Supplementary Information for

Future intensification of compound and cascading drought and heatwave risks in Europe

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Introduction
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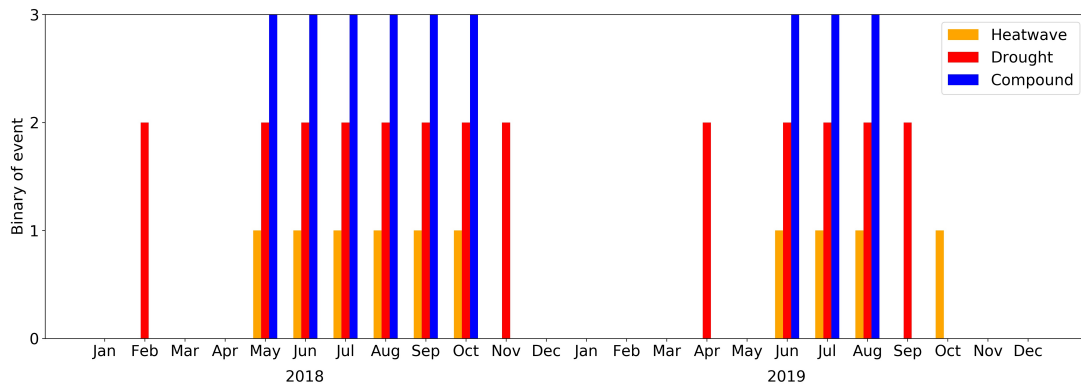
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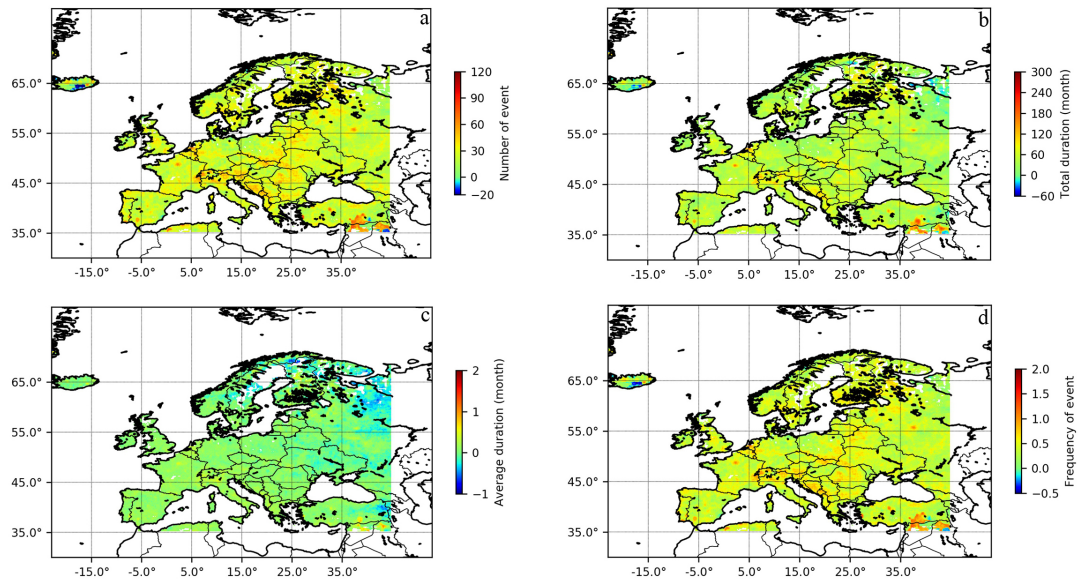
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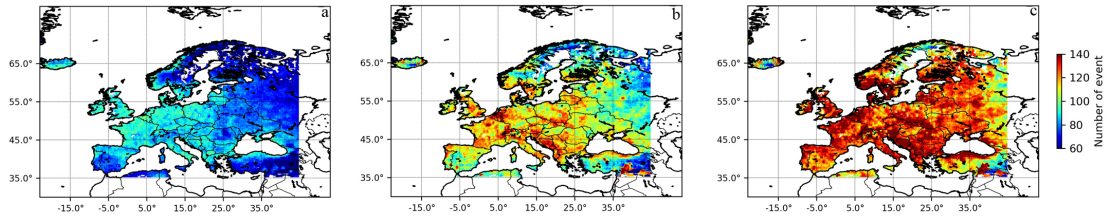
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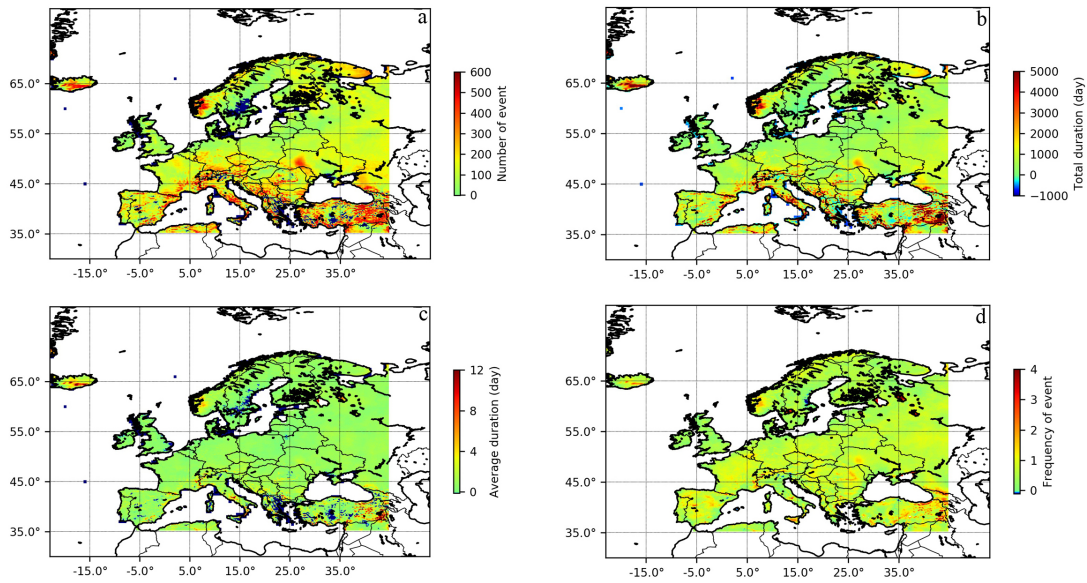
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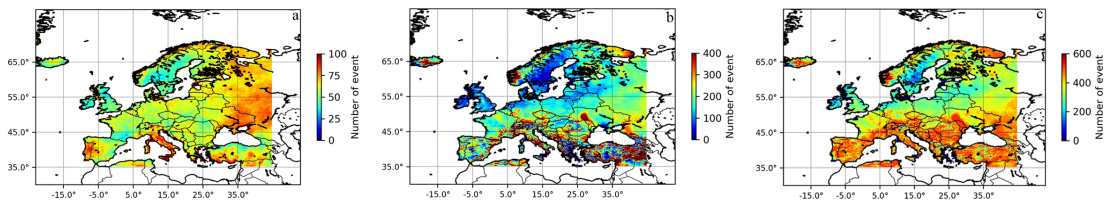
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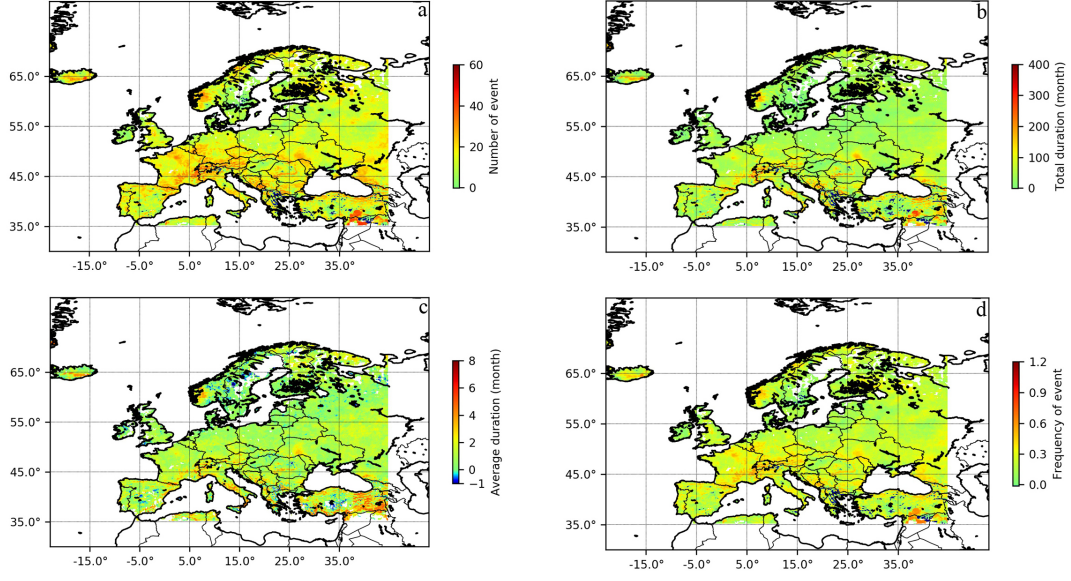
