



*Supplement of*

## **Examining the role of environmental memory in the predictability of carbon and water fluxes across Australian ecosystems**

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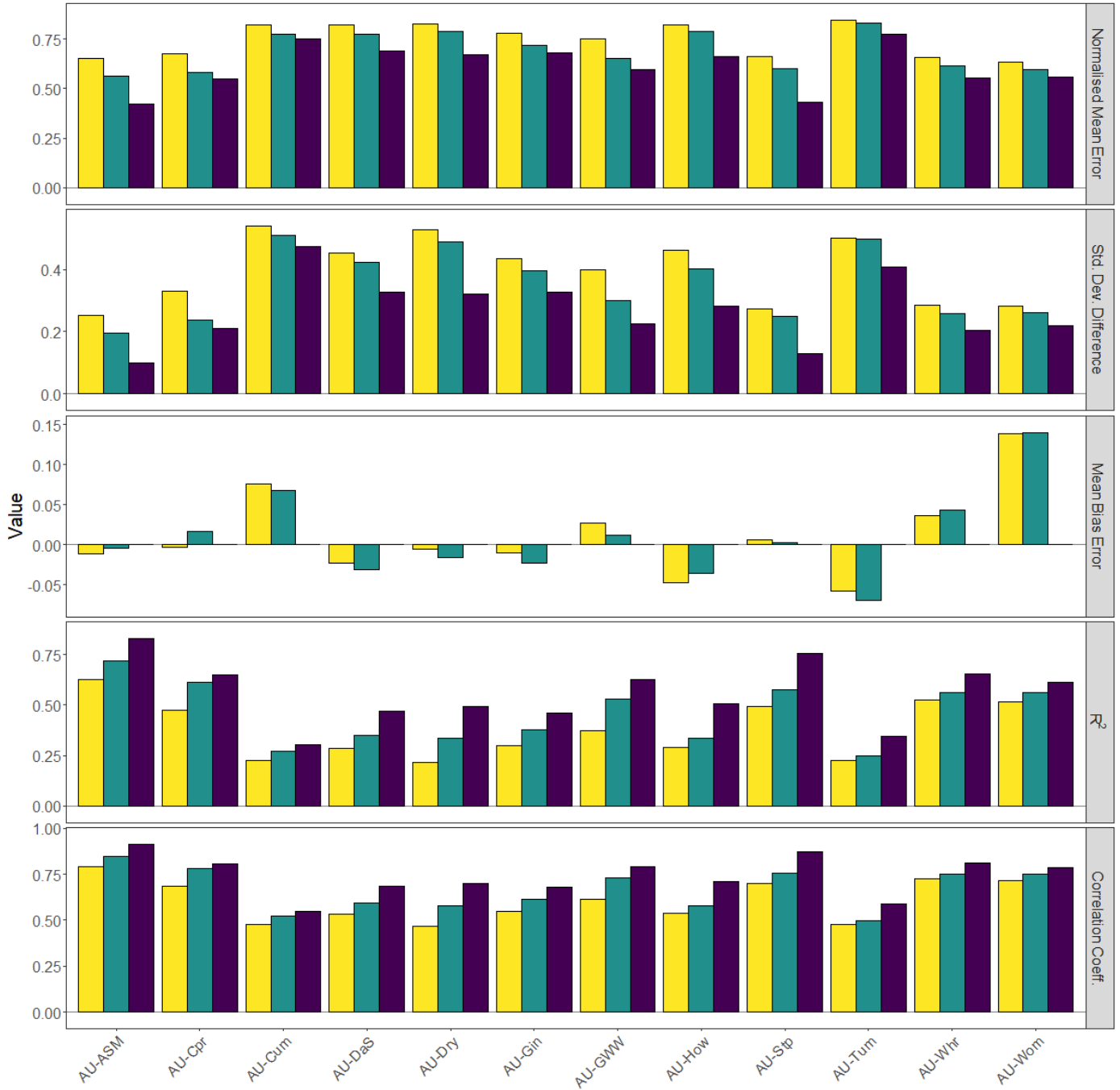


Figure S1: Metrics for NEE models. Colours indicate different model formulations as per Figure 1. Model performance improves as  $R^2$  and the correlation coefficient increase, mean bias error tends to zero, and standard deviation difference and normalised mean error decrease.

