

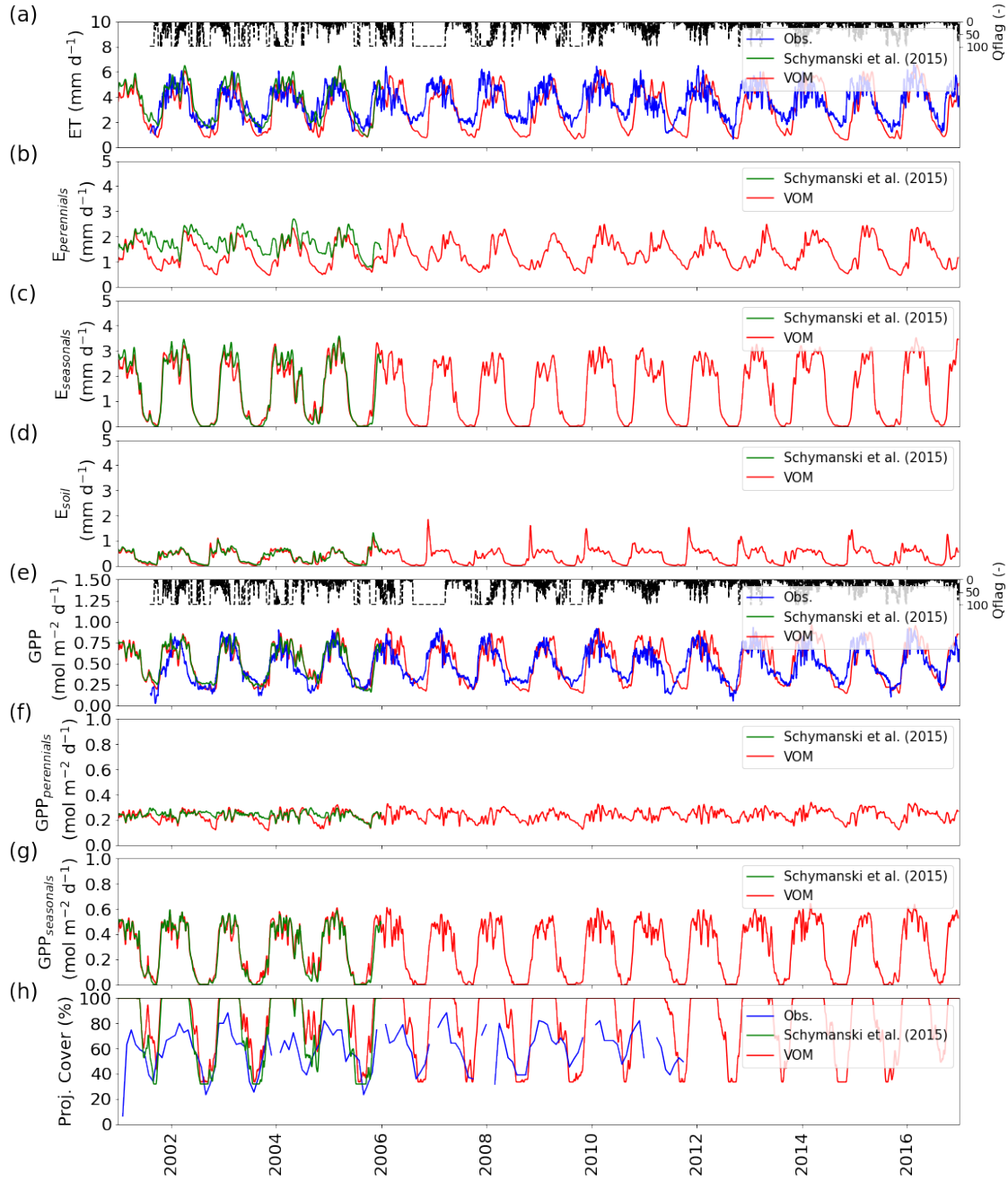
# Supplement S2

October 25, 2021

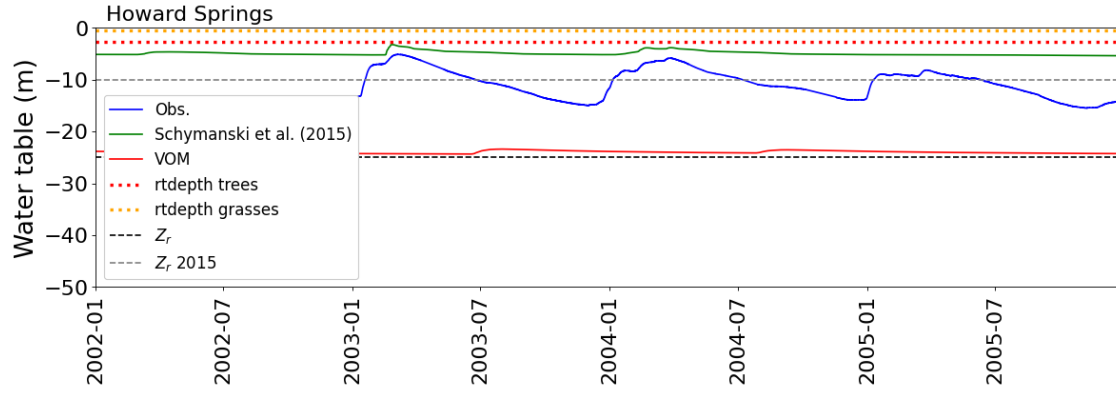
## **1 States and fluxes VOM**

This supplement provides more details about the VOM simulations, in order to provide full transparency and more background to the results as presented in the main manuscript.

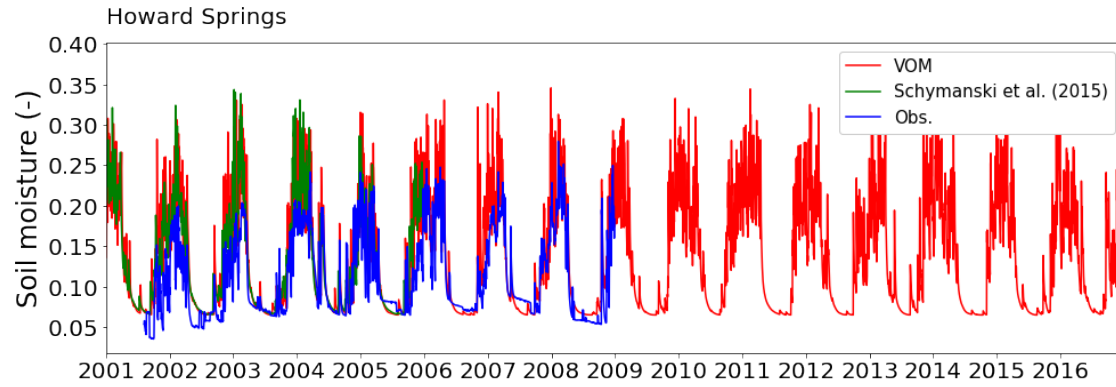
## 1.1 Howard Springs



**Figure S2.1.** Fluxes for Howard Springs from 2001-2016 (subset from 1980-2016) for a) ET, b) transpiration perennials (trees), c) transpiration seasonals (grasses), d) soil evaporation, e) GPP, f) GPP perennials (trees), g) GPP seasonals (grasses), all smoothed with a moving average of 7 days, for the VOM (red) and fluxtower observations (blue). Results of Schymanski et al. (2015) are shown in green. The daily average quality flags of the fluxtower observations are shown in dashed lines with a value of 100 when a day is completely gap-filled and 1 when it is observed.

