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Supplement of

Improved model predictions of carbon and water fluxes by including drought legacy effects

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Contents

Table S1 Fitted K_{max} values (unit: mol m^{-2} s^{-1} MPa^{-1}) when assuming full recovery and no recovery of hydraulic conductance, respectively. Medlyn – Vcmax: the stress factor is applied to the Vcmax side. Medlyn – g1: the stress factor is applied to the g1 side.

	Optimality	Medlyn - Vcmax	Medlyn - g1
K_{max} (full recovery)	1.1	0.89	1.88
K_{max} (no recovery)	1.22	1.16	1.94

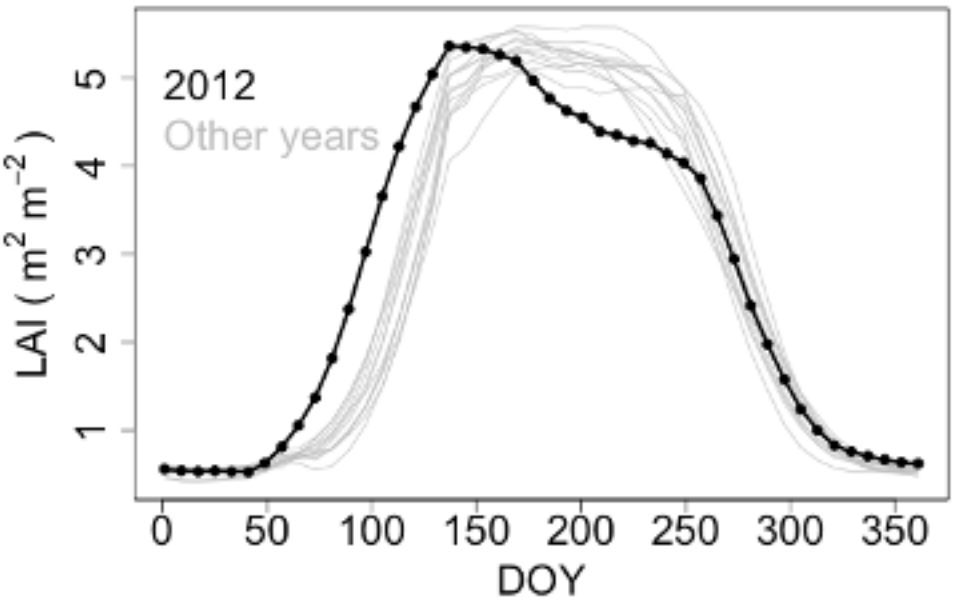

Figure S1 LAI time series in 2012 extracted from MODIS LAI products using GriddingMachine package (Wang et al., 2022; Yuan et al., 2011).

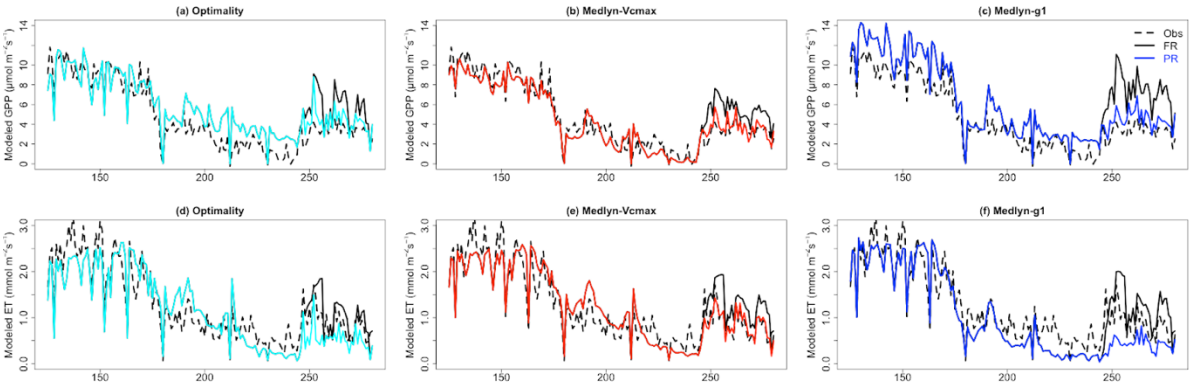

Figure S2 Model simulations and observations of GPP and ET. Simulations use an optimality-based stomatal model (cyan), and the Medlyn stomatal model with the water stress factor applied to either Vcmax (red) or g1 (blue). FR: full recovery, PR: partial recovery.