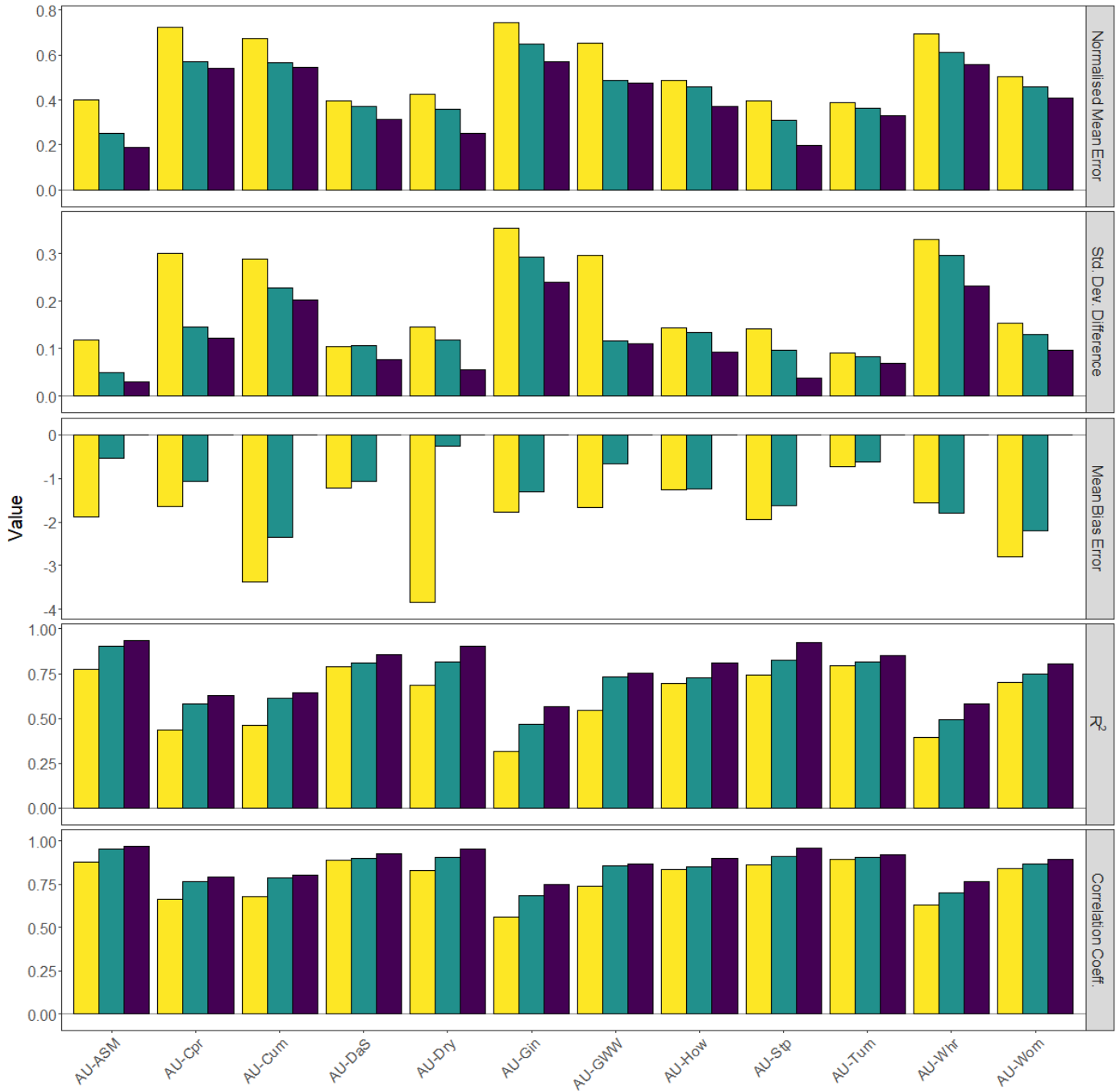


Figure S2: Metrics for  $\lambda E$  models. Figure characteristics are the same as Figure S1.

