S1. Supplement

S1.1. Use of the weather generator

Working with the spatio-temporal Neyman-Scott weather generator (WG) implemented in RainSim (Burton et al., 2008) requires the user to go through a number of steps. The steps are perfectly summed up in Burton et al. (2010a), Figure 1 which is reproduced in Figure S1. Furthermore, these steps are generally described in a number of publications by the model developers (i.e. Burton et al. 2008; 2010a; 2010b). In this appendix we will more specifically describe how the workflow has been for this specific study as a means of understanding the possibilities and limitations the model provide given the data available.

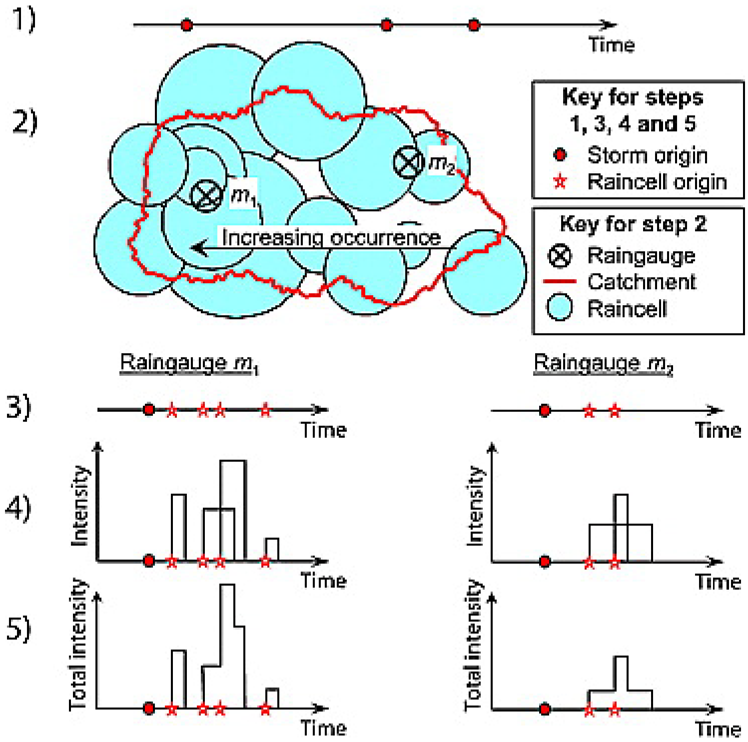

Figure S1 Conceptual sketch of the functioning of the the spatio-temporal Neyman-Scott weather generator. Figure from Burton et al. (2010a).

S1.1.1. Initial treatment of input data

The input data has to be structured in a certain way for the WG to accept it; that is the WG only accepts input of time series text files at either the hourly or daily level, one data point at each line. Thus, the 60 observational time series available in 1-minute resolution was merged into time series with hourly data (clock hours).

The WG's build-in functionality (-a for analyze) was used to calculate the statistics for the observational time series:

- Mean daily precipitation
- Variation of the daily and hourly precipitation intensities
- Skewness of the daily and hourly precipitation intensities

- Probability of dry days and hours
- The auto-correlation between consecutive time-steps (the lag-1 auto-correlation)
- The cross-correlation of precipitation intensities at the hourly time step

S1.1.2. Estimating parameters for the WG

The statistics above are used along with the weights (w's) reported in Table 3 to estimate parameters for the WG (or fitting it following the terminology of Burton et al. (2010a)). The parameters describing the WG are given in Section 3.1.

All these parameters can be linked to the statistical properties of the time series through a set of equations derived by Cowpertwait (1995) and very well reported and explained by Cowpertwait (2006).

With the statistics given as $\mathbf{\Omega}$ and the WG parameters as $\mathbf{\Psi}$ the objective function becomes (after Burton et al. (2008), equation 5):

$$D(\mathbf{\Psi}) = \sum_{g \in \mathbf{\Omega}} \frac{w_g^2}{g_s^2} \left(\tilde{g} - \hat{g}(\mathbf{\Psi})\right)^2 \tag{S1}$$

where $\tilde{g}$ is the observed sample estimate of the statistics, $\hat{g}$ the expected mean value of the statistics arising from the Neyman-Scott process and w_g^2/g_s^2 the weighs scaled according to which statistic they belong to.

