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Supplement of

The effects of rain and evapotranspiration statistics on groundwater recharge estimations for semi-arid environments

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Content description

This supporting information provides a description of the cumulative distribution functions (CDFs) of the observed and synthesized daily, monthly, and yearly rain amounts and the number of rainy days for each rainy month in Beit Dagan and Shenmu. Note that in Beit Dagan, there are only nine months with rain. In addition, the CDFs of the observed and synthesized daily, monthly, and yearly potential evapotranspiration (ETref) rates are presented. In the last two figures, Figure S15 and Figure S16, the cross-correlation matrices between annual rain and annual groundwater recharge, for different lag times and synthesis methods, are presented.

Table S1: The p-values of two sample Kolmogorov-Smirnov tests for the synthesized rain/ETref and the measured ones.

	Beit Dagan			Shenmu		
Month	DS	ETDS	ETWD	DS	ETDS	ETWD
1	1	0.99	1	1	1	1
2	1	1	1	1	1	1
3	1	1	1	1	1	1
4	1	1	1	1	1	1
5	1	0.99	1	1	0.98	1
6	-	1	0.97	1	1	1
7	-	1	1	1	1	0.98
8	-	1	1	1	1	1
9	0.96	1	1	1	0.99	1
10	1	1	1	1	1	1
11	1	1	1	1	1	1
12	1	1	1	0.99	1	1
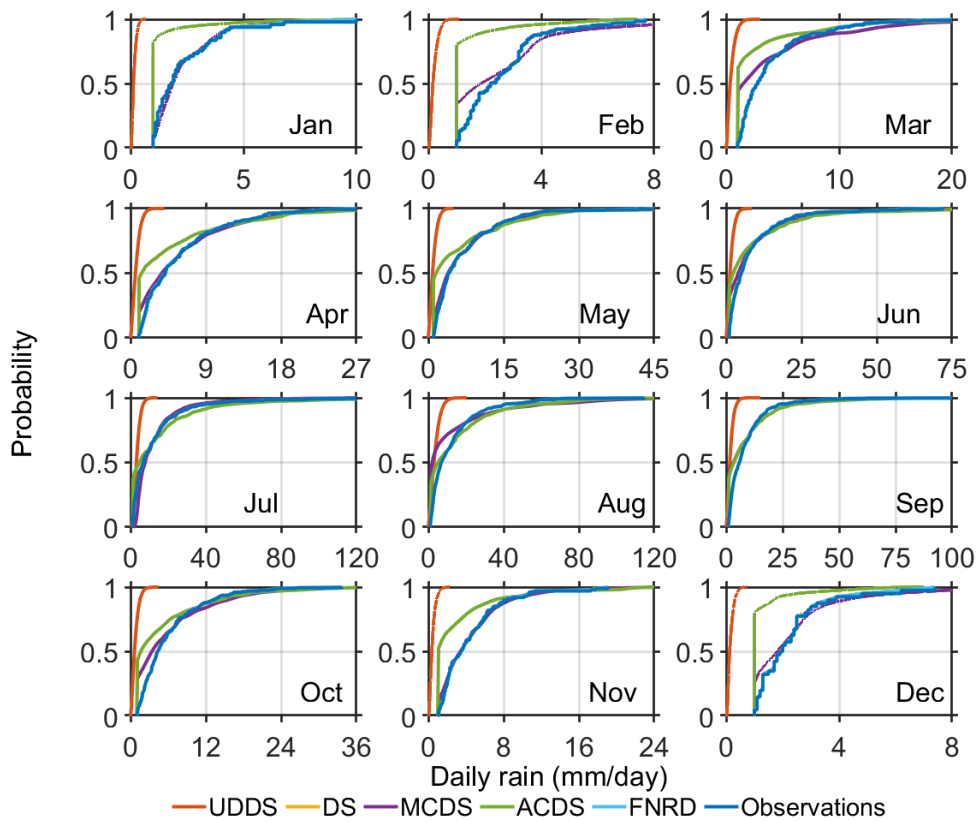
Figure S1: Cumulative distribution functions of daily rain intensity (mm/day) for each month in Shenmu. Note that the CDFs of the Observations, DS, and FNRD are very similar and that the corresponding lines overlay each other.