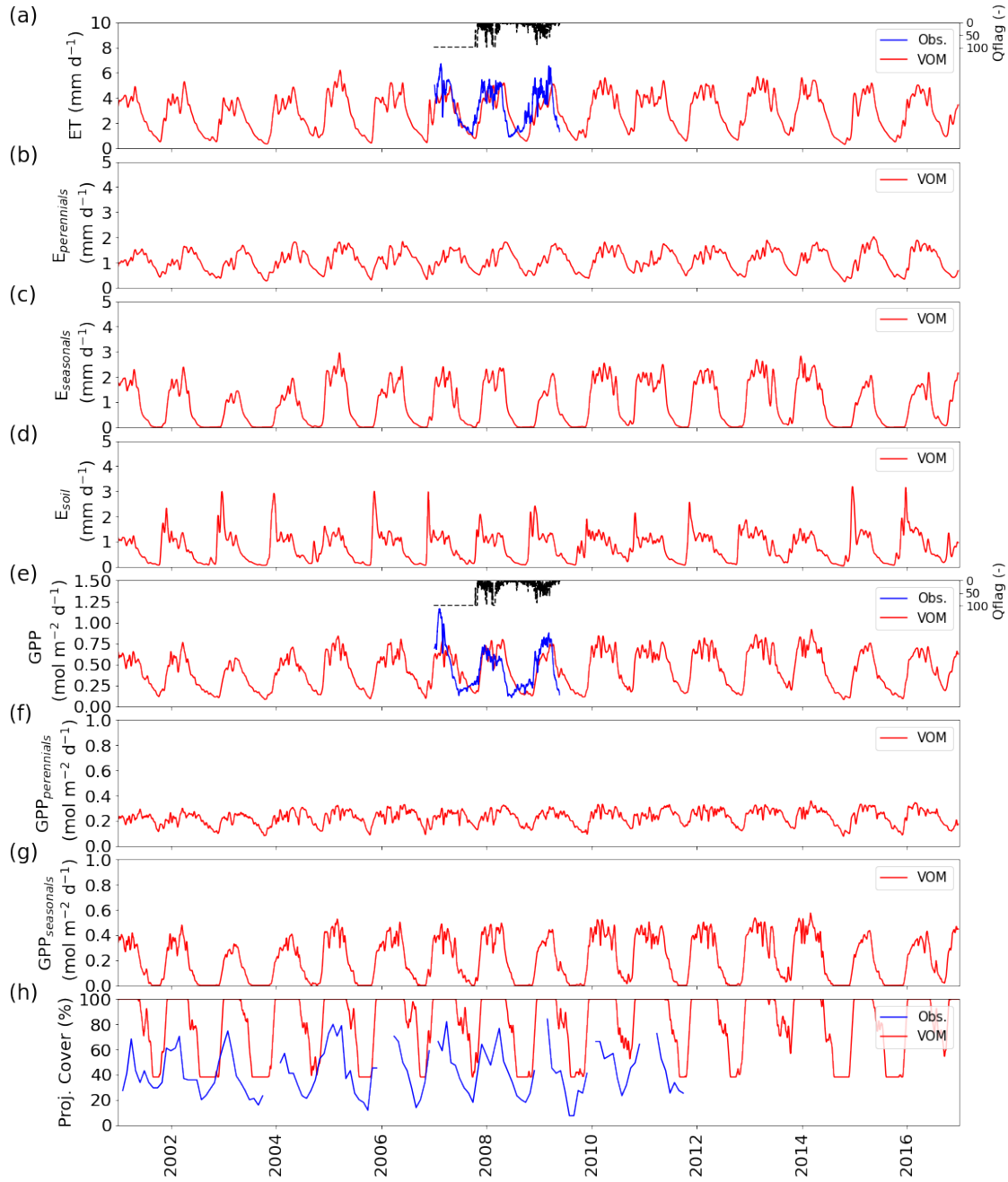


**Figure S2.2.** Groundwater tables for Howard Springs with the VOM results are in red, rooting depths dotted lines, bedrock dashed lines. Observations are shown in blue, with for Howard Springs three boreholes at approx. 1 km distance. The results of Schymanski et al. (2015) are shown in green.



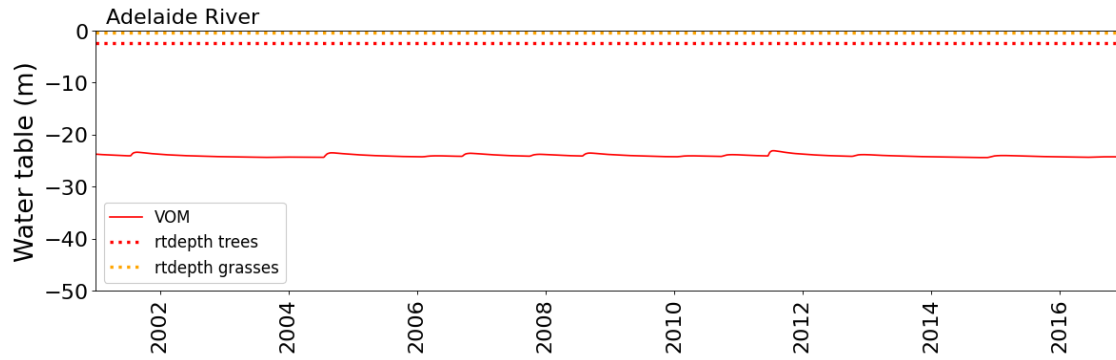
**Figure S2.3** Soil moisture values in the upper layer (0.2 m) for a) Howard Springs. Model results are shown in red, and observations for the upper 5 cm are shown in blue.

