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### **Supplemental Material**

#### **Heatwave and mortality: a multi-country multi-community study**

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Table S1: Summary of the study periods, number of deaths, and annual average number of heatwaves in 400 communities in 18 countries/regions. HW1: 90<sup>th</sup> percentile with  $\geq 2$  duration days; HW2: 90<sup>th</sup> percentile with  $\geq 3$  duration days; HW3: 90<sup>th</sup> percentile with  $\geq 4$  duration days; HW4: 92.5<sup>th</sup> percentile with  $\geq 2$  duration days; HW5: 92.5<sup>th</sup> percentile with  $\geq 3$  duration days; HW6: 92.5<sup>th</sup> percentile with  $\geq 4$  duration days; HW7: 95<sup>th</sup> percentile with  $\geq 2$  duration days; HW8: 95<sup>th</sup> percentile with  $\geq 3$  duration days; HW9: 95<sup>th</sup> percentile with  $\geq 4$  duration days; HW10: 97.5<sup>th</sup> percentile with  $\geq 2$  duration days; HW11: 97.5<sup>th</sup> percentile with  $\geq 3$  duration days; HW12: 97.5<sup>th</sup> percentile with  $\geq 4$  duration days.

Community	Period	Number of death	Heatwave type											
			HW 1	HW 2	HW 3	HW 4	HW 5	HW6	HW7	HW 8	HW 9	HW1 0	HW1 1	HW1 2
MELBOURNE, AUSTRALIA	1988-2009	140400	23	15	9	16	9	6	10	5	2	6	2	1
SYDNEY, AUSTRALIA	1988-2009	161899	25	20	15	16	11	7	10	6	3	4	2	1
BRISBANE, AUSTRALIA	1988-2009	59685	29	23	19	21	16	13	14	10	8	5	3	2
PORTO ALEGRE, BRAZIL	1997-2011	66822	27	21	17	19	14	11	13	9	7	6	3	2
CURITIBA, BRAZIL	1997-2011	47278	24	17	14	17	11	9	9	6	4	4	3	2
SAP PAULO, BRAZIL	1997-2011	288006	23	17	15	16	11	8	10	8	6	5	3	2
VITORIA, BRAZIL	1997-2011	17165	27	23	20	20	16	15	14	11	10	6	4	3
BELO HORIZONTE, BRAZIL	1997-2011	155502	19	16	14	14	12	8	8	7	4	4	3	2
GOIANIA, BRAZIL	1997-2011	44611	23	20	17	18	15	13	13	10	8	6	4	3
BRASILIA, BRAZIL	1997-2011	37087	24	21	19	19	16	13	13	11	8	6	4	3
CUIABA, BRAZIL	1997-2011	16659	19	13	8	14	9	6	9	6	4	4	2	1
SALVADOR, BRAZIL	1997-2011	73998	28	22	17	21	17	14	13	11	9	7	5	4
MACEIO, BRAZIL	1997-2011	30648	18	13	11	13	9	7	9	6	5	4	2	1
RECIFE, BRAZIL	1997-2011	85922	26	19	16	18	14	12	12	10	9	6	5	4
JOAO PESSOA, BRAZIL	1997-	23282	24	20	17	17	15	12	12	10	8	6	5	4

	2011													
NATAL, BRAZIL	1997-2011	26323	27	21	17	19	14	11	13	9	7	6	3	2
TERESINA, BRAZIL	1997-2011	21556	28	24	22	21	18	15	13	10	8	5	3	2
FORTALEZA, BRAZIL	1997-2011	65341	17	12	9	11	7	5	6	4	2	1	1	0
MANAUS, BRAZIL	1997-2011	31989	26	24	20	21	19	15	14	11	8	7	5	3
SAO LUIS, BRAZIL	1997-2011	26123	19	16	12	13	10	7	7	5	4	2	1	1
BELEM, BRAZIL	1997-2011	42837	17	13	9	12	8	6	8	6	5	4	4	3
ABBOTSFORD, CANADA	1986-2011	8572	32	26	22	23	18	14	15	12	9	7	5	3
CALGARY, CANADA	1986-2011	42293	30	24	20	22	17	14	14	11	8	6	4	2
EDMONTON, CANADA	1986-2011	49262	31	26	23	22	18	15	14	11	9	7	4	3
HALIFAX, CANADA	1986-2011	22407	32	27	24	23	18	15	15	11	9	7	5	3
HAMILTON, CANADA	1986-2011	35884	31	26	22	23	19	14	15	12	10	7	4	3
KINGSTON, CANADA	1986-2011	12362	30	26	23	24	19	15	14	11	8	6	4	3
KITCHENER-WATERLOO, CANADA	1986-2011	22176	28	24	20	21	17	13	13	10	9	6	4	3
LONDON ONTARIO, CANADA	1986-2011	30429	30	26	22	22	18	15	15	12	10	6	5	4
MONTREAL, CANADA	1986-2009	79813	31	27	23	22	19	16	15	12	9	7	4	3
NIAGARA, CANADA	1986-2011	30931	32	27	23	23	19	15	14	12	10	7	4	3
OAKVILLE, CANADA	1986-2011	18543	30	25	21	22	17	14	14	11	8	7	5	3
OSHAWA, CANADA	1986-2011	22707	31	26	22	22	18	14	14	11	8	6	4	3
OTTAWA, CANADA	1986-2011	43017	31	27	22	22	19	15	15	12	9	7	4	2
REGINA, CANADA	1986-2011	15797	29	23	19	21	16	12	13	8	6	6	4	2
SARNIA, CANADA	1986-	8874	29	25	21	21	18	14	15	12	9	7	4	2

	2011													
SUDBURY, CANADA	1986-2011	13079	31	27	23	23	19	16	15	12	9	7	5	4
SAINT JOHN NB, CANADA	1986-2011	13676	31	24	20	21	16	12	13	9	7	6	4	2
ST. JOHN'S NFL, CANADA	1986-2011	17001	30	24	20	22	17	14	14	10	7	6	4	3
SAULT STE. MARIE, CANADA	1986-2011	9327	31	25	22	22	18	16	15	11	9	7	5	2
SASKATOON, CANADA	1986-2011	18102	29	24	19	21	16	12	13	9	7	6	4	2
THUNDER BAY, CANADA	1986-2011	11437	29	24	19	22	16	12	13	9	6	6	3	2
TORONTO, CANADA	1986-2011	215163	32	28	23	23	18	15	14	12	9	7	6	4
VICTORIA, CANADA	1986-2011	26457	30	25	21	22	17	12	14	10	7	7	5	3
VANCOUVER, CANADA	1986-2011	103396	33	29	25	24	19	15	15	12	9	7	5	3
WINDSOR, CANADA	1986-2011	20264	30	26	21	22	19	15	15	11	8	7	5	3
WINNIPEG, CANADA	1986-2011	53136	30	24	19	21	16	12	14	10	6	6	4	2
HONG KONG, CHINA	2002-2009	89337	54	49	44	54	49	44	21	15	12	21	15	12
GUANGZHOU, CHINA	2005-2007	10033	32	29	24	25	23	19	17	15	12	7	4	3
WUHAN, CHINA	2004-2008	5998	33	30	26	25	22	18	17	15	10	8	6	5
SHANGHAI, CHINA	2005-2007	22743	34	30	27	26	22	18	16	14	10	8	5	2
TIANJIN, CHINA	2005-2007	19409	35	26	22	24	19	16	14	10	8	7	5	4
BEIJING, CHINA	2005-2007	25183	33	29	21	25	19	11	14	8	6	6	5	4
BOGOTA, COLOMBIA	1998-2013	124605	14	9	6	9	6	4	6	4	2	2	1	1
BARRANQUILLA, COLOMBIA	1998-2013	28656	14	9	5	7	5	2	5	3	1	2	1	0
CALI, COLOMBIA	1998-2013	47457	11	8	6	8	5	3	5	3	2	3	1	1
CARTAGENA, COLOMBIA	1998-	16166	19	12	8	15	9	5	10	6	2	5	2	1

	2013													
MEDELLIN, COLOMBIA	1998-2013	50852	16	12	8	12	8	5	6	3	2	3	1	1
MASHHAD, IRAN	2004-2013	40824	34	31	27	25	22	16	18	15	12	8	6	4
WEST, NORTHERN IRELAND	1984-2007	39306	31	26	22	23	18	15	15	12	8	8	6	4
EAST, NORTHERN IRELAND	1984-2007	65690	31	25	21	23	19	15	15	12	9	7	5	4
NORTHEAST, REPUBLIC OF IRELAND	1984-2007	33862	30	25	22	22	18	16	14	11	9	7	5	4
SOUTHWEST, REPUBLIC OF IRELAND	1984-2007	81484	31	28	24	23	19	17	15	12	10	7	6	5
NORTHWEST, REPUBLIC OF IRELAND	1984-2007	22464	31	27	23	22	18	16	15	11	8	6	5	3
SOUTHEAST, REPUBLIC OF IRELAND	1984-2007	73846	30	24	21	23	17	14	14	10	7	6	4	3
PALERMO, ITALY	1997-2001	8009	30	25	23	21	17	16	13	11	8	6	4	2
BARI, ITALY	1996-2007	9487	31	27	24	22	18	15	14	11	8	6	4	3
LATINA, ITALY	1995-2006	2532	34	33	31	25	24	23	17	16	14	8	7	6
FROSINONE, ITALY	1995-2006	996	33	30	29	24	22	20	16	13	12	8	6	5
ROMA, ITALY	1987-2010	159066	35	33	30	26	24	23	17	15	14	8	6	5
VITERBO, ITALY	1995-2006	1898	35	34	31	25	23	21	16	15	13	8	6	5
GENOVA, ITALY	1999-2007	21779	33	30	27	24	22	19	14	13	11	7	6	5
BOLOGNA, ITALY	1996-2010	17787	32	29	27	24	20	19	15	13	10	7	5	4
TORINO, ITALY	1991-1999	20441	34	32	28	24	22	17	15	13	10	7	6	4
BRESCIA, ITALY	1993-2003	6813	34	30	28	25	22	18	15	13	11	7	6	5
AICHI, JAPAN	1972-2012	467918	35	33	30	26	24	21	18	15	13	8	6	5
AKITA, JAPAN	1972-2012	126294	34	31	30	26	24	21	17	15	14	8	7	6
AOMORI, JAPAN	1972-	141127	35	32	29	25	23	21	17	14	13	8	6	5

	2012													
CHIBA, JAPAN	1972-2012	369536	35	33	30	25	22	19	17	15	13	8	6	5
EHIME, JAPAN	1972-2012	148563	35	33	30	25	23	21	16	14	12	8	6	5
FUKUSHIMA, JAPAN	1972-2012	195153	35	31	29	25	23	20	17	14	12	8	6	5
FUKUI, JAPAN	1972-2012	74642	34	32	29	26	23	21	16	14	12	8	7	5
FUKUOKA, JAPAN	1972-2012	402377	34	31	29	26	23	21	17	15	12	7	6	5
GIFU, JAPAN	1972-2012	171340	35	33	29	26	23	20	17	14	12	9	7	5
GUNMA, JAPAN	1972-2012	168499	34	31	28	25	22	19	17	13	11	8	6	5
HOKKAIDO, JAPAN	1972-2012	479712	35	32	30	26	24	22	17	15	13	8	6	6
HIROSHIMA, JAPAN	1972-2012	244198	35	33	30	26	24	22	17	16	14	9	8	7
HYOGO, JAPAN	1972-2012	442187	36	34	32	26	23	22	18	15	13	9	7	7
IBARAKI, JAPAN	1972-2012	232953	34	30	27	25	22	19	16	14	11	7	5	4
ISHIKAWA, JAPAN	1972-2012	102457	34	32	29	26	23	21	17	14	12	8	6	5
IWATE, JAPAN	1972-2012	133664	34	32	30	26	23	21	17	15	14	8	7	6
KAGAWA, JAPAN	1972-2012	97113	35	32	30	26	23	22	16	15	13	8	7	6
KANAGAWA, JAPAN	1972-2012	504261	34	31	28	26	23	20	16	14	12	8	6	4
KAGOSHIMA, JAPAN	1972-2012	189598	34	31	28	25	22	19	17	14	12	8	6	5
KOCHI, JAPAN	1972-2012	91372	34	31	29	26	23	21	16	13	12	8	7	6
KUMAMOTO, JAPAN	1972-2012	173796	36	33	30	26	23	21	16	14	12	8	6	5
KYOTO, JAPAN	1972-2012	217675	36	33	30	25	23	20	17	14	13	8	6	5
MIE, JAPAN	1972-2012	160694	36	33	29	26	24	22	16	13	12	8	7	5
MIYAGI, JAPAN	1972-	175850	34	31	29	25	22	20	16	14	12	7	6	5