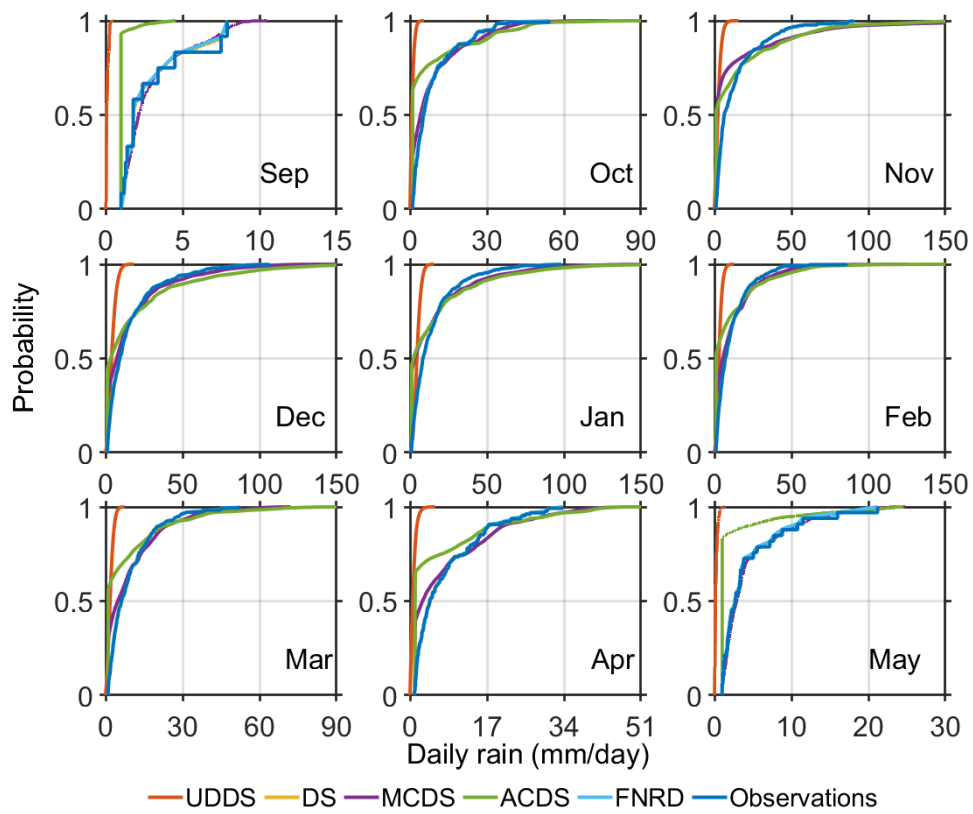
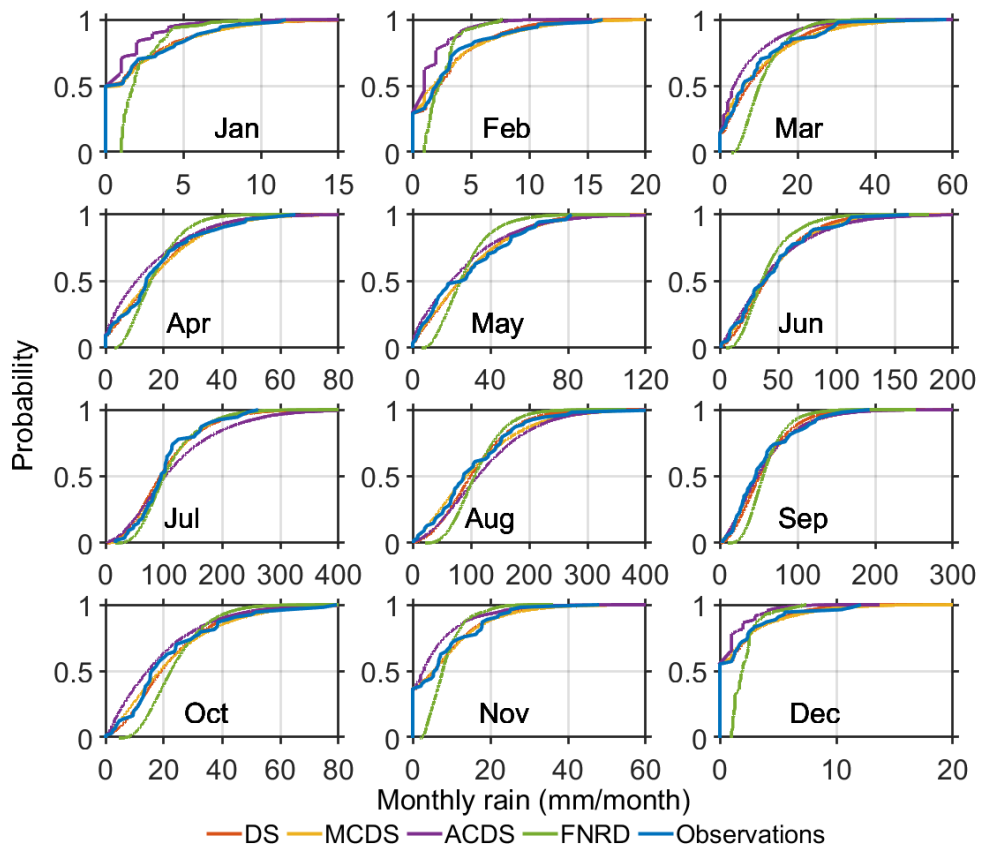Figure S2: Cumulative distribution functions of daily rain intensity (mm/day) for each month within the rainy season in Beit Dagan. Note that the CDFs of the Observations, DS and FNRD are very similar and that the corresponding lines overlay each other.

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Figure S3: Cumulative distribution functions of the total monthly rain (mm/month) for each calendar month in Shenmu.