## 1.2 Adelaide River

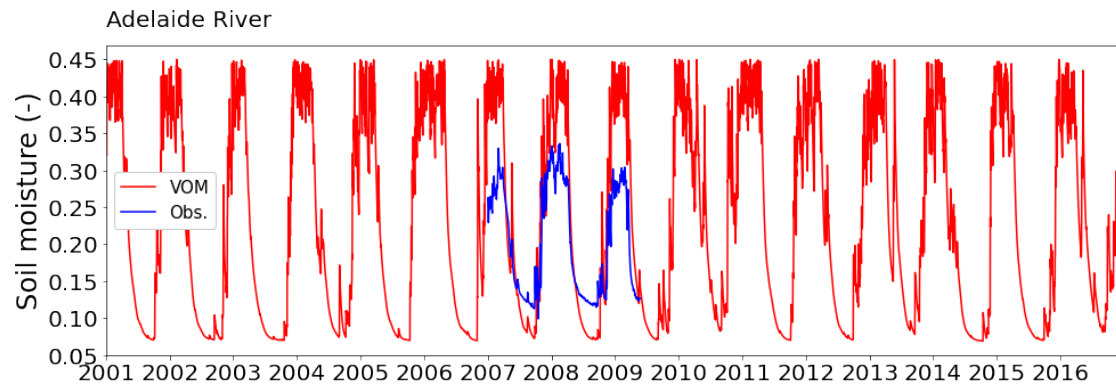


**Figure S2.4.** Fluxes for Adelaide River from 2001-2016 (subset from 1980-2016) for a) total ET, b) transpiration perennials (trees), c) transpiration seasonals (grasses), d) soil evaporation, e) total GPP, f) GPP perennials (trees), g) GPP seasonals (grasses), all smoothed with a moving average of 7 days, for the VOM with predicted cover (red), prescribed cover (black), prescribed cover with just mean monthly values (gray) and fluxtower observations (blue). The daily average quality flags of the fluxtower observations are shown in dashed lines with a value of 100 when a day is completely

gap-filled and 1 when it is observed.

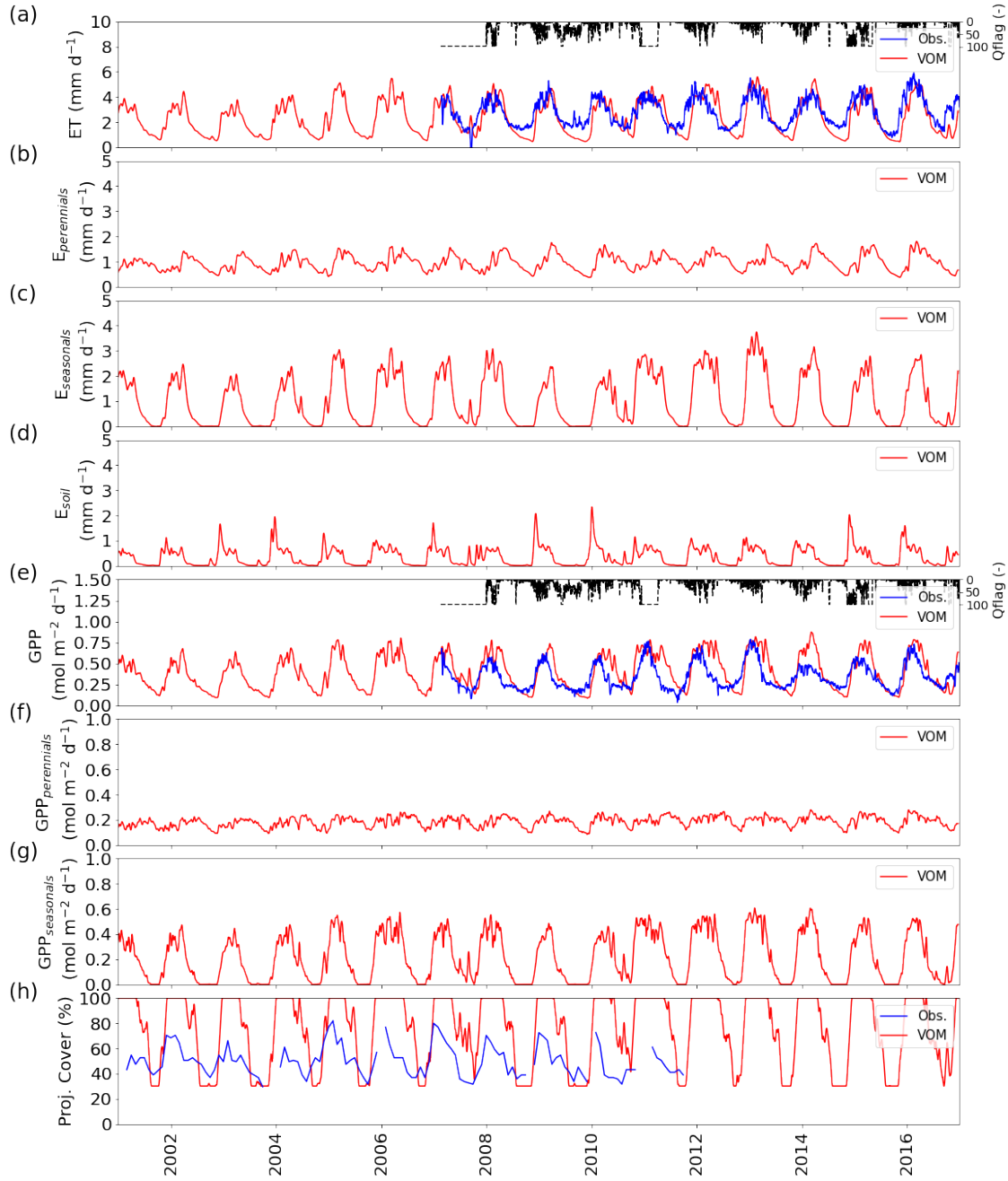


**Figure S2.5.** Groundwater tables for Adelaide River. Model results are shown in red, rooting depths dotted lines, bedrock dashed lines.