S1.1.3. Generating time series with the WG

The weather generator works in continuous time and space as illustrated in Figure S1 but for this study the output is generated as hourly time series on a regular 2 x 2 km spatial grid covering the model region (see Figure 1) giving 682 time series in every output point. This has been chosen as the spatial resolution to better be able to study the spatial behaviour of the WG. This also limits the length of the time series that can be generated as the total disk space allowed for the full output is 2 GB which corresponds to approximately 50 years of hourly output at the described grid. Also, the time it takes to write this output to disk, and the time it takes to process the data for the post analysis has limited the output data sets used to 10 for this study.

S1.1.4. Setting up the weather generator to reflect climate change

To change the parameters of the WG to reflect climate change sets of change factors for the input statistics, $\mathbf{\Omega}$**,** has been calculated based on time series from RCMs. This approach follows Burton et al. (2010b) who also discusses the applicability of it. Each set of change factors are based on two RCM runs, one for a future period forced as a possible future climate and one forced as present day conditions. The details on the RCMs used the emission scenarios the represent and the time periods used for future and present conditions are given in Table 2.

The WG's build-in functionality (-a for analyze) was used to calculate the statistics for the RCM time series to secure consistency. This meant that pointwise time series were derived for each relevant point in the RCMs used.

The change factors, $\alpha_{g,i}^{R}$, for each statistic, g, are calculated for each RCM, R, for each calendar month, i, as described by Burton et al. (2010b, equation 1-3) as:

$$\alpha_{g,i}^{R} = \frac{g_{future,i}^{R}}{g_{present,i}^{R}} \qquad \text{(S2)}$$

With the bounded statistics probability of dry day and hours (here denoted *PDD*) and the auto-correlation (AC) transformed to secure that the change is within their physical bounds:

$$X(PDD) = \frac{PDD}{1-PDD} \qquad \text{(S3)}$$

$$W(AC) = \frac{1+AC}{1-AC} \qquad \text{(S4)}$$

This results in a new set of statistics $\boldsymbol{\Omega_{future}}$ that goes into the objective function (S1) and result in a parameter set for the WG that enables it to generate time series that represent future climate.

S1.2. Results

S1.2.1. Tables with estimated parameters for present conditions

Table S1 parameter estimates for λ as shown on Figure 4 for the observational data (SVK) and for the re-fitted data (WG1-10).

λ^{-1}	SVK	WG1	WG2	WG3	WG4	WG5	WG6	WG7	WG8	WG9	WG10
January	0.01302	0.01330	0.01498	0.01396	0.01433	0.01040	0.01298	0.01150	0.00494	0.01399	0.01479
February	0.00311	0.00639	0.00635	0.00425	0.00614	0.00776	0.00909	0.00744	0.00601	0.00905	0.00363
March	0.00800	0.00863	0.00838	0.00889	0.00849	0.00865	0.00754	0.00972	0.00987	0.00876	0.00706
April	0.00534	0.00528	0.00486	0.00564	0.00467	0.00558	0.00526	0.00553	0.00184	0.00589	0.00556
May	0.00369	0.00343	0.00411	0.00379	0.00427	0.00501	0.00421	0.00390	0.00321	0.00425	0.00355
June	0.00496	0.00247	0.00530	0.00516	0.00419	0.00545	0.00304	0.00524	0.00583	0.00424	0.00483
July	0.00241	0.00256	0.00239	0.00346	0.00317	0.00323	0.00238	0.00273	0.00299	0.00237	0.00227
August	0.00431	0.00467	0.00431	0.00367	0.00460	0.00173	0.00406	0.00449	0.00520	0.00394	0.00423
September	0.00138	0.00186	0.00377	0.00228	0.00189	0.00123	0.00203	0.00161	0.00290	0.00415	0.00222
October	0.00253	0.00689	0.00180	0.00420	0.00194	0.00258	0.00242	0.00704	0.00493	0.00326	0.00735
November	0.01252	0.01404	0.01404	0.01367	0.01403	0.01260	0.01430	0.01494	0.01617	0.01085	0.01427
December	0.00673	0.01349	0.00600	0.00669	0.00818	0.01715	0.01677	0.01553	0.00782	0.01627	0.01402

Table S2 parameter estimates for β as shown on Figure 4 for the observational data (SVK) and for the re-fitted data (WG1-10).