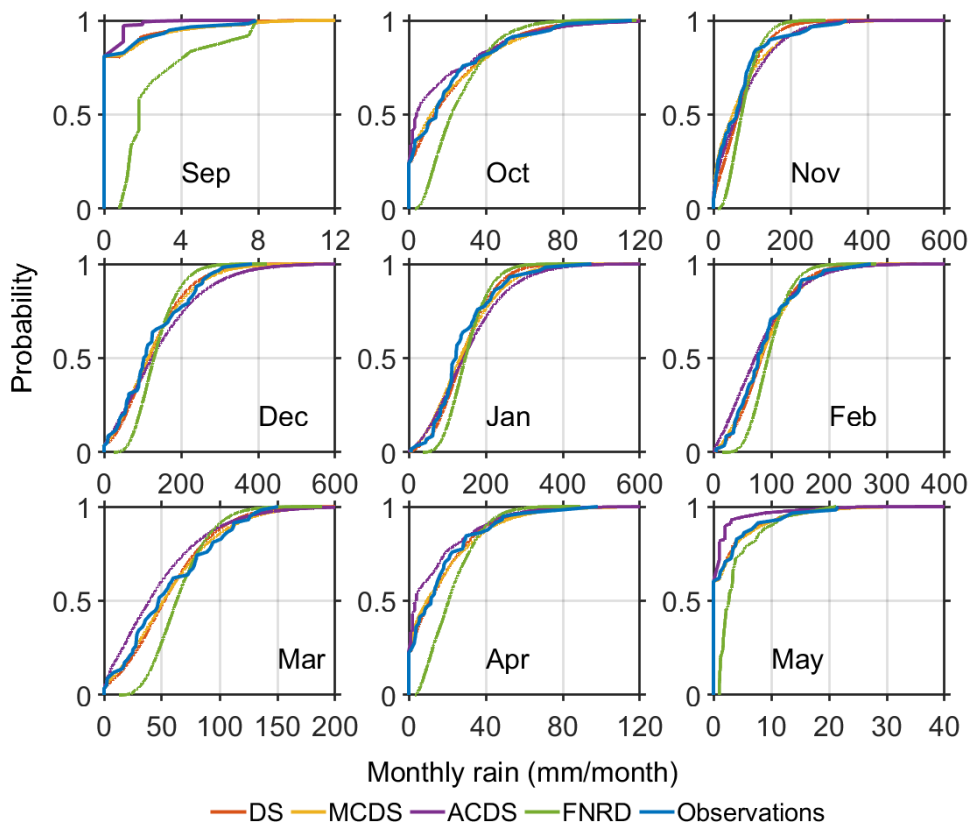
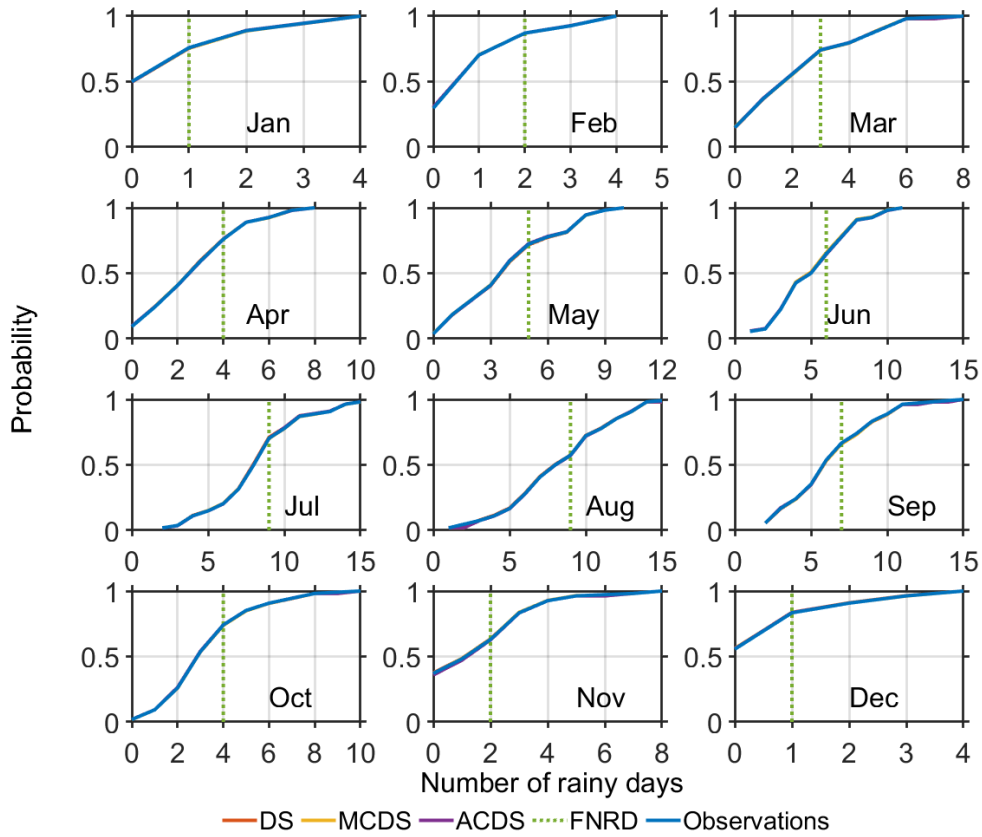Figure S4: Cumulative distribution functions of the total monthly rain (mm/month) for each calendar month within the rainy season in Beit Dagan.
