (2003)
19	Hjort So	Greenland	Warm	Wagner et al (2008)
20	NE Caribbean Sea	Western tropical Atlantic	Warm	Nyberg et al. (2002)
21	Lake Tsuolbmajavri	Finland	Warm	Korhola et al. (2000)
22	Soylegrotta Cave	Norway	Warm	Lauritzen and Lundberg (1999)
23	MD992275	N. Iceland	Warm	Jiang et al., 2005

24	Pigmy Basin, PBBC-1	Gulf of Mexico	Warm	Richey et al. (2007)
25	Iberian Margin	East Atlantic	Warm	Eiriksson et al. (2006)
26	GISP2	Greenland	Warm	Johnsen et al. (2001)
27	WM 28-14	North Atlantic	Warm	Bond et al. (1997); (2001)
28	VM 29-191	North Atlantic	Warm	Bond et al. (1997); (2001)
29	NGRIP	Greenland	Warm	Johnsen et al. (2001)
30	Crag Cave	Ireland	Warm	McDermott et al. (2001)
31	Hardangerjokulen	Norway	Warm	Grove and Switsur (1994)
32	Sangre de Cristo Mountains	NewMexico	Warm	Jimenez-Moreno et al. (2008)
33	Glaciers in Swiss Alps	Swiss	Warm	Grove and Switsur (1994)
34	Robson Glacier	Canada	Warm	Grove and Switsur (1994)
35	Tornetraska	Sweden	Warm	Briffa and Osborn (1999)
36	NAUJG1	West Greenland,	Warm	Willemse and Tornquist (1999)
37	Central England	England	Warm	Lamb (1977)
38	Gulf of California	U.S.A.	Warm	Barron and Bukry (2007)
39	California coast	U.S.A.	Cold	Kennet and Kennet (2000)
40	California coast	U.S.A.	Warm	Barron et al. (2003)
41	U.S. and Canada	North America	Warm	Viau et al. (2006)
42	Kaite Cave	Spain	Warm	Dominguez-Villar et al. (2008)
43	NW Iberia	East Atlantic	Warm	Munoz Sobrino et al. (2005)
44	Lake Nautajarvi	Finland	Warm	Ojala and Alenius (2005)
45	PL07-73	Cariaco Basin	Warm	Black et al. (2007)
46	Nansen Fjord	Greenland	Warm	Jennings and Weiner (1996)
47	ODP984	Subpolar North Atlantic	Warm	Came et al. (2007)
48	Gulf of Maine	U.S.A.	Warm	Wanamaker et al. (2008)
49	GeoB 6518-1	Congo Fan	Warm	Weijers et al. (2007)
50	Spannagel Cave	Austria	+1.7C	Mangini et al. (2005)
51	Lake 850	Sweden	Warm	Larocque and Hall (2004)
52	Lake Njulla	Sweden	Warm	Larocque and Hall (2004)
53	Donard Lake	Baffin Island, Canada	Warm	Moore et al. (2001)
54	Canadian Rockies	Alberta, Canada	Warm	Luckman and Wilson (2005)

55	Southern Colorado Plateau	U.S.A.	0	Salzer and Kipfmueller (2005)
56	Oberer Landschitzsee	Austrian	Warm	Schmidt et al. (2008)
57	Benguela upwelling region	East tropical Atlantic	0	Farmer et al. (2005)

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