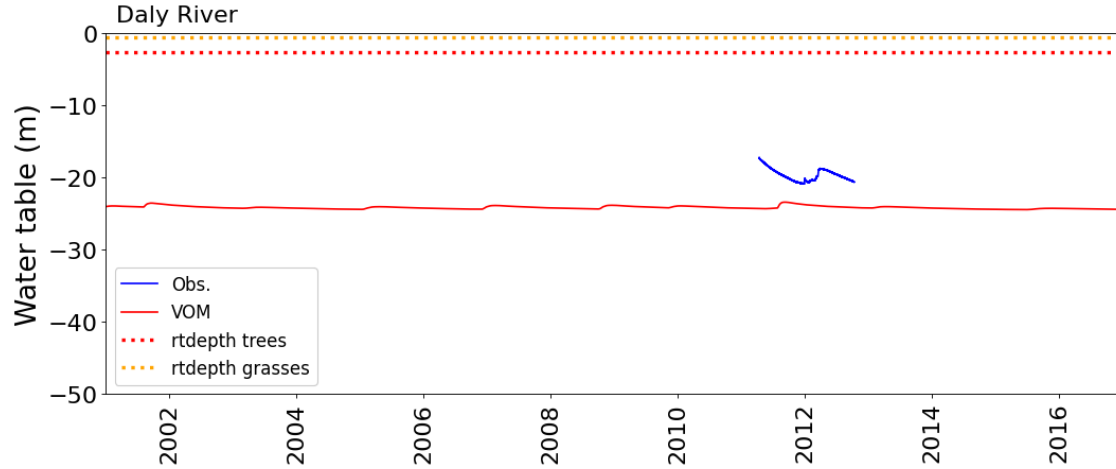


**Figure S2.6.** Soil moisture values in the upper layer (0.2 m) for Adelaide River. Model results are shown in red, and observations for the upper 5 cm are shown in blue.

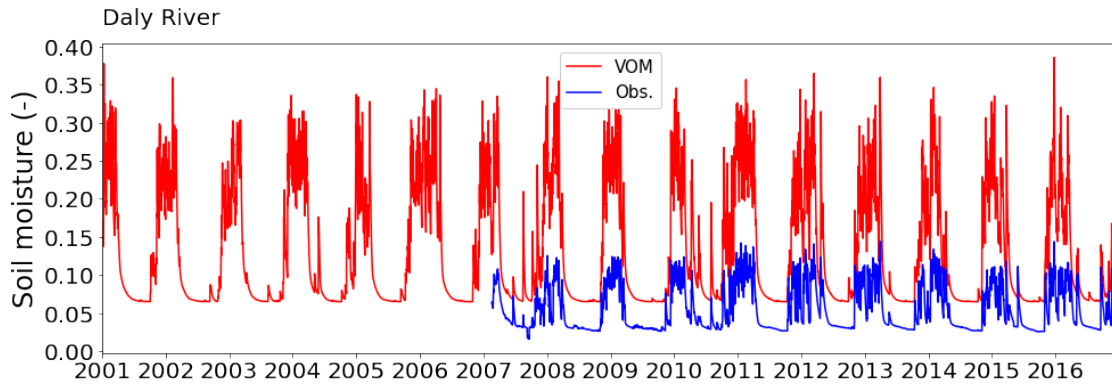
### 1.3 Daly River



**Figure S2.7.** Fluxes for Daly River from 2001-2016 (subset from 1980-2016) for a) total ET, b) transpiration perennials (trees), c) transpiration seasonals (grasses), d) soil evaporation, e) total GPP, f) GPP perennials (trees), g) GPP seasonals (grasses), all smoothed with a moving average of 7 days, for the VOM (red) and fluxtower observations (blue). The daily average quality flags of the fluxtower observations are shown in dashed lines with a value of 100 when a day is completely gap-filled and 1 when it is observed.

