Supporting Information for:

Volcanic imprint in the North Atlantic climate variability as recorded by stable water isotopes of Greenland ice cores.

This supporting material includes the response in the T2m field as a complement to the SLP and $\delta^{18}O$ fields in the main manuscript. Dotted areas indicate areas of 95% significance according to a Student's t-test.

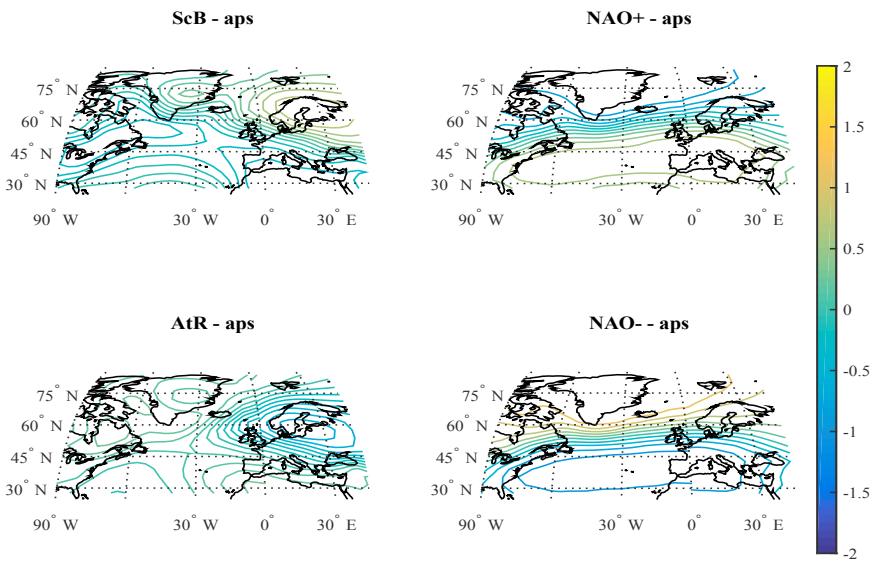


FIGURE F1. The average surface pressure (aps) retrieved by clustering the 1200-year run of ECHAM5-wiso (800-2000 CE) by methods of K-means clustering.