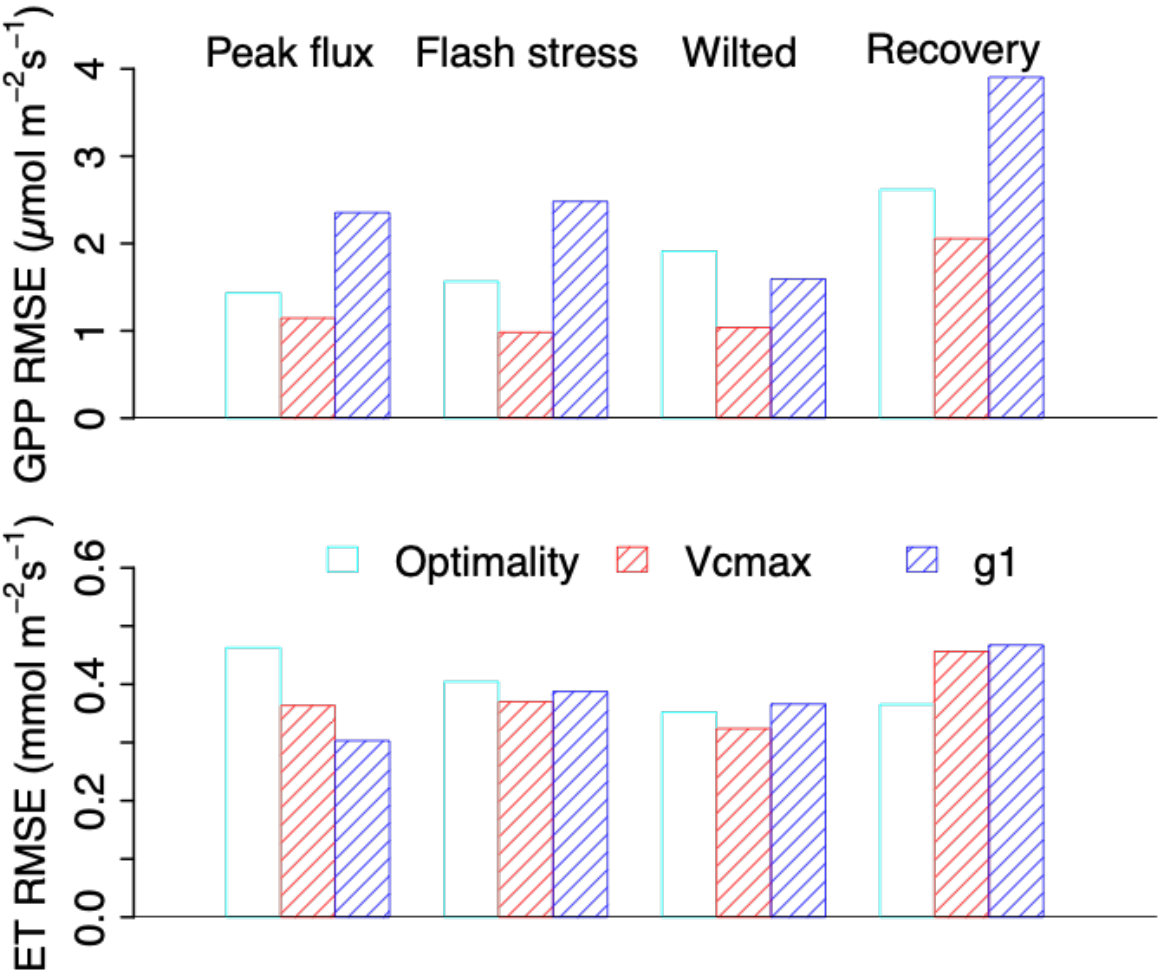

Figure S3 Model performance over the growing season in 2012. RMSE between model simulations and observations was computed for GPP and ET in four time periods.

