Added tables in Supplementary Materials:

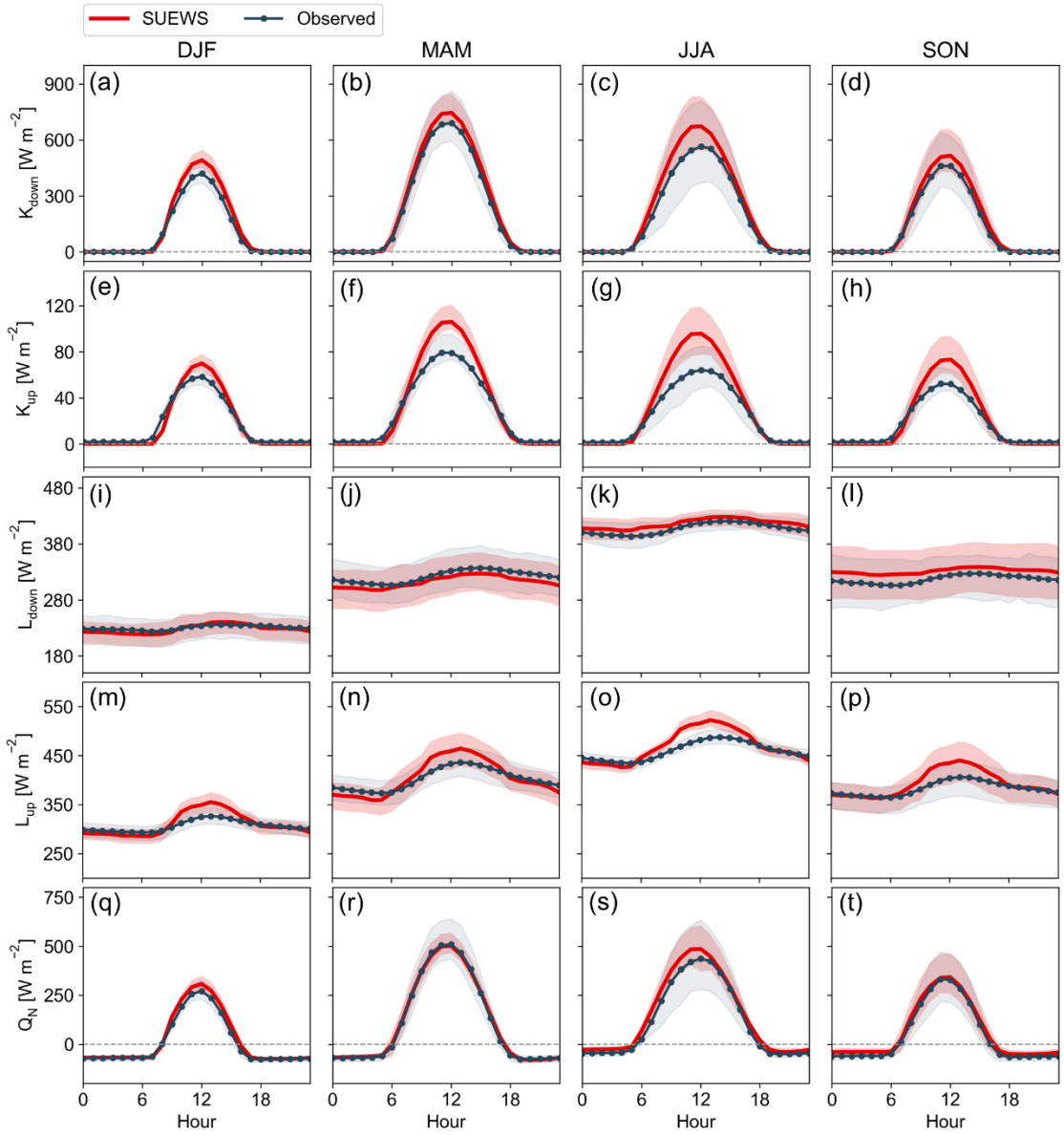
Table S4. Adjusted albedo (α_i) for different surfaces: buildings (Bldgs), paved surface (Paved), evergreen tree/shrub (Everg), deciduous tree/shrub (Dec), grass, and water following Ward et al (2016). The α_i for deciduous tree/shrub and grass are allowed to vary from a lower value in summer to a higher value in winter.