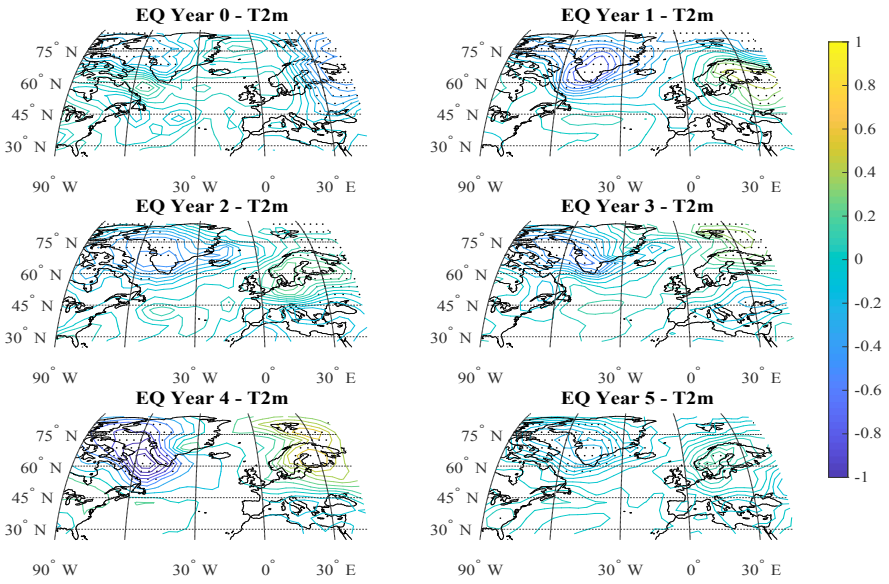
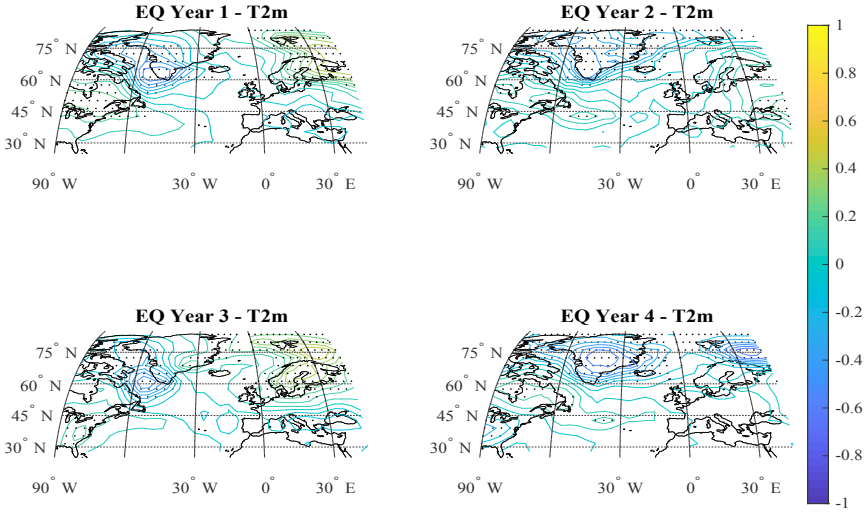
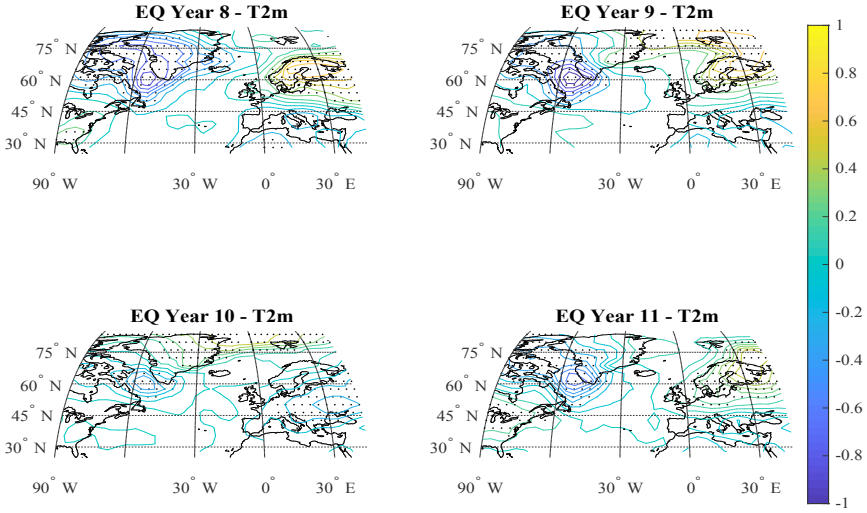


FIGURE F2. 5 EQ volcanic composites for T2m.


EQ Year 1 - T2m
EQ Year 2 - T2m
EQ Year 3 - T2m
EQ Year 4 - T2m
75° N
60° N
45° N
30° N
90° W
30° W
0°
30° E
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


EQ Year 8 - T2m
EQ Year 9 - T2m
EQ Year 10 - T2m
EQ Year 11 - T2m
75° N
60° N
45° N
30° N
90° W
30° W
0°
30° E
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