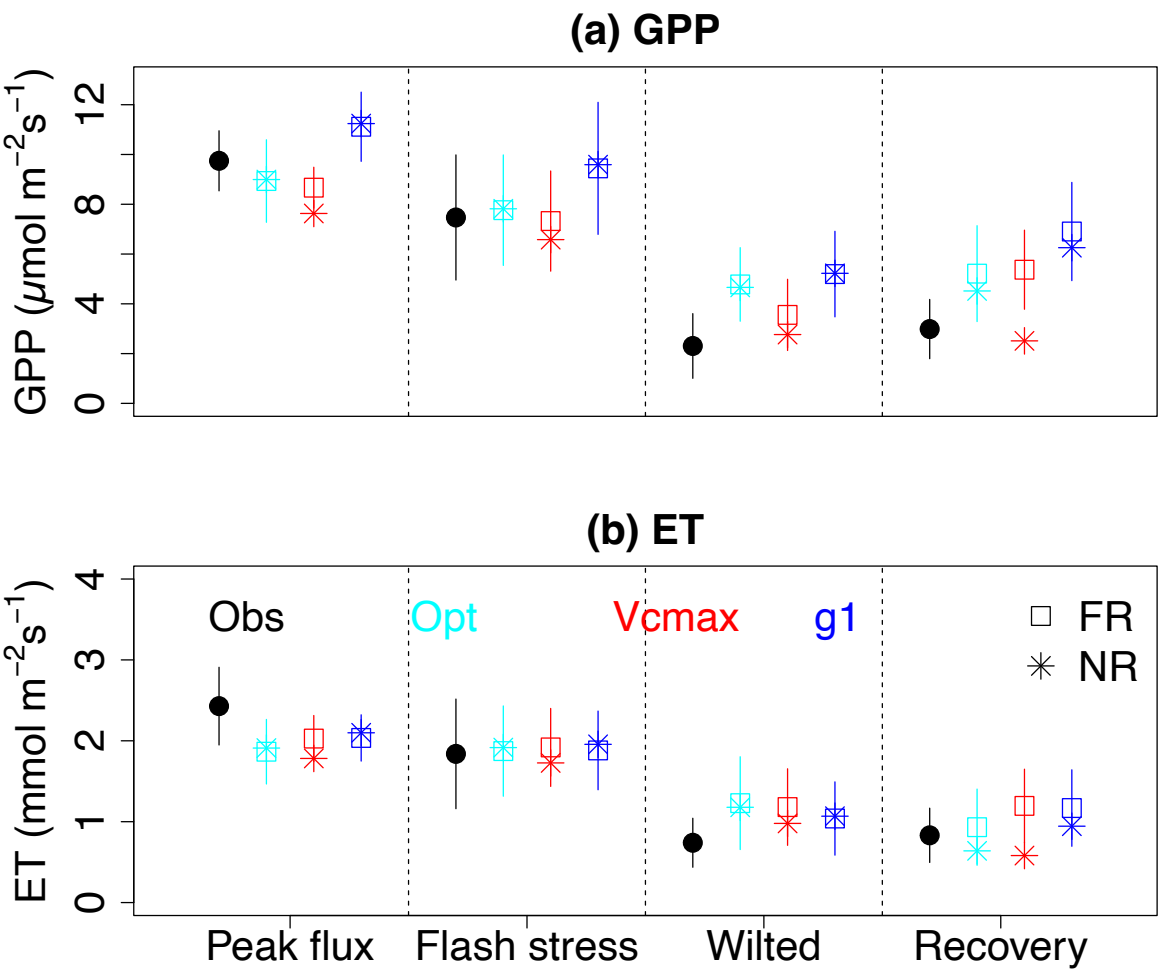

Figure S4 Similar to Figure 3 but using hydraulic trait parameters for *Acer*.

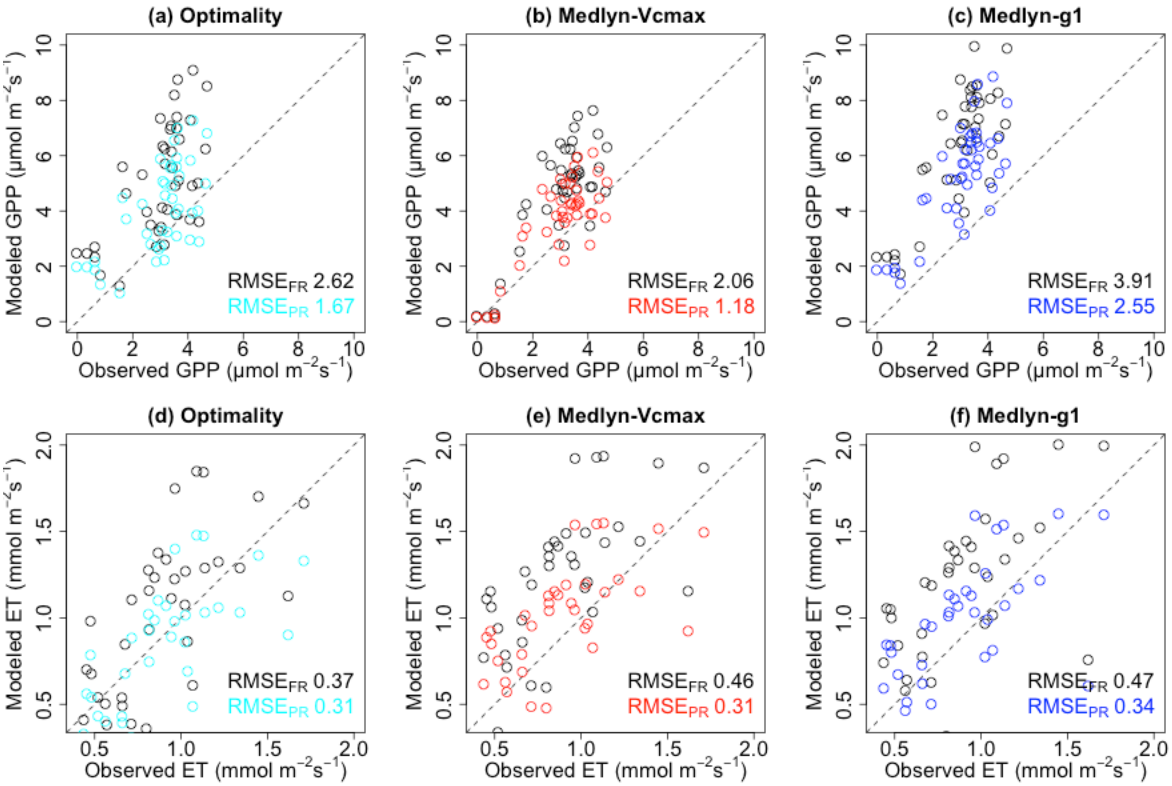

Figure S5 Similar to Figure 5 but setting recovery upper boundary to 80% of the full-recovery condition (recovery period only).