β^{-1}	SVK	WG1	WG2	WG3	WG4	WG5	WG6	WG7	WG8	WG9	WG10
January	0.12926	0.19326	0.20597	0.12666	0.19542	0.06006	0.10744	0.02000	0.02063	0.25921	0.20368
February	0.02000	0.05995	0.17459	0.05659	0.05696	0.16694	0.16685	0.14836	0.10816	0.11009	0.02000
March	0.26160	0.23732	0.31519	0.24703	0.25634	0.09151	0.31869	0.30718	0.21401	0.29338	0.22662
April	0.14460	0.16793	0.21443	0.24707	0.16919	0.36419	0.09814	0.11082	0.02000	0.20551	0.15723
May	0.36423	0.37143	0.40133	0.35422	0.39885	0.35168	0.39883	0.31707	0.26161	0.34296	0.37104
June	0.15569	0.03736	0.19790	0.18893	0.17873	0.22867	0.04862	0.16932	0.16105	0.09710	0.13785
July	0.28271	0.27543	0.33413	0.17286	0.31382	0.16528	0.21841	0.30512	0.31807	0.28245	0.22614
August	0.26222	0.32375	0.34481	0.25464	0.30026	0.02000	0.29563	0.24258	0.26363	0.32693	0.27223
September	0.02000	0.04064	0.09488	0.03926	0.04079	0.02000	0.03410	0.02000	0.09008	0.13390	0.03595
October	0.02000	0.14681	0.02000	0.05254	0.02000	0.02000	0.02000	0.10305	0.11579	0.02000	0.14739
November	0.22144	0.24967	0.21826	0.27672	0.22493	0.26854	0.23389	0.20459	0.24352	0.28537	0.12711
December	0.02000	0.02000	0.02000	0.02000	0.04450	0.12276	0.14634	0.21099	0.02000	0.11899	0.28831

Table S3 parameter estimates for ρ as shown on Figure 4 for the observational data (SVK) and for the re-fitted data (WG1-10).

ρ^{-1}	SVK	WG1	WG2	WG3	WG4	WG5	WG6	WG7	WG8	WG9	WG10
January	0.00370	0.00618	0.00693	0.00307	0.00465	0.00363	0.00483	0.00163	0.00971	0.00639	0.00493
February	0.01146	0.00531	0.01193	0.00926	0.01346	0.01349	0.00778	0.00799	0.01260	0.00866	0.00414
March	0.03435	0.02508	0.03439	0.02311	0.02848	0.00667	0.08365	0.04152	0.01249	0.04499	0.04086
April	0.01157	0.01822	0.01930	0.02450	0.01149	0.07914	0.00858	0.00923	0.01231	0.02457	0.01498
May	0.23470	0.21657	0.33976	0.15222	0.41792	0.14772	0.40310	0.15279	0.03774	0.13494	0.39314
June	0.02376	0.02828	0.03379	0.03202	0.02564	0.04600	0.02783	0.03274	0.02636	0.02064	0.01330
July	0.14950	0.17557	0.31857	0.06534	0.14150	0.06134	0.07858	0.20170	0.28676	0.18341	0.06675
August	0.09344	0.16116	0.18352	0.10446	0.14480	0.05087	0.14060	0.10522	0.10613	0.21833	0.06468
September	0.03437	0.02211	0.01645	0.03457	0.02062	0.03284	0.01947	0.05247	0.02600	0.04129	0.03072
October	0.01580	0.01888	0.01793	0.01237	0.02436	0.01344	0.02735	0.01072	0.01078	0.01447	0.01434
November	0.01103	0.01114	0.01255	0.01794	0.01142	0.02162	0.00634	0.00668	0.00876	0.01230	0.00463
December	0.00272	0.00066	0.00348	0.00264	0.00288	0.00171	0.00194	0.00357	0.00175	0.00190	0.00386

Table S4 parameter estimates for η as shown on Figure 4 for the observational data (SVK) and for the re-fitted data (WG1-10).

