Supplement S2

February 14, 2022

1 Increasing/decreasing meteorological variables for the VOM

In addition to running the models using catchment-specific meteorology and the numerical experiments where only precipitation was increased or decreased by a constant factor, we conducted here experiments with changes in the incoming radiation and vapour pressure.

To do so, the meteorological forcing was altered by multiplying the incoming radiation with factors ranging from 0.2 to 2.0 in steps of 0.2, and the VOM was re-optimized, which would lead to different vegetation parameters. This was repeated in a similar way for the vapour pressure.

After this, the VOM was run for each incoming radiation and vapour pressure case with the vegetation parameters that were obtained in the unmodified situation with the meteorological data as observed, assuming that long-term vegetation properties are not affected by changes in precipitation amounts.

1.1 Incoming shortwave radiation

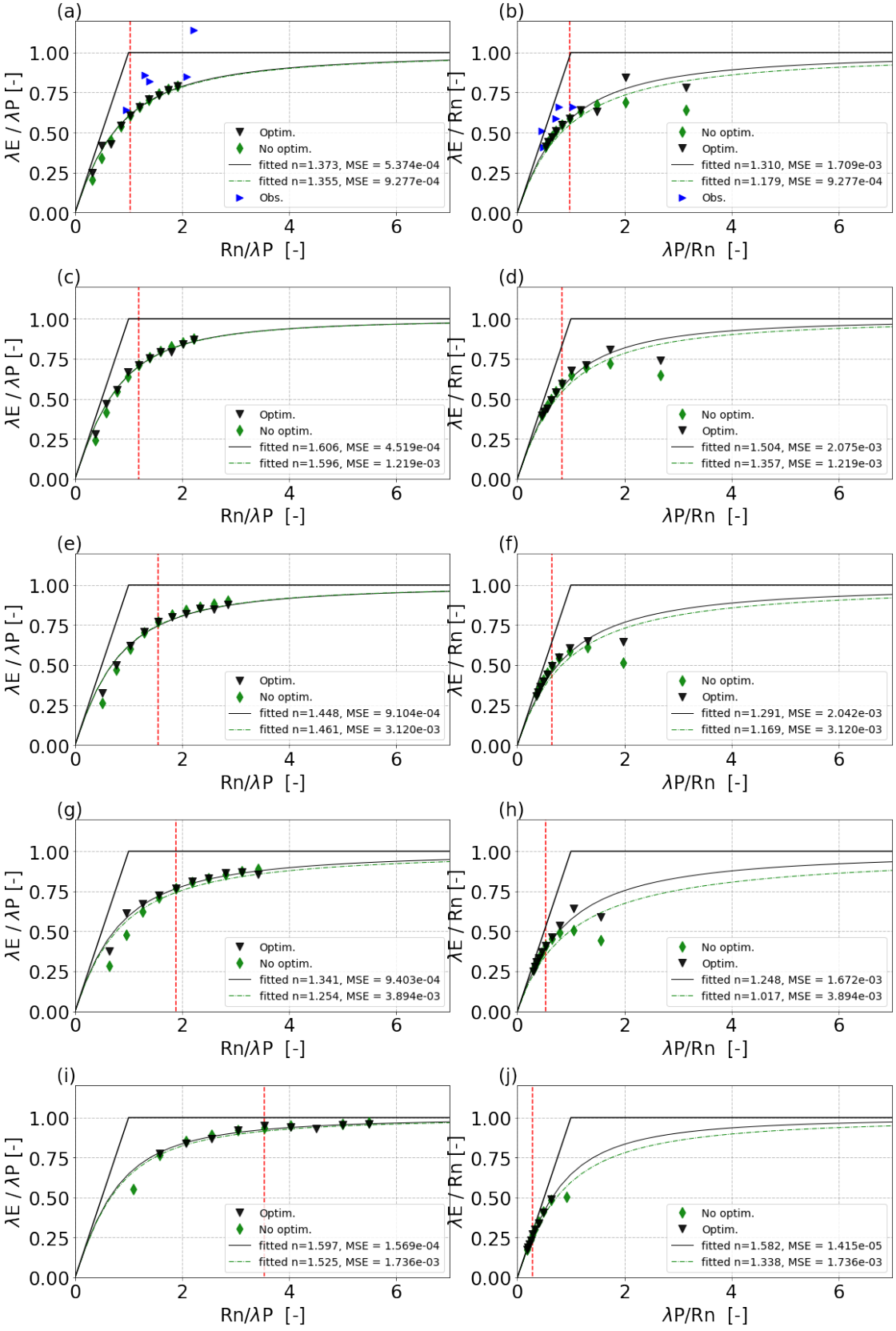

Fig. S2.1. *Budyko curves for sites along the NATT, based on VOM-results, for a) and b) Howard Springs, c) and d) Adelaide River, e) and f) Litchfield, g) and h) Daly Uncleared, i) and j) Dry River and k) and l) Sturt Plains. Model runs that are re-optimized for increased/decreased incoming shortwave radiation are shown in black, whereas model runs that use vegetation parameters based on the benchmark situation (red star) are shown in green.*

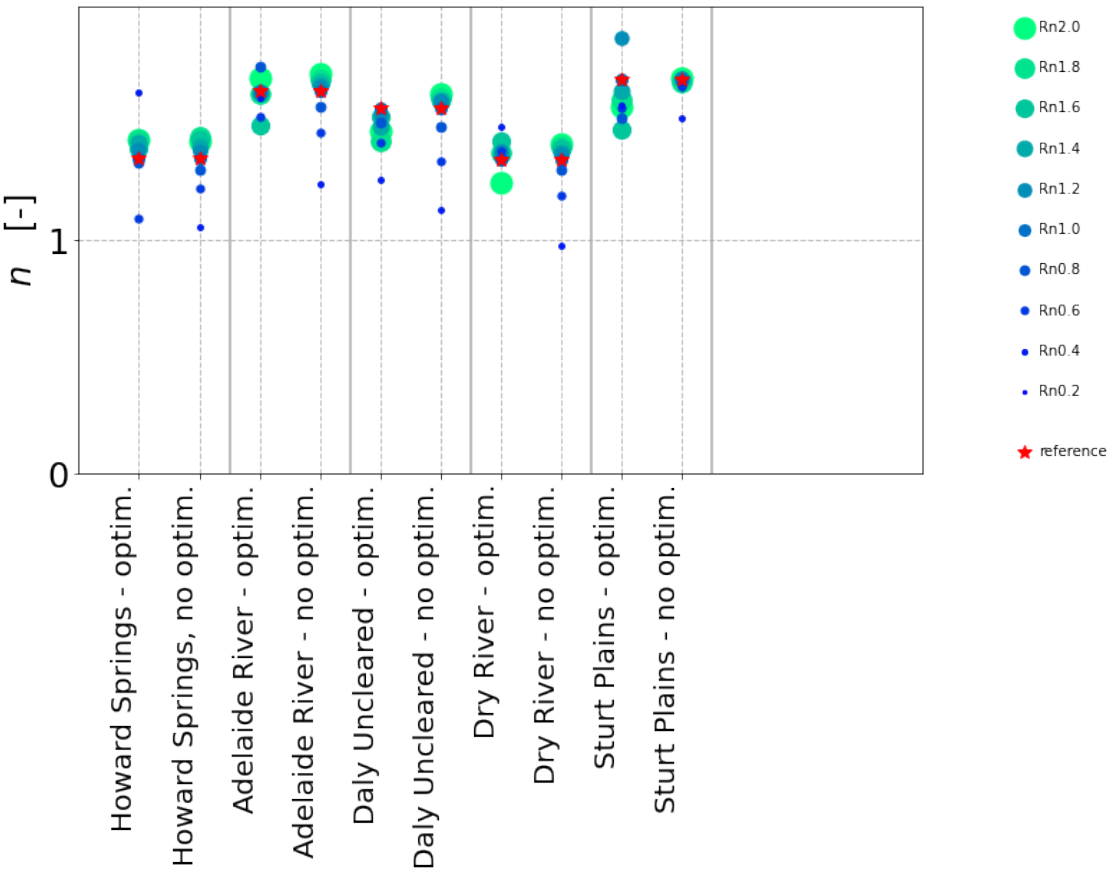

Fig.S2.2*. Values for fitting the Budyko-curve to the VOM-results, for the benchmark runs (red star), runs with increased/decreased incoming shortwave radiation and re-optimized vegetation and the runs with increased/decreased incoming shortwave radiation and the same vegetation parameters (blue color gradient, circles).*