	2012													
MIYAZAKI, JAPAN	1972-2012	106365	33	29	25	26	22	18	16	13	11	7	6	4
NAGANO, JAPAN	1972-2012	203609	35	32	29	26	24	21	17	14	12	8	6	5
NAGASAKI, JAPAN	1972-2012	150753	34	32	30	26	24	22	17	16	14	9	7	6
NARA, JAPAN	1972-2012	108660	34	31	28	26	23	21	18	15	13	8	6	5
NIIGATA, JAPAN	1972-2012	232181	35	33	30	26	23	21	16	14	13	8	6	5
OITA, JAPAN	1972-2012	122626	34	31	28	24	21	19	16	14	12	7	5	4
OKAYAMA, JAPAN	1972-2012	179087	35	33	31	26	25	23	17	15	13	8	7	7
OKINAWA, JAPAN	1973-2012	80349	33	30	28	29	26	24	18	16	15	10	8	7
OSAKA, JAPAN	1972-2012	648975	35	33	30	25	23	21	17	15	13	8	6	5
SAGA, JAPAN	1972-2012	85154	34	32	30	27	25	23	17	15	13	8	6	5
SAITAMA, JAPAN	1972-2012	402072	35	31	29	26	22	20	16	14	12	8	6	5
SHIGA, JAPAN	1972-2012	97398	36	34	32	26	23	21	16	14	13	8	7	6
SHIMANE, JAPAN	1972-2012	84635	36	33	31	26	24	22	17	15	14	8	6	4
SHIZUOKA, JAPAN	1972-2012	289420	33	29	26	24	21	18	16	13	10	7	5	3
TOKUSHIMA, JAPAN	1972-2012	85970	35	32	30	25	22	20	17	15	13	8	7	6
TOCHIGI, JAPAN	1972-2012	162919	34	31	28	26	23	20	17	14	12	8	6	5
TOKYO, JAPAN	1972-2012	878865	34	31	28	26	22	19	16	14	11	8	6	5
TOTTORI, JAPAN	1972-2012	62032	34	32	30	26	23	20	16	14	11	8	6	5
TOYAMA, JAPAN	1972-2012	106444	34	31	29	25	22	19	16	13	11	7	6	4
WAKAYAMA, JAPAN	1972-2012	111229	35	32	30	26	23	20	18	16	14	7	5	3
YAMAGATA, JAPAN	1972-	127750	35	32	30	26	23	21	17	15	13	8	7	6

	2012													
YAMAGUCHI, JAPAN	1972-2012	159778	36	33	31	26	24	22	17	15	13	8	7	6
YAMANASHI, JAPAN	1972-2012	78156	35	33	30	25	23	20	16	14	12	7	6	5
GWANGJU, KOREA	1992-2010	29141	34	32	30	26	24	23	17	14	13	7	6	5
BUSAN, KOREA	1992-2010	93483	35	33	31	26	24	23	17	16	14	8	7	6
ULSAN, KOREA	1992-2010	14906	25	23	21	19	17	16	12	10	9	6	4	3
DAEGU, KOREA	1992-2010	56425	34	30	28	25	23	20	17	15	13	8	6	6
DAEJEON, KOREA	1992-2010	27575	33	31	30	26	24	22	17	15	14	8	6	5
INCHEON, KOREA	1992-2010	52896	34	29	28	25	23	21	17	15	13	8	6	6
SEOUL, KOREA	1992-2010	197995	33	29	26	25	21	20	16	14	13	8	7	6
CAHUL, MOLDOVA	2003-2010	834	34	30	26	25	22	20	16	14	11	8	8	5
CHISINAU, MOLDOVA	2001-2010	17309	33	29	25	24	20	16	16	14	12	8	7	6
ANENII NOI, MOLDOVA	2003-2010	240	33	29	26	24	20	16	14	12	10	8	7	6
FALESTI, MOLDOVA	2003-2010	445	34	29	25	24	18	16	16	12	11	8	7	6
CEBU, PHILIPPINES	2006-2010	14984	25	22	18	21	18	14	11	9	8	7	6	6
DAVAO, PHILIPPINES	2006-2010	14907	16	12	9	15	11	7	7	5	4	4	2	2
MANILA, PHILIPPINES	2006-2010	30590	28	24	23	23	20	18	15	12	10	7	5	4
QUEZON, PHILIPPINES	2006-2010	30436	26	22	21	21	17	14	15	12	11	7	6	4
PALMAS G. CANARIA, SPAIN	1990-2010	27039	29	24	20	23	18	14	13	9	6	6	4	3
TENERIFE, SPAIN	1990-2010	16326	29	26	21	22	18	14	14	10	8	7	5	4
MELILLA, SPAIN	1990-2010	2738	34	30	27	24	20	17	14	11	8	6	3	2
CEUTA, SPAIN	1990-	3069	11	9	7	8	6	4	5	3	3	2	1	0

	2010													
CÁDIZ, SPAIN	1990-2010	12588	31	26	22	23	19	16	15	12	9	8	5	4
MÁLAGA, SPAIN	1990-2010	35549	32	26	20	21	16	12	13	9	5	6	3	2
ALMERÍA, SPAIN	1990-2010	12709	32	26	21	23	18	13	14	10	7	7	4	3
GRANADA, SPAIN	1990-2010	23194	35	32	29	26	22	18	17	14	10	8	7	4
HUELVA, SPAIN	1990-2010	13142	33	28	25	24	19	16	16	12	10	7	5	4
SEVILLA, SPAIN	1990-2010	52635	35	31	27	25	22	19	17	14	11	8	5	5
JAÉN, SPAIN	1990-2010	11011	35	32	27	27	24	19	17	14	11	7	6	5
CÓRDOBA, SPAIN	1990-2010	21505	35	32	29	26	23	21	17	14	12	8	5	4
MURCIA, SPAIN	1990-2010	23245	34	30	27	24	20	17	14	11	8	6	3	2
ALICANTE, SPAIN	1990-2010	15634	33	29	26	23	19	17	15	12	9	7	5	2
BADAJOS, SPAIN	1990-2010	11335	34	32	25	25	22	16	16	13	11	8	5	4
ALBACETE, SPAIN	1990-2010	10495	35	30	27	25	21	18	17	13	11	7	6	3
CIUDAD REAL, SPAIN	1990-2010	6933	35	33	29	26	23	20	17	14	11	7	5	3
CÁCERES, SPAIN	1990-2010	11104	34	32	28	27	23	18	17	13	10	8	6	4
VALENCIA, SPAIN	1990-2010	63467	33	30	28	25	21	18	14	11	9	6	4	3
PALMA MALLORCA, SPAIN	1990-2010	25347	34	29	25	22	18	15	15	12	8	6	4	2
TOLEDO, SPAIN	1990-2010	9639	35	32	29	27	24	21	18	15	11	7	5	3
CASTELLÓN, SPAIN	1990-2010	12557	34	31	28	24	21	19	15	12	10	6	5	4
CUENCA, SPAIN	1990-2010	5159	36	32	29	25	23	20	16	14	9	8	5	3
TERUEL, SPAIN	1990-2010	3844	35	31	27	26	22	18	16	12	8	7	5	2
MADRID, SPAIN	1990-	171996	36	33	29	26	22	20	17	14	10	8	5	4

	2010													
GUADALAJARA, SPAIN	1990-2010	6275	29	27	23	21	18	16	14	12	9	6	4	3
AVILA, SPAIN	1990-2010	6736	34	31	27	26	21	18	16	12	10	8	5	3
SALAMANCA, SPAIN	1990-2010	13985	34	31	27	25	21	17	16	12	10	8	5	4
SEGOVIA, SPAIN	1990-2010	5424	34	30	25	25	21	16	16	12	9	7	4	3
TARRAGONA, SPAIN	1990-2010	8439	36	32	30	25	22	20	15	12	9	7	4	3
BARCELONA, SPAIN	1990-2010	110440	34	32	30	26	23	22	17	16	14	8	6	5
ZAMORA, SPAIN	1990-2010	6435	33	30	25	25	22	17	16	13	10	7	5	3
LLEIDA, SPAIN	1990-2010	11309	35	32	29	25	21	17	16	13	10	7	5	3
VALLADOLID, SPAIN	1990-2010	20582	34	31	26	25	21	17	16	12	11	7	5	3
ZARAGOZA, SPAIN	1990-2010	43127	33	30	26	25	21	18	15	12	9	7	5	3
SORIA, SPAIN	1990-2010	4055	34	32	28	25	22	20	16	13	11	7	4	3
GIRONA, SPAIN	1990-2010	9619	34	30	28	24	21	19	16	14	11	7	6	4
HUESCA, SPAIN	1990-2010	4824	32	27	24	24	19	16	15	12	9	7	5	3
BURGOS, SPAIN	1990-2010	13026	33	30	26	25	22	18	16	11	8	7	4	3
OURENSE, SPAIN	1990-2010	11763	33	29	25	23	20	16	15	12	9	7	6	5
PONTEVEDRA, SPAIN	1990-2010	9707	31	27	21	22	18	13	15	12	8	7	4	3
LOGROÑO, SPAIN	1990-2010	10081	33	29	24	24	20	16	16	11	9	7	4	2
LEÓN, SPAIN	1990-2010	13663	33	30	24	25	22	17	16	11	8	7	4	3
PAMPLONA, SPAIN	1990-2010	17661	32	27	21	25	20	15	15	10	7	7	5	3
VITORIA, SPAIN	1990-2010	11721	31	25	19	23	18	12	15	10	6	7	4	3
LUGO, SPAIN	1990-	10413	30	25	19	22	17	12	13	8	6	6	3	2

	2010													
BILBAO, SPAIN	1990-2010	24210	27	22	16	21	15	11	11	8	6	5	3	2
SAN SEBASTIÁN, SPAIN	1990-2010	20326	27	21	16	19	14	10	12	8	5	5	3	2
OVIEDO, SPAIN	1990-2010	21508	29	23	19	21	16	12	12	8	5	6	4	2
A CORUÑA, SPAIN	1990-2010	18713	28	22	17	21	17	12	13	10	7	5	4	2
SANTANDER, SPAIN	1990-2010	17796	31	25	22	20	16	12	13	8	5	5	3	2
KAOHSIUNG, TAIWAN	1994-2007	60822	36	32	30	24	21	19	18	15	13	10	9	7
TAIPEI, TAIWAN	1994-2007	112364	34	29	27	26	22	18	16	14	12	7	6	4
TAICHUNG, TAIWAN	1994-2007	45116	34	29	26	24	20	16	16	12	10	8	6	4
NARATHIWAT, THAILAND	1999-2008	5068	26	21	18	23	18	14	14	10	7	5	4	3
YALA, THAILAND	1999-2008	3575	11	9	7	9	6	5	5	3	3	3	2	1
PATTANI, THAILAND	1999-2008	4006	25	20	18	20	16	14	13	10	8	6	4	3
SONGKHLA, THAILAND	1999-2008	11280	22	18	14	16	13	10	10	8	5	4	3	3
TRANG, THAILAND	1999-2008	4495	27	24	21	20	17	14	14	12	9	6	6	4
KRABI, THAILAND	1999-2008	2462	20	17	15	14	12	11	10	8	6	4	2	2
NAKHON SI THAMMARAT, THAILAND	1999-2008	13085	11	8	7	8	6	5	4	3	2	2	2	1
SURAT THANI, THAILAND	1999-2008	7687	25	21	20	21	17	15	12	10	8	6	5	3
CHUMPHON, THAILAND	1999-2008	4209	31	29	27	24	21	18	16	14	12	8	7	4
PRACHUAP KHIRI KHAN, THAILAND	1999-2008	4906	26	21	16	17	14	8	14	11	7	6	4	3
CHANTHABURI, THAILAND	1999-2008	7443	25	20	16	18	13	11	11	9	7	7	6	4
RAYONG, THAILAND	1999-2008	6189	34	33	32	26	24	22	17	15	14	8	7	6
PHETCHABURI, THAILAND	1999-	4743	31	26	23	23	20	16	16	14	11	7	5	4