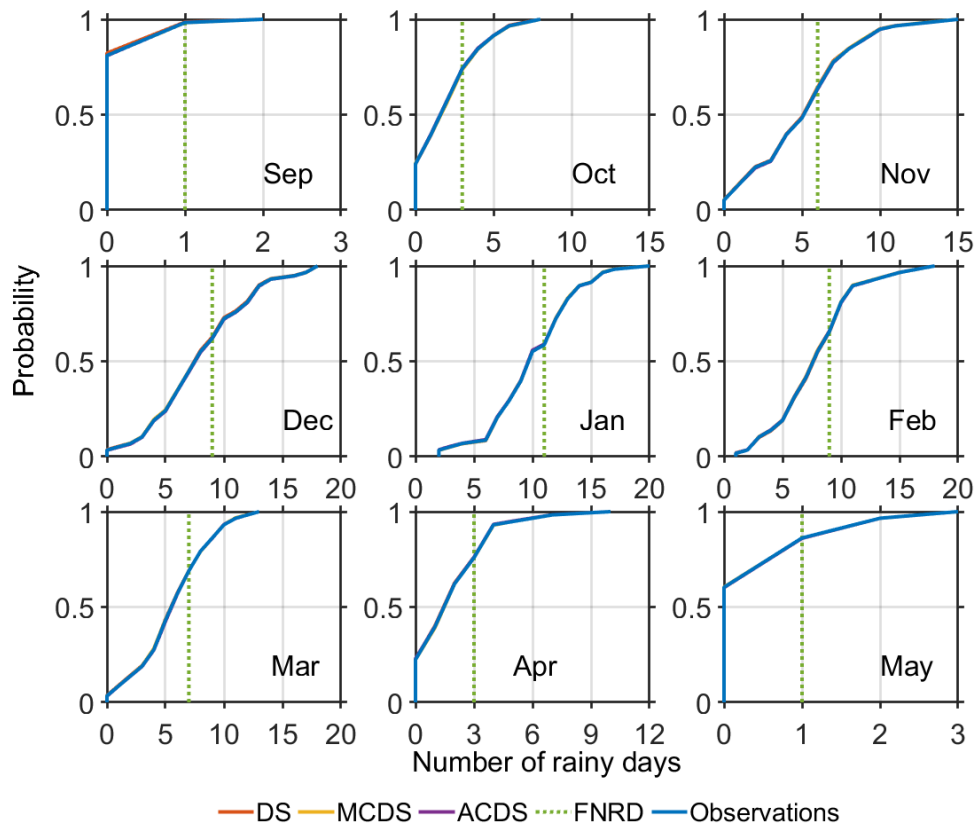
Figure S5: Cumulative distribution functions of the number of rainy days for each month in Shenmu. Note that the lines corresponding to the different methods, except for the FNRD, overlay each other since the distribution of the number of rainy days was preserved in all the rain synthesis methods.

Figure S6: Cumulative distribution functions of the number of rainy days for each month in Beit Dagan. Note that the lines corresponding to the different methods, except for the FNRD, overlay each other since the distribution of the number of rainy days was preserved in all the rain synthesis methods.
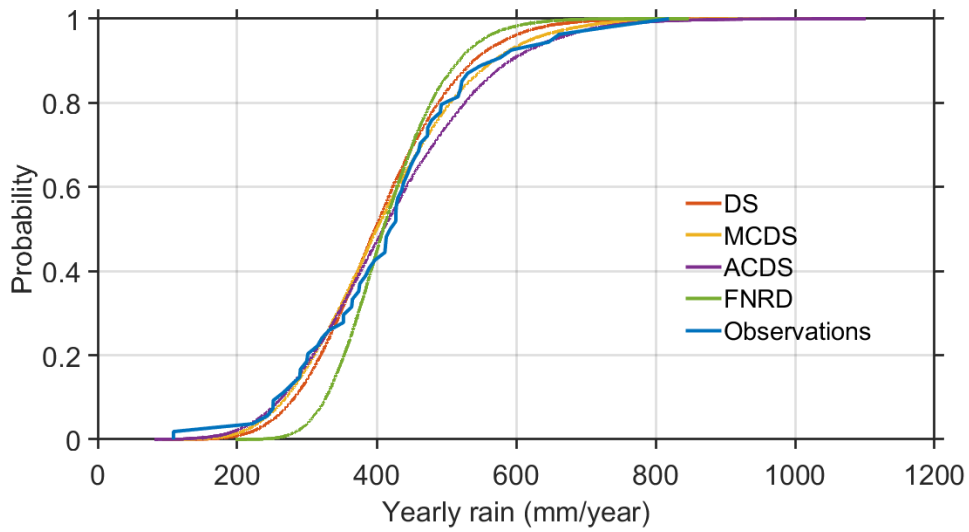
Figure S7: Cumulative distribution functions of the total annual rain (mm/year) in Shenmu.
