Reply to the Associate Editor

B. Abis and V. Brovkin

Dear Editor,

Thank you for all the attentions dedicated to our manuscript submission. In this document, we will answer your last comments regarding the supplementary material, providing the updated version of the file Supplementary_Tables.pdf.

Best regards,
B. Abis and V. Brovkin

Q1. "Supplementary_Tables.pdf. For clarification, please use figure and table numbers different from those in the main text: for example, Figure S1 and Table S1."

A1. We implemented this correction.

Q2. "Supplementary_Tables.pdf. Please explain the colors (green and purple) used in Figure 1 (looks like a table) in the caption."

A2. We realised this table was somewhat difficult to interpret, so we decided to split it into two summary tables, with more detailed captions. Furthermore, the table was named as a figure due to its formatting. By splitting the table, we were able to simplify its formatting and include everything as tables. The colours were indicative of regions and overlaps in case of fire disturbed states, in which one of the two states might be present in another class not fire disturbed. This information was used to create the corrected totals for each case. We decided to remove the colours to improve readability, and we included the necessary information in the captions.

Supplementary Tables to "Environmental Conditions for Alternative Tree Cover States in High Latitudes"

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Table S1. Correlation matrix among all the environmental variables across North America.

Correlation matrix for Eastern North America								
	MAR	MSSM	MTmin	PZI	FF	GDD0	PTD	ST
MAR	1.0000	0.8891	0.8253	-0.7847	0.1039	0.6490	0.3097	-0.0213
MSSM	0.8891	1.0000	0.7148	-0.6763	0.0503	0.5574	0.2356	-0.0173
MTmin	0.8253	0.7148	1.0000	-0.9295	0.2115	0.9269	0.5796	0.0303
PZI	-0.7847	-0.6763	-0.9295	1.0000	-0.2830	-0.9032	-0.5726	-0.0009
FF	0.1039	0.0503	0.2115	-0.2830	1.0000	0.2539	0.3054	0.0610
GDD0	0.6490	0.5574	0.9269	-0.9032	0.2539	1.0000	0.6239	-0.0190
PTD	0.3097	0.2356	0.5796	-0.5726	0.3054	0.6239	1.0000	0.0787
ST	-0.0213	-0.0173	0.0303	-0.0009	0.0610	-0.0190	0.0787	1.0000
Correlation matrix for Western North America								
	MAR	MSSM	MTmin	PZI	FF	GDD0	PTD	ST
MAR	1.0000	0.7899	0.5708	-0.5321	-0.0081	0.3072	0.2775	-0.1028
MSSM	0.7899	1.0000	0.4975	-0.4778	0.0286	0.2183	0.2208	-0.0638
MTmin	0.5708	0.4975	1.0000	-0.8895	0.2362	0.8605	0.7730	-0.1384
PZI	-0.5321	-0.4778	-0.8895	1.0000	-0.2610	-0.6850	-0.6206	0.0677
FF	-0.0081	0.0286	0.2362	-0.2610	1.0000	0.2557	0.2153	-0.0829
GDD0	0.3072	0.2183	0.8605	-0.6850	0.2557	1.0000	0.8225	-0.1951
PTD	0.2775	0.2208	0.7730	-0.6206	0.2153	0.8225	1.0000	-0.2866
ST	-0.1028	-0.0638	-0.1384	0.0677	-0.0829	-0.1951	-0.2866	1.0000

Table S2. Correlation matrix among all the environmental variables across North Eurasia.

Correlation matrix for Eastern North Eurasia								
	MAR	MSSM	MTmin	PZI	FF	GDD0	PTD	ST
MAR	1.0000	0.8289	0.5571	-0.5170	0.0243	0.3526	0.0627	-0.0238
MSSM	0.8289	1.0000	0.5134	-0.4385	-0.1163	0.2293	0.0242	-0.1577
MTmin	0.5571	0.5134	1.0000	-0.8917	0.3394	0.7816	0.3576	-0.3114
PZI	-0.5170	-0.4385	-0.8917	1.0000	-0.3712	-0.7641	-0.3359	0.3286
FF	0.0243	-0.1163	0.3394	-0.3712	1.0000	0.5002	0.3976	-0.1153
GDD0	0.3526	0.2293	0.7816	-0.7641	0.5002	1.0000	0.5128	-0.3454
PTD	0.0627	0.0242	0.3576	-0.3359	0.3976	0.5128	1.0000	-0.3295
ST	-0.0238	-0.1577	-0.3114	0.3286	-0.1153	-0.3454	-0.3295	1.0000
Correlation matrix for Western North Eurasia								
	MAR	MSSM	MTmin	PZI	FF	GDD0	PTD	ST
MAR	1.0000	0.8076	0.0038	-0.2666	-0.6025	-0.2109	-0.2476	-0.0190
MSSM	0.8076	1.0000	-0.0999	-0.0737	-0.5793	-0.2450	-0.2464	-0.0636
MTmin	0.0038	-0.0999	1.0000	-0.7889	0.5027	0.9316	0.7961	-0.0954
PZI	-0.2666	-0.0737	-0.7889	1.0000	-0.2001	-0.6642	-0.4717	0.1565
FF	-0.6025	-0.5793	0.5027	-0.2001	1.0000	0.6525	0.6215	-0.0617
GDD0	-0.2109	-0.2450	0.9316	-0.6642	0.6525	1.0000	0.8325	-0.0281
PTD	-0.2476	-0.2464	0.7961	-0.4717	0.6215	0.8325	1.0000	-0.0831
ST	-0.0190	-0.0636	-0.0954	0.1565	-0.0617	-0.0281	-0.0831	1.0000

Table S3. Boundaries of the bins used in the classification.