	2008													
CHON BURI, THAILAND	1999-2008	16072	20	16	13	16	11	9	9	7	5	5	4	3
SAMUTPRAKAN, THAILAND	1999-2008	10063	26	22	18	19	16	12	14	11	8	6	5	2
RATCHABURI, THAILAND	1999-2008	9918	32	30	28	25	22	20	17	15	14	7	6	6
SAMUT SAKHON, THAILAND	1999-2008	5155	16	10	8	16	10	8	9	6	3	5	4	2
CHACHOENSAO, THAILAND	1999-2008	6948	26	24	20	19	17	14	14	12	9	6	5	4
BANGKOK, THAILAND	1999-2008	81210	30	27	23	22	18	13	14	12	9	7	5	4
SA KAE0, THAILAND	1999-2008	4684	27	23	20	19	19	16	14	12	10	7	6	4
NONTHABURI, THAILAND	1999-2008	10489	31	28	25	24	21	19	16	15	14	8	6	4
NAKHON PATHOM, THAILAND	1999-2008	8492	33	30	27	25	22	20	17	13	10	8	7	6
KANCHANABURI, THAILAND	1999-2008	7249	29	25	23	23	20	19	15	14	13	8	7	5
PATHUM THANI, THAILAND	1999-2008	7398	23	21	18	20	17	14	12	10	8	7	5	5
PRACHIN BURI, THAILAND	1999-2008	4935	22	18	17	16	14	12	11	9	7	5	4	4
AYUTTHAYA, THAILAND	1999-2008	8173	30	27	25	24	21	20	15	14	12	8	6	4
SUPHANBURI, THAILAND	1999-2008	8073	27	23	22	24	21	19	15	14	12	7	6	5
SARABURI, THAILAND	1999-2008	7652	35	31	29	28	25	23	16	14	12	8	6	4
LOP BURI, THAILAND	1999-2008	9947	20	15	11	15	10	8	9	6	4	3	2	1
SURIN, THAILAND	1999-2008	10238	30	26	23	23	20	15	16	13	10	8	6	5
NAKHON RATCHASIMA, THAILAND	1999-2008	25182	29	26	22	23	19	17	16	14	12	7	6	4
BURI RAM, THAILAND	1999-2008	10646	12	11	10	10	10	9	6	5	5	3	3	2
SI SA KET, THAILAND	1999-2008	12043	30	25	22	24	20	17	15	13	10	7	6	4
UBON RATCHATHANI, THAILAND	1999-	16204	30	28	24	24	20	18	15	12	10	8	7	5

	2008													
NAKHON SAWAN, THAILAND	1999-2008	12885	33	30	28	26	24	22	17	15	14	8	7	5
YASOTHON, THAILAND	1999-2008	5233	25	21	19	19	16	15	14	11	10	7	6	5
CHAIYAPHUM, THAILAND	1999-2008	9470	32	27	25	23	19	16	17	15	11	7	6	3
AMNAT CHAROEN, THAILAND	1999-2008	3447	20	16	13	16	12	9	11	7	6	5	2	0
ROI ET, THAILAND	1999-2008	13239	23	19	16	18	14	13	12	10	7	5	5	3
MAHA SAKHAM, THAILAND	1999-2008	8452	28	24	20	22	19	15	15	12	9	7	6	5
PHETCHABUN, THAILAND	1999-2008	8941	6	4	3	4	3	2	3	2	2	2	1	1
KALASIN, THAILAND	1999-2008	10235	26	22	20	17	14	11	12	10	9	6	5	5
KHON KAEN, THAILAND	1999-2008	20322	30	27	23	23	19	16	15	12	10	7	6	5
PHICHIT, THAILAND	1999-2008	5148	30	28	24	23	20	19	16	14	12	8	7	6
MUKDAHAN, THAILAND	1999-2008	2496	31	27	24	25	22	20	15	13	12	8	6	4
KAMPHAENG PHET, THAILAND	1999-2008	4551	23	20	15	17	14	11	12	10	8	6	5	4
PHITSANULOK, THAILAND	1999-2008	10489	30	26	25	22	19	17	15	13	12	8	7	4
TAK, THAILAND	1999-2008	3925	24	22	18	18	14	12	14	11	9	5	3	3
SUKHOTHAI, THAILAND	1999-2008	6057	30	26	22	23	19	17	15	13	11	8	7	6
SAKON NAKHON, THAILAND	1999-2008	10656	22	20	16	17	14	12	11	9	7	6	4	3
NONG BUA LAM PHU, THAILAND	1999-2008	4236	31	29	27	24	22	19	18	15	13	8	6	5
NAKHON PHANOM, THAILAND	1999-2008	5384	26	21	16	18	13	9	14	10	6	6	4	3
UDON THANI, THAILAND	1999-2008	15321	25	23	20	20	17	14	14	12	10	6	5	4
UTTARADIT, THAILAND	1999-2008	6835	31	28	23	24	20	16	15	12	9	8	6	4
NONG KHAI, THAILAND	1999-	6945	30	27	23	22	19	16	17	14	12	8	6	4

	2008													
PHRAE, THAILAND	1999-2008	7548	30	26	22	22	18	16	15	13	11	8	7	5
LAMPANG, THAILAND	1999-2008	12937	33	30	28	24	22	22	17	14	11	8	6	5
LAMPHUN, THAILAND	1999-2008	5461	27	24	22	22	20	20	15	14	12	8	6	6
NAN, THAILAND	1999-2008	6419	29	28	25	23	20	18	16	14	13	9	8	6
CHIANG MAI, THAILAND	1999-2008	26170	20	18	16	15	14	12	11	9	8	6	4	4
PHAYAO, THAILAND	1999-2008	8185	34	31	28	26	24	21	16	15	12	8	6	5
CHIANG RAI, THAILAND	1999-2008	18526	24	19	15	19	14	10	13	10	7	6	4	2
EAST, UK	1990-2012	349071	31	27	22	23	20	16	15	11	9	7	5	4
EAST MIDLANDS, UK	1990-2012	281307	30	25	22	22	19	16	14	11	9	7	6	4
LONDON, UK	1990-2012	384191	31	26	23	22	19	16	15	12	10	7	5	4
NORTH EAST, UK	1990-2012	190551	30	25	21	22	18	16	14	11	9	7	5	3
NORTH WEST, UK	1990-2012	495075	30	26	23	22	19	17	15	12	9	7	6	4
SOUTH EAST, UK	1990-2012	526489	31	27	23	23	20	16	15	12	10	8	6	4
SOUTH WEST, UK	1990-2012	360927	31	27	24	23	19	17	15	12	9	7	6	5
WALES, UK	1990-2012	219114	31	27	24	23	20	16	15	13	11	7	6	5
WEST MIDLANDS, UK	1990-2012	356808	29	25	22	22	18	16	15	12	10	7	6	4
YORKSHIRE & HUMBER, UK	1990-2012	349510	31	27	23	23	20	17	15	12	9	7	5	4
AKRON, OH, USA	1985-2006	33295	33	29	25	25	21	19	17	14	11	7	5	3
ALBUQUERQUE, NM, USA	1985-2006	22151	37	33	29	24	22	19	17	14	11	8	6	5
ALLENTOWN-BETHLEHEM, PA, USA	1985-2006	18616	33	27	23	23	19	16	16	13	10	8	6	5
ATLANTA, GA, USA	1985-	96303	36	32	29	25	22	19	18	16	14	9	7	5



	2006													
ATLANTIC CITY, NJ, USA	1985-2006	15199	32	27	20	23	17	14	14	10	6	7	4	3
AUSTIN, TX, USA	1985-2006	21831	39	36	34	28	25	23	17	16	14	8	7	5
BAKERSFIELD, CA, USA	1985-2006	27716	33	30	25	26	22	19	17	15	12	8	7	6
BALTIMORE, MD, USA	1985-2006	99401	33	28	21	23	18	15	17	13	11	8	5	4
BARNSTABLE-YARMOUTH, MA, USA	1985-2006	16153	32	27	22	25	21	16	16	13	9	6	4	2
BERGEN-PASSAIC, NJ, USA	1985-2006	73212	34	29	22	24	18	14	17	13	9	7	4	3
BIRMINGHAM, AL, USA	1985-2006	53165	35	32	28	25	21	20	16	14	12	10	8	6
BOSTON, MA, USA	1985-2006	145615	31	25	20	23	17	11	15	10	6	7	5	3
BATON ROUGE, LA, USA	1985-2006	19473	36	32	28	28	25	22	16	13	10	8	6	4
BROWNSVILLE, TX, USA	1985-2006	10965	32	28	24	32	28	24	15	12	10	9	7	5
BUFFALO, NY, USA	1985-2006	65843	33	28	24	23	19	16	15	12	10	7	5	4
CANTON-MASSILLON, OH, USA	1985-2006	23766	33	29	25	25	21	19	17	14	11	7	5	3
CHARLESTON, WV, USA	1985-2006	15363	34	30	26	26	22	19	16	13	11	9	7	5
CHARLOTTE, NC, USA	1985-2006	25311	34	30	26	25	21	18	18	15	12	9	7	5
CHATTANOOGA, TN, USA	1985-2006	18913	37	34	30	27	24	21	18	15	14	10	8	7
CHICAGO, IL, USA	1985-2006	349050	29	23	19	24	19	15	15	13	9	8	6	4
CINCINNATI, OH, USA	1985-2006	53094	33	29	26	22	18	15	16	13	11	7	6	5
CLEVELAND, OH, USA	1985-2006	125455	31	26	21	22	18	15	16	12	10	6	4	3
COLUMBIA, SC, USA	1985-2006	23635	36	31	28	26	23	20	18	15	12	10	7	5
COLUMBUS, OH, USA	1985-2006	49586	32	28	24	23	19	16	15	12	10	7	6	4
DALLAS, TX, USA	1985-	81635	37	34	31	27	24	22	19	18	16	8	7	6

	2006													
DAYTONA BEACH, FL, USA	1985-2006	33248	36	30	25	26	21	18	19	15	11	9	6	4
DAYTON, OH, USA	1985-2006	33728	31	27	23	25	21	18	17	14	11	8	6	5
DENVER, CO, USA	1985-2006	56583	33	28	23	23	19	15	15	10	7	7	3	3
DES MOINES, IA, USA	1985-2006	16899	33	29	24	25	20	16	16	12	10	7	5	4
DETROIT, MI, USA	1985-2006	229193	31	27	23	22	19	16	16	14	11	8	5	5
DUTCHESS COUNTY, NY, USA	1985-2006	13143	31	26	21	21	16	13	14	10	8	7	5	4
EL PASO, TX, USA	1985-2006	22366	31	28	24	24	20	18	17	15	12	8	6	5
ERIE, PA, USA	1985-2006	16916	31	25	20	22	17	14	15	11	8	7	4	2
FLINT, MI, USA	1985-2006	23674	30	25	22	24	20	15	14	11	8	7	4	3
FRESNO, CA, USA	1985-2006	31852	35	32	28	26	23	20	18	15	12	9	7	6
FT. LAUDERDALE, FL, USA	1985-2006	97450	31	24	19	22	16	12	14	10	7	6	3	2
FORT MYERS-CAPE CORAL, FL, USA	1985-2006	27339	32	25	21	20	15	11	12	8	5	6	4	2
FORT PIERCE-PORT ST. LUCIE, FL, USA	1985-2006	20681	39	32	26	27	22	18	19	14	11	6	3	2
FORT WORTH-ARLINGTON, TX, USA	1985-2006	53579	20	18	16	16	14	13	10	9	9	5	5	3
GALVESTON, TX, USA	1985-2006	12921	28	25	20	22	18	14	10	8	7	6	5	3
GARY, IN, USA	1985-2006	28345	30	26	21	24	20	16	16	12	9	7	5	4
GRAND RAPIDS, MI, USA	1985-2006	24572	31	27	23	22	19	16	16	12	10	8	6	4
GREENSBORO, NC, USA	1985-2006	20318	34	29	25	25	22	17	18	14	10	8	6	4
GREENVILLE, SC, USA	1985-2006	17982	37	34	30	27	25	22	16	14	12	8	6	5
HAMILTON, OH, USA	1985-2006	15447	33	29	26	22	18	15	16	13	11	7	6	5
HARRISBURG-CARLISLE, PA, USA	1985-	15600	23	21	18	17	14	11	11	10	8	5	4	3