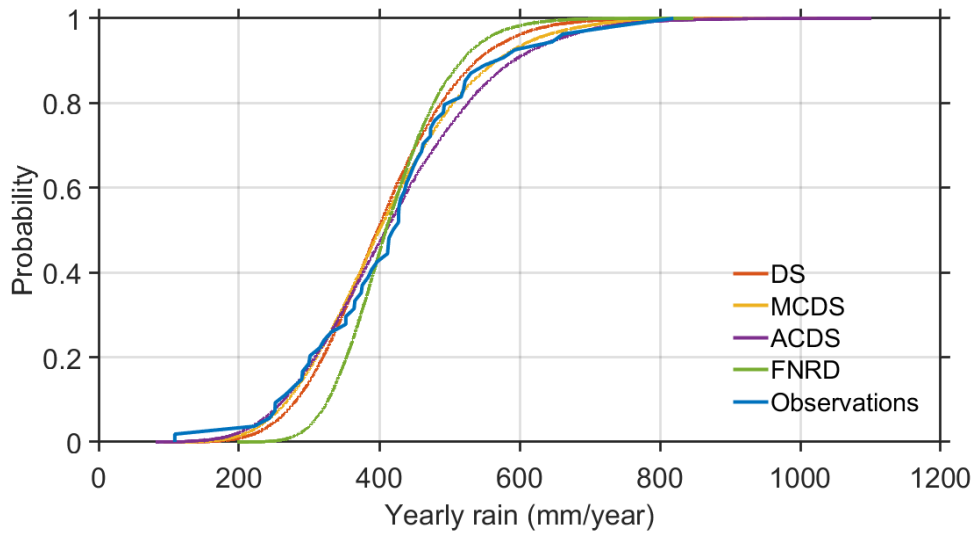

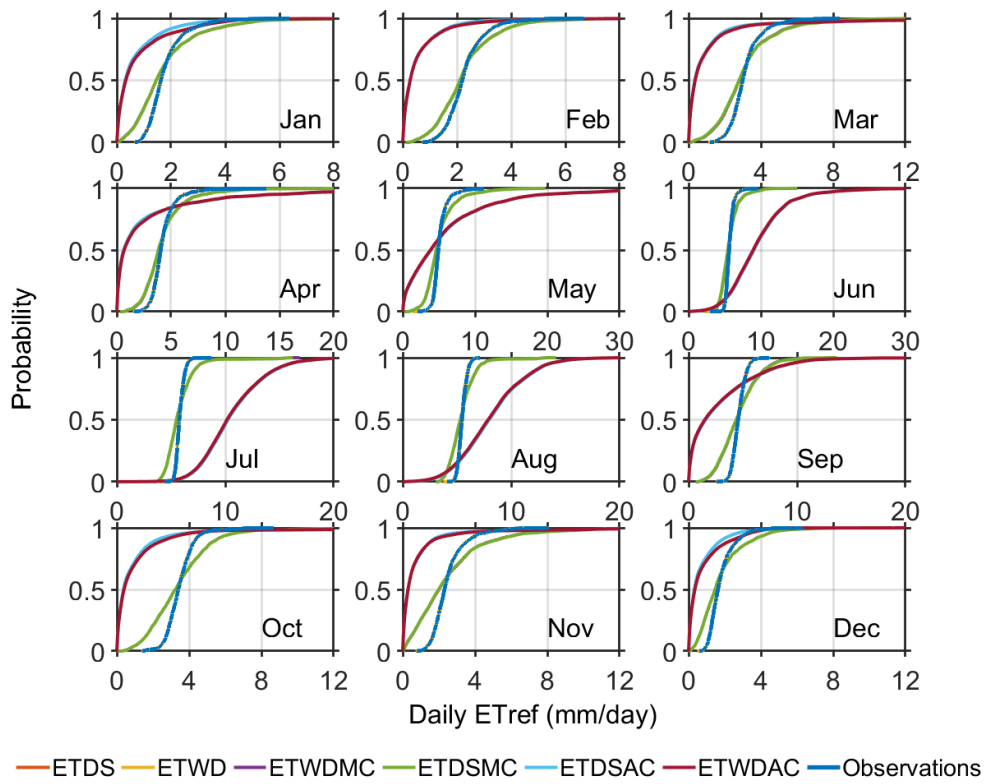Figure S8: Cumulative distribution functions of the total annual rain (mm/year) in Beit Dagan.