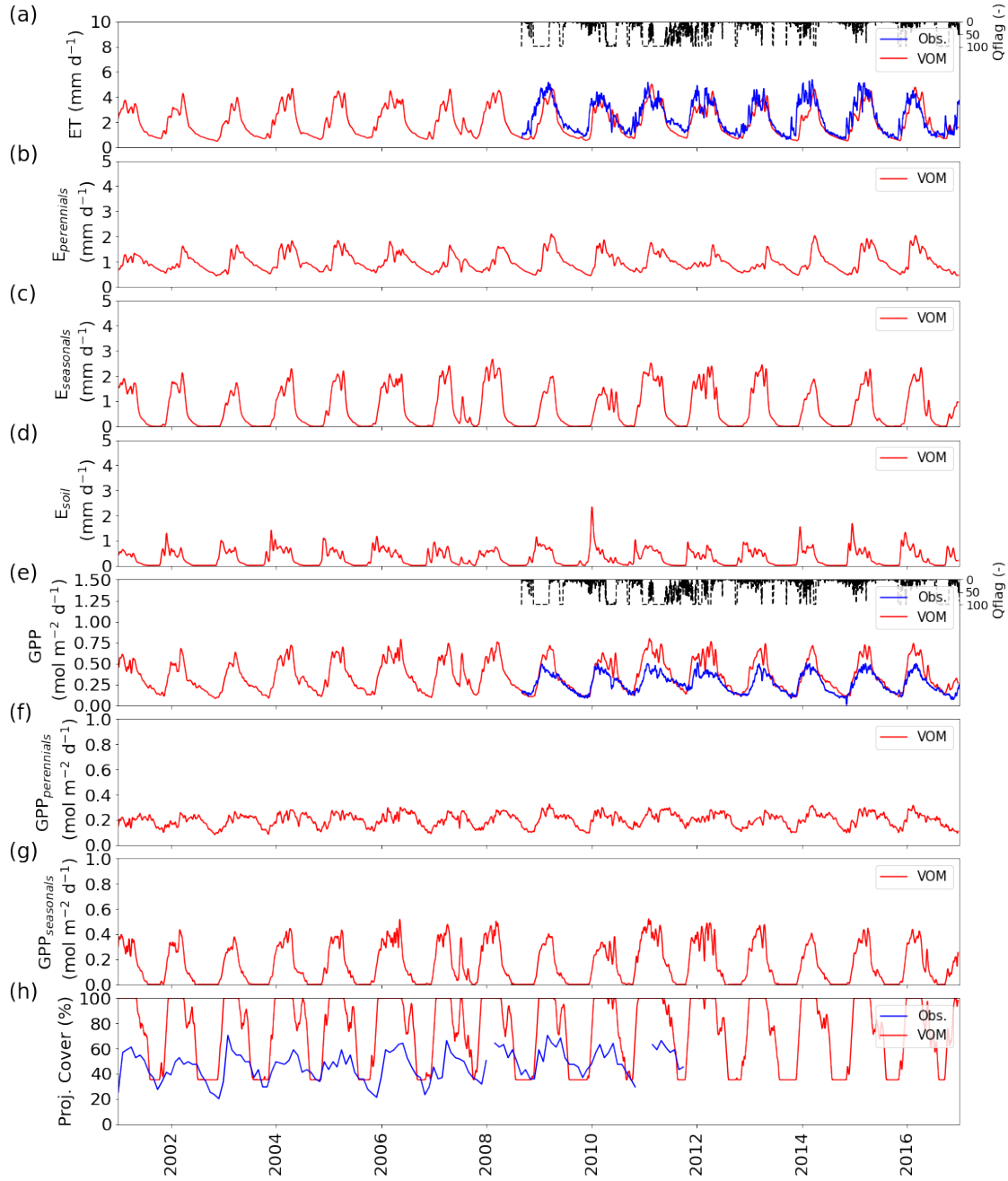


**Figure S2.8.** Groundwater tables for Daly River. Model results are shown in red, rooting depths dotted lines, bedrock dashed lines. Observations are shown in blue, with for Daly Uncleared one borehole at 2 km.



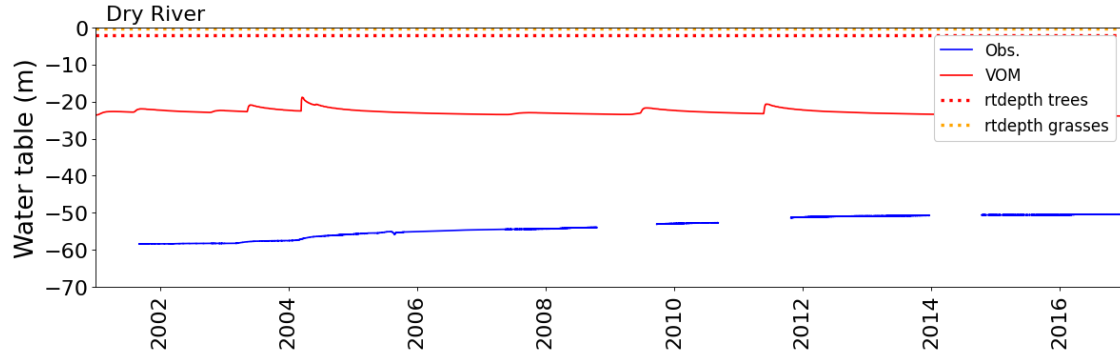
**Figure S6.9** Soil moisture values in the upper layer (0.2 m) for Daly Uncleared. Model results are shown in red, and observations for the upper 5 cm are shown in blue.