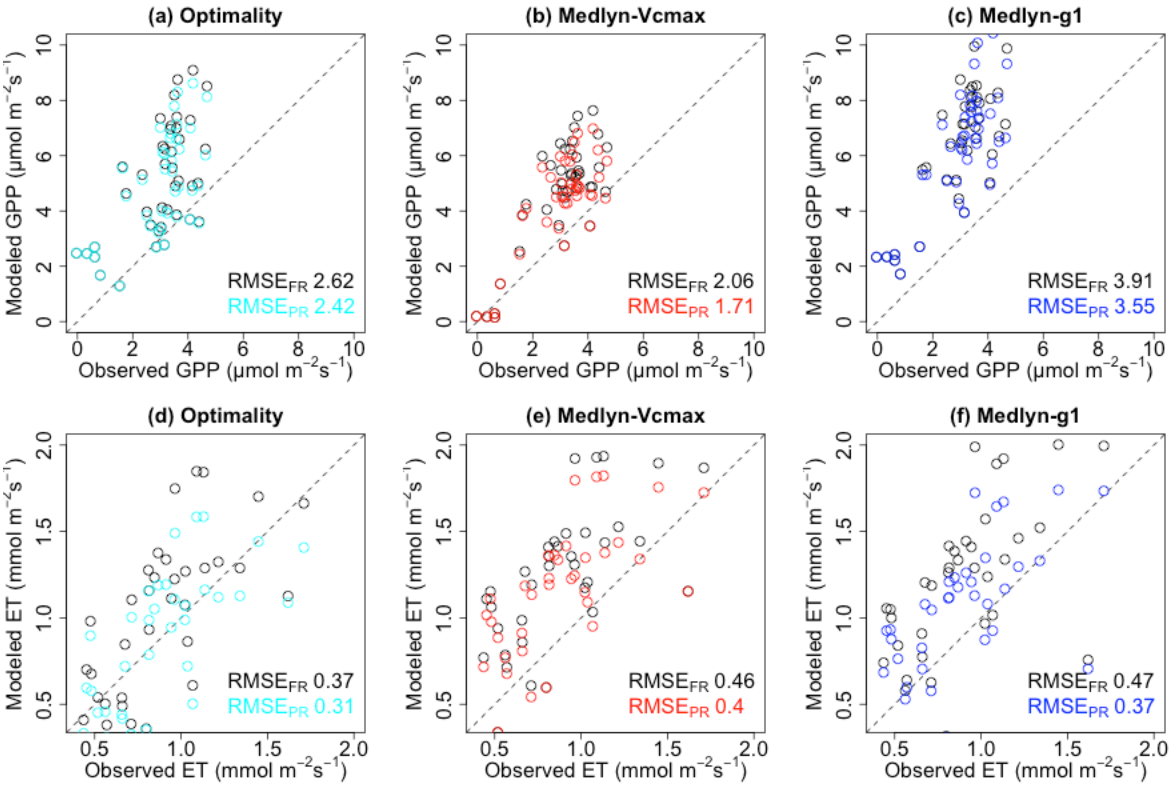

Figure S6 Similar to Figure 5 but setting recovery upper boundary to -3 MPa of leaf water potential (recovery period only).

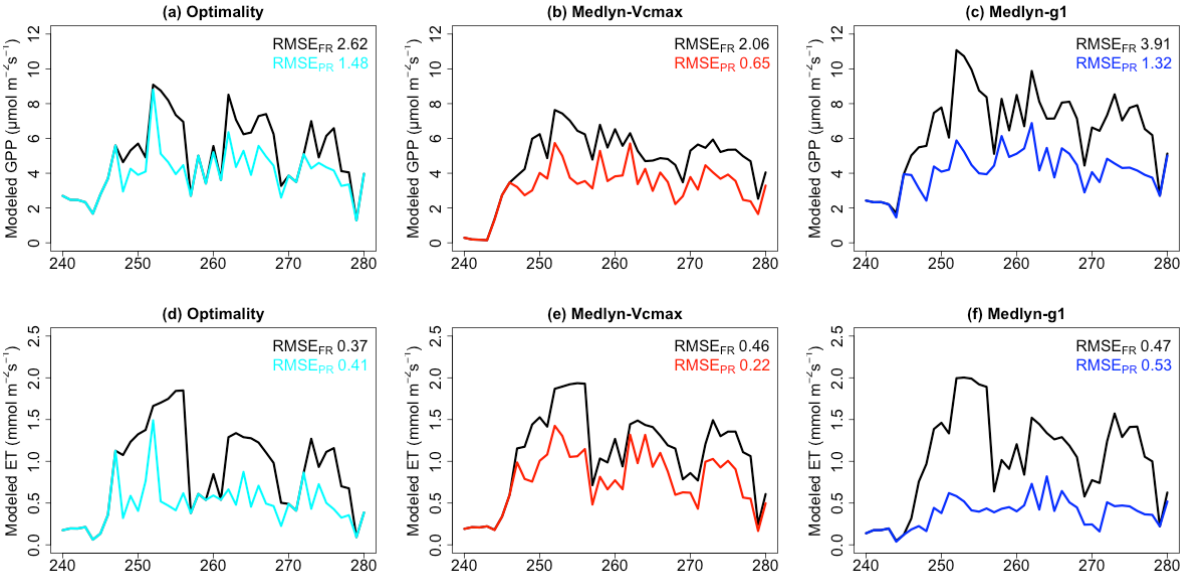

Figure S7 Time series of GPP and ET during recovery period between FR and PR.

