Supplemental figures for: Increasing summer net CO_2 uptake in high northern ecosystems inferred from atmospheric inversions and remote sensing, by Welp et al.

Figure captions

Figure S1: Time series of fossil fuel fluxes that are subtracted from the inversion results in order to calculate the land biosphere exchange for the (a) globe, (b) European region and (c) Boreal North America and Boreal Asia. Black is the RIGC inversion and grey is the Jena s85 inversion.

Figure S2: Correlation coefficients for July CO_2 fluxes from the arctic zone with lagged 3-month running mean temperature (area-weighted and NPP-weighted) and NDVI for (a) RIGC inversion and (b) Jena s85 inversion over the current and previous 4 years. Positive correlations mean greater NDVI during (or following) warmer temperature. Filled circles indicate significance greater than the 95% level.

Figure S3: Mean seasonal cycle of biomass burning CO_2 emissions in the (a) arctic zone and (b) boreal zone. Units are in Tg C mon^{-1}. Blue line is the RETRO dataset from 1985-2000 and magenta in the GFED4 dataset from 1997–2012.

Figure S4: Time series of biomass burning CO_2 emissions from RETRO and GFED4 for both regions as annual sums (a and b) and for the month of July only (c and d).

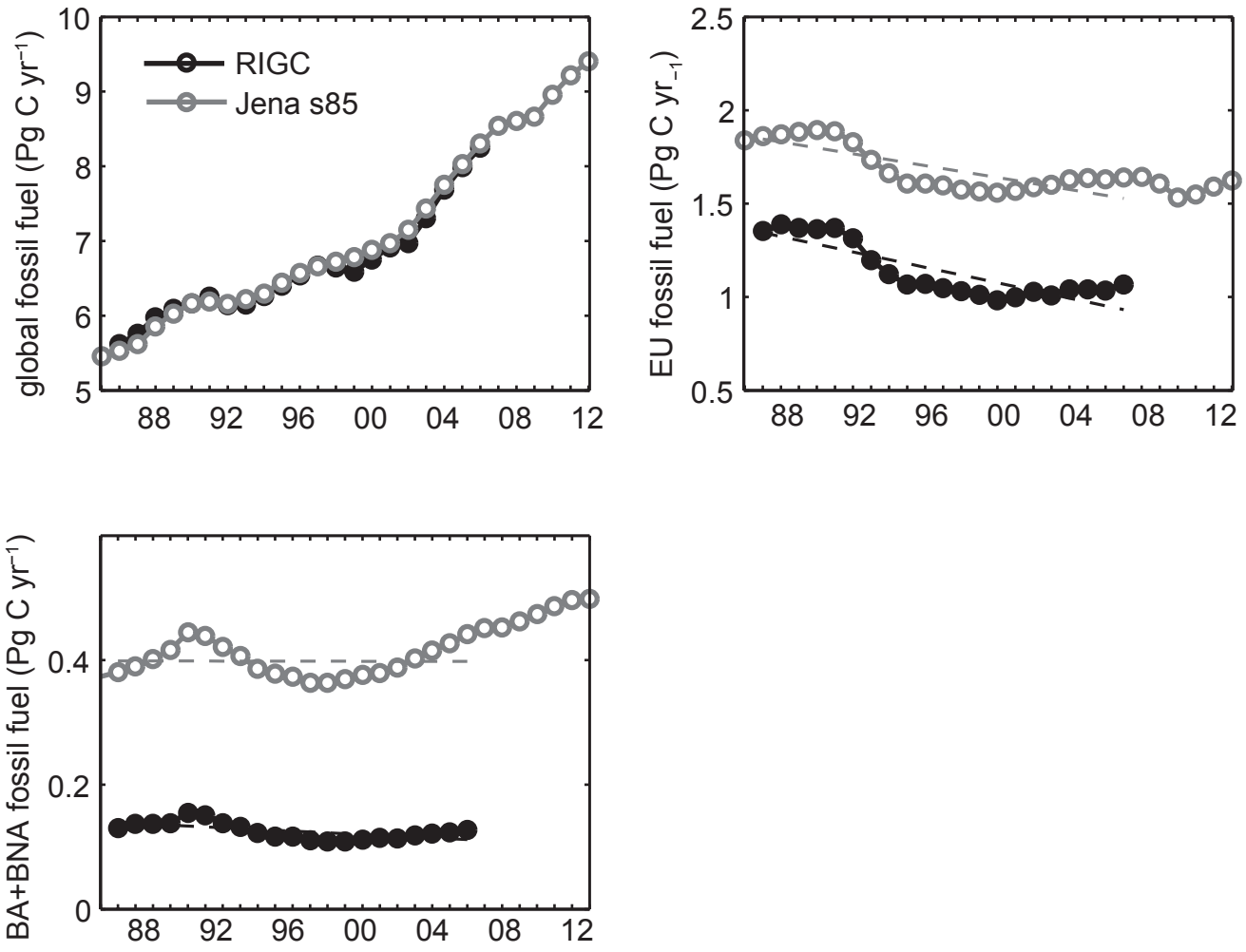
global fossil fuel (Pg C yr⁻¹)
RIGC
Jena s85
EU fossil fuel (Pg C yr⁻¹)
BA+BNA fossil fuel (Pg C yr⁻¹)
88
92
96
00
04
08
12