	Unit	Bldgs	Paved	Everg	Dec	Grass	Water
α_i	−	0.12	0.10	0.10	0.12-0.18	0.18-0.21	0.10

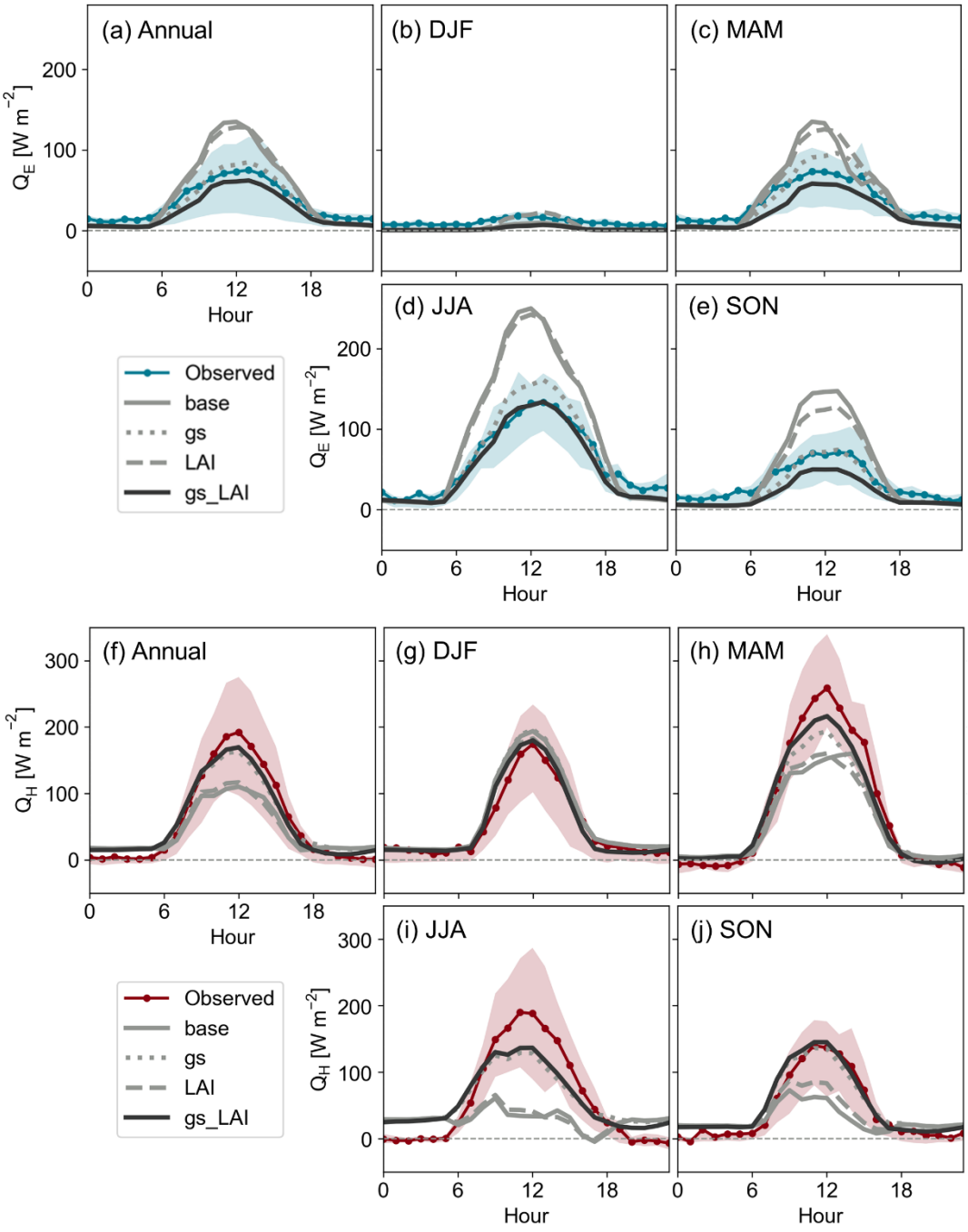
Table S5. SUEWS model performance statistics with adjusted albedo (α_i) (Table S4) for radiation fluxes, including incoming solar radiation (K_{down}), outgoing shortwave radiation (K_{up}), incoming longwave radiation (L_{down}), outgoing longwave radiation (L_{up}), and net radiation (Q_N) from May 2010 to June 2011.

	Season	R^2	RMSE	MBE	N
K_{down}	DJF	0.94	52.3	19.5	2160
	MAM	0.93	82.6	19.8	2940
	JJA	0.86	110.4	39.3	2728
	SON	0.93	59.6	16.6	2150
K_{up}	DJF	0.88	8.3	-2.5	2160
	MAM	0.92	10.1	0.2	2940
	JJA	0.88	13.6	4.6	2728
	SON	0.91	8.4	0.6	2150
L_{down}	DJF	0.74	16.0	-2.4	2160
	MAM	0.86	20.5	-10.0	2940
	JJA	0.68	18.1	8.8	2728
	SON	0.88	23.7	12.9	2150
L_{up}	DJF	0.80	15.7	4.0	2160
	MAM	0.90	19.1	3.6	2940
	JJA	0.79	22.5	10.7	2728
	SON	0.90	18.9	9.4	2150
Q_N	DJF	0.94	40.5	15.6	2160
	MAM	0.93	64.6	6.0	2940
	JJA	0.86	88.8	32.8	2728
	SON	0.92	51.8	19.5	2150