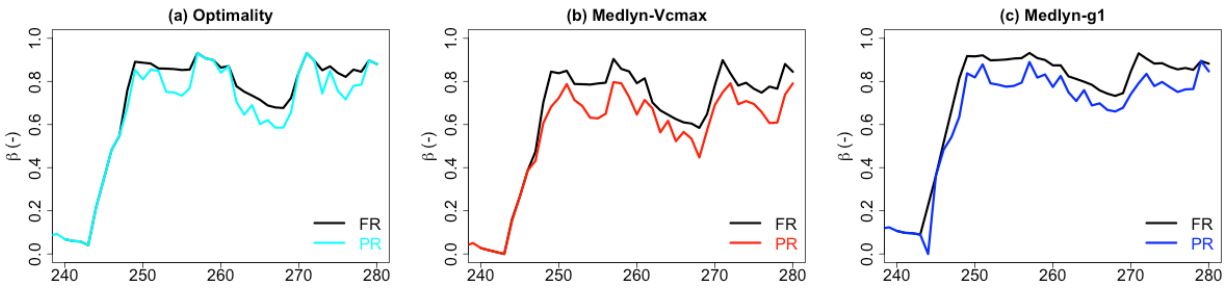

Figure S8 Time series of water stress (β) between FR and PR.

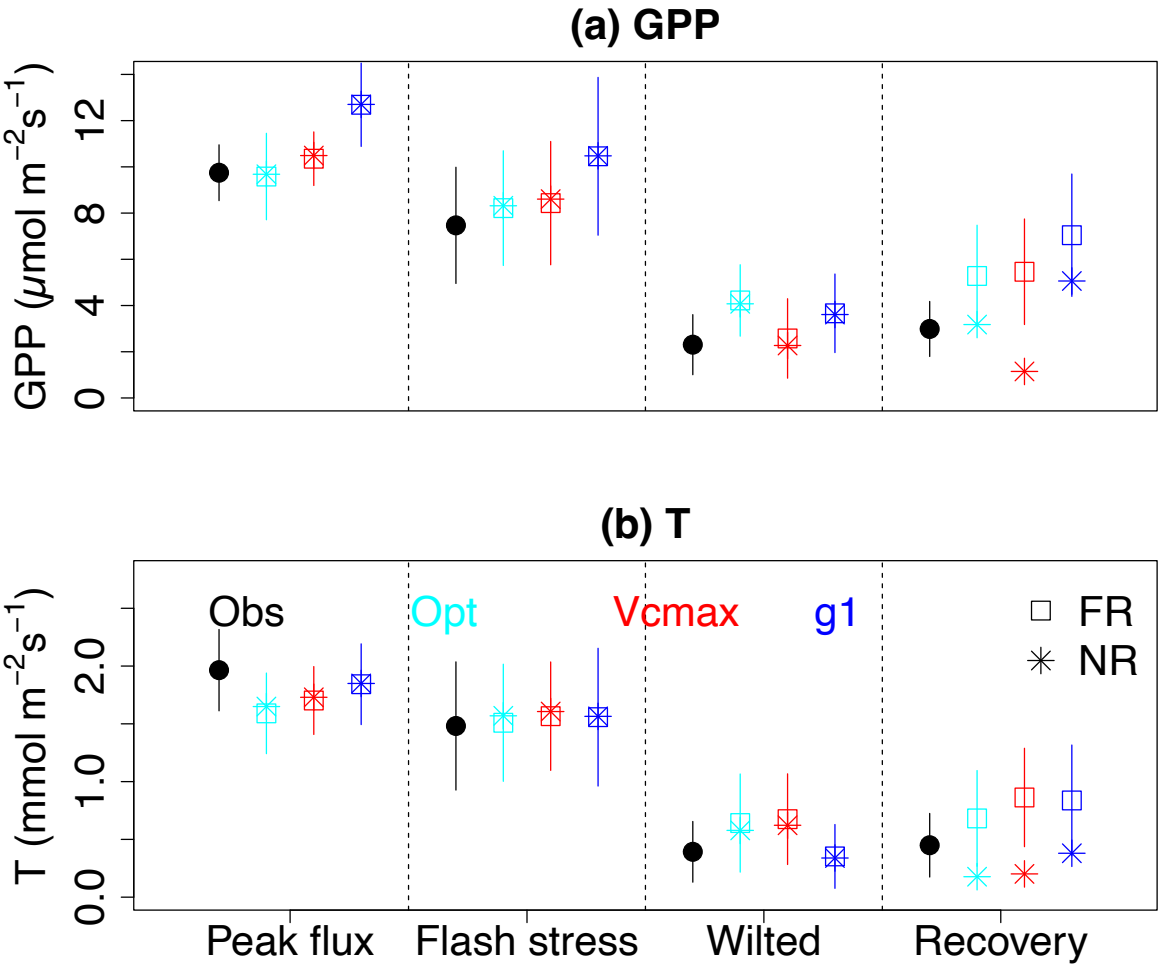

Figure S9 Similar to Figure 3 but for GPP and transpiration (T).