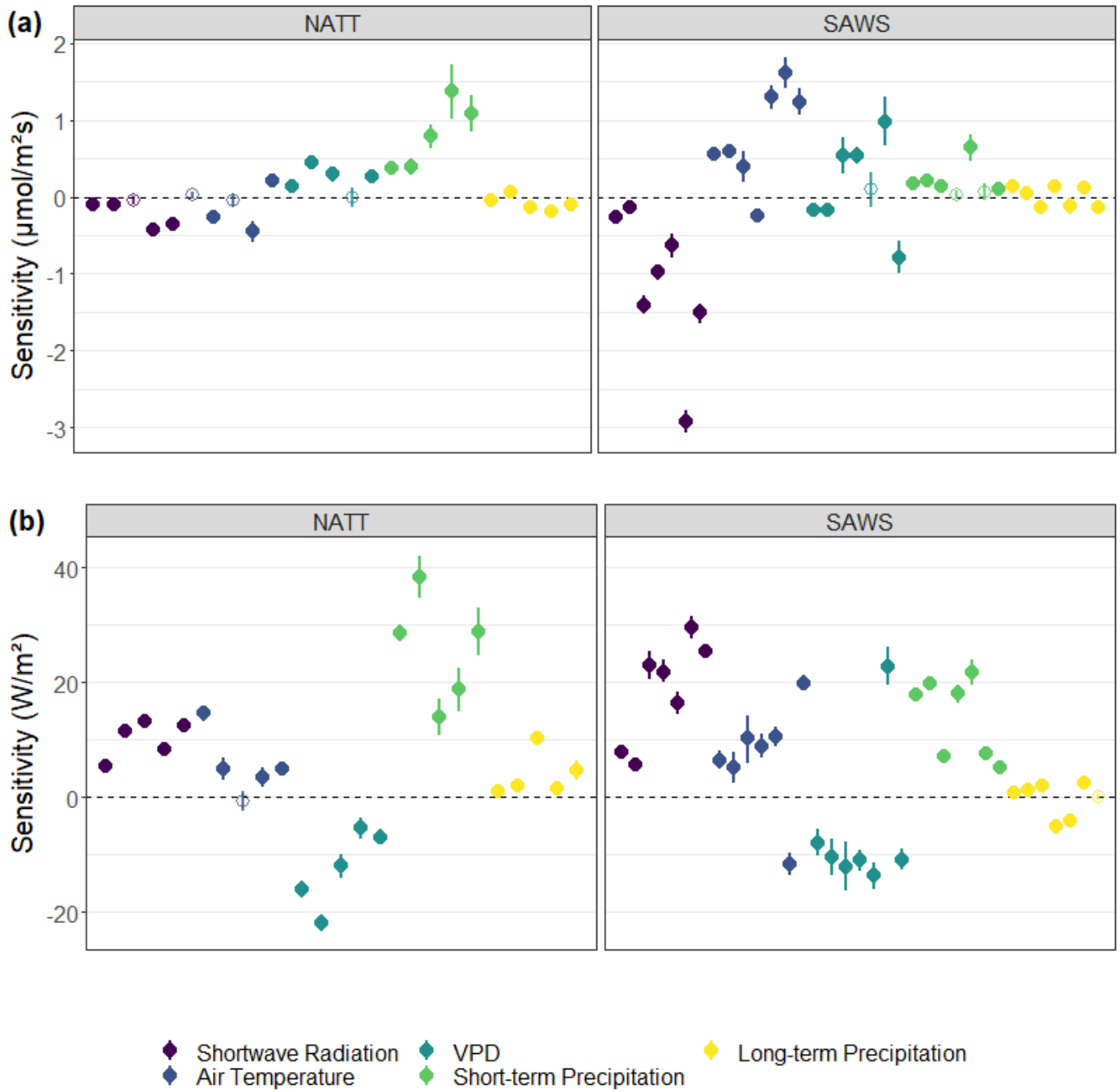


Figure S3: Climate sensitivities for (a) NEE and (b)  $\lambda E$  fluxes. Each point represents a site, ordered by increasing MAP from left to right, and grouped by climate variable. The circle is the mean sensitivity with the error bars representing the 95% credible interval. Empty symbols indicate non-significance of the climate variable. NATT sites, in order from left to right within each variable, are AU-ASM, AU-Stp, AU-Dry, AU-DaS and AU-How. SAWS sites are AU-Cpr, AU-GWW, AU-Whr, AU-Gin, AU-Cum, AU-Wom and AU-Tum.