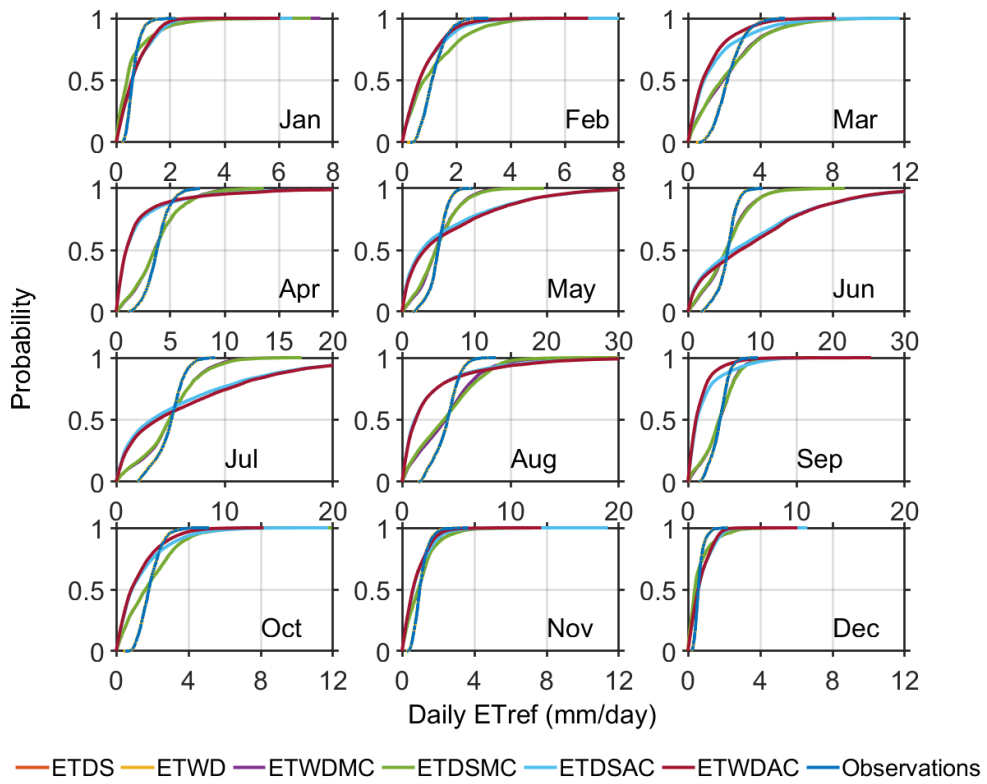Figure S9: Cumulative distribution functions of daily measured and synthesized ETref values (mm/day) for Shenmu.

Figure S10: Cumulative distribution functions of daily measured and synthesized ETref values (mm/day) for Beit Dagan.
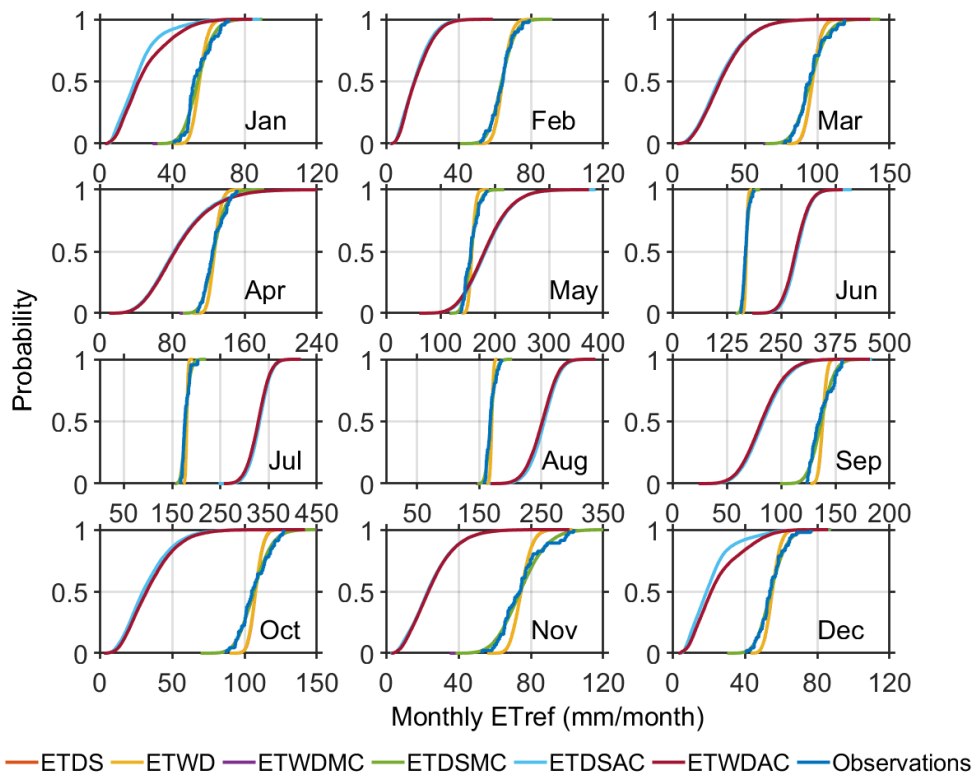
Figure S11: Cumulative distribution functions of observed and synthesized total monthly ETref values (mm/month) for Shenmu.
