Figure S1. Sensitivity of f_{pet} and f_{ng} (C_{pet}/C_{xs} and C_{ng}/C_{xs}) to assuming δ_{bio} value. Solid line represents f_{pet} and f_{ng} calculated using $\delta_{bio} = -26.6$ ‰ and the dashed line represents $\delta_{bio} = -20$ ‰. f_{pet} changes from 0.62 ± 0.13 to 0.58 ± 0.15 (annual mean and standard deviation of monthly mean fraction), f_{ng} changes from 0.30 ± 0.08 to 0.35 ± 0.08.
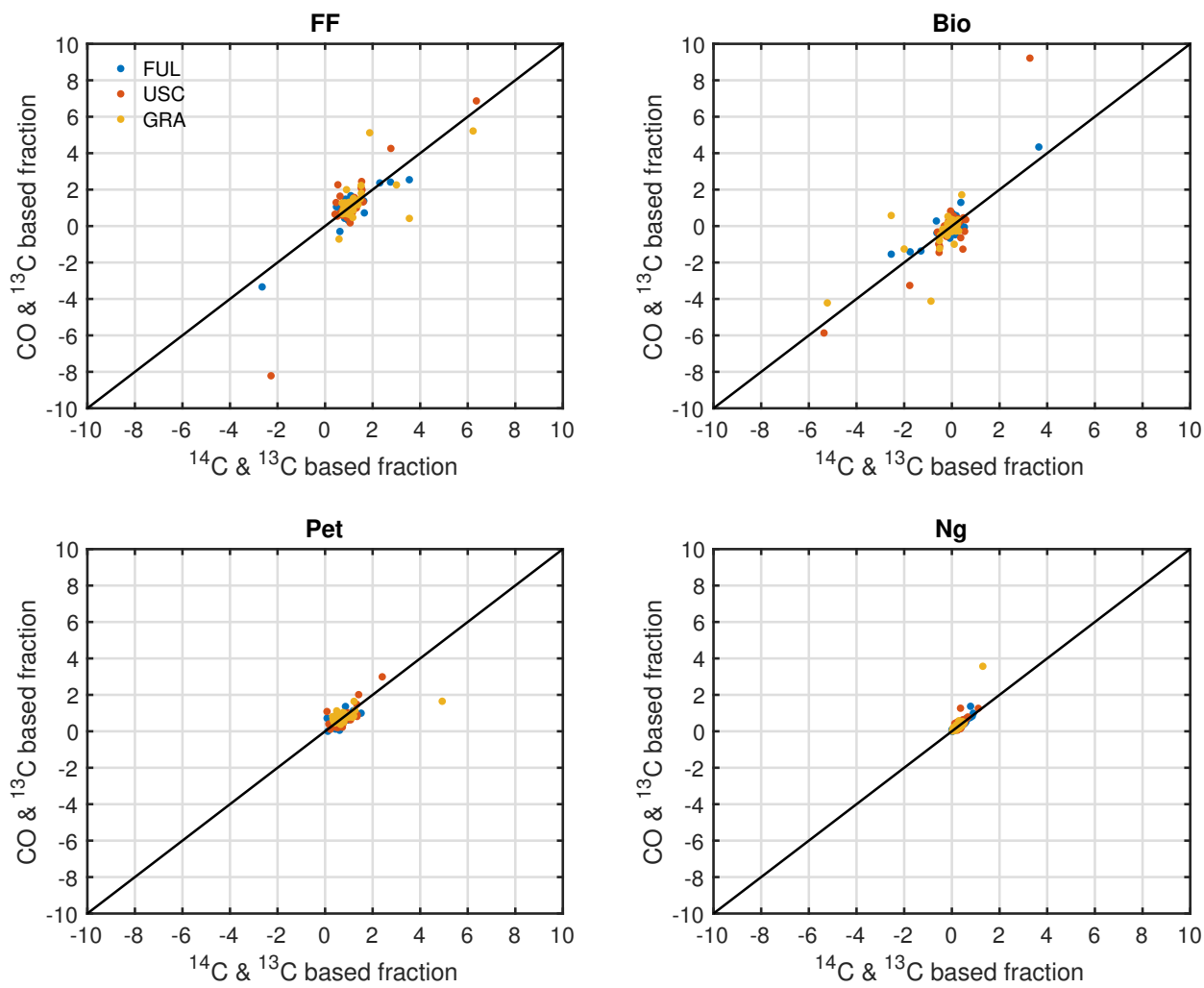
Figure S2. Comparison of f and f' values for each source. Black lines represent 1:1 relationships and different colors indicate different sites.