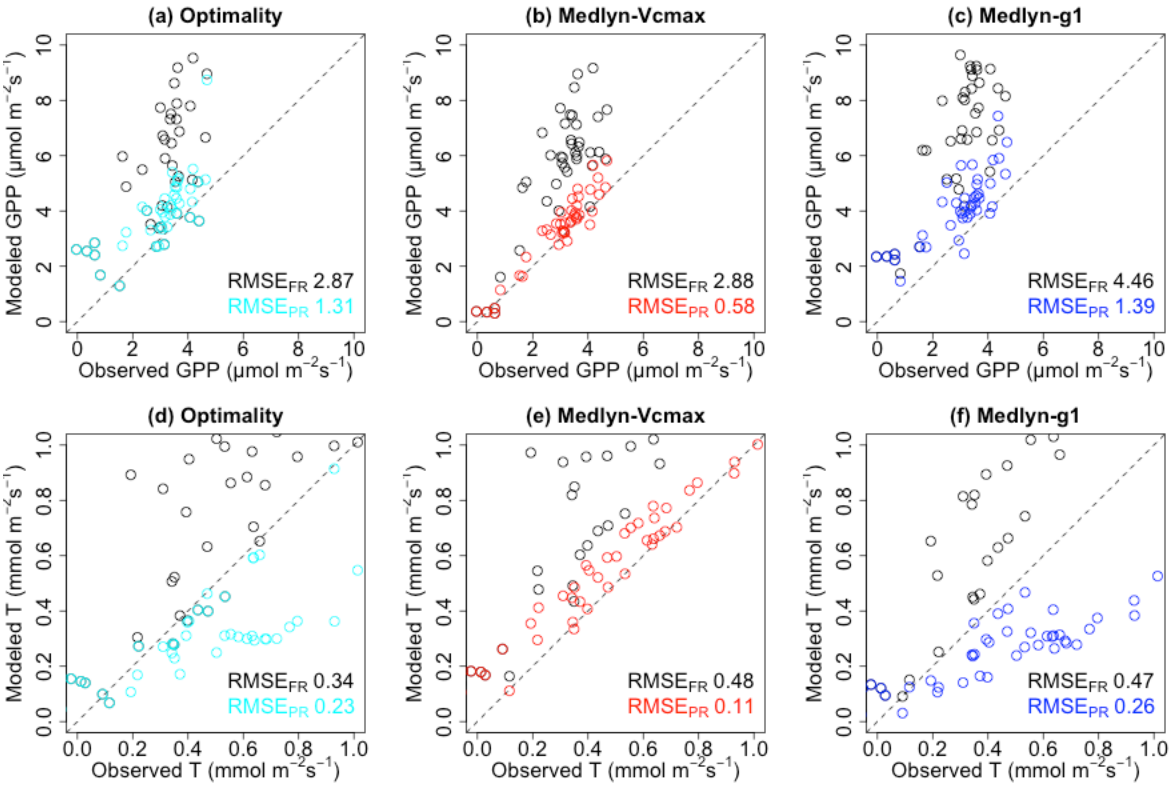

Figure S10 Similar to Figure 5 but for GPP and transpiration (T).