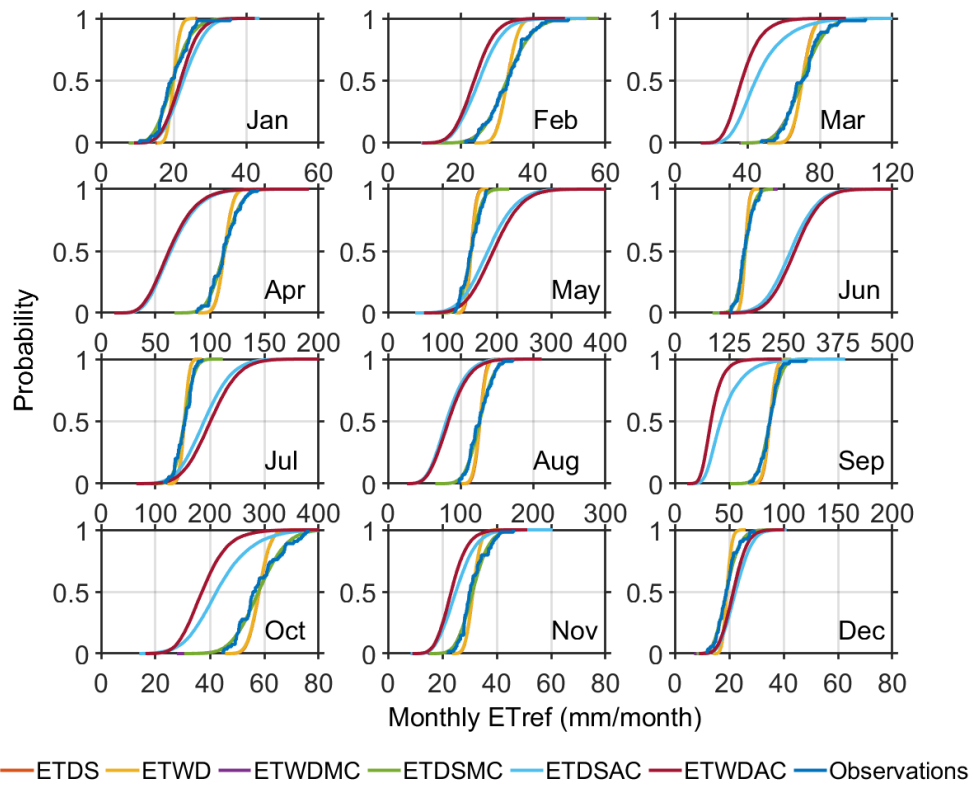
Figure S12: Cumulative distribution functions of observed and synthesized total monthly ETref values (mm/month) for Beit Dagan.
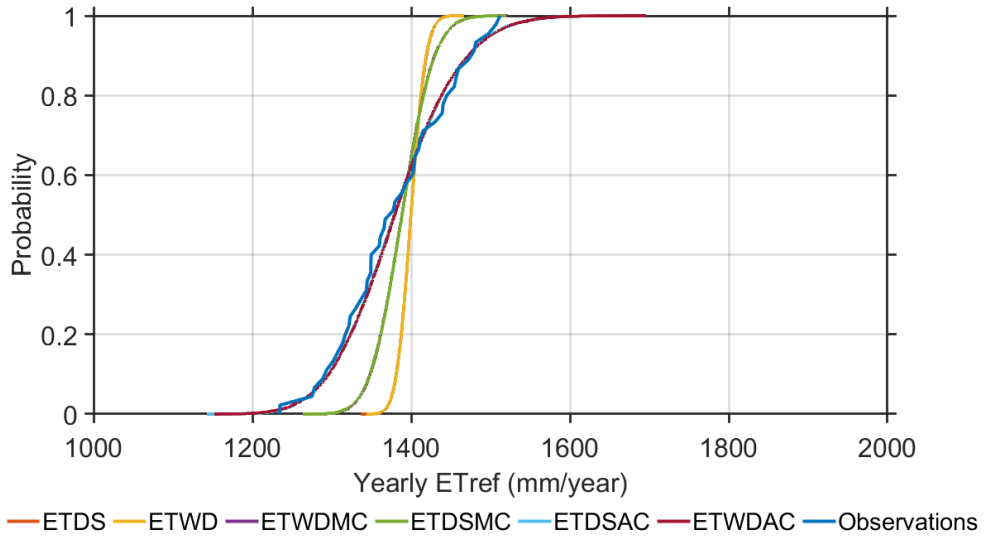
Figure S13: Cumulative distribution functions of measured and synthesized annual ETref values (mm/year) for Shenmu.
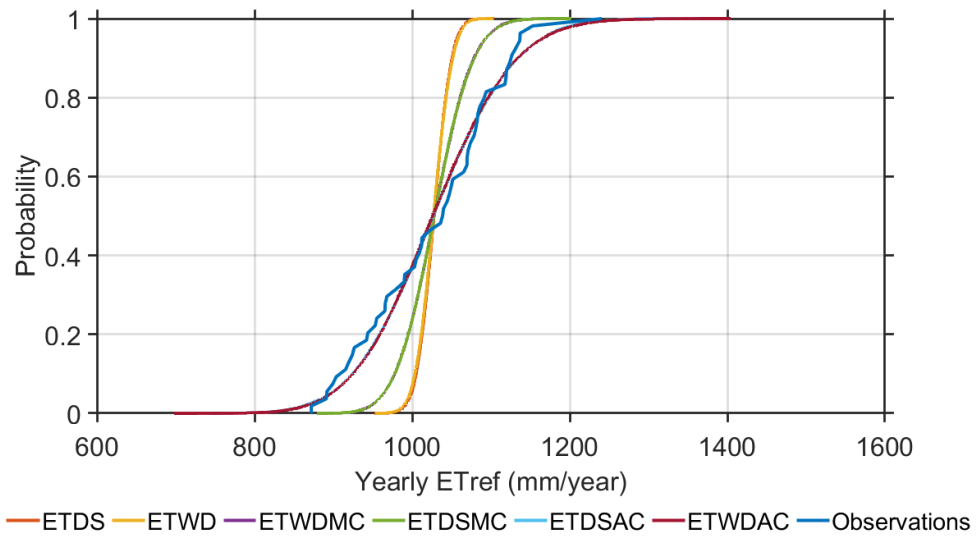

Figure S14: Cumulative distribution functions of measured and synthesized annual ETref values (mm/year) for Beit Dagan.
