# Supplementary Material
Divergent responses of evergreen needle-leaf forests in Europe to the 2020 warm winter

Supplementary Table 1 Mean seasonal NEP ($\mu mol\ CO_2\ m^{-2}\ s^{-1}$) during 2020 compared to the reference period (2014-2019). Negative values indicate a net CO_2 emission and positive values indicate a net uptake.

| Site	NEP - winter		NEP- spring		NEP - summer		NEP - autumn	
	Reference	2020	Reference	2020	Reference	2020	Reference	2020
IT-SR2	-0.18	0.63	2.03	2.33	0.82	1.53	-0.71	-0.71
FR-Bil	0.21	0.16	2.38	1.94	1.17	2.04	-0.08	0.51
BE-Bra	-1.39	-2.79	1.41	1.10	3.42	2.46	-0.34	-1.35
DE-Tha	-0.22	-0.18	2.07	1.83	2.48	1.28	0.70	0.50
DE-RuW	1.53	1.23	2.69	2.21	0.96	-0.01	0.84	0.70
DE-Obe	-1.25	-1.56	2.21	1.49	2.10	0.88	-0.44	-0.14
SE-Nor	-1.42	-1.29	0.58	0.87	-0.01	0.18	-2.51	-2.57
CZ-Bk1	-0.36	-0.30	3.59	2.25	3.78	-0.01	1.48	0.38
RU-Fyo	-0.63	-0.55	0.76	1.55	0.86	0.55	-0.70	-0.45
FI-Let	-0.78	-1.05	0.01	0.49	0.88	1.84	-1.26	-1.32
IT-Ren	-0.38	-0.61	2.38	3.04	3.58	2.86	1.47	1.47
CH-Dav	-1.34	-1.29	1.38	1.21	1.20	0.18	0.29	-0.34
SE-Ros	-0.37	-0.35	1.02	0.69	2.19	1.95	-0.07	-0.57
SE-Svb	-0.64	-0.69	1.12	0.54	2.04	2.41	-0.80	-0.78

Supplementary Figure 1 Yearly temperature and precipitation anomalies in winter 2020 at the sites not included in Figure 2, relative to winter during the reference period 2014-2019. Precipitation anomalies are converted to relative change (relative to mean) and temperature changes are in the original unit (°C). Anomalies are classified in