Geophysical Research Letters

Supporting Information for

Enhanced summer convection explains observed trends in extreme subdaily precipitation in the northeastern Italian Alps

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Code	Name	X [m]	Y [m]	Quote [m a.s.l]	# years
T0010	Levico (Terme)	678457	5097800	502	28
T0014	Telve (Pontarso)	692750	5109940	925	28
T0015	Bieno	697716	5106240	843	29
T0024	Passo Cereda	724970	5119950	1322	30
T0030	Canal San Bovo	711191	5114300	750	28
T0032	Lavarone (Chiesa)	674697	5089880	1155	29
T0071	Mezzana	638273	5130430	905	30
T0074	Male'	647602	5134900	720	27
T0082	Passo Mendola	668239	5142950	1315	29
T0092	Pian Fedaia (Diga)	719834	5149030	2063	29
T0096	Moena (Diga Pezze')	704896	5140120	1205	30
T0103	Passo Rolle	714648	5130920	2012	29
T0104	Passo Valles	715465	5135460	2032	29
T0115	Segonzano (Gresta)	676612	5120060	660	28
T0118	Cembra	671193	5115370	652	27
T0139	Sant'Orsola Terme	677921	5108520	925	30
T0146	Aldeno (San Zeno)	662021	5092620	182	29
T0147	Rovereto	658565	5084560	203	29
T0148	Terragnolo (Piazza)	666927	5082920	800	28
T0151	Mori (Loppio)	649939	5079790	230	28
T0153	Ala (Ronchi)	660682	5067140	692	28
T0177	Val di Breguzzo (Ponte Arno')	626962	5098910	1148	27
T0179	Tione	633926	5100070	533	30
T0182	Montagne (Larzana)	635493	5102100	955	28
T0189	Santa Massenza (Centrale)	653156	5103200	252	29
T0193	Torbole (Belvedere)	645707	5081330	90	29
T0203	Forte D'Ampola	627788	5080240	740	27
T0210	Folgaria	667845	5086920	1121	28
T0212	Spormaggiore	657859	5120520	555	28
T0236	Romeno	662908	5139640	958	30

Table S1. Rain gauge stations. Coordinates X and Y are in WGS 84/UTM zone 32N Reference System.