	2006													
HARTFORD, CT, USA	1985-2006	48290	32	26	23	24	19	15	16	13	10	8	6	3
HONOLULU, HI, USA	1985-2006	24364	35	31	26	23	19	16	13	10	8	7	5	3
HOUSTON, TX, USA	1985-2006	115796	31	26	22	24	20	17	19	15	13	9	8	6
INDIANAPOLIS, IN, USA	1985-2006	46853	35	30	28	25	21	18	15	12	10	7	6	4
JACKSONVILLE, FL, USA	1985-2006	38724	36	31	28	28	23	20	16	13	11	9	6	4
JERSEY CITY, NJ, USA	1985-2006	31701	34	29	22	24	18	14	17	13	9	7	4	3
KANSAS CITY, MO-KS, USA	1985-2006	67807	32	28	24	24	20	16	17	13	11	8	6	4
KNOXVILLE, TN, USA	1985-2006	24834	36	33	28	26	23	19	17	15	11	8	6	5
LAKELAND-WINTER HAVEN, FL, USA	1985-2006	29250	39	33	29	27	22	19	18	14	11	7	4	2
LANCASTER, PA, USA	1985-2006	24548	32	26	22	26	21	18	16	13	10	9	6	5
LANSING, MI, USA	1985-2006	11583	29	25	21	22	18	15	14	11	8	6	4	2
LAS VEGAS, NV-AZ, USA	1985-2006	56467	35	32	28	26	23	20	16	14	12	9	8	6
LOS ANGELES, CA, USA	1985-2006	386647	31	27	24	23	20	16	14	11	8	7	4	3
LOUISVILLE, KY, USA	1985-2006	42618	35	31	28	27	24	19	17	14	11	9	7	5
LITTLE ROCK, AR, USA	1985-2006	19999	36	32	29	26	23	21	19	17	15	8	6	6
LUBBOCK, TX, USA	1985-2006	10691	33	28	23	24	19	15	14	12	7	7	6	3
MADISON, WI, USA	1985-2006	15106	30	26	21	23	19	14	16	12	8	7	5	4
MCALLEN-EDINBURG-MISSION, TX, USA	1985-2006	15090	33	30	26	24	21	19	17	14	12	7	5	4
MELBOURNE-TITUSVILLE-PALM BAY, FL, USA	1985-2006	27810	34	27	22	24	18	13	15	11	9	7	5	3
MEMPHIS, TN, USA	1985-2006	47476	37	33	30	28	26	22	16	13	11	9	7	6
MIAMI, FL, USA	1985-	119487	36	31	26	26	21	17	17	13	9	10	7	5

	2006													
MIDDLESEX, NJ, USA	1985-2006	33829	32	25	20	22	18	14	14	11	9	7	5	4
MILWAUKEE, WI, USA	1985-2006	71799	32	26	21	22	16	13	16	11	8	7	5	3
MINNEAPOLIS-ST. PAUL, MN, USA	1985-2006	74244	32	28	25	24	20	16	16	12	10	7	5	4
MOBILE, AL, USA	1985-2006	22679	33	30	26	24	21	17	19	15	13	9	8	5
MONMOUTH-OCEAN, NJ, USA	1985-2006	73356	22	18	15	16	12	10	11	8	6	6	4	3
MYRTLE BEACH, SC, USA	1985-2006	9518	32	28	25	22	18	15	14	11	8	7	5	3
NAPLES, FL, USA	1985-2006	11336	35	28	24	23	18	14	23	18	14	7	4	3
NASHUA, NH, USA	1985-2006	15701	31	26	21	23	19	15	14	10	7	7	6	4
NASHVILLE, TN, USA	1985-2006	30097	32	29	24	24	21	18	18	15	13	8	7	5
NASSAU-SUFFOLK, NY, USA	1985-2006	143694	31	24	20	24	19	14	16	12	10	7	5	4
NEWARK, NJ, USA	1985-2006	68728	34	29	22	24	18	14	17	13	9	7	4	3
NEWBURGH, NY, USA	1985-2006	15476	31	26	22	22	18	15	14	12	10	7	5	4
NEW HAVEN-MERIDEN, CT, USA	1985-2006	48273	32	26	23	24	19	15	16	13	10	8	6	3
NEW LONDON, CT, USA	1985-2006	12576	31	24	20	22	16	13	14	11	8	7	5	4
NEW YORK, NY, USA	1985-2006	426430	32	26	22	23	18	14	16	11	8	7	5	3
OAKLAND, CA, USA	1985-2006	99888	20	15	11	14	10	8	10	7	4	4	2	1
OCALA, FL, USA	1985-2006	17933	32	26	22	23	18	15	17	12	9	7	5	4
OKLAHOMA CITY, OK, USA	1985-2006	36601	36	32	29	24	22	19	18	16	14	7	6	5
OMAHA, NE, USA	1985-2006	22024	33	29	25	25	20	17	16	13	11	7	5	4
ORANGE COUNTY, CA, USA	1985-2006	98795	32	28	25	24	21	18	16	13	10	7	5	4
ORLANDO, FL, USA	1985-	49272	32	27	23	22	18	15	15	12	9	9	6	5

	2006													
PENSACOLA, FL, USA	1985-2006	16165	34	30	24	26	22	19	15	12	9	8	6	4
PHILADELPHIA, PA-NJ, USA	1985-2006	279833	33	28	22	25	20	16	15	12	9	8	6	5
PHOENIX, AZ, USA	1985-2006	117774	36	31	27	27	23	21	19	16	13	9	7	5
PITTSBURGH, PA, USA	1985-2006	97477	32	29	24	25	21	18	15	11	10	9	6	5
PORTLAND, ME, USA	1985-2006	14093	33	27	22	25	19	15	14	10	7	7	4	3
PORTLAND, OR, USA	1985-2006	65670	35	29	25	24	19	16	17	13	9	7	5	3
PROVIDENCE-FALL RIVER, RI-MA, USA	1985-2006	11215	32	25	21	23	18	14	16	11	9	7	4	3
PUNTA GORDA, FL, USA	1985-2006	11663	40	33	26	25	19	15	16	11	8	9	6	4
RALEIGH, NC, USA	1985-2006	18149	36	32	27	27	24	20	16	13	9	8	5	4
READING, PA, USA	1985-2006	22163	36	32	27	27	24	20	16	13	9	8	5	4
RIVERSIDE-SAN BERNARDINO, CA, USA	1985-2006	134247	33	31	27	27	25	22	18	16	14	8	6	5
ROCHESTER, NY, USA	1985-2006	39921	32	28	24	24	19	16	15	12	9	7	5	4
ROCKFORD, IL, USA	1985-2006	14176	31	27	22	23	19	16	16	12	10	8	6	5
SACRAMENTO, CA, USA	1985-2006	53242	34	29	23	24	19	16	16	12	10	9	6	4
SAGINAW, MI, USA	1985-2006	12524	30	25	22	23	19	15	15	12	8	8	5	3
SALINAS, CA, USA	1985-2006	14338	18	15	10	15	11	6	8	5	3	3	2	1
SALT LAKE CITY, UT, USA	1985-2006	27783	34	30	25	24	19	15	16	13	9	9	6	4
SAN ANTONIO, TX, USA	1985-2006	57736	37	34	31	31	28	25	18	15	12	8	6	4
SARASOTA-BRADENTON, FL, USA	1985-2006	46351	32	28	24	24	20	16	13	10	8	9	7	6
SCRANTON--WILKES-BARRE--HAZLETON, PA, USA	1985-2006	46123	32	27	23	23	19	16	15	13	10	7	5	4
SAN DIEGO, CA, USA	1985-	116484	33	29	27	23	21	19	16	14	12	7	5	3

	2006													
SEATTLE, WA, USA	1985-2006	69921	35	30	24	24	18	14	16	12	7	8	6	3
SAN FRANCISCO, CA, USA	1985-2006	77042	22	16	12	18	13	9	10	7	4	4	2	1
SHREVEPORT, LA, USA	1985-2006	16221	34	31	28	29	26	23	19	16	14	9	7	6
SAN JOSE, CA, USA	1985-2006	54245	30	24	18	22	17	12	14	9	6	8	4	2
SPOKANE, WA, USA	1985-2006	21294	33	29	25	26	23	19	17	14	11	8	5	4
SPRINGFIELD, MA, USA	1985-2006	29030	32	26	23	24	19	15	16	13	10	8	6	3
STAMFORD-NORWALK, CT, USA	1985-2006	43691	33	27	22	25	19	16	16	12	9	8	5	4
ST. LOUIS, MO-IL, USA	1985-2006	96368	34	30	26	25	22	18	16	13	10	9	6	4
STOCKTON-LODI, CA, USA	1985-2006	25244	32	28	22	26	21	17	16	12	10	8	5	4
SYRACUSE, NY, USA	1985-2006	26252	32	28	23	24	19	16	14	12	9	7	5	3
TACOMA, WA, USA	1985-2006	29688	33	28	23	24	19	15	15	11	9	8	5	3
TAMPA-ST. PETERSBURG-CLEARWATER, FL, USA	1985-2006	49811	37	30	24	27	21	17	17	13	10	6	3	3
TOLEDO, OH, USA	1985-2006	28669	33	29	25	25	21	17	15	13	10	7	5	4
TRENTON, NJ, USA	1985-2006	17869	31	24	19	22	17	13	16	12	9	7	5	4
TUCSON, AZ, USA	1985-2006	39643	33	30	26	26	22	19	18	15	12	9	7	5
TULSA, OK, USA	1985-2006	29746	35	31	27	25	21	19	16	13	11	8	6	5
UTICA-ROME, NY, USA	1985-2006	16479	30	26	21	24	20	17	15	12	10	7	5	3
VENTURA COUNTY, CA, USA	1985-2006	27134	22	20	17	18	16	14	10	8	7	5	3	3
VIRGINIA BEACH, VA, USA	1985-2006	58165	32	27	22	25	19	15	15	11	8	8	6	3
WASHINGTON, DC-MD-VA, USA	1985-2006	44237	33	28	23	23	19	15	16	12	10	7	5	3
WICHITA, KS, USA	1985-	21215	35	31	26	25	21	18	17	13	12	8	6	5

	2006													
WILMINGTON, DE, USA	1985-2006	23455	31	26	21	23	18	14	16	11	9	7	5	3
WORCESTER, MA, USA	1985-2006	41347	34	28	24	25	20	16	15	11	8	7	5	3
WEST PALM BEACH-BOCA RATON, FL, USA	1985-2006	72824	37	30	25	25	19	15	17	11	8	9	5	3
YORK, PA, USA	1985-2006	19280	32	26	21	25	20	16	16	12	9	8	6	4
YOUNGSTOWN-WARREN, OH, USA	1985-2006	26632	30	25	21	23	19	15	16	12	10	7	5	4
HO CHI MINH CITY, VIETNAM	2010-2013	33722	31	25	21	22	17	15	15	12	11	8	7	6
HUE, VIETNAM	2009-2013	1933	33	28	24	22	18	14	16	11	8	8	4	3

Table S2: Second-stage random-effects meta-analysis and meta-regression models for explaining variation in overall heatwave effects and added heatwave effects: Cochran Q test for heterogeneity,  $I^2$  statistics for residual heterogeneity. Please refer table 1 for heatwave definitions.