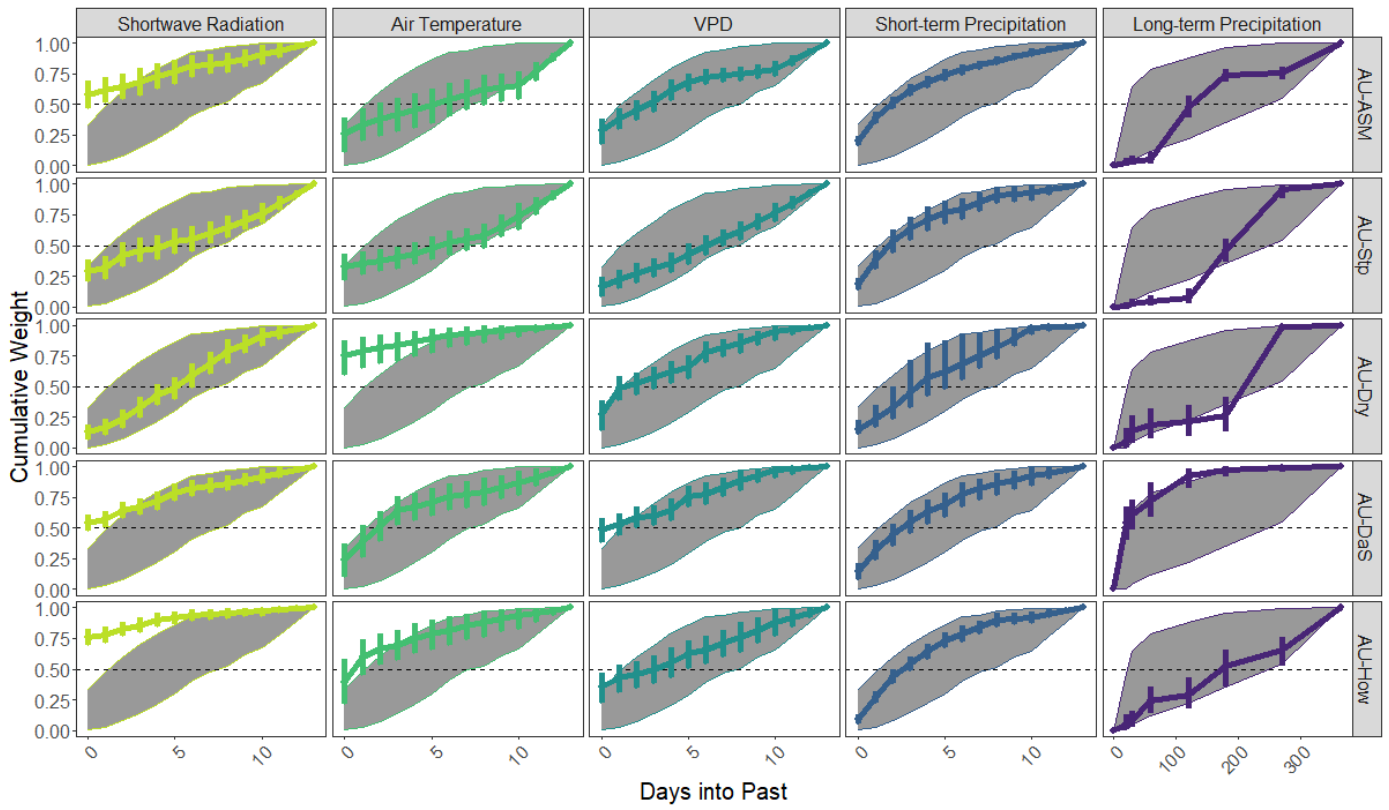


Figure S4: Mean cumulative weights from the NEE environmental memory model for NATT sites. Error bars indicate the 95% credible interval. Sites are ordered with highest mean annual precipitation at the bottom. Grey area indicates the prior distribution for the weights. The dotted line at a weight of 0.5 indicates the critical timescale where this is crossed.