η^{-1}	SVK	WG1	WG2	WG3	WG4	WG5	WG6	WG7	WG8	WG9	WG10
January	0.92830	1.02200	1.07631	0.88349	1.00515	0.80668	0.98951	0.61827	0.84228	1.10143	0.95512
February	0.88967	0.98431	1.19556	1.02480	1.14728	1.22784	0.99776	1.04167	1.22199	1.07698	0.64982
March	1.92438	1.82938	1.90471	1.75446	1.69872	1.18606	2.33448	1.93616	1.49919	2.19784	1.97384
April	1.23663	1.43805	1.31239	1.54710	1.16638	1.92355	1.06420	1.19253	0.89731	1.40733	1.26643
May	7.40311	11.99998	8.98552	5.35446	11.99983	4.70409	10.20450	5.56440	2.64089	4.51010	11.99992
June	2.13391	1.79619	2.65700	2.14676	2.20053	2.59951	1.74871	2.31182	2.24411	1.81119	1.80567
July	3.92201	4.54122	4.83739	2.75868	3.79104	2.58679	3.05385	4.04133	5.34975	3.86296	2.58657
August	3.95607	4.38064	5.24630	3.36549	5.23782	1.79857	4.52770	3.54866	4.22462	5.68291	3.75923
September	1.21630	1.21131	1.52805	1.40212	1.33305	0.88979	1.19080	1.14619	1.31939	1.69733	1.14020
October	1.01915	1.49826	0.97819	1.09480	1.02209	0.89875	1.00766	1.27766	1.24780	0.98171	1.40443
November	1.22986	1.35240	1.34166	1.40325	1.27173	1.54015	1.08681	1.14225	1.21430	1.23771	0.99642
December	0.57253	0.42605	0.57123	0.52963	0.57437	0.62234	0.68156	0.78759	0.53012	0.70213	0.75501

Table S5 parameter estimates for ξ as shown on Figure 4 for the observational data (SVK) and for the re-fitted data (WG1-10).

ξ^{-1}	SVK	WG1	WG2	WG3	WG4	WG5	WG6	WG7	WG8	WG9	WG10
January	0.64078	0.71296	0.81020	0.70844	0.73254	0.72882	0.69286	0.55858	0.68563	0.75875	0.78238
February	0.52393	0.51543	0.41504	0.41798	0.63859	0.57347	0.57753	0.56164	0.45748	0.59383	0.42305
March	0.51229	0.45828	0.48356	0.49380	0.50049	0.43751	0.48066	0.56733	0.50181	0.47127	0.41444
April	0.36122	0.29378	0.34995	0.31800	0.29525	0.38836	0.30943	0.30719	0.26170	0.33204	0.37773
May	0.11537	0.04890	0.08108	0.09592	0.06494	0.13384	0.07519	0.09728	0.10171	0.11984	0.05484
June	0.20413	0.15206	0.16239	0.17247	0.13882	0.17896	0.17145	0.18776	0.18379	0.16181	0.16143
July	0.08973	0.05394	0.05412	0.08447	0.06678	0.08169	0.05905	0.06761	0.06035	0.05722	0.05908
August	0.13371	0.10681	0.09023	0.09170	0.09617	0.14368	0.09155	0.11213	0.10396	0.07706	0.09505
September	0.26667	0.19134	0.19774	0.21670	0.19489	0.25269	0.23985	0.32456	0.18485	0.23773	0.24702
October	0.47190	0.46060	0.35393	0.34435	0.41749	0.42897	0.50301	0.42401	0.34979	0.47646	0.43850
November	0.80476	0.79266	0.90207	0.78600	0.82689	0.82272	0.67609	0.75110	0.87531	0.71421	0.74789
December	0.76139	0.61273	0.84598	0.67101	0.85273	0.83959	0.91781	0.86569	0.63078	0.70279	0.76307

Table S6 parameter estimates for γ as shown on Figure 4 for the observational data (SVK) and for the re-fitted data (WG1-10).