				Eastern North America			
	0	1	2	3	4	5	6
Mtmin 1x	-16.9697	-6.5599	-4.5902	-2.6206	-0.6509	1.3187	5.8752
MSSM 6x	104.2174	238.6162	301.3687	364.1211	426.8735	489.6259	598.2341
Mar 36x	120.0692	534.9277	647.2662	759.6046	871.9431	984.2815	1,607.1846
PZI 216x	0.0000	0.0878	0.1757	0.6411	1.0000		
ST 1000x	1,2,12	3,4,5,6,7,8	9,10,11,13,14				
FF 3864x	0.0000	0.0714	0.1429	0.3714	1.8824		
				Western North America			
	0	1	2	3	4	5	6
Mtmin 1x	-15.2733	-8.9262	-6.2897	-3.6531	-1.0165	1.6200	8.4559
MSSM 6x	19.2895	137.0854	188.1259	239.1663	290.2067	341.2471	694.4776
Mar 36x	51.8308	191.7554	284.9050	378.0546	471.2042	564.3538	3138.8692
PZI 216x	0.0000	0.2012	0.4024	0.8197	1.0000		
ST 1000x	1,2,12	3,4,5,6,7,8	9,10,11,13,14				
FF 3864x	0.0000	0.2941	0.5882	0.7059	2.9412		
				Eastern North Eurasia			
	0	1	2	3	4	5	6
Mtmin 1x	-17.9223	-10.5526	-8.5407	-6.5288	-4.5170	-2.5051	3.0637
MSSM 6x	54.3041	155.1053	199.3099	243.5146	287.7192	331.9239	573.2997
Mar 36x	132.3769	331.0546	399.7775	468.5004	537.2233	605.9462	1006.1846
PZI 216x	0.0000	0.0050	0.0100	0.9662	1.0000		
ST 1000x	1,2,12	3,4,5,6,7,8	9,10,11,13,14				
FF 3864x	0.0000	0.4118	0.8235	0.9412	3.5294		
				Western North Eurasia			
	0	1	2	3	4	5	
Mtmin 1x	-8.2882	-4.7622	-2.4858	-0.2094	2.0669	5.3837	
MSSM 5x	99.4328	255.6825	291.2951	326.9077	362.5203	440.3554	
Mar 25x	204.7615	520.0138	567.5974	615.1810	662.7646	797.2000	
PZI 125x	0.0000	0.0705	0.1410	0.2774			
ST 1000x	1,2,12	3,4,5,6,7,8	9,10,11,13,14				
FF 3864x	0.0000	0.2647	0.5294	0.5882	3.1765		

Table S4. Summary of possible alternative classes. The multipliers refer to the boundaries in Table S3. The vegetation states correspond to the sum of the multipliers. In the fire disturbed cases, the total number of gridcells is corrected to take into account overlaps with cases where the same vegetation state is also present among the states which are not fire disturbed.

Vegetation State		3864x	1000x	216x	36x	6x	1x	# Gridcells I	# Gridcells II	Total
					Eastern North America					
Treeless – Open woodland	496	0	0	2	1	4	4	12	12	**24**
Treeless – Open woodland	669	0	0	3	0	3	3	13	7	**20**
Forest – Open woodland	216	0	0	0	5	5	6	40	18	**58**
					Western North America					
Forest – Open woodland	4988	1	1	0	3	2	4	18	9	**27**
Forest – Open woodland	6988	1	3	0	3	2	4	29	15	**44**
					Eastern North Eurasia					
Treeless – Open woodland	1539	0	1	2	2	5	5	24	11	**35**
Treeless – Open woodland	5519	1	1	3	0	1	1	27	7	**34**
Forest – Open woodland	1519	0	1	2	2	2	3	13	10	**23**
Forest – Open woodland	1575	0	1	2	3	5	5	12	11	**23**
Forest – Open woodland	5439	1	1	2	3	5	5	11	10	**21**
Forest – Open woodland	5469	1	1	2	4	4	5	11	8	**19**
Open woodland – FD Treeless	1655	0	1	3	0	1	1	10	58	**68**
Open woodland – FD Treeless	5519	1	1	3	0	1	1	7	35	**35**
Open woodland – FD Forest	1575	0	1	2	3	5	5	11	11	**11**
Forest – FD Open woodland	1519	0	1	2	2	2	3	13	11	**11**
Forest – FD Open woodland	1575	0	1	2	3	5	5	12	17	**17**
Vegetation State		3864x	1000x	125x	25x	5x	1x	# Gridcells I	# Gridcells II	Total
					Western North Eurasia					
Treeless – Open woodland	16532	4	1	0	3	0	1	33	7	**40**
Forest – Open woodland	69	0	0	0	2	3	4	11	7	**18**
Forest – Open woodland	1093	0	1	0	3	3	3	12	8	**20**

Table S5. Total amount of gridcells related to alternative classes.

NA_E Total	NA_W Total	NA Total	NA %	EA_E Total	EA_W Total	EA Total	EA %	Global Total	Global %
102	71	173	3.55	297	78	375	5.06	548	4.46