four main classes of "wet-warm", "dry-warm", "wet-cold", and "dry-cold". Winter 2020 is marked in bold. Symbols are marked in blue, and label (year) is displayed only if precipitation change was larger than 10% and at the same time temperature change more than 0.5 °C. Sites ordered by increasing mean temperature (FI-Ros coldest and FR-Bil warmest).
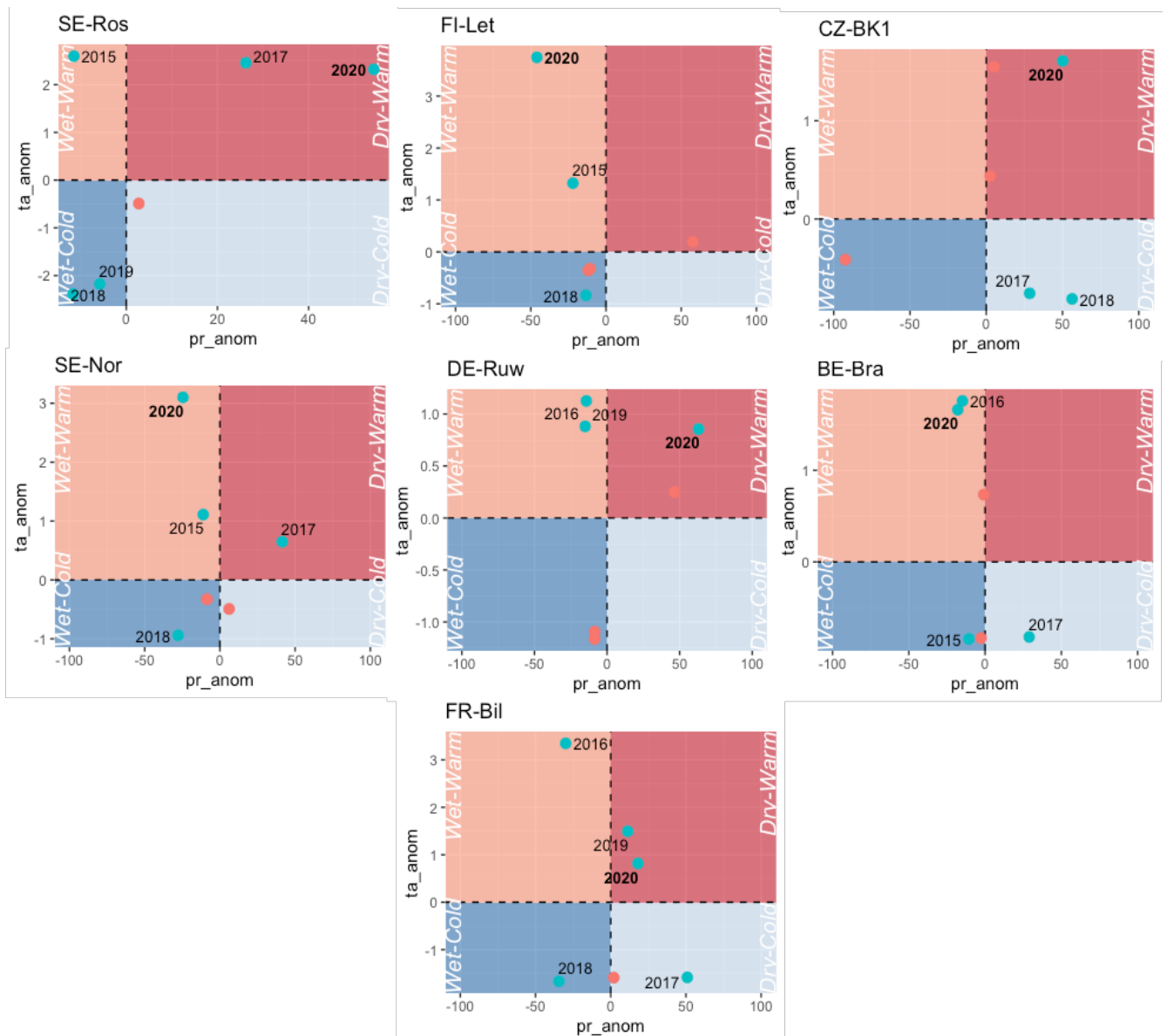
Supplementary Figure 2 Mean daily NEP between 2014 and 2019 at each site. Zero line is marked to show the start and end of the net carbon uptake (CUP) period. Start of the net carbon uptake period is when daily NEP crosses from negative to positive, and end is the inverse. The curve is fitted with a loess (span = 0.5) and the shaded area marks the 95% confidence interval.
