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Supplement of

The warm winter paradox in the Pliocene northern high latitudes

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Supplementary Tables

SITE	LOCATION	mPWP MAT		PI MAT		
		data	MMM	modern data	MMM	CRU*
Lost Chicken Mine	64N, 142 W	2.5	-2.8	-5.7	-7.6	-7.3
Lake Baikal	56N, 108E	7.0 +/- 4.0	-1.7	-3.6	-5.8	-6.3
James Bay Lowland	53N, 84W	6.0 +/- 4.5	2.9	-1.3	-1.6	-2.8
Pula Maar	47N 17E	12.8 +/- 1.2	13.0	9.9	9.2	9.9
Alpes-Maritimes	44N, 7E	17.5 +/-2.0	17.2	10.2	13.2	12.4
Tarragona	41N, 1E	20.0 +/- 3.5	18.8	15.7	15.3	n/a
Rio Maior	39N 9W	19.3 +/- 2.7	18.9	14.2	15.4	15.5
Yallalie	-30S 116E	21.0 +/- 5.0	21.2	18.8	18.8	17.4

Table S1: Data for initial DMC shown in figure 2. Note that CRU is from the years 1901-1930.

LOCATION	METHOD	mPWP Warm month (°C)		mPWP Cold month (°C)	
		data	model mean	data	model mean
Vegetation: figure 3					
Lake El'gygytgyn	BMA	15.0 - 16.0	16.2	-36.8 - -30.4	-24.0
Lake Baikal	CLE	15.3 - 17.5	22.9	-1.7 - 1.0	-24.2
Lake Baikal	CA	13.0 - 24.0	22.9	-15.0 - -5.0	-24.2
Mirny	CA	18.8 - 24.6	26.6	-0.3 - 0.7	-12.6
Merkutlinskiy	CA	17.3 - 23.8	25.7	-3.8 - 6.2	-12.7
Kabinet	CA	21.6 - 24.4	26.8	-4.4 - 4.6	-12.6
Delyankir	CA	18.9 - 24.9	21.1	-6.9 - 1.3	-32.0
Chernoluche	CA	19.6 - 20.3	26.5	-5.9 - 0.7	-11.8
Blizkiy	CA	15.6 - 23.3	16.3	-12.8 - 5.2	-23.2
42km	CA	21.6 - 23.3	26.8	-4.4 - 0.7	-12.6
Lost Chicken Mine	QE	12.0	15.9	< -2.0	-19.0
Tnekveem	CA	18.9 - 25.6	16.8	-11.8 - 5.8	-21.8
Hydzhak	CA	18.8 - 24.9	16.1	-8.7 - 1.3	-27.0
Meighen Island*	CLE	19.6 - 20.5 / 12.8 - 13.3	13.3	-11.6 - -11.4 / -6.8 - -6.2	-31.5
Beaver Pond*	CLE	18.4 - 20.9 / 12.4 - 13.1	13.2	-12.2 - -11.5 / -7.3 - -6.8	-30.5
Fyles Leaf Beds*	CLE	19.7 - 21.1 / 12.6 - 13.4	13.6	-12.8 - -9.1 / -7.2 - -5.5	-31.0
Meighen Island*	CA	18.1 - 22.8 / 10.6 - 16.2	13.3	-21.7 - -7.9 / -16.3 - -2.7	-31.5
Beaver Pond*	CA	18.1 - 22.4 / 11.3 - 16.3	13.2	-21.7 - -8.1 . -15.0 - -3.5	-30.5
Fyles Leaf Beds*	CA	18.1 - 22.7 / 10.9 - 15.0	13.6	-16.9 - -6.4 / -12.4 - -2.3	-31.0
Beetle: figure 4					
Meighen Island*	CLE	19.8 - 21.2 / 12.5 - 13.6	13.3	-15.0 - -11.6 / -9.4 - -6.3	-31.5
Beaver Pond*	CLE	13.6 - 13.9 / 7.4 - 7.7	13.2	-23.5 - -20.4 / -21.1 - -18.3	-30.5
Meighen Island*	CA	19.5 - 22.3 / 11.2 - 14.9	13.3	-24.0 - -13.0 / -15.7 - -6.1	-31.5
Beaver Pond*	CA	9.4 - 16.5 / 4.6 - 9.4	13.2	-25.0 - -10.4 / -25.0 - -4.1	-30.5
Ballast Brook	MCR	12.0 - 14.5	14.7	-21.9 - -19.5	-27.8
Strathcona Beaver Peat	MCR	11.7 - 12.2	13.2	-28.7 - -27.2	-30.5
Meighen Island	MCR	11.5 - 13.5	13.3	-33.0 - -18.5	-31.5
Lost Chicken Mine	MCR	13.5 - 16.0	15.9	-27.8 - -19.3	-19.1
Bluefish	MCR	12.7 - 15.0	16.9	-30.0 - -20.5	-22.0