1.2 Vapour pressure

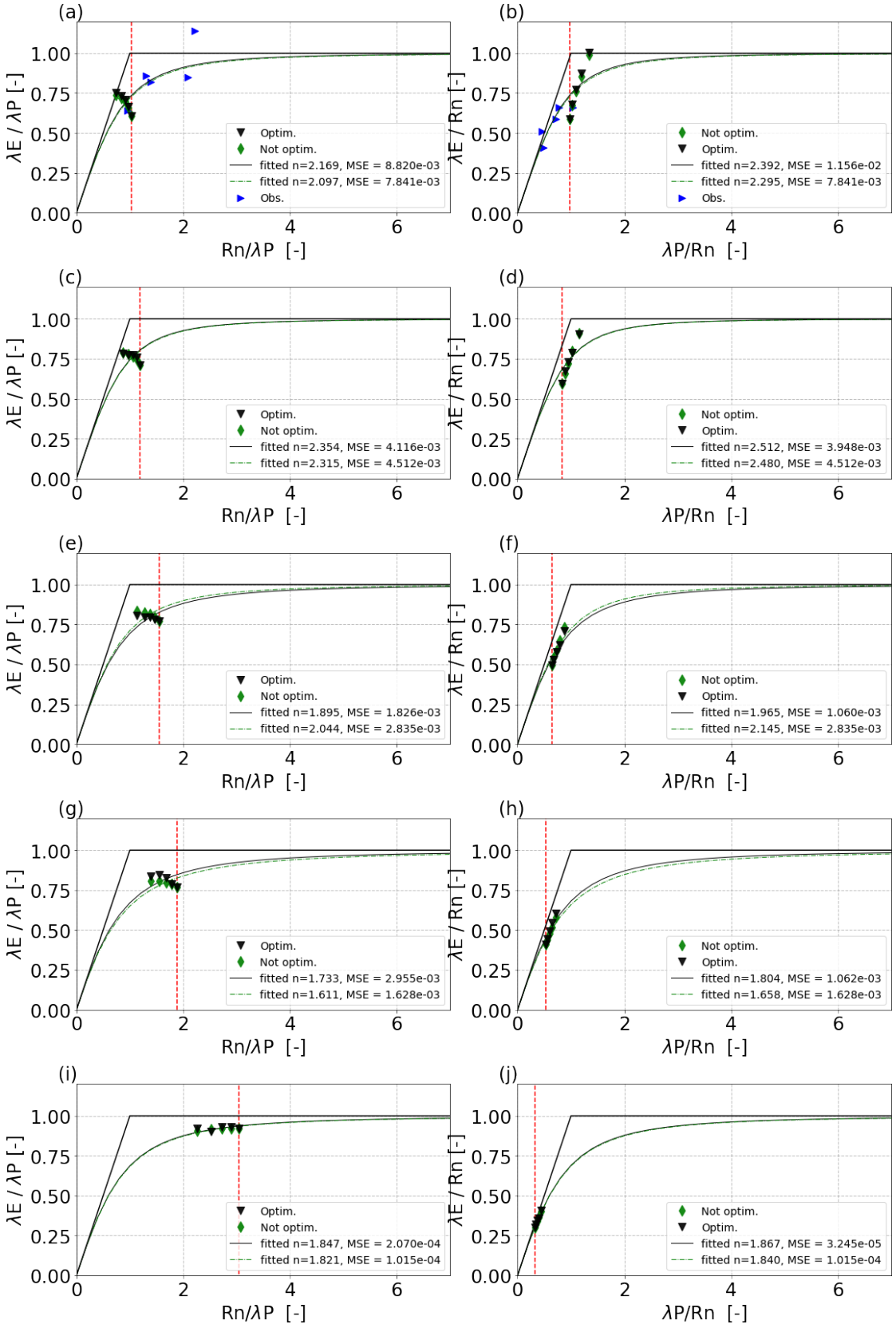

Fig. S2.3. *Budyko curves for sites along the NATT, based on VOM-results, for a) and b) Howard Springs, c) and d) Adelaide River, e) and f) Litchfield, g) and h) Daly Uncleared, i) and j) Dry River and k) and l) Sturt Plains. Model runs that are re-optimized for decreased vapour pressure are shown in black, whereas model runs that use vegetation parameters based on the benchmark situation (red star) are shown in green.*

