Supporting Information

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Table S1. Climate field values, 30 °N to 60 °N

Month	Variable Name	Units	Land				Ocean			
			μ	Δ	σ	p	μ	Δ	σ	p
Annual Mean										
	Surf. Air Temp.	K	280.81	1.04	0.10	**0.003**	285.97	0.79	0.12	**0.023**
	Precipitation	mm/day	1.73	0.06	0.04	$p <$ **0.001**	2.83	0.03	0.04	$p <$ **0.001**
	Albedo	albedo	0.22	−0.05	0.00	$p <$ **0.001**	0.07	0.00	0.00	$p <$ **0.001**
	Latent Heat	Wm^{-2}	33.42	1.04	0.74	$p <$ **0.001**	80.28	2.17	0.87	$p <$ **0.001**
	Sensible Heat	Wm^{-2}	26.50	8.24	0.40	$p <$ **0.001**	21.29	−0.60	0.43	$p <$ **0.001**
	Low Cloud	fraction	0.29	−0.03	0.00	$p <$ **0.001**	0.54	−0.01	0.00	$p <$ **0.001**
	Water Vapor	kgm^{-2}	13.14	1.04	0.10	$p <$ **0.001**	20.75	1.25	0.17	$p <$ **0.001**
	Transpiration	Wm^{-2}	9.80	3.33	0.02	$p <$ **0.001**	-	-	-	-
	Leaf Area Index	$m^2\ m^{-2}$	1.50	0.10	0.00	$p <$ **0.001**	-	-	-	-
	1-ET/PET	unitless	−0.36	0.02	0.05	0.111	-	-	-	-
JJA										
	Surf. Air Temp.	K	293.48	1.89	0.13	$p <$ **0.001**	289.98	1.08	0.15	$p <$ **0.001**
	Precipitation	mm/day	2.25	−0.08	0.09	$p <$ **0.001**	1.65	−0.02	0.11	0.436
	Albedo	albedo	0.18	−0.04	0.00	$p <$ **0.001**	0.05	0.00	0.00	0.168
	Latent Heat	Wm^{-2}	63.58	0.66	2.02	0.084	42.19	2.44	1.84	$p <$ **0.001**
	Sensible Heat	Wm^{-2}	49.36	15.70	1.16	$p <$ **0.001**	4.82	0.08	1.11	0.723
	Low Cloud	fraction	0.17	−0.03	0.01	$p <$ **0.001**	0.61	0.00	0.01	0.826
	Water Vapor	kgm^{-2}	20.72	1.93	0.16	$p <$ **0.001**	28.95	1.58	0.24	$p <$ **0.001**
	Transpiration	Wm^{-2}	24.28	6.19	0.01	$p <$ **0.001**	-	-	-	-
	Leaf Area Index	$m^2\ m^{-2}$	1.79	0.02	0.00	$p <$ **0.001**	-	-	-	-
	1-ET/PET	unitless	0.50	0.01	0.17	0.168	-	-	-	-
DJF										
	Surf. Air Temp.	K	268.22	−0.03	0.11	0.983	282.03	0.03	0.11	0.985
	Precipitation	mm/day	1.41	0.32	0.06	$p <$ **0.001**	4.07	0.18	0.07	$p <$ **0.001**
	Albedo	albedo	0.28	−0.07	0.00	$p <$ **0.001**	0.11	0.00	0.00	**0.005**
	Latent Heat	Wm^{-2}	10.25	1.83	1.36	$p <$ **0.001**	114.44	3.38	1.55	$p <$ **0.001**
	Sensible Heat	Wm^{-2}	3.87	1.19	0.43	$p <$ **0.001**	43.33	−1.33	0.59	$p <$ **0.001**
	Low Cloud	fraction	0.43	−0.02	0.01	$p <$ **0.001**	0.55	−0.01	0.01	$p <$ **0.001**
	Water Vapor	kgm^{-2}	7.36	0.35	0.19	**0.007**	14.71	0.87	0.27	$p <$ **0.001**
	Transpiration	Wm^{-2}	0.78	0.64	0.04	$p <$ **0.001**	-	-	-	-
	Leaf Area Index	$m^2\ m^{-2}$	1.19	0.12	0.00	$p <$ **0.001**	-	-	-	-
	1-ET/PET	unitless	0.51	−0.01	0.02	0.321	-	-	-	-

Variables of interest are shown from climate model runs averaged over the entire year (annual mean), summer months (June, July, and August—JJA), and winter months (December, January, and February—DJF). Values are reported as the mean (μ) of the control run (CON), the anomaly (Δ, TREE-CON), the standard deviation of the control (σ) and *p*-value of significance for spatial averages over either land or ocean area north of 30 °N and south of 60 °N. *p*-values of 0.05 or less indicate significance of at least 95% confidence and are shown in bold. Hyphens indicate land surface quantities that are not defined over the ocean.