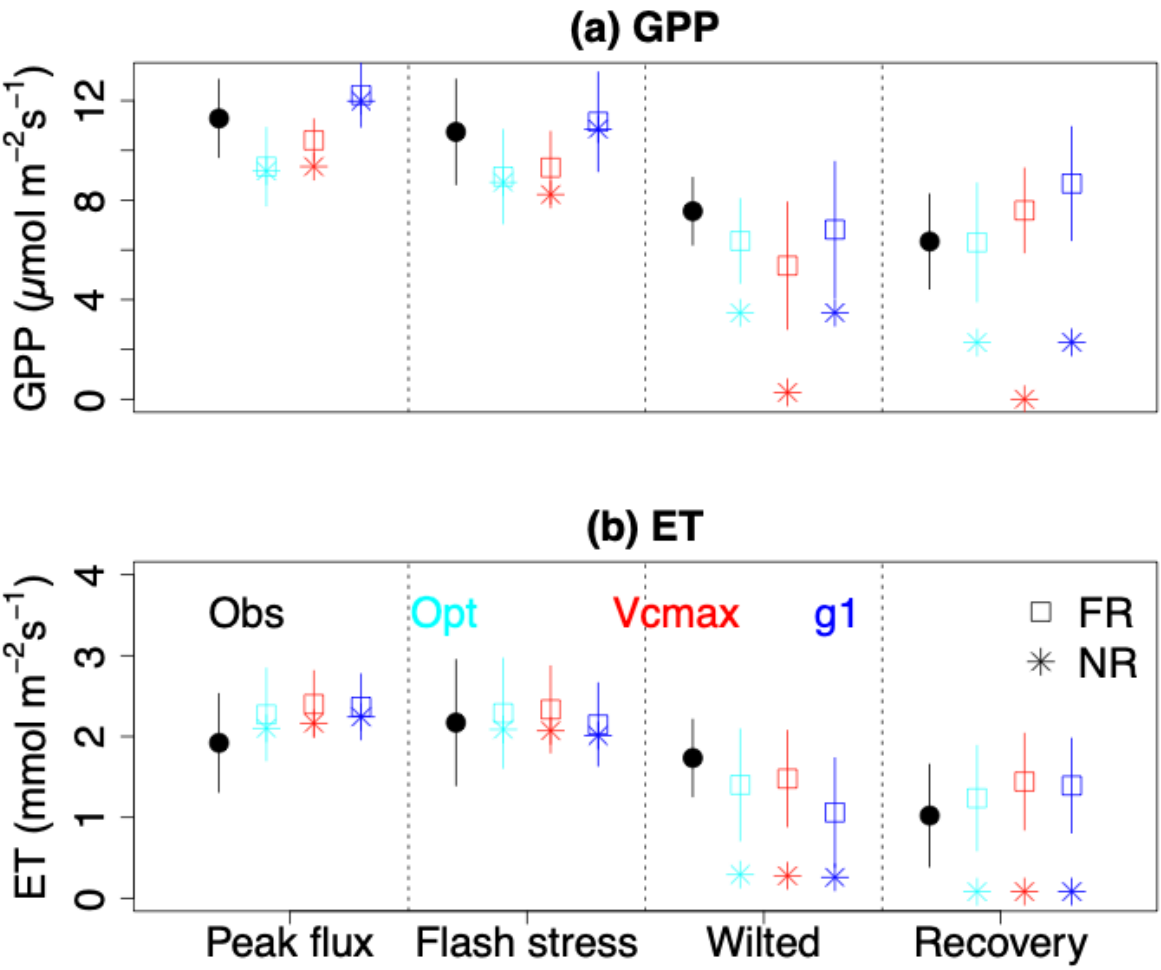

Figure S11 Similar to Figure 3 but for US-MMS site in 2012.

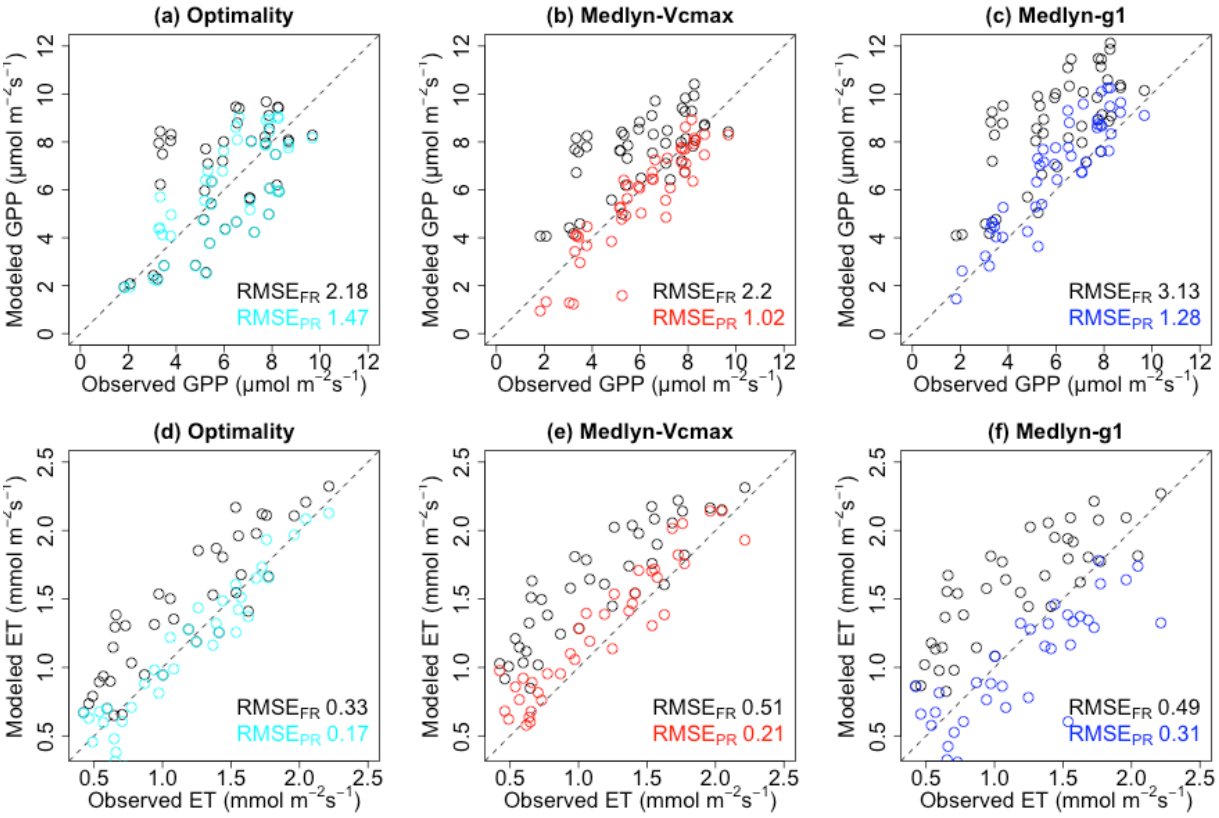

Figure S12 Similar to Figure 5 but for US-MMS site.