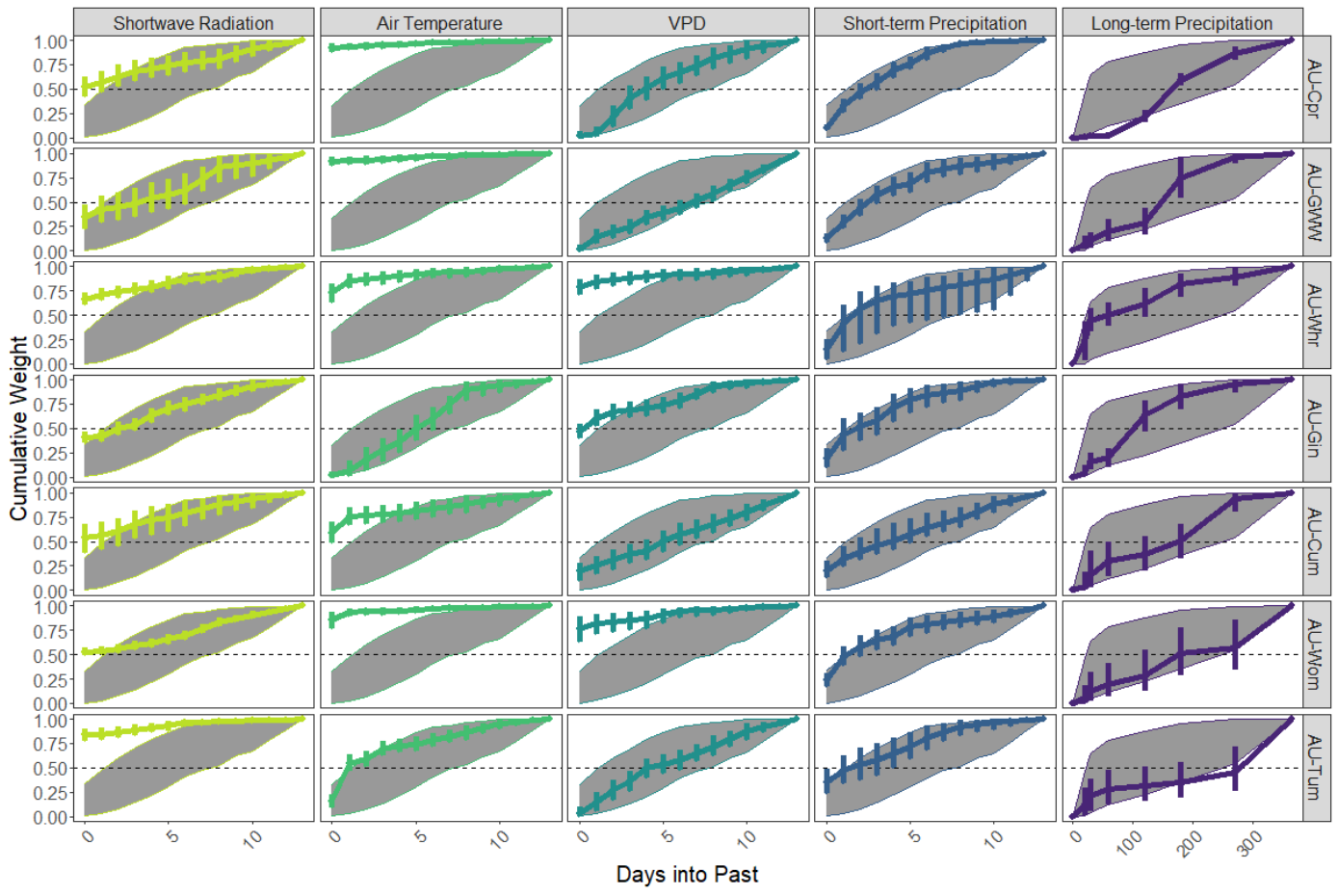


Figure S5: Mean cumulative weights from the NEE environmental memory model for SAWS sites. Figure characteristics are the same as Figure S4.