γ^{-1}	SVK	WG1	WG2	WG3	WG4	WG5	WG6	WG7	WG8	WG9	WG10
January	0.06288	0.07466	0.07720	0.05857	0.06784	0.05604	0.06736	0.05279	0.06407	0.07408	0.06979
February	0.06183	0.05706	0.08869	0.06689	0.07468	0.08776	0.07879	0.07446	0.08324	0.07719	0.05333
March	0.12451	0.11462	0.12760	0.10900	0.12029	0.07311	0.16920	0.13533	0.09024	0.13876	0.13224
April	0.08978	0.10639	0.10136	0.11994	0.08886	0.17796	0.08229	0.08400	0.06807	0.12453	0.09292
May	0.27018	0.25470	0.30882	0.23369	0.33572	0.23579	0.33246	0.22995	0.14504	0.22435	0.32227
June	0.12984	0.11043	0.14663	0.14775	0.13524	0.16419	0.11681	0.14020	0.13583	0.12014	0.10647
July	0.28615	0.29433	0.37770	0.21022	0.29054	0.20721	0.22406	0.31420	0.35881	0.31133	0.22580
August	0.22627	0.28025	0.28883	0.25132	0.25619	0.12598	0.25862	0.24102	0.24386	0.31944	0.19260
September	0.09398	0.09573	0.10091	0.11037	0.08581	0.09490	0.08266	0.10620	0.12116	0.14401	0.10760
October	0.06812	0.09874	0.07041	0.08391	0.07506	0.06985	0.08176	0.08251	0.08131	0.07118	0.09198
November	0.08508	0.08496	0.08487	0.10554	0.08678	0.10333	0.07967	0.07615	0.08179	0.08899	0.06586
December	0.04553	0.04130	0.04620	0.05043	0.04816	0.05255	0.05093	0.06449	0.04619	0.05597	0.07057

S1.2.2. Tables with change factors

Table S7 Change factors for the 24 hour mean for the six climate change scenarios as reported in Figure 10.

24 hour mean	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	1.23553	1.30388	1.02567	1.06084	1.12765	1.23538
February	1.11245	1.10416	0.97759	1.06651	1.10797	1.14306
March	1.25228	1.18568	1.11590	1.02920	1.08328	1.09460
April	1.26755	1.33504	0.85133	1.05316	1.06490	1.15468
May	1.30449	1.25087	1.04735	1.09183	1.06892	1.07679
June	1.06680	0.96221	1.14612	1.32866	0.80427	1.02819
July	1.27999	1.00026	1.12312	1.15539	0.98412	1.05558
August	1.15927	0.87629	0.95690	0.95979	1.04933	0.86372
September	1.07528	1.09315	1.06110	0.97085	1.02966	1.11342
October	1.13907	1.12644	1.05515	0.86584	1.40159	1.48525
November	1.33973	1.30811	0.98924	1.01706	1.03710	1.27082
December	1.20484	1.24938	1.04879	1.13112	1.09381	1.26071

Table S8 Change factors for the 24 hour variance for the six climate change scenarios as reported in Figure 10.

24 hour variance	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	1.50144	1.52475	0.98131	1.13559	1.27757	1.56943
February	1.30543	1.31600	1.09434	1.16314	1.21944	1.56812
March	1.47334	1.47019	1.41286	1.22827	1.06285	1.30565
April	1.40934	1.78456	0.88681	1.45401	1.09275	1.40061
May	1.37147	1.42441	1.10468	1.64129	1.38100	1.47399
June	1.36021	1.51175	1.56499	2.20074	0.94288	1.41727
July	1.63430	1.31130	2.08154	2.86417	1.31464	1.91927
August	1.58494	1.34014	1.30655	1.51431	1.65118	1.37813
September	1.25310	1.26592	1.20112	1.62834	1.20286	1.40696
October	1.48234	1.43906	1.45359	1.43251	1.46242	1.89362
November	1.50361	1.43881	0.97390	1.10512	1.07280	1.42910
December	1.35331	1.73331	1.16080	1.29154	1.11931	1.51390

Table S9 Change factors for the 24 hour skewness for the six climate change scenarios as reported in Figure 10.