Heatwave definition	Model	Predictor	<i>Overall heatwave effect</i>		<i>Added heatwave effect</i>	
			P value for Q test	$I^2$ (%)	P value for Q test	$I^2$ (%)
90P_2day	Intercept only	-----	<0.001	73.33	0.372	2.12
	Single predictor	Average temperature	<0.001	70.83	0.376	2.04
		Temperature range	<0.001	73.40	0.399	1.63
		Temperature variability	<0.001	73.03	0.412	1.39
		Longitude	<0.001	72.26	0.359	2.35
		Latitude	<0.001	72.16	0.361	2.31
		Country	<0.001	44.72	0.335	2.86
		Full	Average temperature			
	Temperature range					
	Temperature variability		<0.001	43.99	0.402	1.61
	Longitude					
		Latitude				
		Country				
92.5P_2day	Intercept only	-----	<0.001	74.37	0.031	12.03
	Single predictor	Average temperature	<0.001	72.84	0.038	11.42
		Temperature range	<0.001	74.34	0.030	12.11
		Temperature variability	<0.001	73.52	0.028	12.25
		Longitude	<0.001	73.72	0.028	12.25
		Latitude	<0.001	73.61	0.028	12.24
		Country	<0.001	46.52	0.024	12.87
		Full	Average temperature			



		Temperature range				
		Temperature variability	<0.001	43.83	0.030	12.39
		Longitude				
		Latitude				
		Country				
95P_2day	Intercept only	-----	<0.001	74.99	0.095	8.59
	Single predictor	Average temperature	<0.001	74.51	0.108	8.13
		Temperature range	<0.001	74.91	0.149	6.88
		Temperature variability	<0.001	74.20	0.116	7.88
		Longitude	<0.001	74.65	0.100	8.40
		Latitude	<0.001	74.61	0.090	8.78
		Country	<0.001	49.54	0.082	9.28
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	46.66	0.097	8.72
		Longitude				
		Latitude				
		Country				
97.5P_2day	Intercept only	-----	<0.001	73.99	0.038	11.47
	Single predictor	Average temperature	<0.001	74.02	0.038	11.47
		Temperature range	<0.001	73.73	0.074	9.45
		Temperature variability	<0.001	73.43	0.057	10.30
		Longitude	<0.001	74.03	0.043	11.11
		Latitude	<0.001	73.92	0.053	10.48
		Country	<0.001	51.82	0.089	9.00
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	47.79	0.080	9.42
		Longitude				

		Latitude				
		Country				
90P_3day	Intercept only	-----	<0.001	72.33	0.765	5.48
	Single predictor	Average temperature	<0.001	70.14	0.775	5.72
		Temperature range	<0.001	72.40	0.817	6.86
		Temperature variability	<0.001	71.92	0.809	6.65
		Longitude	<0.001	71.40	0.754	5.22
		Latitude	<0.001	71.01	0.765	5.48
		Country	<0.001	44.87	0.868	8.75
		Full	Average temperature			
	Temperature range					
	Temperature variability		<0.001	43.93	0.876	9.12
	Longitude					
	Latitude					
		Country				
92.5P_3day	Intercept only	-----	<0.001	73.31	0.458	0.58
	Single predictor	Average temperature	<0.001	72.18	0.508	-0.31
		Temperature range	<0.001	73.24	0.464	0.48
		Temperature variability	<0.001	72.32	0.448	0.76
		Longitude	<0.001	72.83	0.449	0.74
		Latitude	<0.001	72.61	0.450	0.73
		Country	<0.001	46.88	0.574	1.53
		Full	Average temperature			
	Temperature range					
	Temperature variability		<0.001	43.40	0.585	1.76
	Longitude					
	Latitude					
		Country				
95P_3day	Intercept only	-----	<0.001	73.52	0.091	8.73

	Single predictor	Average temperature	<0.001	73.32	0.103	8.31
		Temperature range	<0.001	73.42	0.133	7.34
		Temperature variability	<0.001	72.76	0.103	8.32
		Longitude	<0.001	73.37	0.088	8.87
		Latitude	<0.001	73.23	0.090	8.77
		Country	<0.001	51.82	0.111	8.18
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	48.36	0.132	7.55
		Longitude				
		Latitude				
		Country				
97.5P_3day	Intercept only	-----	<0.001	71.16	0.207	5.42
	Single predictor	Average temperature	<0.001	71.12	0.201	5.56
		Temperature range	<0.001	70.89	0.258	4.32
		Temperature variability	<0.001	70.66	0.235	4.79
		Longitude	<0.001	71.23	0.197	5.65
		Latitude	<0.001	71.13	0.278	3.89
		Country	<0.001	50.05	0.367	2.25
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	45.41	0.436	0.99
		Longitude				
		Latitude				
		Country				
90P_4day	Intercept only	-----	<0.001	70.58	0.278	3.90
	Single predictor	Average temperature	<0.001	68.76	0.286	3.73
		Temperature range	<0.001	70.65	0.336	2.79
		Temperature variability	<0.001	70.02	0.317	3.15

		Longitude	<0.001	69.79	0.266	4.14
		Latitude	<0.001	69.37	0.271	4.05
		Country	<0.001	44.25	0.436	0.98
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	42.50	0.465	0.45
		Longitude				
		Latitude				
		Country				
92.5P_4day	Intercept only	-----	<0.001	72.05	0.086	8.95
	Single predictor	Average temperature	<0.001	71.42	0.089	8.83
		Temperature range	<0.001	71.97	0.096	8.57
		Temperature variability	<0.001	71.10	0.086	8.96
		Longitude	<0.001	71.79	0.086	8.95
		Latitude	<0.001	71.44	0.089	8.82
		Country	<0.001	47.65	0.173	6.37
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	43.27	0.217	5.33
		Longitude				
		Latitude				
		Country				
95P_4day	Intercept only	-----	<0.001	73.19	0.036	11.59
	Single predictor	Average temperature	<0.001	73.16	0.038	11.44
		Temperature range	<0.001	73.03	0.044	11.05
		Temperature variability	<0.001	72.45	0.035	11.65
		Longitude	<0.001	73.14	0.035	11.66
		Latitude	<0.001	73.00	0.042	11.15
		Country	<0.001	54.10	0.100	8.59

	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	50.15	0.102	8.57
		Longitude				
		Latitude				
		Country				
97.5P_4day	Intercept only	-----	<0.001	69.31	0.004	16.34
	Single predictor	Average temperature	<0.001	69.01	0.004	16.47
		Temperature range	<0.001	68.95	0.005	16.28
		Temperature variability	<0.001	68.86	0.005	16.26
		Longitude	<0.001	69.37	0.004	16.37
		Latitude	<0.001	69.39	0.005	16.00
		Country	<0.001	48.71	0.011	14.69
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	44.06	0.019	13.57
		Longitude				
		Latitude				
		Country				

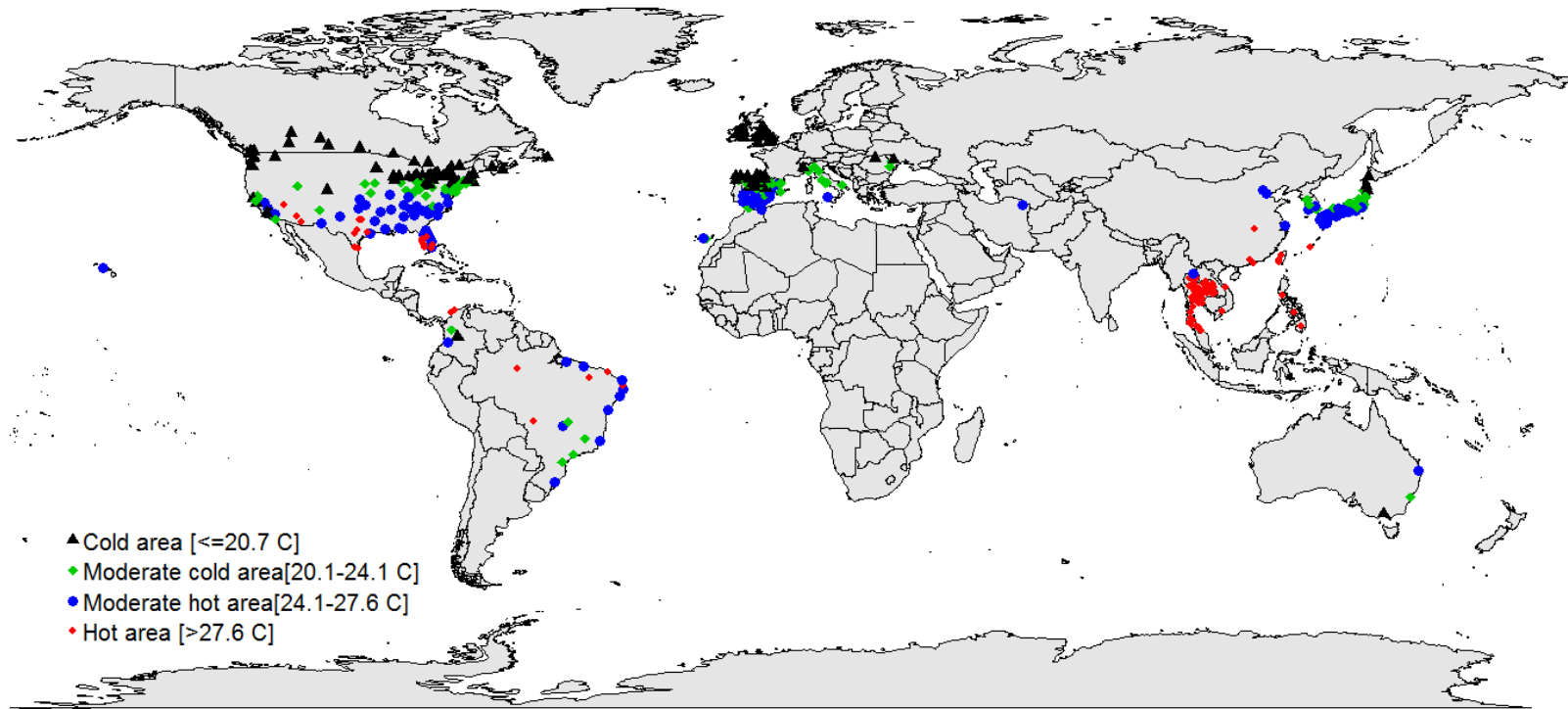


Figure S1: Locations of communities stratified by cold, moderate cold, moderate hot and hot areas, by the quantiles ( $\leq 25^{\text{th}}$ ,  $25^{\text{th}}-50^{\text{th}}$ ,  $50^{\text{th}}-75^{\text{th}}$ , and  $> 75^{\text{th}}$ ) of their mean temperatures of hot season (each community has one value of annual mean temperature).

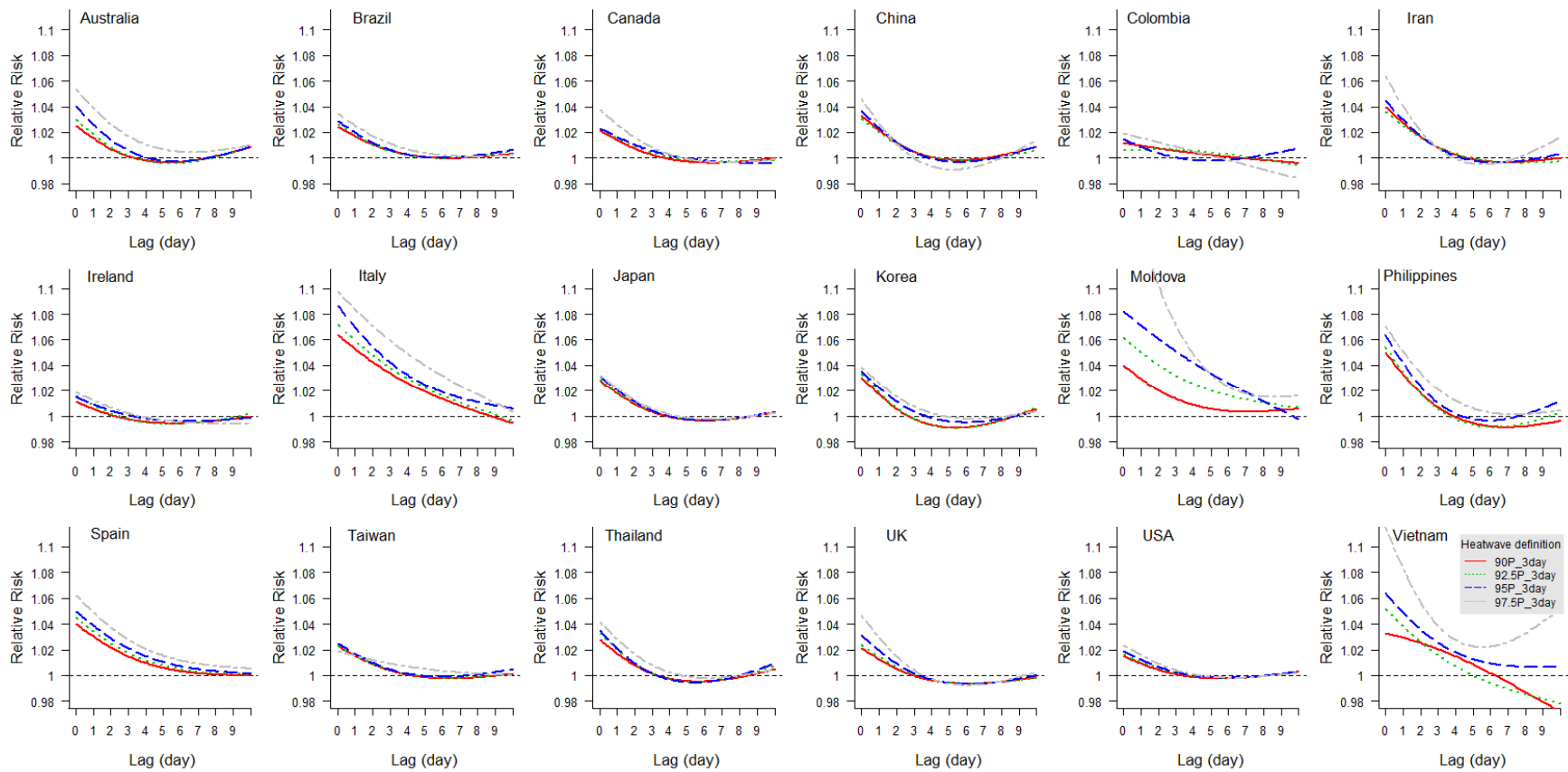


Figure S2: Lag effects of heatwaves on mortality along lag 0–10 days in 18 countries/regions for 4 types of heatwave definitions. 90P\_3day: 90<sup>th</sup> percentile with  $\geq 3$  days duration; 92.5P\_3day: 92.5<sup>th</sup> percentile with  $\geq 3$  days duration; 95P\_3day: 95<sup>th</sup> percentile with  $\geq 3$  days duration; 97.5P\_3day: 97.5<sup>th</sup> percentile with  $\geq 3$  days duration.