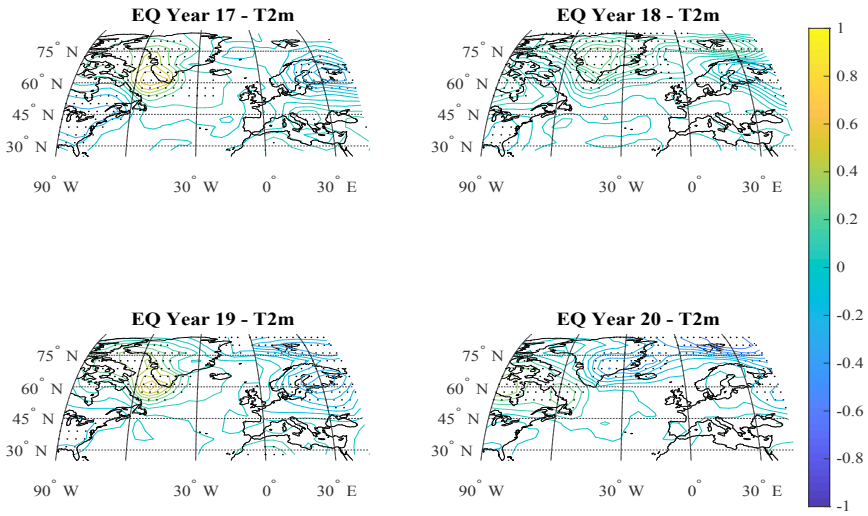


FIGURE F3. a) 1-4 and b) 8-11 and c) 17-20 years after 8 EQ volcanic eruptions in the T2m fields retrieved by stacking 8 EQ volcanic eruptions.

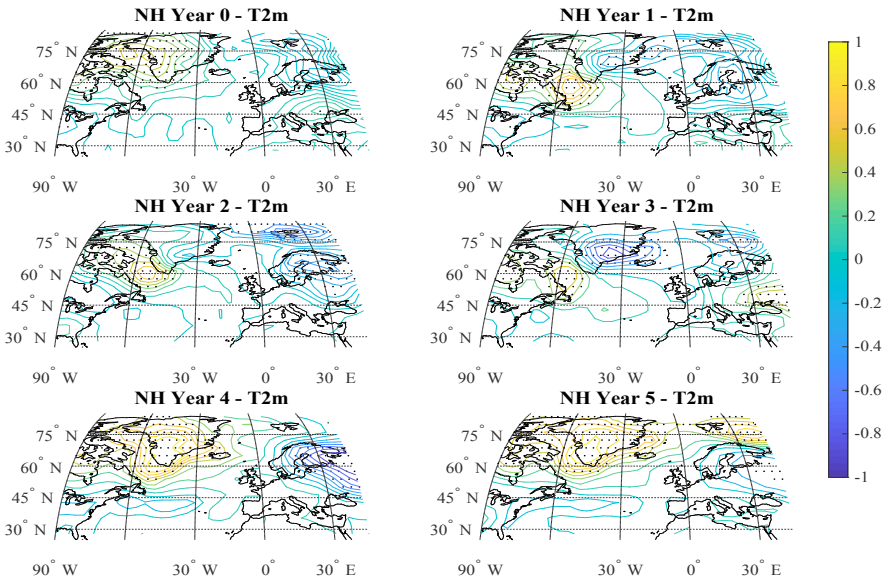
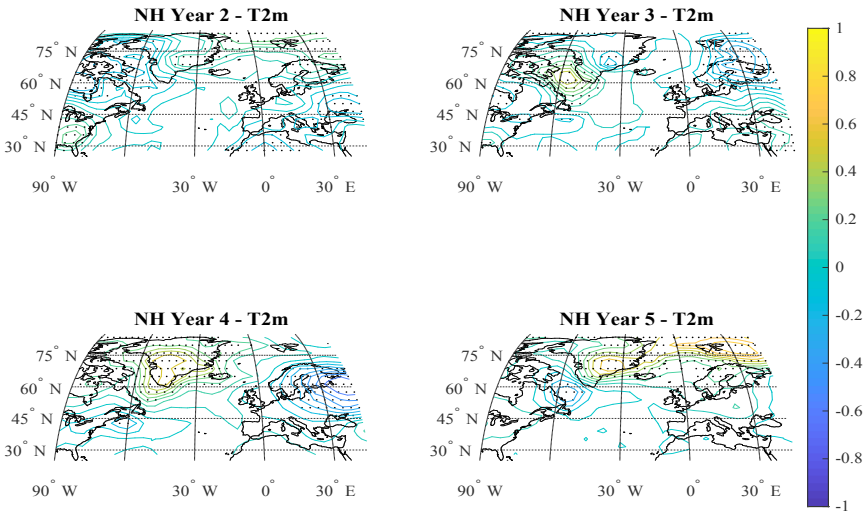