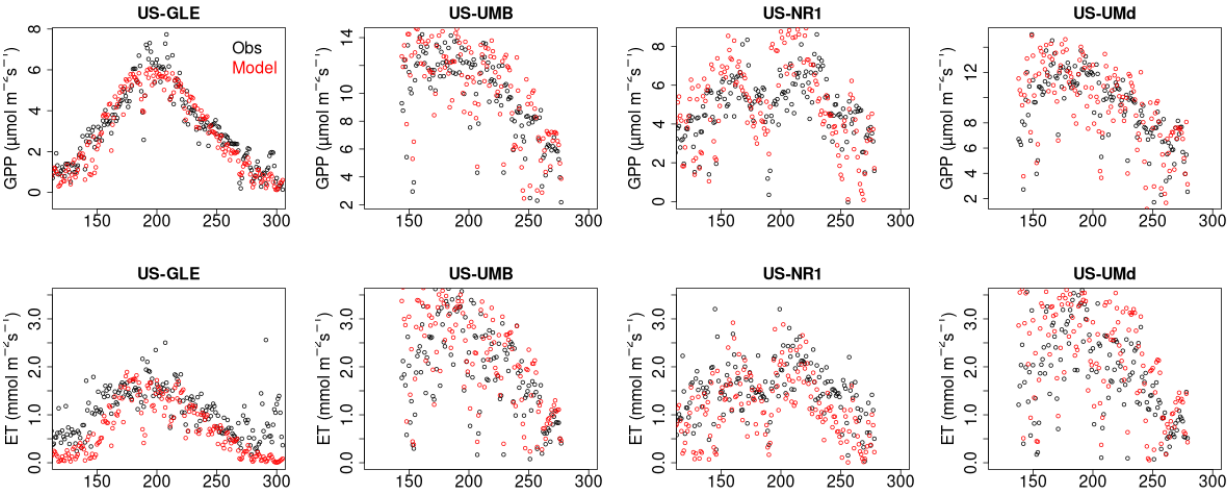

Figure S13 Modeled seasonal dynamics of carbon and water fluxes at four additional sites when assuming 'full recovery'.

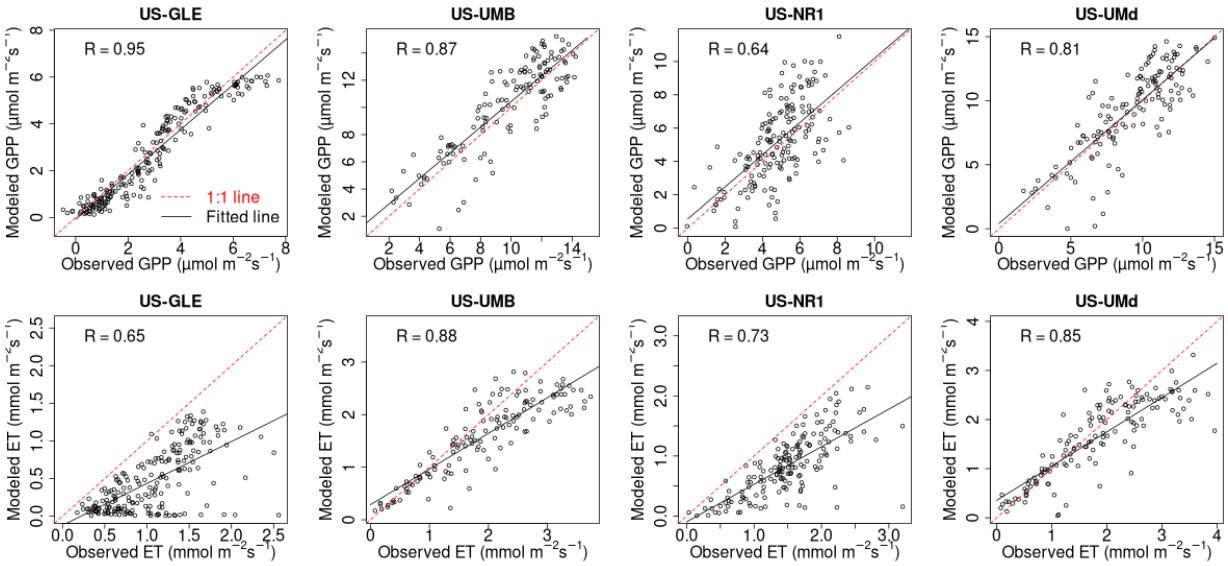

Figure S14 Scatterplots comparing modeled and observed carbon and water fluxes at four additional sites under the 'full recovery' assumption.