Figure S1

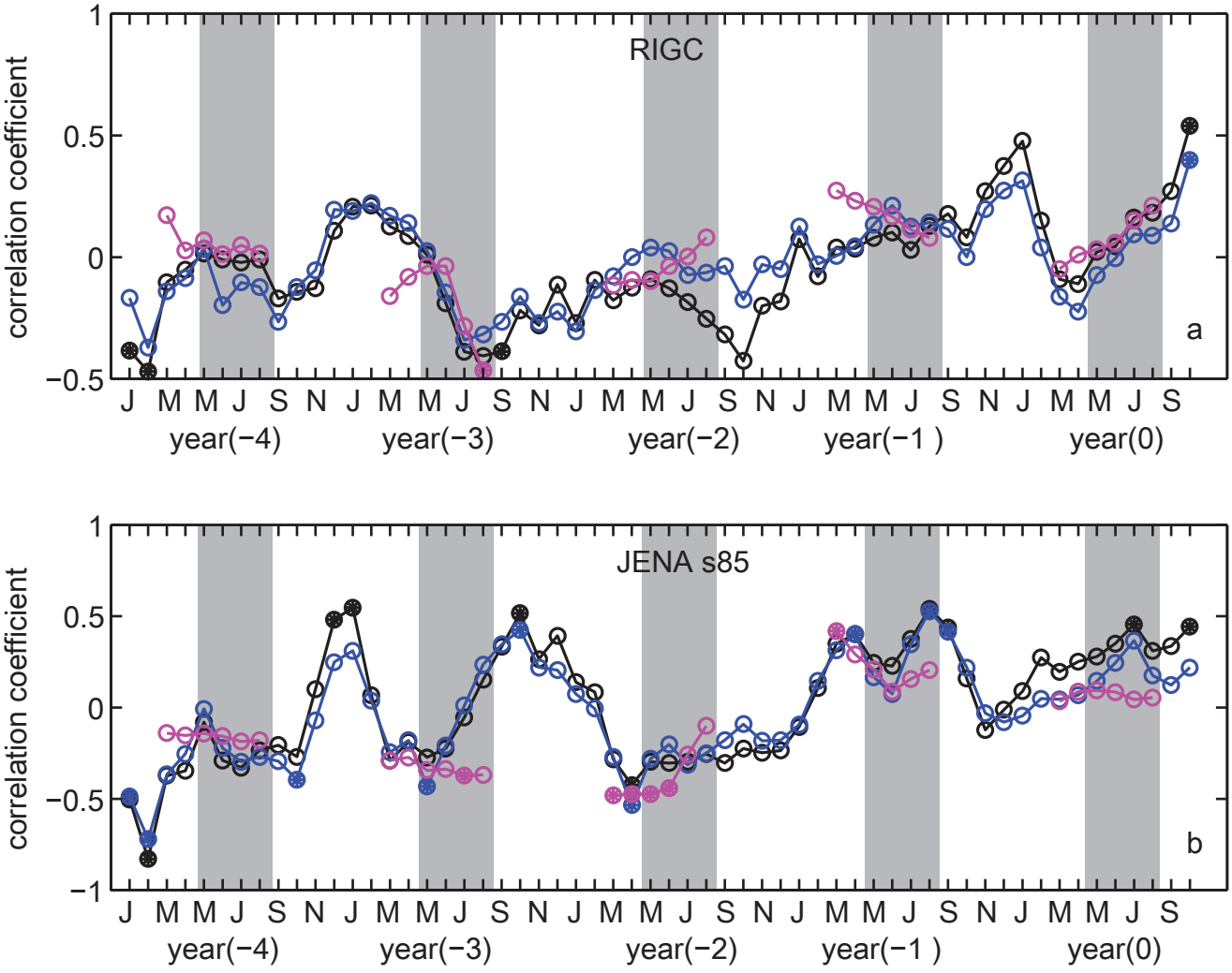
RIGC
correlation coefficient
1
0.5
0
−0.5
J M M J S N J M M J S N J M M J S N J M M J S N J M M J S
year(−4)
year(−3)
year(−2)
year(−1)
year(0)
a
JENA s85
correlation coefficient
1
0.5
0
−0.5
−1
J M M J S N J M M J S N J M M J S N J M M J S N J M M J S
year(−4)
year(−3)
year(−2)
year(−1)
year(0)
b