## 1.4 Dry River

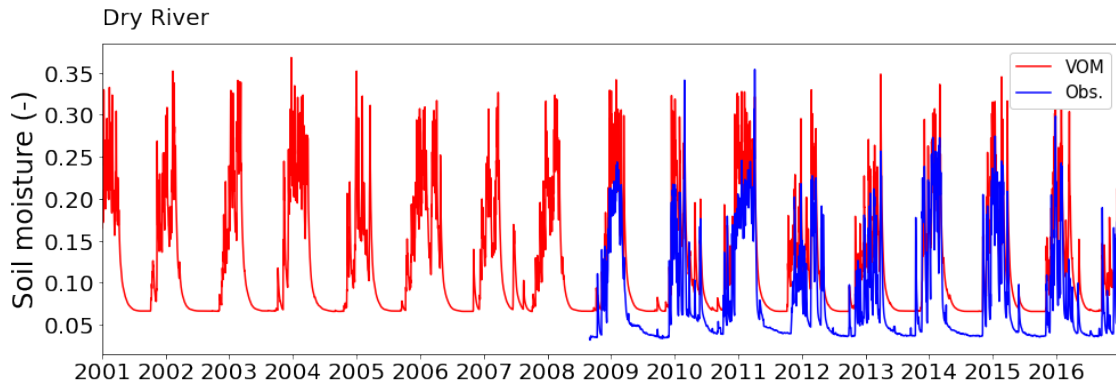


**Figure S2.10.** Fluxes for Dry River from 2001-2016 (subset from 1980-2016) for a) total ET, b) transpiration perennials (trees), c) transpiration seasonals (grasses), d) soil evaporation, e) total GPP, f) GPP perennials (trees), g) GPP seasonals (grasses), all smoothed with a moving average of 7 days, for the VOM (red) and fluxtower observations (blue). The daily average quality flags of the fluxtower observations are shown in dashed lines with a value of 100 when a day is completely gap-filled and 1 when it is observed.