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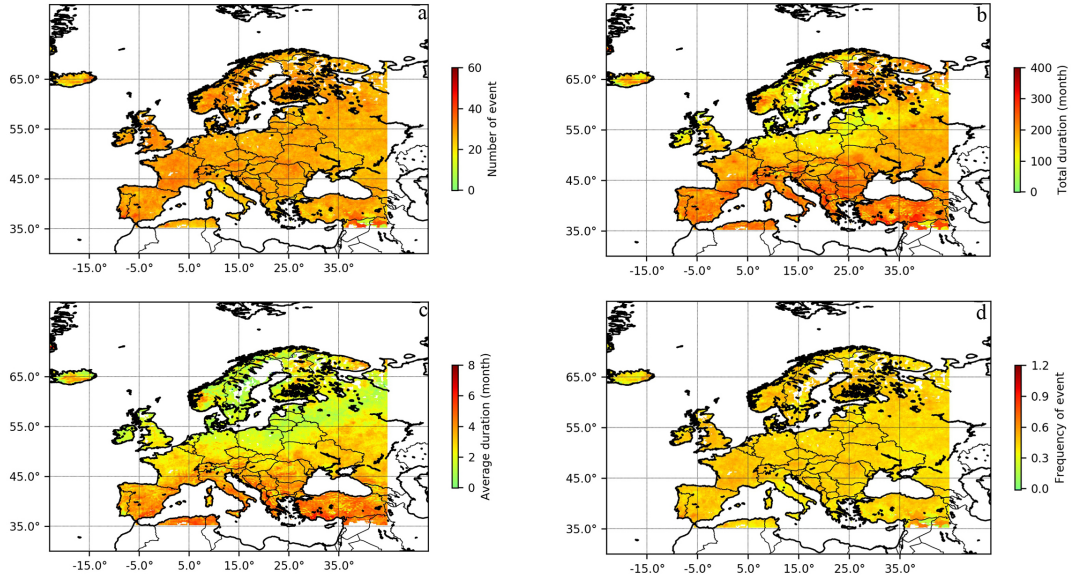
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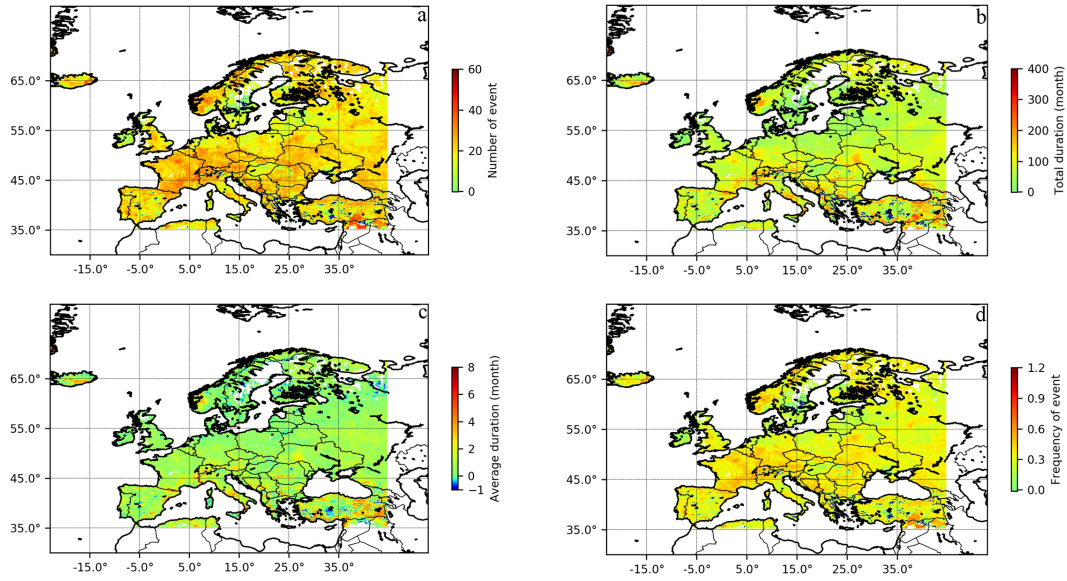
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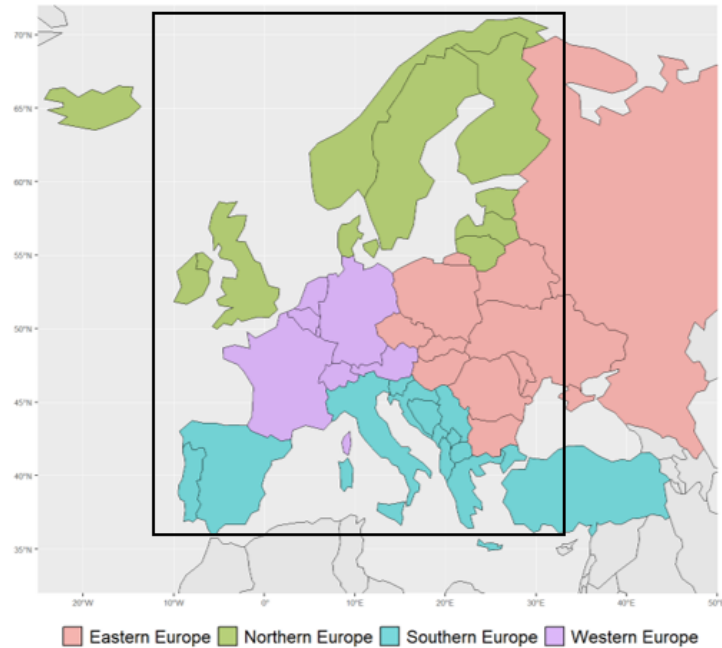
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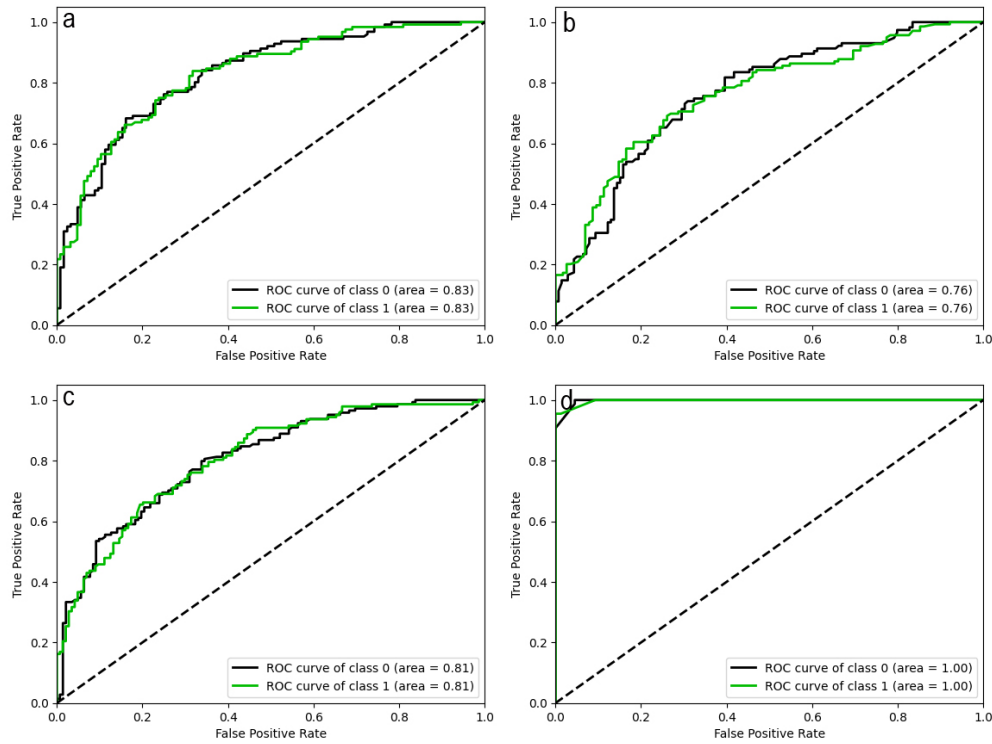
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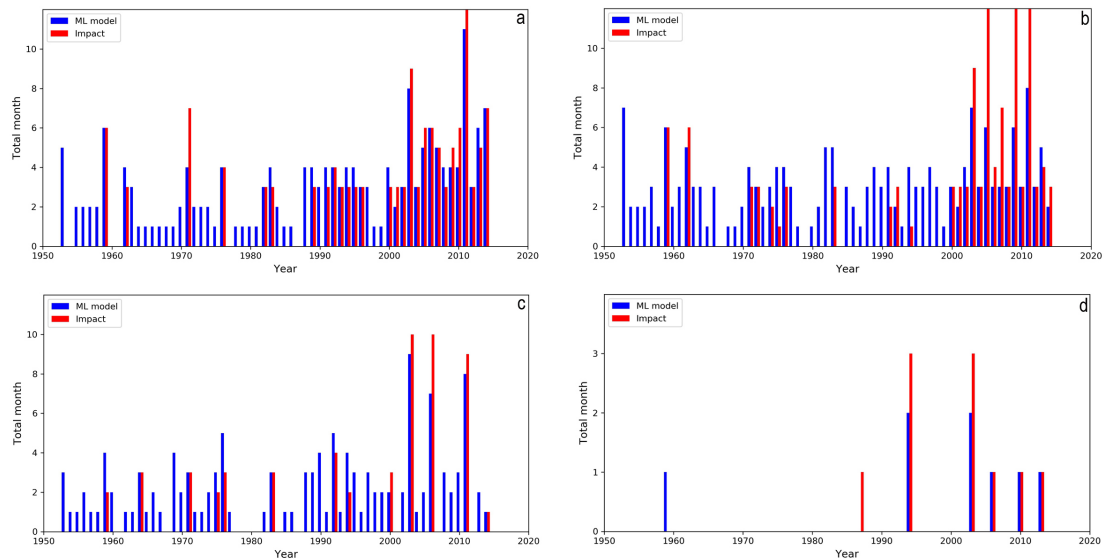
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Supplementary Table

Table S1. Data and models used in the study

Variable	Unit	Time scale	Spatial resolution	Model	Period
Maximum near-surface temperature (Tmax)	K	Daily	ISIMIP: 0.5° x 0.5° ERA5 Land: 0.1° x 0.1°	ISIMIP (GFDL, IPSL, MPI, MRI, UKESM), ERA5 Land	ISIMIP: Extended summer period from 1953 to 2014 and from 2015 to 2100 ERA5 Land: 1953-2019
