

Table. Model setup and selected explanatory variable for energy, CO₂ and CH₄ fluxes. List of abbreviation: land cover type - IGBP classification (LC_IGBP), net radiation (RNET), latent heat flux (LE), sensible heat flux (H), gross primary production (GPP), ecosystem respiration (RE), methane flux (FCH₄), enhanced vegetation index (EVI), normalized difference vegetation index (NDVI), precipitation (P), incoming shortwave radiation (SW_IN), incoming longwave radiation (LW_IN), vapor pressure deficit (VPD), air temperature (TA), potential evapotranspiration (PET), wind speed (WS), daytime land surface temperature (LST.day), nighttime land surface temperature (LST.night), land surface water index (2130nm) (LSWI2), seasonal amplitude of EVI (EVI.amp), seasonal amplitude of NDVI (EVI.amp), EVI in the peak-EVI quarter (EVI.pqtr), NDVI in the peak-NDVI quarter (NDVI.pqtr)

Variable setup ¹	Type of variable	Energy flux (RNET, LE, H)	CO ₂ flux (GPP, RE)	CH ₄ flux (FCH ₄)	Data source [original name]
I. CIMIS+MODIS (500m×8day)	Spatial (yearly-aggregated)	LC_IGBP	LC_IGBP	LC_IGBP	MODIS [LC.IGBP.1]
		EVI.amp	EVI.amp	EVI.amp	MODIS/Landsat
		NDVI.amp	NDVI.amp	NDVI.amp	MODIS/Landsat
		EVI.pqtr	EVI.pqtr	EVI.pqtr	MODIS/Landsat
		NDVI.pqtr	NDVI.pqtr	NDVI.pqtr	MODIS/Landsat
	Temporal (daily) ²	P	P	P	CIMIS [Precip]
		SW_IN	SW_IN	SW_IN	CIMIS [Sol Rad]
		LW_IN	LW_IN	LW_IN	Tower data [LW_IN]
		VPD	VPD	VPD	CIMIS-derived [VPD]
		TA	TA	TA	CIMIS [Avg Air Temp]
		PET	PET	PET	CIMIS [ETo]
		WS	WS	WS	CIMIS [Avg Wind Speed]
		LST.day	LSTday	LSTday	MODIS [LST.day]
		LST.night	LSTnight	LSTnight	MODIS [LST.night]
		EVI	EVI	EVI	MODIS/Landsat [EVI]
		NDVI	NDVI	NDVI	MODIS/Landsat [NDVI]
		LSWI2	LSWI2	LSWI2	MODIS/Landsat [LSWI2]
II. CIMIS+MODIS (250m×16day)	Temporal (daily) ²	-	-	RNET	ML-derived
		-	-	GPP	ML-derived
		-	-	P-PET	CIMIS-derived
		-	-	P-ET	ML-derived
III. CIMIS+Landsat (120m×32day)	Temporal (daily) ²	LST.day	LSTday	LSTday	MODIS [LST.day]
		LST.night	LSTnight	LSTnight	MODIS [LST.night]
		EVI	EVI	EVI	MODIS/Landsat [EVI]
		NDVI	NDVI	NDVI	MODIS/Landsat [NDVI]
		LSWI2	LSWI2	LSWI2	MODIS/Landsat [LSWI2]

¹ Three variable setups were adopted with the major difference in the sources of remote-sensing products used, such as MODIS 500 m × 8 day, MODIS 250 m × 16 day, and Landsat 120 m × 32 day

² Daily LST.day, LST.night, EVI, NDVI, LSWI2 are derived by using spline interpolation on the original 8-day and 16-day MODIS or 30-day Landsat data.