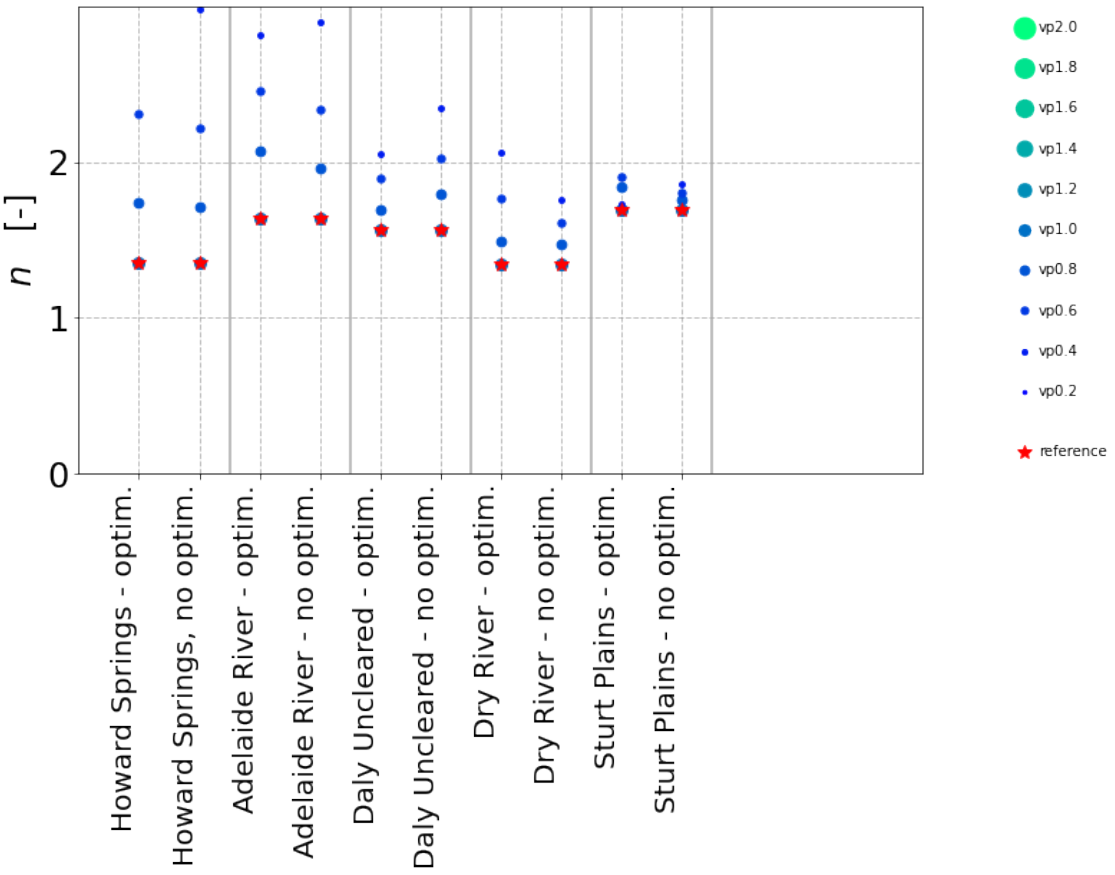

Fig.S2.4*. Values for fitting the Budyko-curve to the VOM-results, for the benchmark runs (red star), runs with increased/decreased incoming shortwave radiation and re-optimized vegetation and the runs with decreased vapour pressure and the same vegetation parameters (blue color gradient, circles).*