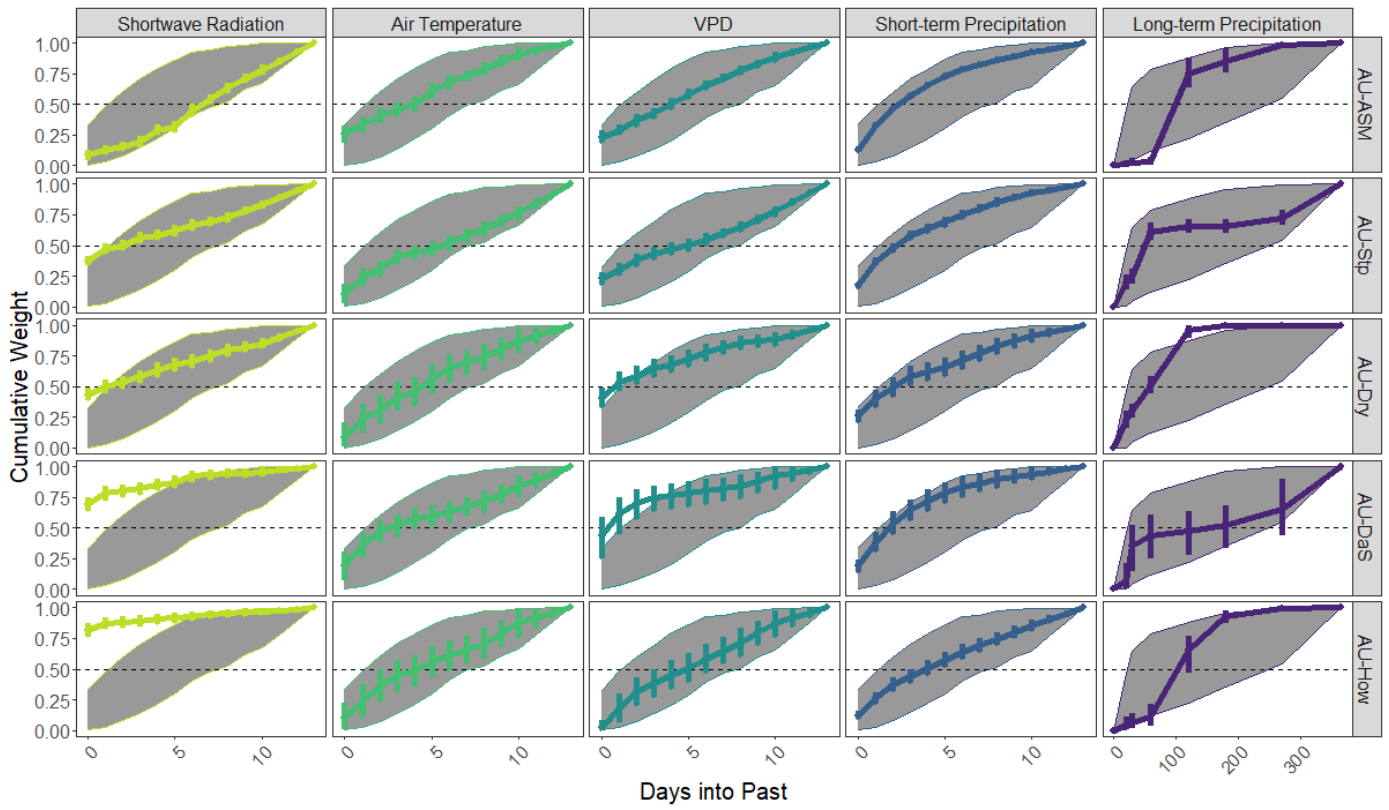


Figure S6: Mean cumulative weights from the  $\lambda E$  environmental memory model for NATT sites. Figure characteristics are the same as Figure S4.