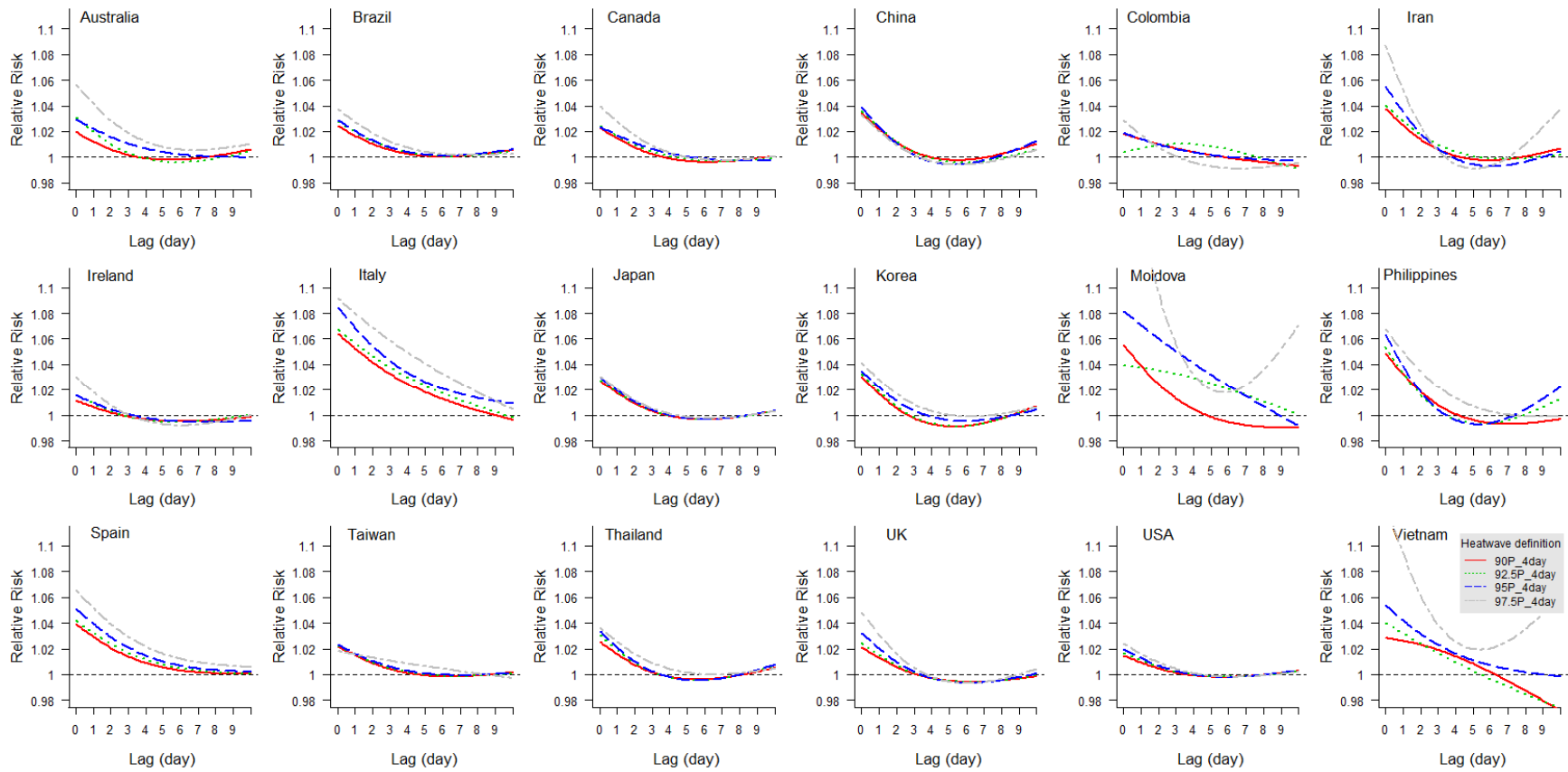


Figure S3: Lag effects of heatwaves on mortality along lag 0–10 days in 18 countries/regions for 4 types of heatwave definitions. 90P\_4day: 90<sup>th</sup> percentile with  $\geq 4$  days duration; 92.5P\_4day: 92.5<sup>th</sup> percentile with  $\geq 4$  days duration; 95P\_4day: 95<sup>th</sup> percentile with  $\geq 4$  days duration; 97.5P\_4day: 97.5<sup>th</sup> percentile with  $\geq 4$  days duration.



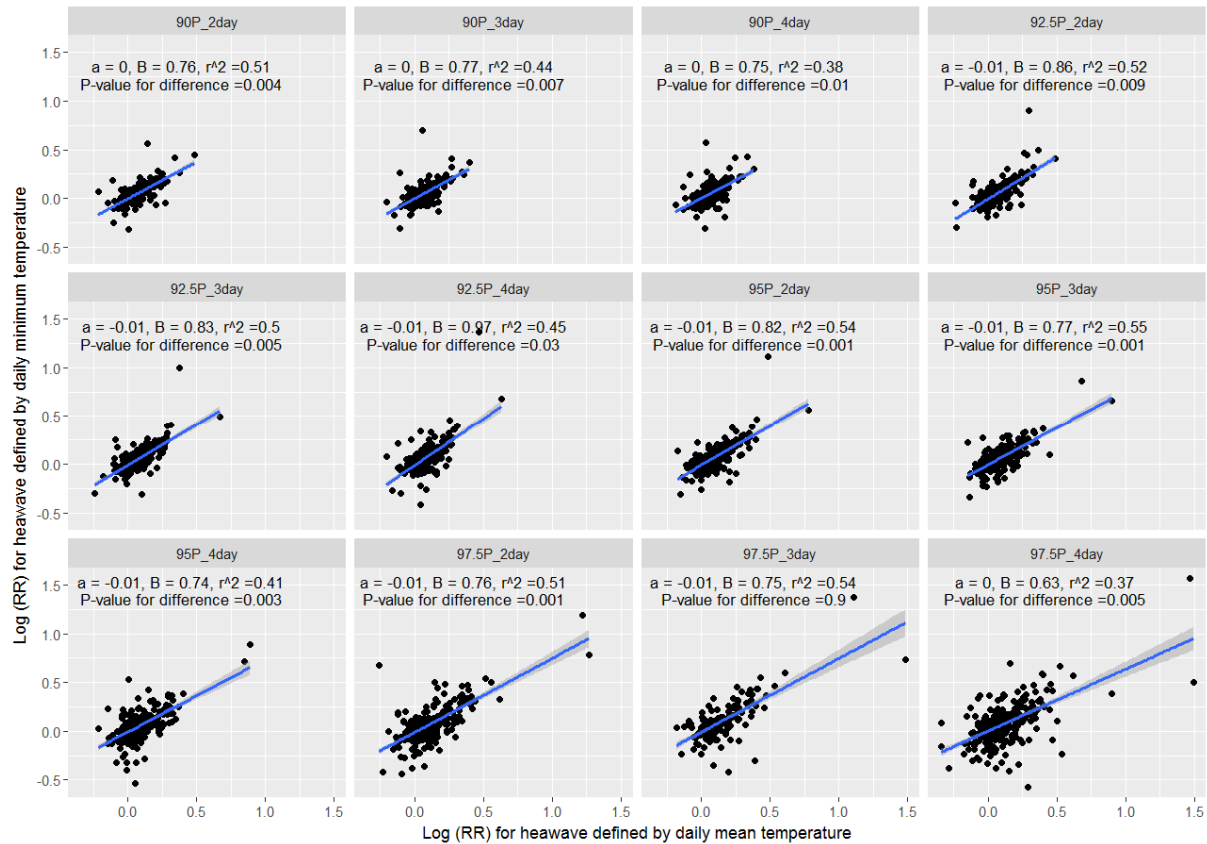


Figure S4: Comparison for cumulative effects of heatwaves on mortality over lag 0–10 days in 16 countries/regions for 12 types of heatwave definitions using daily mean and minimum temperatures. Please refer table 1 for heatwave definitions. a, B, and r<sup>2</sup> are intercept, coefficient, and r-squared respectively derived from linear regression model for effect estimates modelled by heatwaves defined by daily mean and minimum temperatures. P-value for difference is modelled by the Paired t-test between effect estimates modelled by heatwaves defined by daily mean and minimum temperatures.

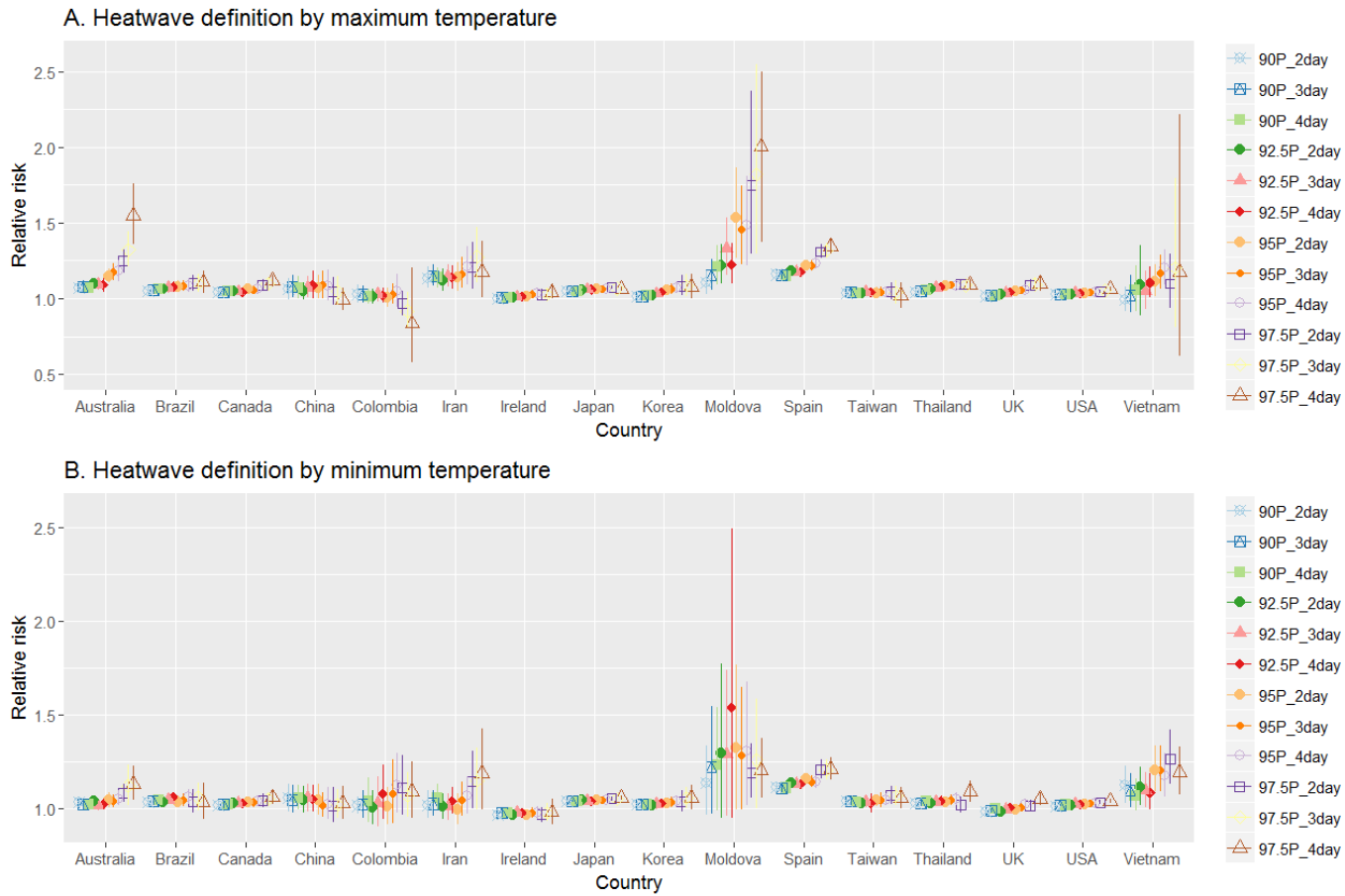


Figure S5: Cumulative effects of heatwaves (A. definition by maximum temperature and B. definition by minimum temperature) on mortality over lag 0–10 days in 18 countries/regions for 12 types of heatwave definitions. Please refer table 1 for heatwave definitions.