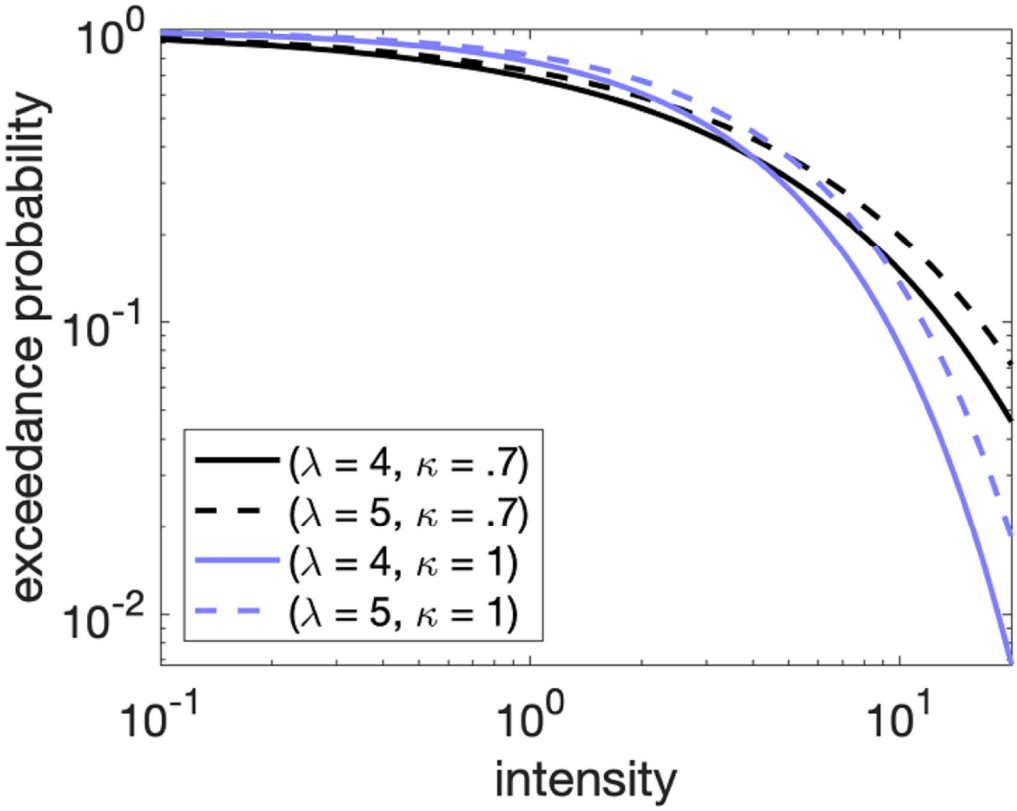

Figure S1. Exceedance probability of Weibull distributions with different scale ($\boldsymbol{\lambda}$) and shape ($\boldsymbol{\kappa}$) parameters. Blue lines show the case with exponential tail $\boldsymbol{\kappa = 1}$; black lines show a case with heavier tail ($\boldsymbol{\kappa = 0.7}$). Dashed lines show higher scale parameters ($\boldsymbol{\lambda = 5}$) while solid lines show lower scale parameters ($\boldsymbol{\lambda = 4}$).

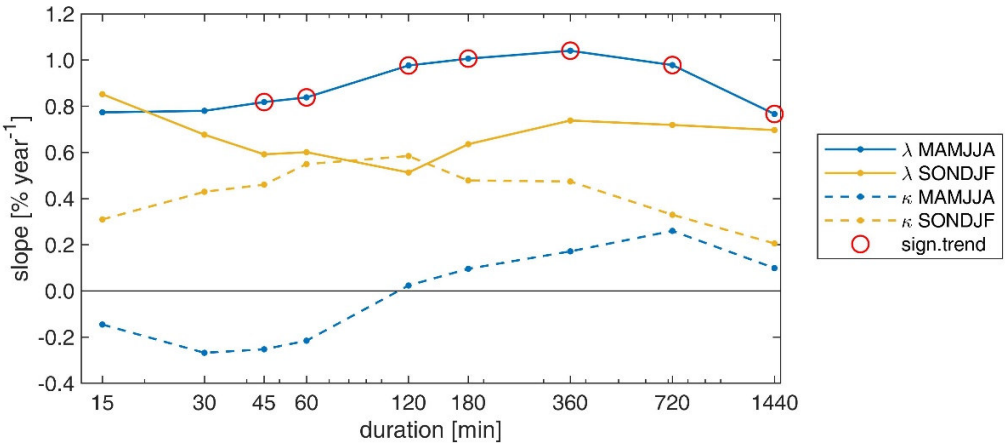

Figure S2. Scale $\boldsymbol{\lambda}$ and shape $\boldsymbol{\kappa}$ trend slopes for two seasons. The trend analysis on the distribution parameters is here performed to evaluate their changes for the different seasons. Because of the low sample size, this analysis is performed by dividing the annual events in two "seasons", aggregating MAM with JJA and SON with DJF. For all the seasons and durations, the scale parameter increases, with significant trends in MMA-JJA. This resembles the behavior of the whole-year parameters reported in Figure 2 in the main manuscript. Interestingly, the shape parameter shows positive trends (decreasing tail heaviness) in SON-DJF, and opposing trends at short and long durations in MMA-JJA. Decreasing trends are observed for durations ≤ 2 h and increasing trends for durations ≥ 3 h (increasing and decreasing tail heaviness, respectively). The overall decreasing trend at short durations, that was observed for the whole-year and that dominates the overall response of annual maxima, is thus imputable to the period MMA-JJA.