Figure S2

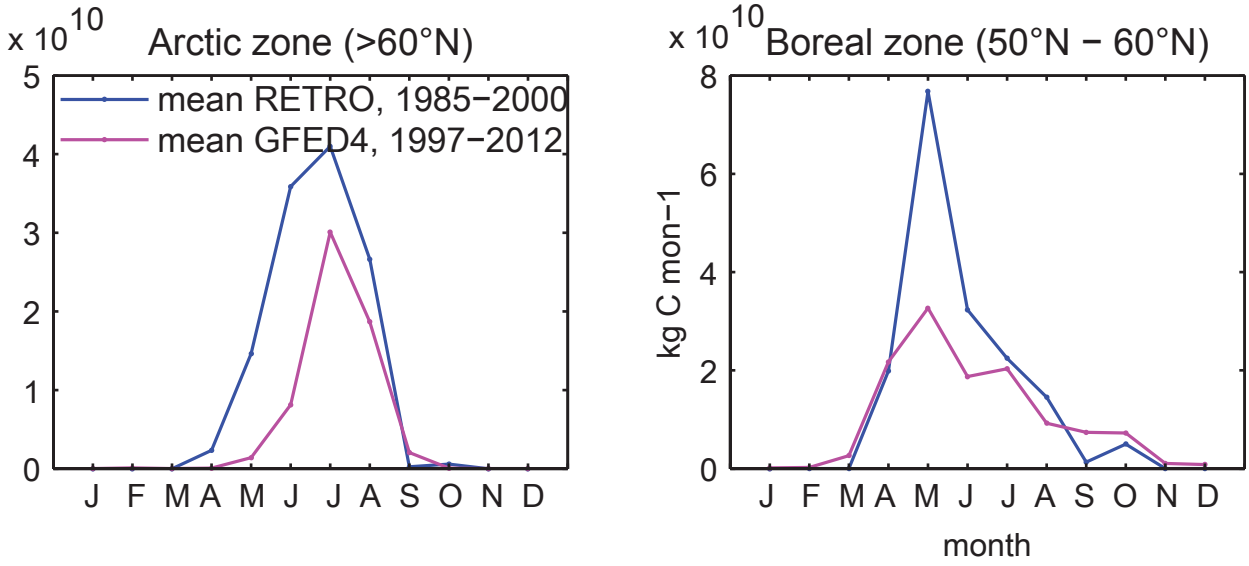
x 10^10
Arctic zone (>60°N)
mean RETRO, 1985−2000
mean GFED4, 1997−2012
0
1
2
3
4
5
J F M A M J J A S O N D
x 10^10
Boreal zone (50°N − 60°N)
kg C mon−1
0
2
4
6
8
J F M A M J J A S O N D
month