Remove USA



F

Figure S6: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding USA. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $> 27.6$  °C. Please refer table 1 for heatwave definitions.

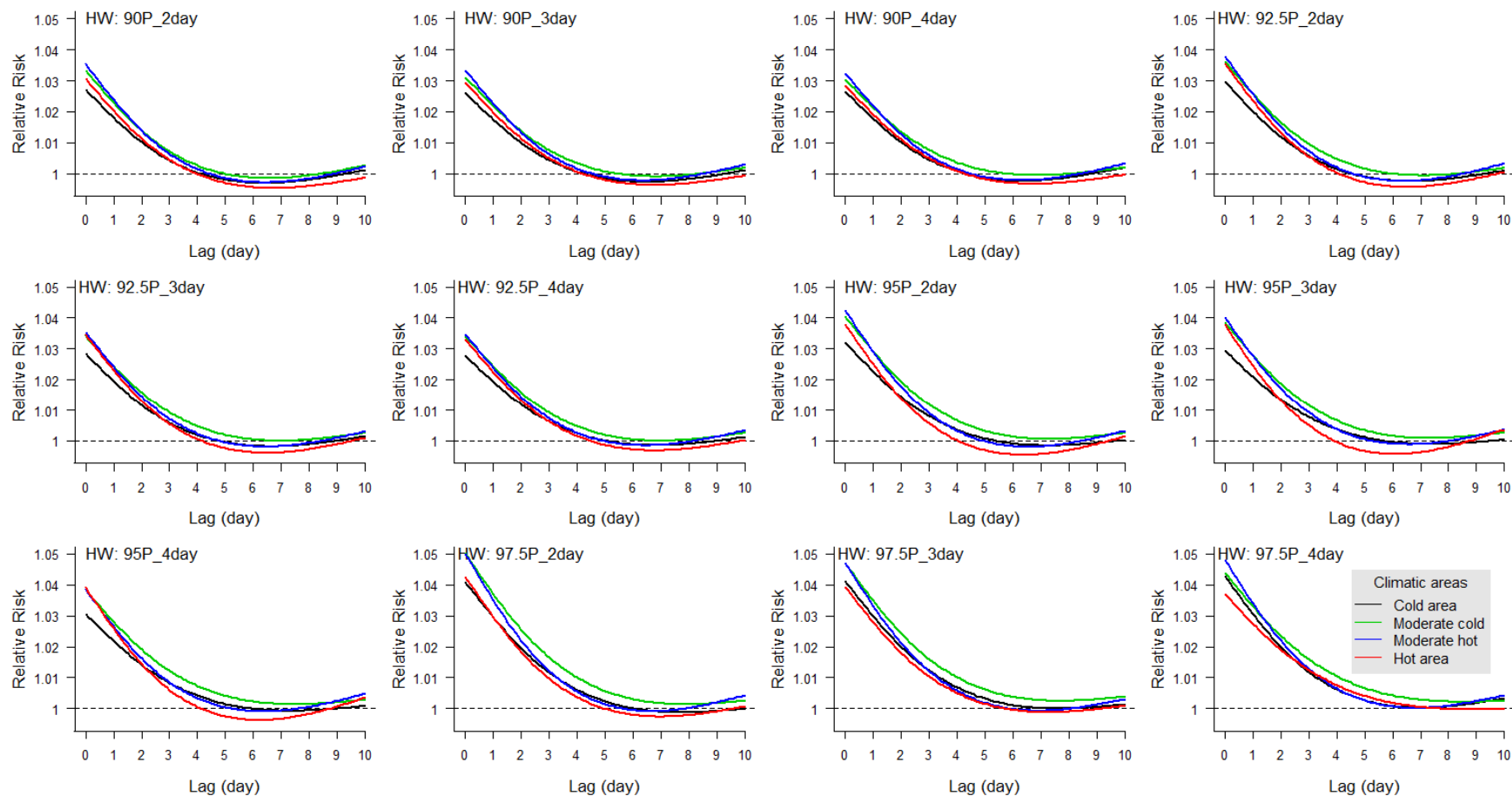


Figure S7: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding USA. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $>27.6$  °C. Please refer table 1 for heatwave definitions.

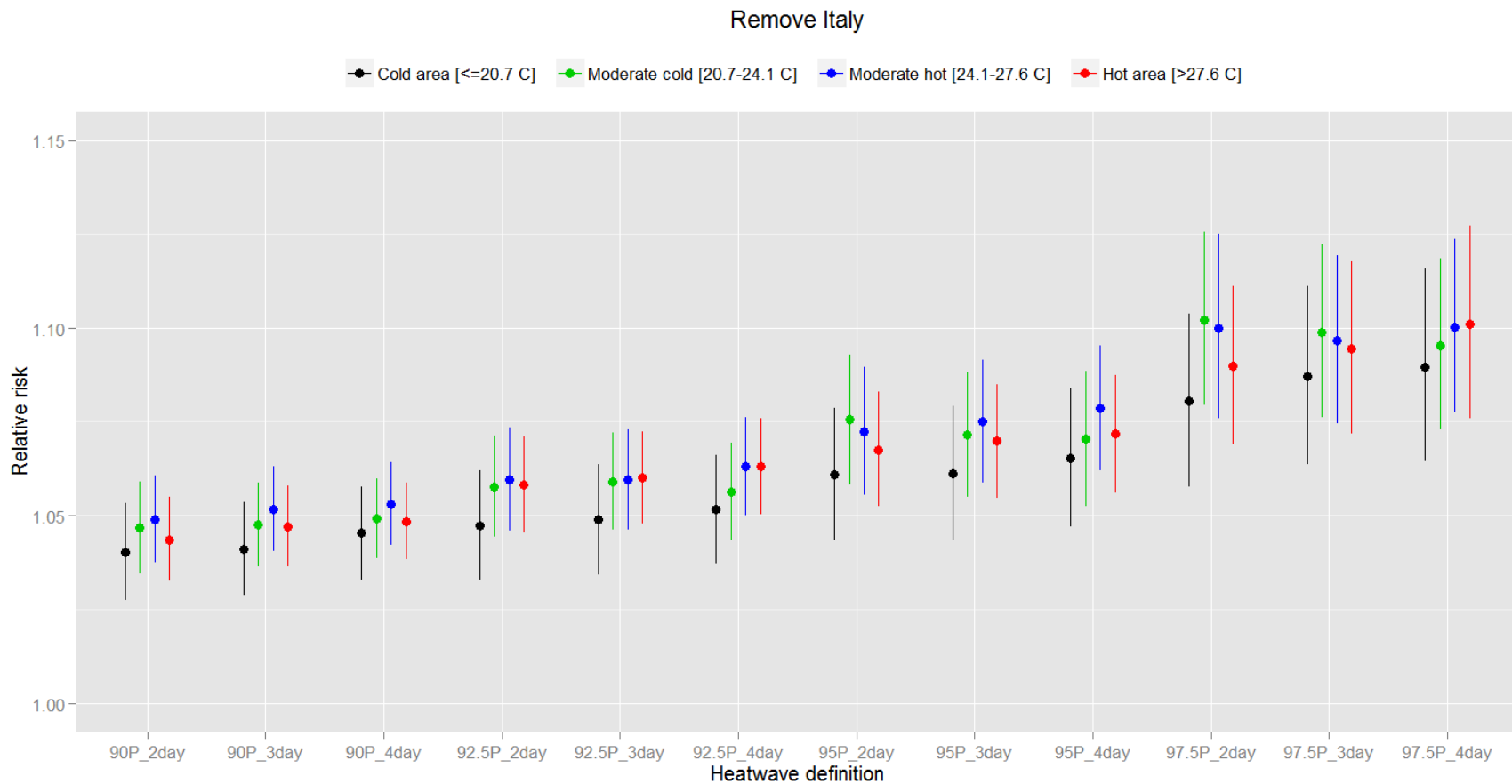


Figure S8: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Italy. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $> 27.6$  °C. Please refer table 1 for heatwave definitions.

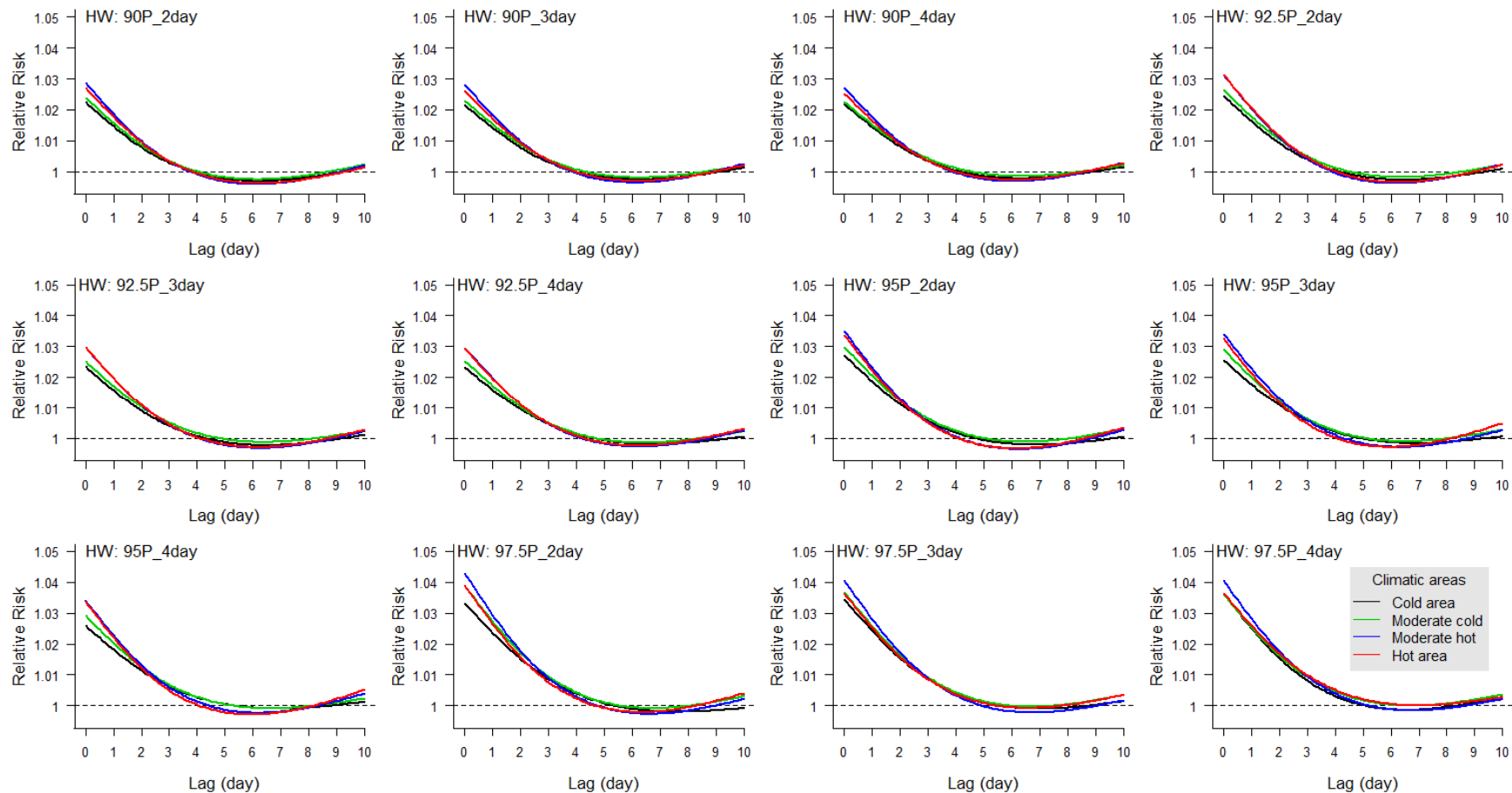


Figure S9: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Italy. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $>27.6$  °C. Please refer table 1 for heatwave definitions.

