

**Table S1.** Model parameters and equations.  $\alpha = 1.26$  is the Priestley-Taylor coefficient (Priestley and Taylor [26]),  $\Delta$  is the slope of the saturation to vapor pressure curve,  $\gamma$  is the psychrometric constant, RH is relative humidity, VPD is the saturation vapor pressure deficit,  $\beta = 3.0$  is a sensitivity parameter,  $T_a$  is the air temperature in Celsius,  $NDVI_{soil} = 0.05$  and  $NDVI_{veg} = 0.84$  are the minimum value of NDVI over bare soil and maximum value of NDVI of the vegetated areas for the study period respectively,  $m_2 = 1.0$  and  $b_2 = -0.05$  (Fisher et al. [27]),  $A = 0.31$  and  $B = 74,000$  (Santanello and Friedl [58]),  $k_{rn} = 0.6$  (Fisher et al. [27]), LAI is the leaf area index (Houborg and McCabe [46]),  $NIR$  and  $Red$  are the near infrared and red band reflectance values (Houborg and McCabe [46]). In the reference column, original study refers to the formulation proposed by Fisher et al. [27].

Parameter	Description	Equation	Reference
$ET$	Evapotranspiration	$ET_c + ET_s + ET_i$	Original study
$ET_c$	Canopy transpiration	$(1 - f_{wet}) \cdot f_g f_T f_M \cdot \alpha \frac{\Delta}{\Delta + \gamma} \cdot Rn_c$	Original study
$ET_s$	Soil evaporation	$(f_{wet} + f_{SM}(1 - f_{wet})) \cdot \alpha \frac{\Delta}{\Delta + \gamma} \cdot (Rn_s - G)$	Original study
$ET_i$	Interception evaporation	$f_{wet} \cdot \alpha \frac{\Delta}{\Delta + \gamma} \cdot Rn_c$	Original study
$f_{wet}$	Relative surface wetness	$RH^4$	Original study
$f_g$	Green canopy fraction	$\frac{f_{APAR}}{f_{IPAR}}$	Original study
$f_T$	Plant temperature constraint	$\frac{1}{1 + e^{0.2 \cdot (12 - T_a)}}$	This study
$f_M$	Plant moisture constraint	$\frac{f_{APAR}}{f_{APARmax}}$	Original study
$f_{SM}$	Soil moisture constraint	$RH^{VPD/\beta}$	Original study
$f_{APAR}$	Fraction of photosynthetically active radiation absorbed by green vegetation cover	$(NDVI - NDVI_{soil}) / (NDVI_{veg} - NDVI_{soil})$	Wittich and Hansing [61]
$f_{IPAR}$	Fraction of photosynthetically active radiation intercepted by total vegetation cover	$m_2 NDVI + b_2$	Original study
$G$	Soil heat flux	$A \cdot \cos\left(\frac{2\pi(t + 10,800)}{B}\right) \cdot Rn_s$	Santanello and Friedl [58]
$Rn_s$	Net radiation that reaches the soil	$Rn \cdot e^{-k_{rn} \cdot LAI}$	Original study
$Rn_c$	Net radiation to the canopy	$Rn - Rn_s$	Original study
$NDVI$	Normalized difference vegetation index	$\frac{NIR - Red}{NIR + Red}$	Original study