24 hour skewness	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.99142	0.84140	0.93685	1.07968	1.09407	1.09003
February	0.91310	1.03779	1.09084	1.00477	0.84723	1.11371
March	0.91927	1.05708	1.19057	1.03103	0.91741	1.10513
April	0.94424	0.99764	1.16754	1.19511	1.04205	1.09465
May	0.95870	0.85805	0.98985	1.42405	1.23482	1.31259
June	1.20069	1.50512	1.29540	1.41142	1.24548	1.26800
July	0.99944	1.33472	1.41164	1.61773	1.05677	1.39496
August	1.14266	1.81091	1.35492	1.52285	1.44715	1.42466
September	1.15609	1.00201	1.08477	1.44635	1.09522	1.13455
October	1.28567	1.08069	1.38150	1.53367	0.83646	0.95204
November	0.79038	0.86134	0.86639	0.90689	0.83202	0.91098
December	0.92404	1.09938	0.99146	0.80017	1.00433	0.99929

Table S10 Change factors for the 1 hour variance for the six climate change scenarios as reported in Figure 10.

1 hour variance	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	1.45481	1.62029	0.98102	1.19482	1.20730	1.49446
February	1.20815	1.18774	1.05779	1.22923	1.20132	1.38732
March	1.41098	1.43374	1.32300	1.29879	1.20352	1.35586
April	1.37850	1.56979	0.84667	1.39576	1.14422	1.56379
May	1.46607	1.54308	1.23446	1.82475	1.89132	2.03428
June	1.32314	1.39871	1.50368	3.06052	1.09647	1.92270
July	1.71752	1.50786	2.22923	3.60512	1.43831	1.96226
August	1.59110	1.28307	1.43392	2.16220	1.53735	1.59682
September	1.32132	1.21700	1.33425	2.14812	1.41269	1.86565
October	1.42613	1.41610	1.31692	1.46708	1.52533	2.13487
November	1.66899	1.53753	1.10637	1.21986	1.11627	1.62402
December	1.28540	1.56312	1.12538	1.35307	1.17963	1.50691

Table S11 Change factors for the 1 hour skewness for the six climate change scenarios as reported in Figure 10.

1 hour skewness	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.94751	0.91704	0.97498	1.05759	1.01138	1.03403
February	0.90788	0.90832	1.03527	1.09020	0.96536	1.02183
March	0.87467	0.96080	1.04267	1.24555	1.06845	1.15137
April	0.94980	0.95594	1.17408	1.57158	1.14544	1.23819
May	1.12316	1.01743	1.20464	1.72648	1.75039	1.87867
June	1.24977	1.37040	1.25046	1.67922	1.42530	1.55005
July	1.25484	1.57894	1.47388	1.74784	1.17367	1.27505
August	1.36711	1.75725	1.29488	2.00374	1.26096	1.57177
September	1.29795	1.03654	1.22417	1.85997	1.37124	1.44856
October	1.04387	1.08944	1.23211	1.89645	0.97153	1.23196
November	1.01756	0.93508	1.08237	1.16484	1.12331	1.18021
December	0.92301	0.96640	1.00494	0.99472	0.97327	0.98467

Table S12 Change factors for the lag-1 auto-correlation for the six climate change scenarios as reported in Figure 10.

lag-1 auto-correlation	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	1.02872	0.91301	0.91352	0.93224	0.93332	0.91662
February	1.09834	1.09376	0.96309	0.89008	1.06247	1.07327
March	1.18586	1.07865	0.94293	0.89870	0.90251	0.91005
April	1.00374	1.31779	1.05914	1.01495	0.83425	0.76030
May	0.94624	0.89057	0.92295	0.85670	0.69671	0.70949
June	1.04799	1.14945	1.03826	0.79513	0.91104	0.79572
July	1.09740	0.97665	0.94476	0.81728	0.94403	0.99747
August	0.98586	1.00757	0.98239	0.76123	1.00779	0.91500
September	0.85808	0.93328	0.98090	0.76155	0.79861	0.77871
October	1.01448	0.91033	0.99147	0.83331	0.82275	0.74061
November	0.96197	0.99896	0.95087	0.94921	0.84858	0.79617
December	1.11004	1.11706	1.03458	0.95916	0.92669	0.91142

Table S13 Change factors for the probability of dry days for the six climate change scenarios as reported in Figure 10.