Table S2: Values used in the seasonal temperature DMC shown in figure 3 and figure 4. *Data presented for these sites was max/min temperature of the warmest/coldest month, and temperature of the warmest/coldest quarter. The WMMT and CMMT will lie within these values.
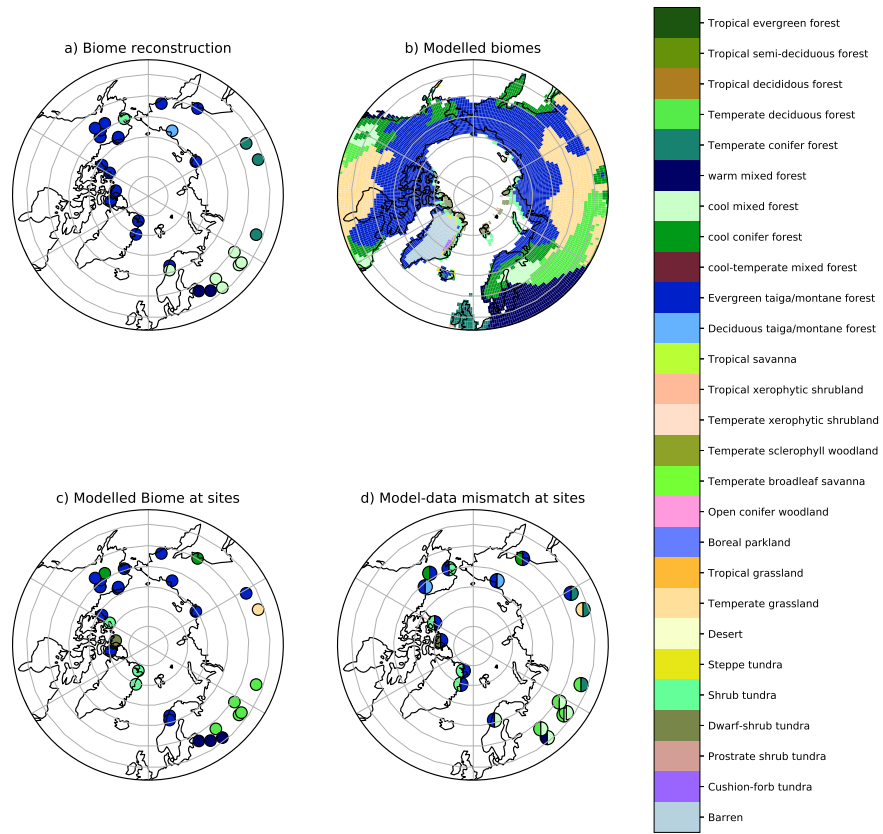
Supplementary figures

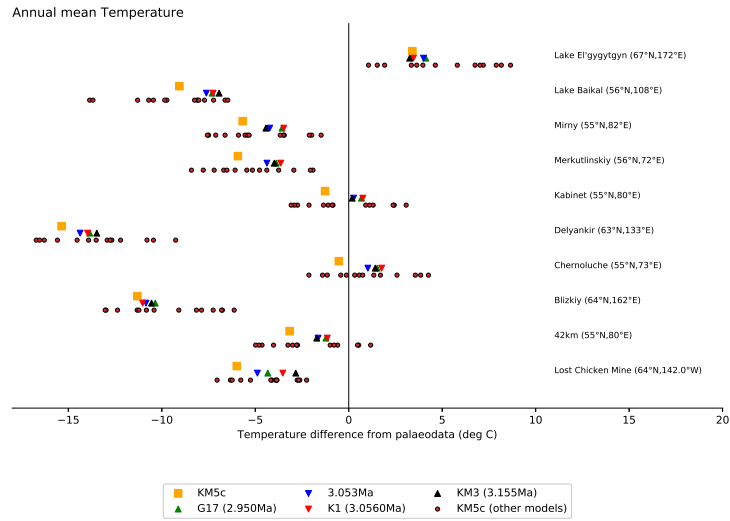Figure S1: The same as figure 5 but with BIOME4 run in absolute mode. See section 2.

Figure S2: The same as figure 6 but for the annual mean. The difference between modelled temperature and the data, for different models and different orbital configurations. HadCM3 simulations with a range of different orbital configurations are shown by the square and triangles. The KM5c simulation for other models is shown by the circles. Data is 'Late Pliocene' for all sites except Lake Baikal and Lake El'gygytgyn which are KM5c'.