FIGURE F4. 5 NH volcanic composites for T2m.


NH Year 2 - T2m
NH Year 3 - T2m
NH Year 4 - T2m
NH Year 5 - T2m
75° N
60° N
45° N
30° N
90° W
30° W
0°
30° E
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

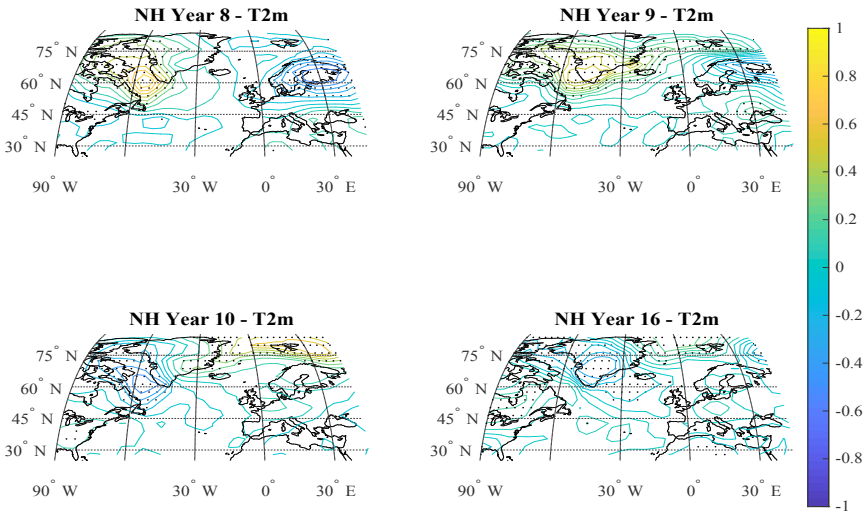


FIGURE F5. a) 2-5 and b) 8, 9, 10 and 16 years after 8 (7 in b) NH volcanic eruptions in the T2m fields retrieved by stacking of selected volcanic eruptions (see main text).

EQ aps
5 volc erupt

	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 0	-0.76	0.00	0.23	0.00	0.80	0.00	-0.21	0.00
Year 1	0.40	0.00	0.49	0.00	-0.02	0.69	-0.50	0.00
Year 2	0.47	0.00	-0.27	0.00	-0.75	0.00	0.31	0.00
Year 3	-0.10	0.01	-0.45	0.00	-0.28	0.00	0.48	0.00
Year 4	-0.08	0.06	-0.79	0.00	-0.58	0.00	0.84	0.00
Year 5	-0.26	0.00	-0.84	0.00	-0.32	0.00	0.85	0.00

EQ aps
9 volc erupt

	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 10	-0.08	0.05	0.30	0.00	0.15	0.00	-0.19	0.00
Year 11	0.47	0.00	-0.27	0.00	0.43	0.00	-0.41	0.00
Year 12	0.44	0.00	-0.20	0.00	0.47	0.00	-0.45	0.00
Year 13	-0.23	0.00	-0.23	0.00	-0.44	0.00	0.50	0.00
Year 14	-0.16	0.00	0.06	0.15	-0.16	0.00	0.16	0.00
Year 15	0.23	0.00	-0.20	0.00	0.22	0.00	-0.18	0.00