Probability of dry days	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.81959	0.82460	0.93661	0.96179	0.90669	0.89907
February	1.01172	1.00942	1.15178	1.00596	0.99078	1.05763
March	0.84054	0.97246	0.98344	1.12789	0.89592	1.01757
April	0.76380	0.91973	1.21165	1.20060	0.96006	0.94551
May	0.66365	0.94083	0.96052	0.99802	1.04899	1.04324
June	1.06950	1.26073	0.93925	0.82516	1.41065	1.10425
July	0.79649	1.23068	1.18080	1.30380	1.32271	1.29028
August	0.99644	1.31603	1.13442	1.20088	1.22037	1.75701
September	0.99091	1.08769	0.95674	1.32391	1.07702	1.08782
October	0.94102	1.06649	1.08776	1.63545	0.65500	0.69348
November	0.72594	0.76928	1.08552	1.10950	1.03194	0.75676
December	0.77919	0.90595	1.04593	1.02771	0.92582	0.86615

Table S14 Change factors for the probability of dry hours for the six climate change scenarios as reported in Figure 10.

Probability of dry hours	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.83184	0.83829	0.92326	0.98566	0.90984	0.87146
February	0.95000	0.98539	1.09732	0.99672	0.94948	0.98494
March	0.83256	0.95434	0.97605	1.09202	0.97607	1.03381
April	0.79246	0.83815	1.12922	1.06891	0.96089	0.99221
May	0.73436	0.89447	0.98120	1.00293	1.10196	1.10855
June	1.01341	1.19447	0.93487	0.91750	1.31153	1.13891
July	0.81582	1.21161	1.12743	1.26076	1.28493	1.28294
August	0.94646	1.25228	1.17933	1.20261	1.16141	1.61613
September	0.97736	1.01681	0.99810	1.33951	1.09782	1.10872
October	1.00658	1.04474	1.05084	1.44645	0.67796	0.72866
November	0.79100	0.79974	1.07563	1.07174	0.99650	0.82702
December	0.82661	0.87772	0.99069	0.98478	0.96012	0.86620

S1.2.3. Tables with estimated parameters for future conditions

Table S15 parameter estimates for λ for the six runs representing climate change.

λ^{-1}	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.01497	0.01482	0.00979	0.00458	0.00451	0.00423
February	0.00841	0.00328	0.00213	0.00268	0.00856	0.00254
March	0.00897	0.00895	0.00515	0.00561	0.00840	0.00708
April	0.00598	0.00444	0.00364	0.00190	0.00402	0.00336
May	0.00399	0.00494	0.00374	0.00203	0.00353	0.00314
June	0.00295	0.00240	0.00300	0.00376	0.00298	0.00358
July	0.00182	0.00119	0.00126	0.00133	0.00179	0.00178
August	0.00260	0.00137	0.00352	0.00227	0.00195	0.00202
September	0.00144	0.00134	0.00323	0.00176	0.00256	0.00302
October	0.00436	0.00172	0.00131	0.00191	0.00328	0.00507
November	0.01064	0.01825	0.01038	0.00965	0.01007	0.01564
December	0.03032	0.04125	0.01813	0.01454	0.01271	0.01326

Table S16 parameter estimates for β for the six runs representing climate change.

β^{-1}	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.10228	0.12588	0.06688	0.02000	0.02000	0.02000
February	0.11752	0.02000	0.02000	0.02000	0.21277	0.02000
March	0.37778	0.23049	0.05813	0.39455	0.37975	0.22917
April	0.13606	0.45043	0.19231	0.40096	0.09786	0.07063
May	0.42351	0.41444	0.46009	0.39174	0.39745	0.42700
June	0.22465	0.12926	0.11463	0.28447	0.30036	0.33708
July	0.38427	0.40893	0.31017	0.32497	0.39976	0.15983
August	0.33388	0.19607	0.19969	0.47681	0.06328	0.39460
September	0.03928	0.02498	0.13210	0.11980	0.11750	0.12441
October	0.02000	0.02000	0.02000	0.11513	0.02000	0.05434
November	0.03443	0.34711	0.46317	0.49466	0.40919	0.33801
December	0.49999	0.42535	0.12649	0.20448	0.02000	0.02000

Table S17 parameter estimates for ρ for the six runs representing climate change.