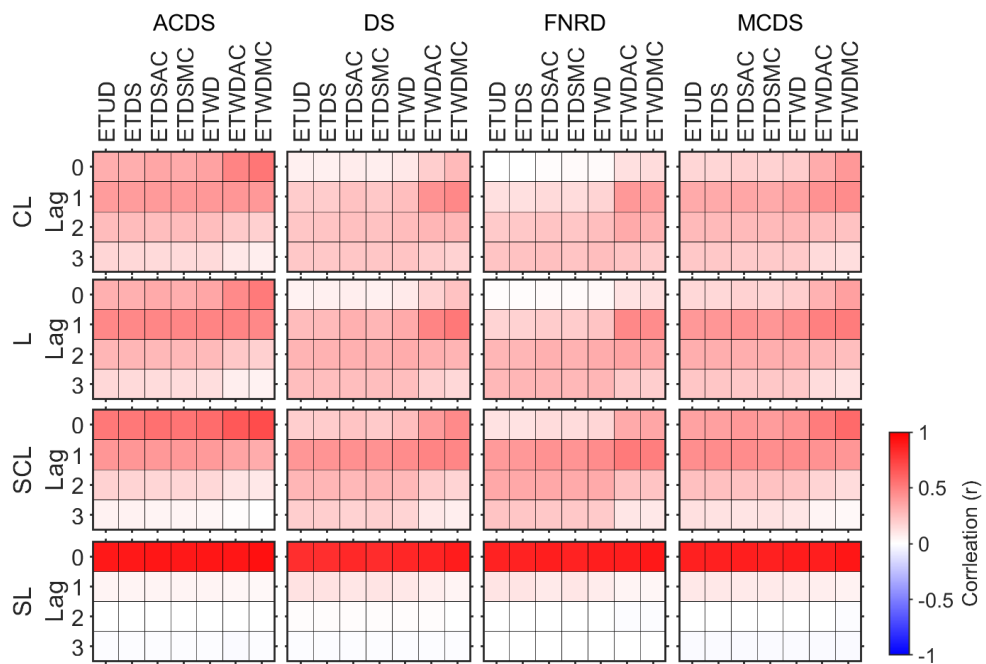
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Figure S15: Cross-Correlation matrices between annual rain and annual groundwater recharge for Shenmu. Note that the abbreviations CL, L, SCL and SL stand for Clay Loam, Loam, Sandy Clay Loam, Sandy Loam, respectively.
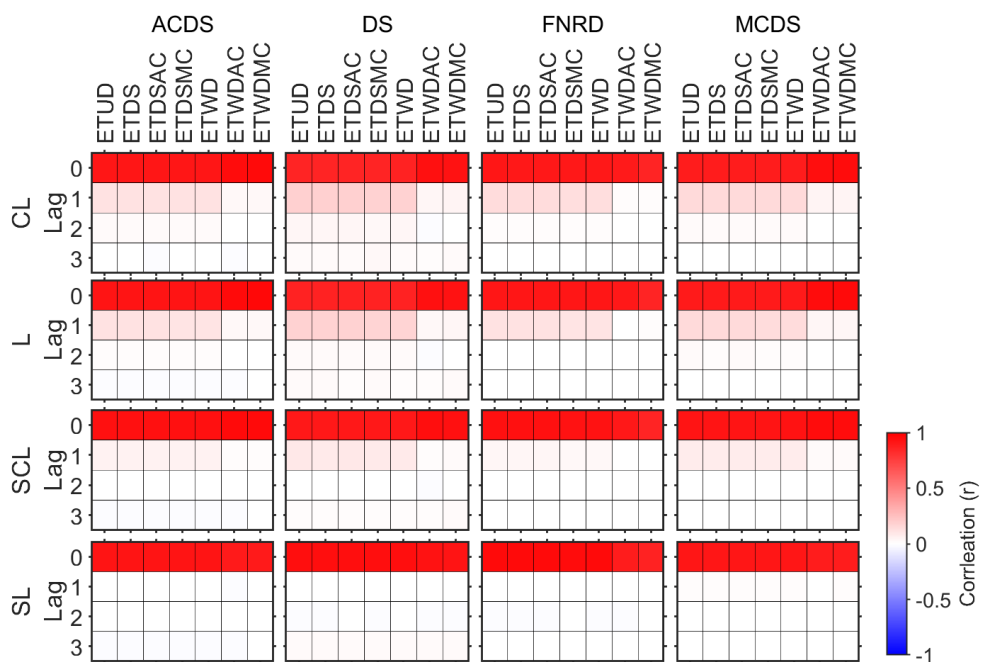
Figure S16: Cross-Correlation matrices between annual rain and annual groundwater recharge for Beit Dagan. Note that the abbreviations CL, L, SCL and SL stand for Clay Loam, Loam, Sandy Clay Loam, Sandy Loam, respectively.