Figure S3

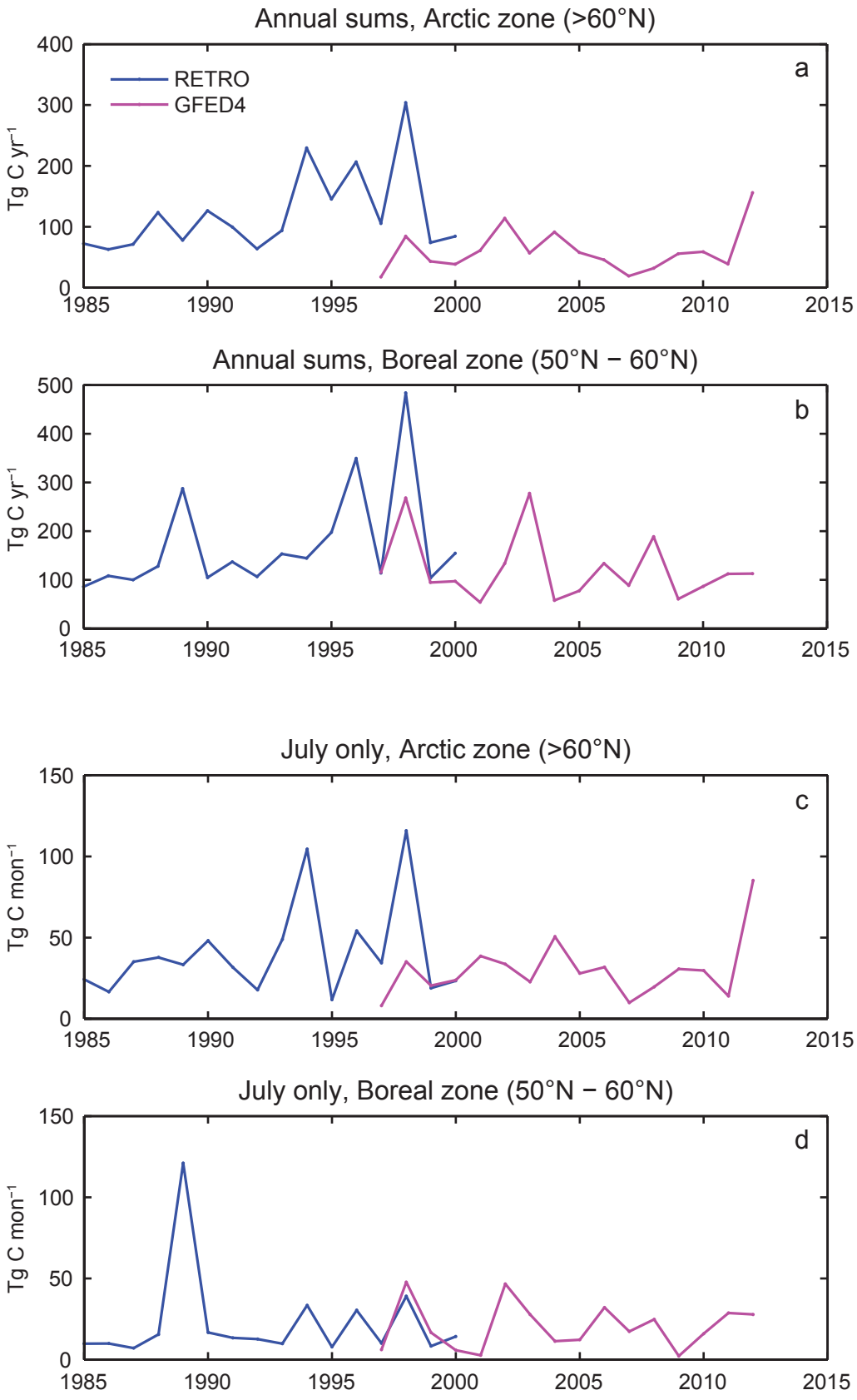
Annual sums, Arctic zone (>60°N)
RETRO
GFED4
a
Tg C yr⁻¹
Annual sums, Boreal zone (50°N − 60°N)
b
Tg C yr⁻¹
July only, Arctic zone (>60°N)
c
Tg C mon⁻¹
July only, Boreal zone (50°N − 60°N)
d
Tg C mon⁻¹

Figure S4