ρ^{-1}	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.00277	0.00509	0.00532	0.00660	0.00680	0.00747
February	0.00835	0.00998	0.01756	0.01418	0.01779	0.01172
March	0.08949	0.01638	0.01094	0.19014	0.07372	0.02077
April	0.01098	0.09798	0.01802	0.70012	0.01247	0.01148
May	0.15163	0.13340	0.14095	0.07322	0.01933	0.01984
June	0.04753	0.01854	0.01919	0.01307	0.04431	0.02540
July	0.31685	0.26921	0.13829	0.05098	0.42805	0.03377
August	0.17808	0.06106	0.02610	0.05638	0.03260	0.16514
September	0.02895	0.04284	0.01710	0.01553	0.02349	0.01432
October	0.00410	0.02534	0.01801	0.01769	0.01768	0.00908
November	0.00000	0.01191	0.16003	0.14928	0.19668	0.01027
December	0.00106	0.00040	0.00123	0.00431	0.00134	0.00129

Table S18 parameter estimates for η for the six runs representing climate change.

η^{-1}	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.81707	1.19646	1.10633	0.94527	0.90228	0.95818
February	0.84178	0.67766	0.96566	1.15210	1.14480	0.74061
March	1.42037	1.32760	1.35332	5.34072	3.29063	2.09810
April	1.22086	0.79275	1.22642	4.55953	1.70957	1.85088
May	12.00000	12.00000	12.00000	11.99998	11.99999	12.00000
June	2.55280	1.56822	1.86203	3.04200	3.41964	3.79788
July	12.00000	11.99999	4.57787	4.10830	11.99974	2.33939
August	11.99988	3.30778	2.61570	12.00000	2.19402	7.96626
September	1.72250	1.46658	1.49843	2.22514	2.27677	2.12326
October	0.67764	1.26209	0.92040	2.00840	1.47884	1.84352
November	0.80103	1.29071	2.61043	2.51444	5.58099	2.15387
December	0.45321	0.38695	0.55351	0.87549	0.62230	0.65224

Table S19 parameter estimates for ξ for the six runs representing climate change.

ξ^{-1}	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.70567	0.72094	0.65789	0.54865	0.58377	0.55984
February	0.68097	0.60651	0.48035	0.43672	0.68561	0.51355
March	0.76417	0.49717	0.37466	0.23446	0.36911	0.33417
April	0.35207	0.61847	0.26704	0.17908	0.23422	0.18889
May	0.04979	0.05064	0.04069	0.02243	0.01952	0.01778
June	0.12375	0.10651	0.12504	0.06254	0.07768	0.06201
July	0.02028	0.01303	0.02599	0.01774	0.01825	0.03814
August	0.03032	0.04649	0.06944	0.01374	0.07767	0.02781
September	0.14781	0.20635	0.17000	0.06817	0.12345	0.10942
October	0.35665	0.35725	0.31269	0.14741	0.44124	0.29137
November	3.99984	0.92296	0.78794	0.71965	0.46955	0.52784
December	1.08418	0.87816	0.81522	0.88719	0.70956	0.68841

Table S20 parameter estimates for γ for the six runs representing climate change.

γ^{-1}	HIRHAM SRES A1B	RACMO SRES A1B	HIRHAM RCP 4.5	HIRHAM RCP 8.5	WRF RCP 4.5	WRF RCP 8.5
January	0.05908	0.06440	0.05964	0.05413	0.05448	0.05475
February	0.07726	0.06235	0.06480	0.06208	0.09943	0.06303
March	0.19130	0.10378	0.07343	0.21550	0.16264	0.10420
April	0.08796	0.22357	0.10532	0.33779	0.08206	0.07634
May	0.23924	0.22801	0.23914	0.18479	0.12717	0.12996
June	0.16203	0.12317	0.11951	0.12489	0.16578	0.14680
July	0.37208	0.35926	0.28328	0.21801	0.41511	0.17774
August	0.27631	0.19074	0.16022	0.21653	0.13892	0.28649
September	0.09778	0.09841	0.11049	0.10292	0.11054	0.10249
October	0.06180	0.07115	0.06983	0.08592	0.06705	0.06858
November	0.04931	0.09447	0.20614	0.20574	0.20020	0.08551
December	0.05701	0.04906	0.04997	0.06315	0.04350	0.04330

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