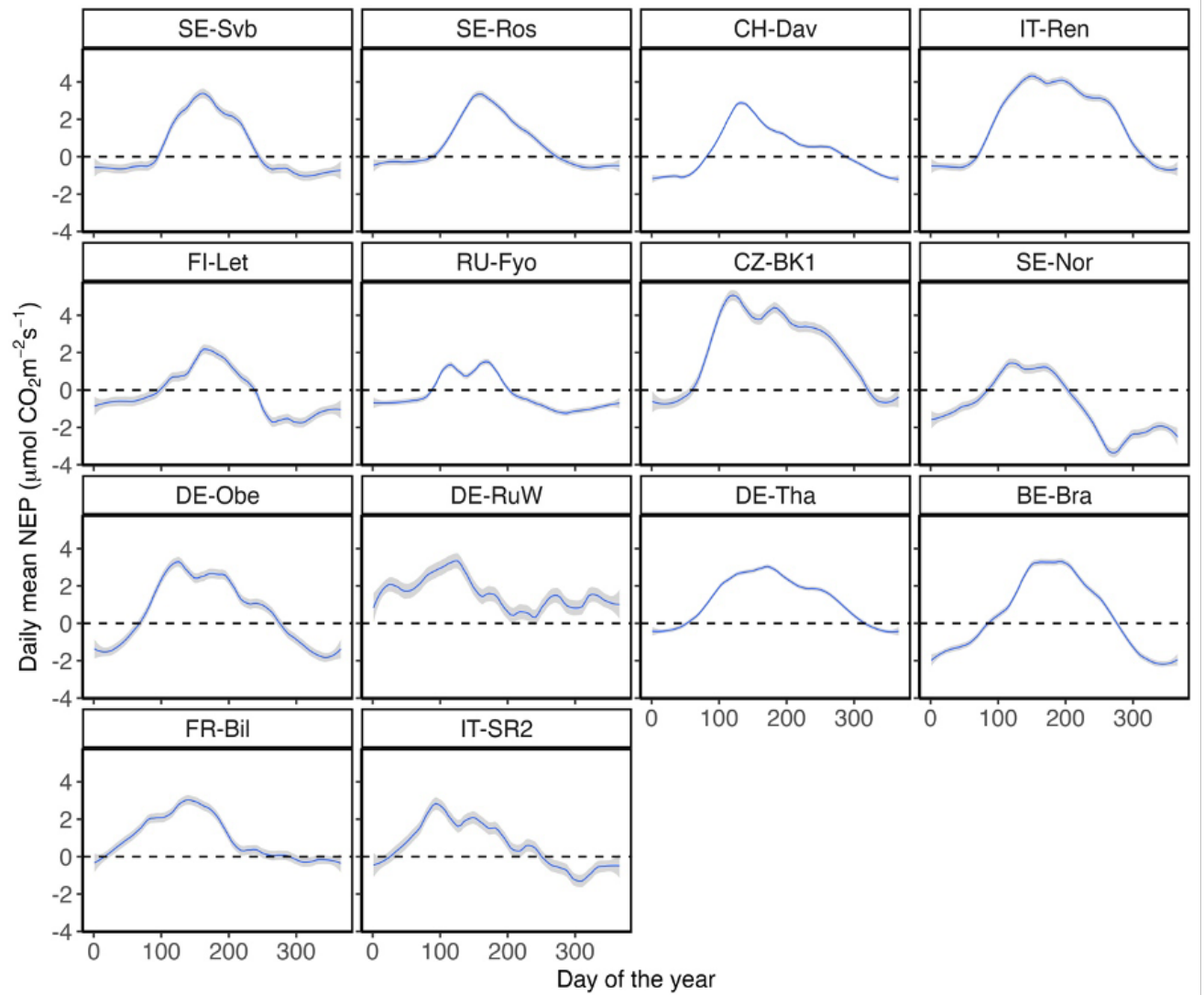
Supplementary Figure 3 Net ecosystem productivity (NEP) response to air temperature (TA) in winter and spring. Data were binned by TA with an equal number of observations in each bin. Symbols mark the median values and error bars show the 5–95% percentile range of the data in each bin. Data were pooled for the reference period (2014–2019).
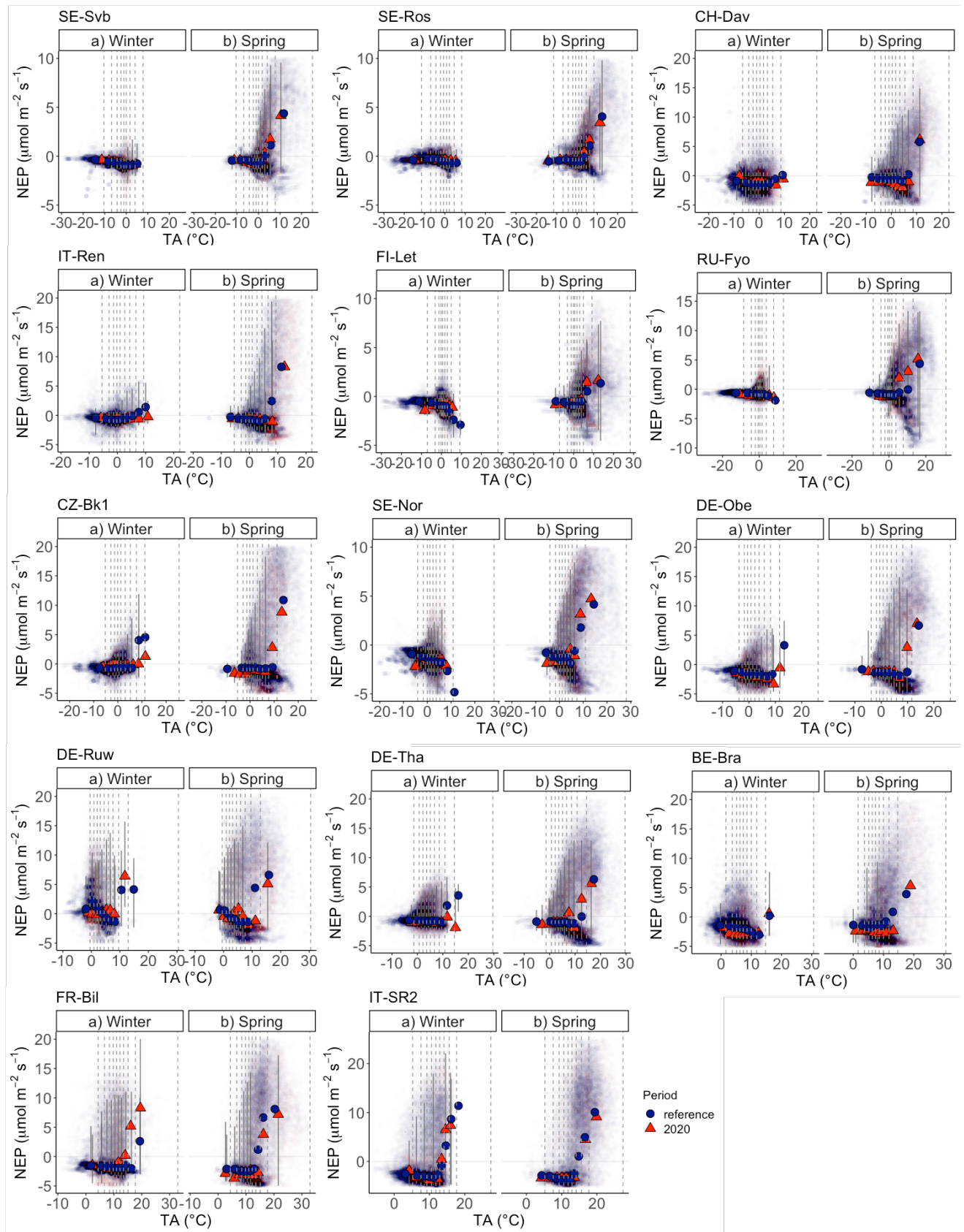
Supplementary Figure 4 Average variance explained (across all sites) by the random forest model was 78% ($r^2 = 0.78$).
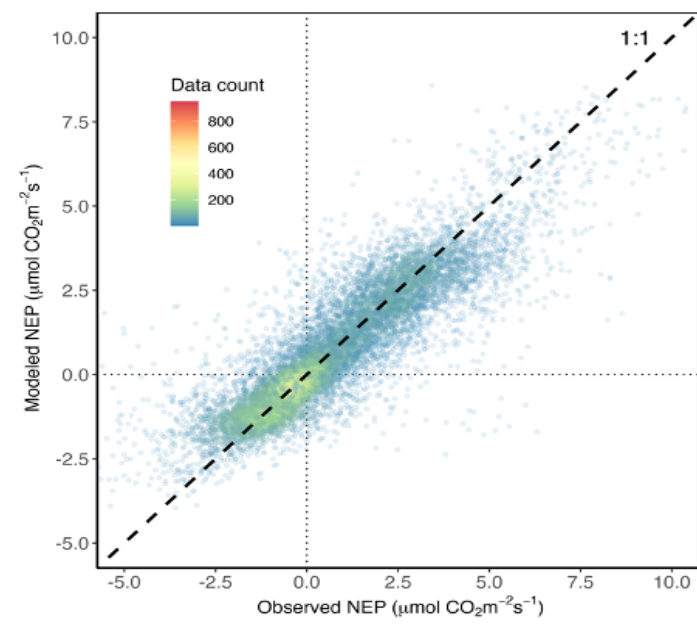
Supplementary Figure 5 Relationship between changes in NEP in 2020 compared to the reference period (ΔNEP) with elevation and latitude across sites.