EQ aps
10 volc erupt

	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 0	0.18	0.00	0.83	0.00	0.24	0.00	-0.80	0.00
Year 1	-0.13	0.00	0.31	0.00	0.60	0.00	-0.40	0.00
Year 2	0.51	0.00	0.26	0.00	-0.47	0.00	-0.21	0.00
Year 3	0.52	0.00	0.30	0.00	-0.16	0.00	-0.34	0.00
Year 4	-0.07	0.10	-0.11	0.01	-0.21	0.00	0.17	0.00
Year 5	-0.43	0.00	-0.43	0.00	-0.24	0.00	0.40	0.00

FIGURE T1. EQ eruptions. Calculated statistics for the reconstructed aps with respect to aps ECHAM5 weather regimes.

EQ	d18O							
10 volc erupt								
	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 0	0.52	0.00	-0.47	0.00	0.46	0.00	-0.46	0.00
Year 1	0.23	0.00	-0.29	0.00	-0.45	0.00	0.42	0.00
Year 2	0.17	0.00	-0.11	0.01	0.50	0.00	-0.47	0.00
Year 3	-0.06	0.15	-0.16	0.00	0.30	0.00	-0.25	0.00
Year 4	0.58	0.00	-0.59	0.00	0.33	0.00	-0.33	0.00
Year 5	-0.53	0.00	0.34	0.00	-0.71	0.00	0.66	0.00

	d18O							
5 volc erupt								
	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 0	0.12	0.01	-0.11	0.01	0.36	0.00	-0.34	0.00
Year 1	0.32	0.00	-0.42	0.00	-0.02	0.55	-0.13	0.00
Year 2	0.24	0.00	-0.42	0.00	-0.43	0.00	0.36	0.00
Year 3	0.32	0.00	-0.43	0.00	0.27	0.00	-0.35	0.00
Year 4	0.07	0.08	-0.26	0.00	-0.48	0.00	0.39	0.00
Year 5	-0.33	0.00	0.26	0.00	-0.20	0.00	0.17	0.00

	d18O							
9 volc erupt								
	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 10	-0.71	0.00	0.62	0.00	-0.35	0.00	0.33	0.00
Year 11	0.35	0.00	-0.17	0.00	0.74	0.00	-0.64	0.00
Year 12	0.33	0.00	-0.13	0.00	0.75	0.00	-0.65	0.00
Year 13	0.47	0.00	-0.53	0.00	-0.12	0.01	0.08	0.05
Year 14	-0.17	0.00	-0.08	0.05	-0.25	0.00	0.24	0.00
Year 15	0.46	0.00	-0.27	0.00	0.55	0.00	-0.44	0.00

FIGURE T2. EQ eruptions. Calculated statistics for the reconstructed $\delta^{18}O$ with respect to $\delta^{18}O$ ECHAM5 weather regimes.

NH aps
5 volc erupt

	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 0	0.24	0.00	0.67	0.00	0.13	0.00	-0.65	0.00
Year 1	0.20	0.00	0.90	0.00	0.30	0.00	-0.88	0.00
Year 2	0.43	0.00	0.58	0.00	-0.12	0.00	-0.56	0.00
Year 3	0.72	0.00	0.22	0.00	-0.62	0.00	-0.19	0.00
Year 4	-0.10	0.02	0.80	0.00	0.69	0.00	-0.83	0.00
Year 5	-0.41	0.00	0.64	0.00	0.87	0.00	-0.67	0.00

NH aps
8 volc erupt

	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 0	0.34	0.00	-0.63	0.00	-0.77	0.00	0.65	0.00
Year 1	0.50	0.00	0.72	0.00	-0.12	0.00	-0.69	0.00
Year 2	-0.30	0.00	-0.74	0.00	-0.31	0.00	0.78	0.00
Year 3	0.41	0.00	0.87	0.00	0.30	0.00	-0.91	0.00
Year 4	-0.14	0.00	0.88	0.00	0.72	0.00	-0.89	0.00
Year 5	-0.73	0.00	-0.68	0.00	0.22	0.00	0.69	0.00