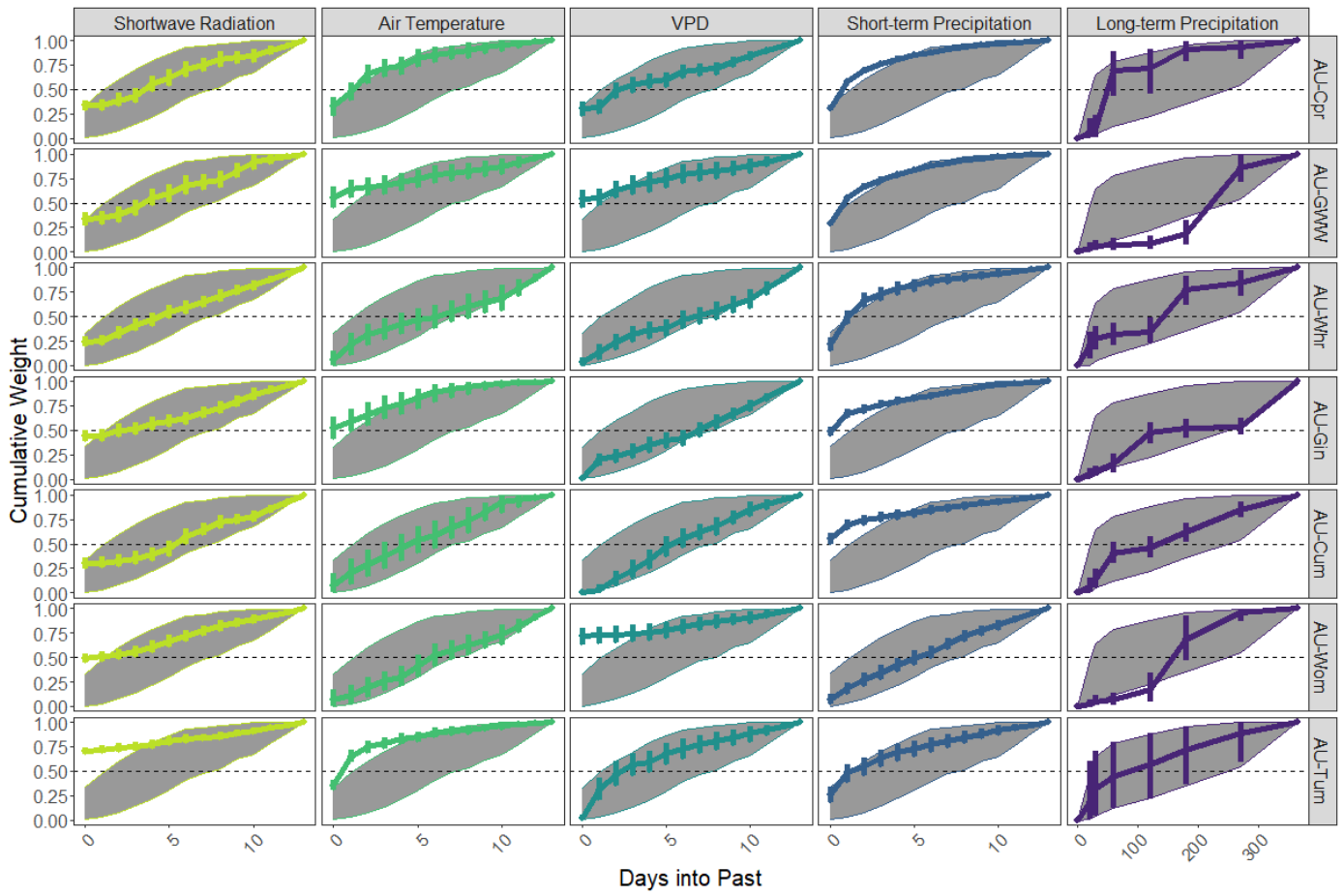


Figure S7: Mean cumulative weights from the  $\lambda E$  environmental memory model for SAWS sites. Figure characteristics are the same as Figure S4.