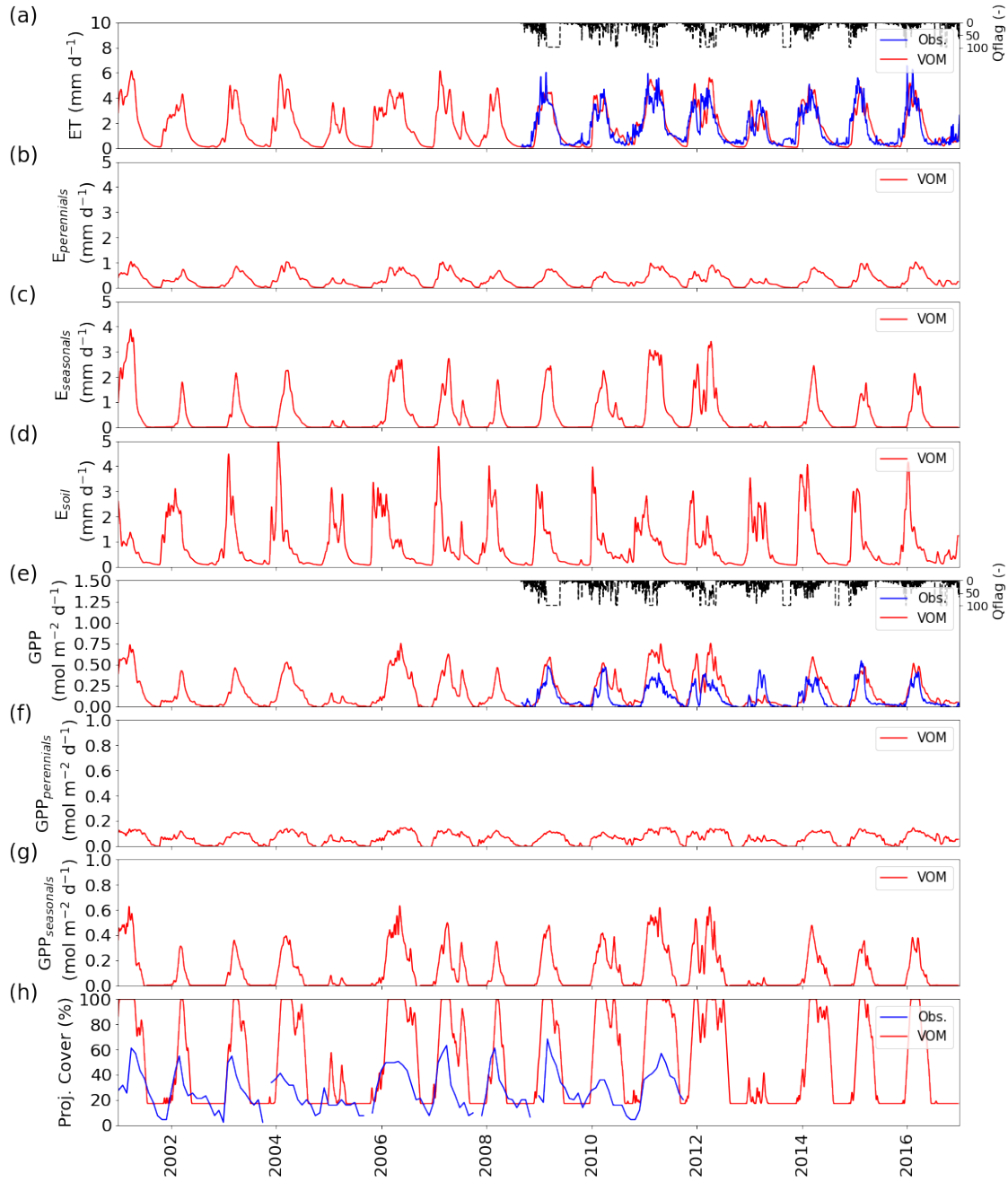


**Figure S2.11.** Groundwater tables for Dry River. Model results are shown in red, rooting depths dotted lines, bedrock dashed lines. Observations are shown in blue, with for Dry River one borehole at 13 km distance.

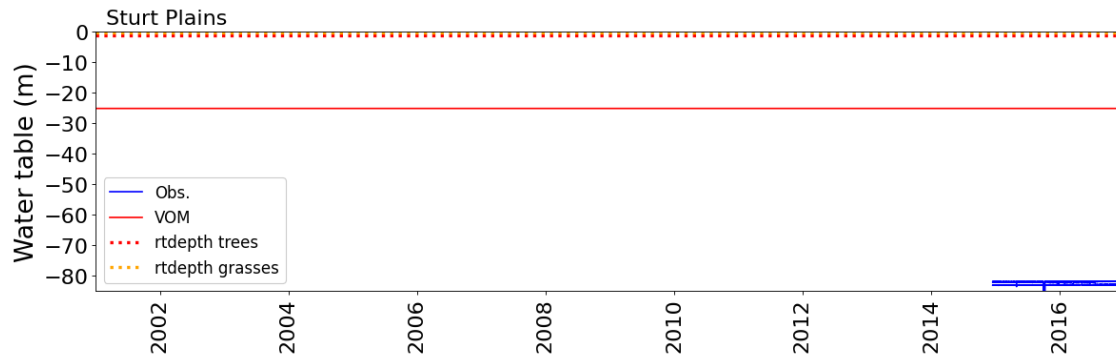


**Figure S2.12.** Soil moisture values in the upper layer (0.2 m) for Dry River. Model results are shown in red, and observations for the upper 5 cm are shown in blue.

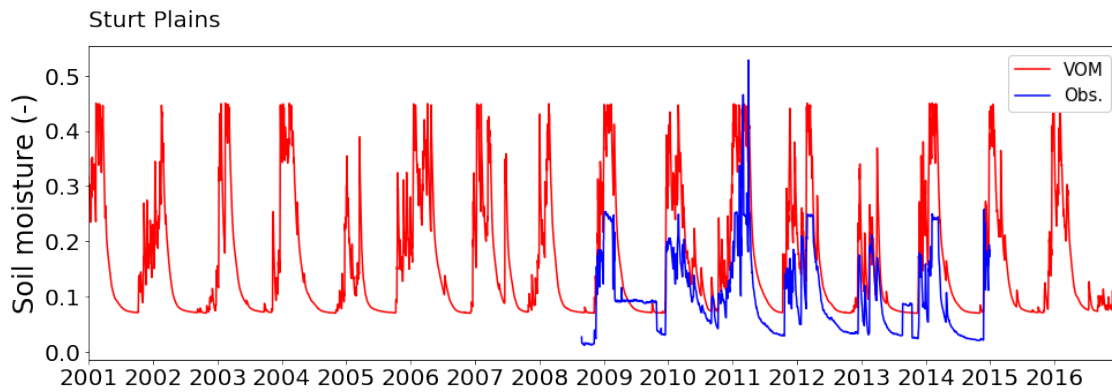
## 1.5 Sturt Plains



**Figure S2.13.** Fluxes for Sturt Plains from 2001-2016 (subset from 1980-2016) for a) total ET, b) transpiration perennials (trees), c) transpiration seasonals (grasses), d) soil evaporation, e) total GPP, f) GPP perennials (trees), g) GPP seasonals (grasses), all smoothed with a moving average of 7 days, for the VOM (red) and fluxtower observations (blue). The daily average quality flags of the fluxtower observations are shown in dashed lines with a value of 100 when a day is completely gap-filled and 1 when it is observed.



**Figure S2.14.** Groundwater tables for Sturt Plains. Model results are shown in red, rooting depths dotted lines, bedrock dashed lines. Observations are shown in blue, with for Sturt Plains two boreholes at 10 km distance.



**Figure S2.15** Soil moisture values in the upper layer (0.2 m) for Sturt Plains. Model results are shown in red, and observations for the upper 5 cm are shown in blue.