NH aps
7 volc erupt

	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 10	-0.46	0.00	-0.75	0.00	-0.07	0.09	0.78	0.00
Year 11	0.33	0.00	0.73	0.00	0.25	0.00	-0.76	0.00
Year 12	-0.19	0.00	0.73	0.00	0.78	0.00	-0.77	0.00
Year 13	0.11	0.01	0.92	0.00	0.39	0.00	-0.89	0.00
Year 14	0.50	0.00	0.84	0.00	0.18	0.00	-0.87	0.00
Year 15	-0.34	0.00	-0.85	0.00	-0.31	0.00	0.88	0.00

NH aps no 1783
4 volc erupt

	AtR		ScB		NAO-		NAO+	
	r	p	r	p	r	p	r	p
Year 0	0.10	0.01	0.90	0.00	0.50	0.00	-0.91	0.00
Year 1	0.24	0.00	0.33	0.00	-0.25	0.00	-0.26	0.00
Year 2	0.34	0.00	-0.48	0.00	-0.76	0.00	0.53	0.00
Year 3	0.58	0.00	-0.16	0.00	-0.78	0.00	0.20	0.00
Year 4	0.04	0.32	0.81	0.00	0.61	0.00	-0.86	0.00
Year 5	-0.25	0.00	0.76	0.00	0.81	0.00	-0.79	0.00

FIGURE T3. NH eruptions. Calculated statistics for the reconstructed aps with respect to aps ECHAM5 weather regimes.

NH	d18O								
8 volc erupt									
	AtR		ScB		NAO-		NAO+		
	r	p	r	p	r	p	r	p	
Year 0	-0.36	0.00	0.28	0.00	-0.63	0.00	0.63	0.00	
Year 1	0.73	0.00	-0.78	0.00	0.15	0.00	-0.10	0.01	
Year 2	-0.35	0.00	0.30	0.00	-0.36	0.00	0.36	0.00	
Year 3	0.61	0.00	-0.57	0.00	0.52	0.00	-0.50	0.00	
Year 4	-0.02	0.65	0.09	0.03	0.49	0.00	-0.50	0.00	
Year 5	-0.58	0.00	0.57	0.00	-0.22	0.00	0.21	0.00	

	d18O								
5 volc erupt									
	AtR		ScB		NAO-		NAO+		
	r	p	r	p	r	p	r	p	
Year 0	-0.11	0.01	0.10	0.02	-0.11	0.01	0.11	0.01	
Year 1	0.66	0.00	-0.67	0.00	0.37	0.00	0.33	0.00	
Year 2	0.45	0.00	-0.45	0.00	0.15	0.00	-0.14	0.00	
Year 3	0.64	0.00	-0.68	0.00	0.16	0.00	-0.12	0.00	
Year 4	-0.24	0.00	0.31	0.00	0.24	0.00	-0.27	0.00	
Year 5	-0.27	0.00	0.31	0.00	0.28	0.00	-0.29	0.00	

	d18O								
7 volc erupt									
	AtR		ScB		NAO-		NAO+		
	r	p	r	p	r	p	r	p	
Year 10	-0.55	0.00	0.23	0.00	-0.46	0.00	0.25	0.00	
Year 11	0.54	0.00	-0.50	0.00	0.54	0.00	-0.54	0.00	
Year 12	-0.33	0.00	0.35	0.00	0.31	0.00	-0.33	0.00	
Year 13	0.26	0.00	-0.12	0.00	0.40	0.00	-0.28	0.00	
Year 14	0.53	0.00	-0.44	0.00	0.42	0.00	-0.40	0.00	
Year 15	-0.46	0.00	0.48	0.00	-0.35	0.00	0.41	0.00	

FIGURE T4. NH eruptions. Calculated statistics for the reconstructed $\delta^{18}O$ with respect to $\delta^{18}O$ ECHAM5 weather regimes.