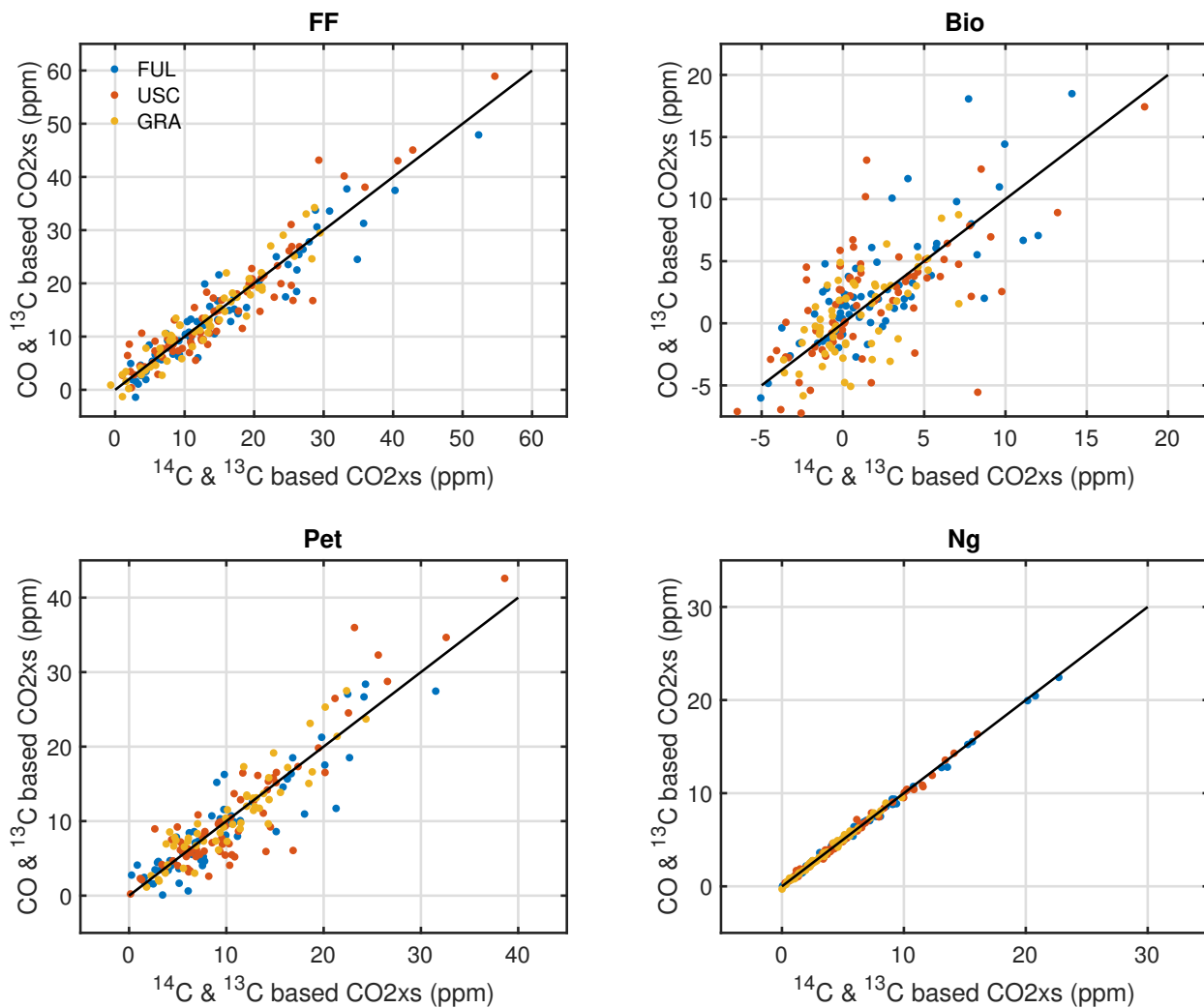
Figure S3. Comparison of C and C' values for each source. Black lines represent 1:1 relationships and different colors indicate different sites.

Table S1. Monthly mean fractional contributions (f) of biosphere (green), petroleum (red), and natural gas (yellow) to CO_2xs at each site, as determined from $\Delta^{14}C$ and $\delta^{13}C$ observations (Section 2.2). The sum of the fractions is one in each month.

	FUL			USC			GRA		
Month	Bio	Pet	NG	Bio	Pet	NG	Bio	Pet	NG
Apr 15	0.08	0.58	0.34				-0.03	0.71	0.32
May15	0.00	0.67	0.33	0.06	0.71	0.23	-0.11	0.80	0.31
Jun15				-0.01	0.56	0.45	0.00	0.81	0.19
Jul15	-0.13	0.66	0.47	-0.22	0.87	0.35	-0.08	0.85	0.23
Aug15	0.01	0.76	0.23	-0.20	0.78	0.42	0.09	0.68	0.23
Sep15	0.05	0.55	0.40	0.07	0.65	0.28	0.07	0.81	0.12
Oct15	0.08	0.47	0.45	0.11	0.57	0.32	0.07	0.67	0.26
Nov15	0.26	0.48	0.26	0.25	0.52	0.23	0.22	0.47	0.31
Dec15	0.19	0.50	0.31	0.18	0.65	0.17	0.12	0.70	0.18
Jan16	0.17	0.57	0.26	0.21	0.57	0.22	0.15	0.55	0.30
Feb16	0.18	0.50	0.32	0.17	0.60	0.23	0.10	0.60	0.30
Mar16	0.15	0.47	0.38	0.13	0.51	0.36	0.03	0.57	0.40