Minimum near-surface temperature (Tmin)	K	Daily	ISIMIP: 0.5° x 0.5° ERA5 Land: 0.1° x 0.1°	ISIMIP (GFDL, IPSL, MPI, MRI, UKESM), ERA5 Land	ISIMIP: Extended summer period from 1953 to 2014 and from 2015 to 2100 ERA5 Land: 1953-2019
Moisture in the upper portion of the soil column (SM)	Kg m^{-2}	Monthly	ISIMIP: 0.5° x 0.5° ERA5 Land: 0.1° x 0.1°	ISIMIP (CWatM), ERA5 Land	ISIMIP: from 1953 to 2014 and from 2015 to 2100 ERA5 Land: 1953-2019

Table S2. Definition of drought and heatwave characteristics as singly and CnC

	Total number of events	Total duration of events	Average duration of events	Frequency of events
Heatwave	Total number of heatwaves in the considered period	Total number of heatwave days during the analyzed period	Division of total heatwave duration by the total number of heatwave events	Frequency of heatwave events in a year, which is the total number of heatwave events divided by total years
Drought	Total number of drought events in the considered period	Total number of drought months during the analyzed period	Division of total drought events duration by the total number of drought events	Frequency of drought events in a year, which is the total number of drought events divided by total years
CnC	Total number of compound/cascading events in the considered period	Total number of compound/cascading months during the analyzed period	Division of total compound/cascading events duration by the total number of events	Frequency of compound/cascading events in a year, which is the total number of compound/cascading events divided by total years

Table S3. The characteristics of drought and heatwave impacts on economic, non-economic, ecosystem, and human sectors derived from reference period and future scenarios

Impact sector	Scenario	Characteristics			
		Total number of impact	Total duration	Average duration	Frequency
Drought					
Economic	Reference	36	128	3.5	2.1
	SSPI1.2-6	65	216	3.3	3.5
	SSP5-8.5	66	248	3.8	4
Non-economic	Reference	45	126	2.8	2
	SSPI1.2-6	54	183	3.4	2.9
	SSP5-8.5	65	224	3.5	3.6
Ecosystem	Reference	24	75	3.1	1.2
	SSPI1.2-6	57	165	2.9	2.7
	SSP5-8.5	66	209	3.2	3.4
Heatwave					
Human	Reference	7	8	1.1	0.2
	SSPI1.2-6	63	96	1.5	1.5
	SSP5-8.5	71	203	2.9	3.3