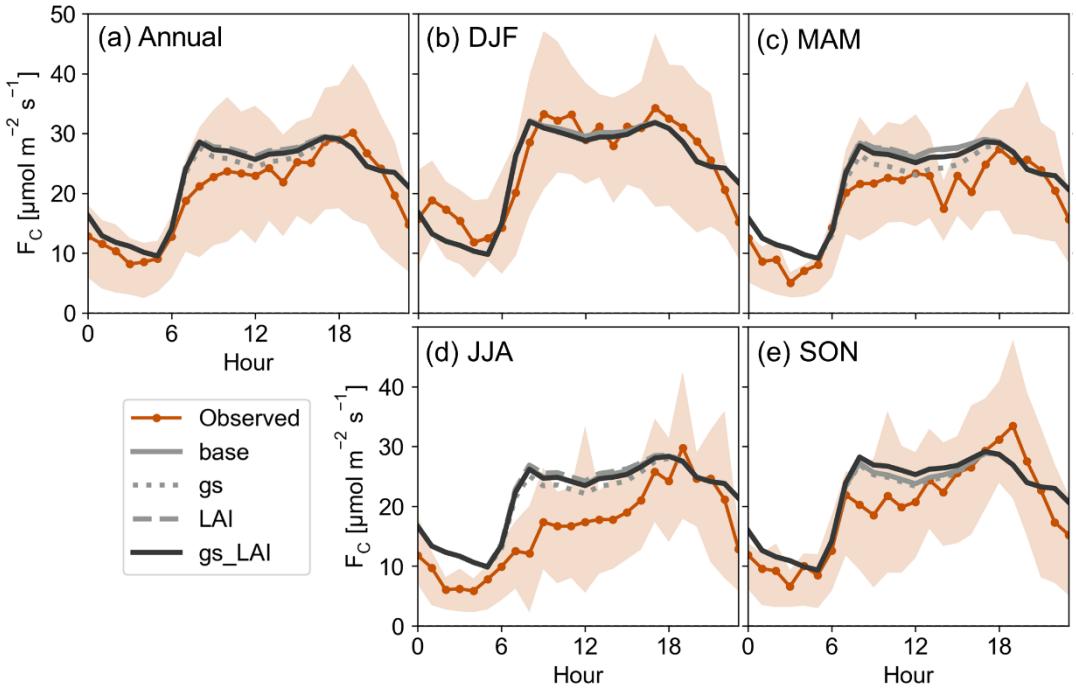
Modified figures:



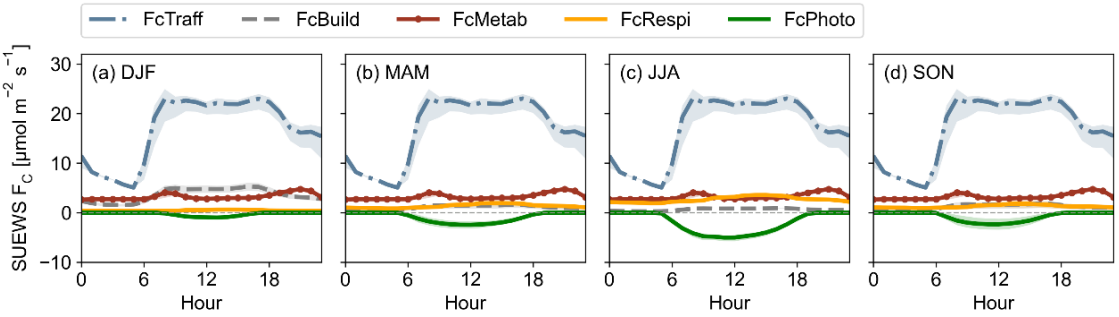
Modified **Figure 5**. Average diurnal cycle of input or modelled and observed hourly radiation fluxes by season, including (a–d) incoming solar radiation (K_{down}), (e–h) outgoing shortwave radiation (K_{up}), (i–l) incoming longwave radiation (L_{down}), (m–p) outgoing longwave radiation (L_{up}), and (q–t) net radiation (Q_N) from May 2010 to June 2011. Shaded area denotes the interquartile range. Note that only Kdown is input and the rest are model output.



Modified **Figure 6**. Annual and seasonal mean diurnal cycles of observed and modelled (a–e) latent heat flux (Q_E) and (f–j) sensible heat flux (Q_H) for the four model runs (case **base**, **gs**, **LAI**, and **gs_LAI**) in the year 2016. Shaded area denotes the interquartile range.



Modified **Figure 8**. Annual and seasonal average diurnal cycles of observed and modelled CO_2 flux (F_C) for the four model runs (case **base**, **gs**, **LAI**, and **gs_LAI**) in the year 2016. Shaded area denotes the interquartile range.



Modified **Figure 9**. Seasonal average diurnal cycles of modelled CO_2 flux (F_C) components by case **gs_LAI** in 2016. FcTraff denotes F_C from on-road traffic, FcBuilding building, FcMetab human metabolism, FcRespi vegetation and soil respiration, and FcPhoto vegetation photosynthesis. Positive values indicate sources of CO_2 and negative values sinks with respect to the atmosphere. Shaded area denotes the interquartile range.