### Remove Moldova

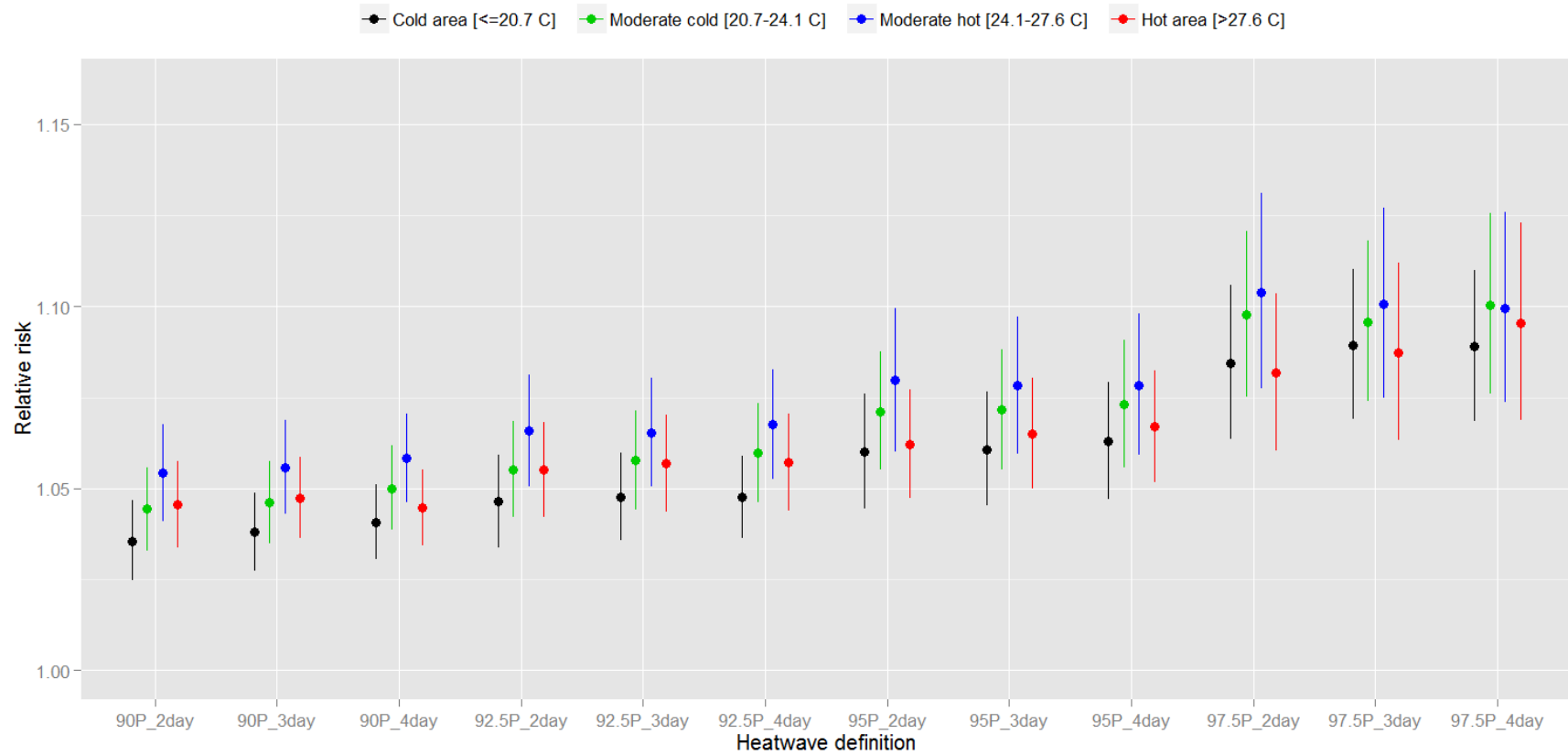


Figure S10: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Moldova. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $> 27.6$  °C. Please refer table 1 for heatwave definitions.

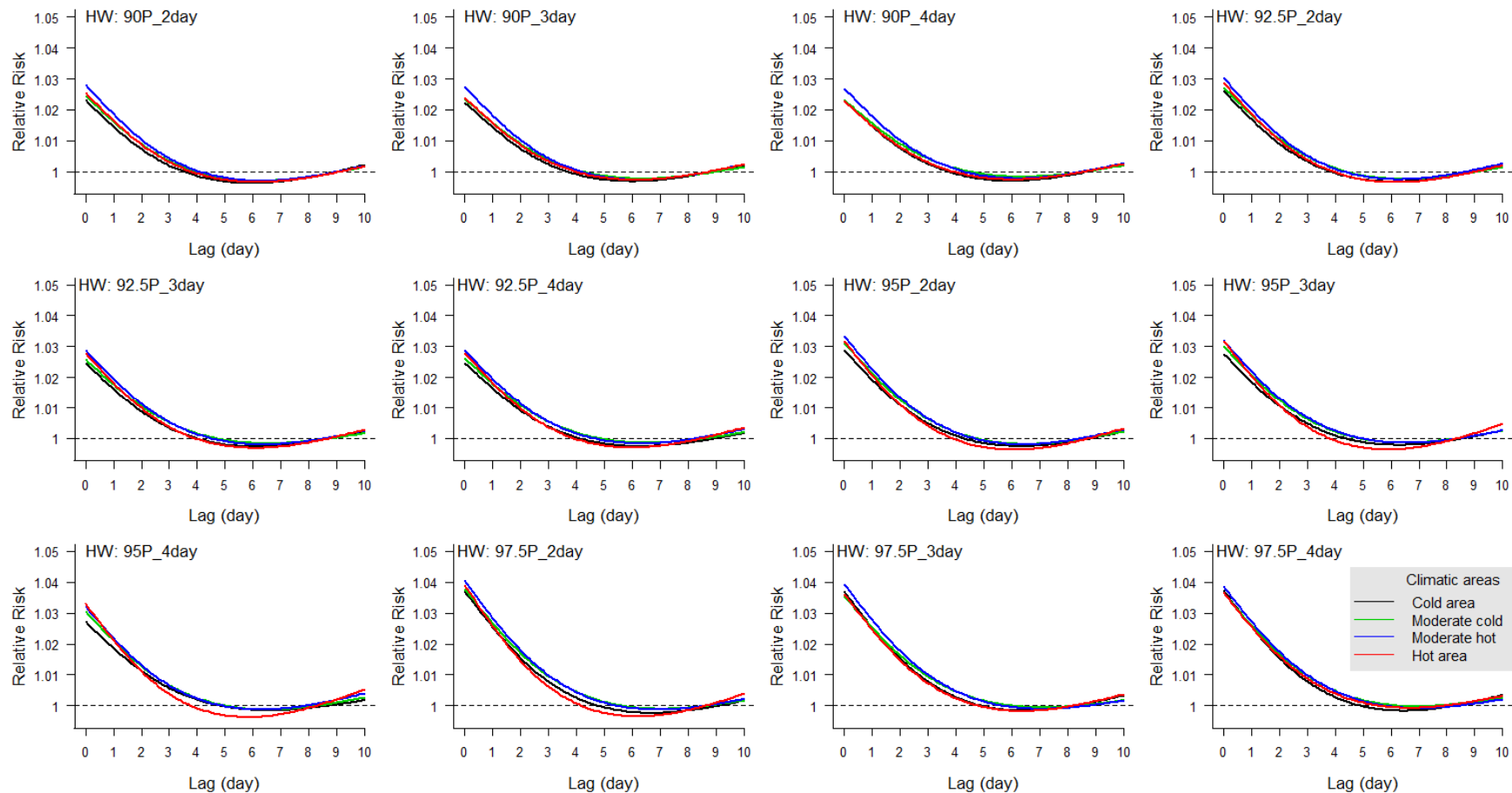


Figure S11: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Moldova. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $> 27.6$  °C. Please refer table 1 for heatwave definitions.



### Remove Vietnam

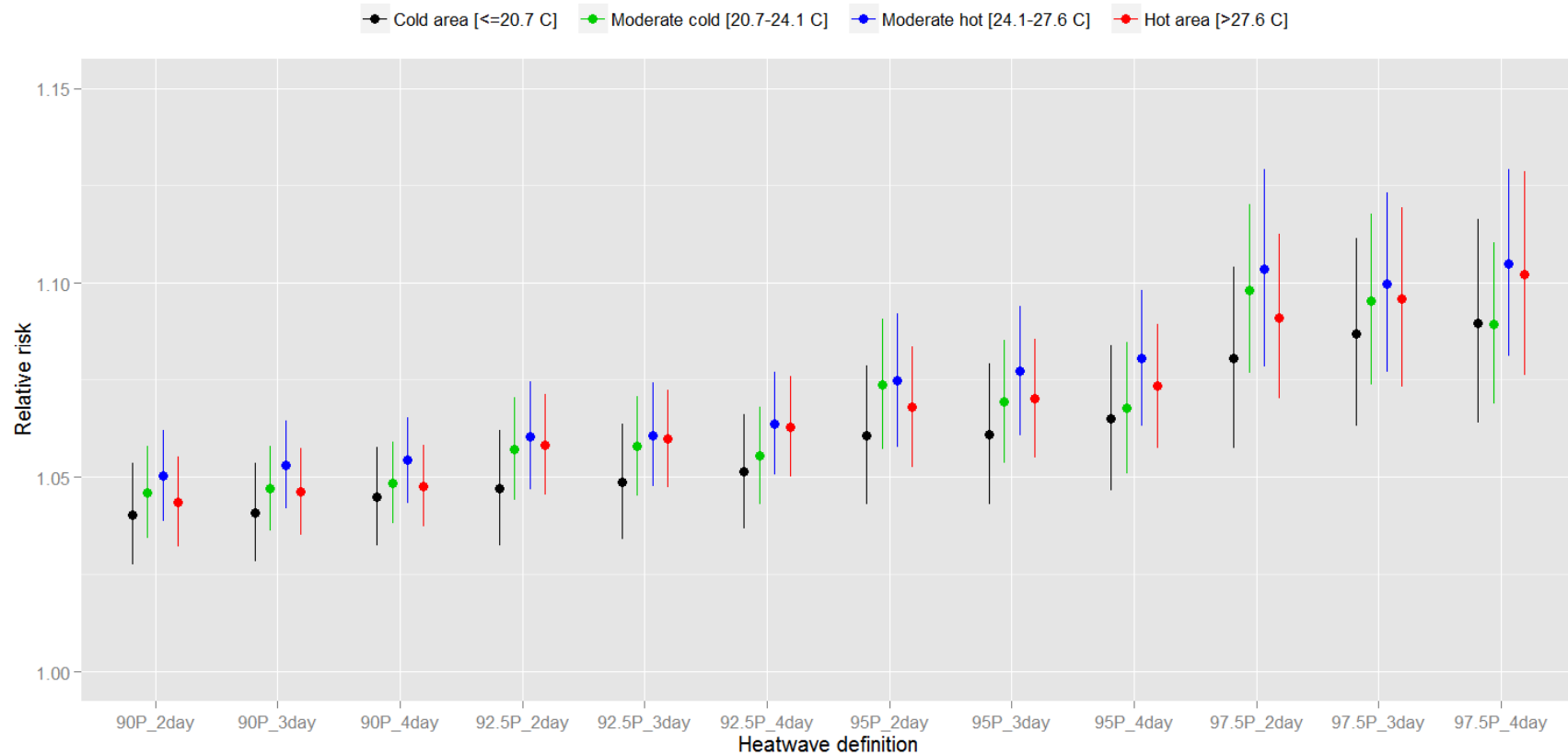


Figure S12: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Vietnam. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $> 27.6$  °C. Please refer table 1 for heatwave definitions.

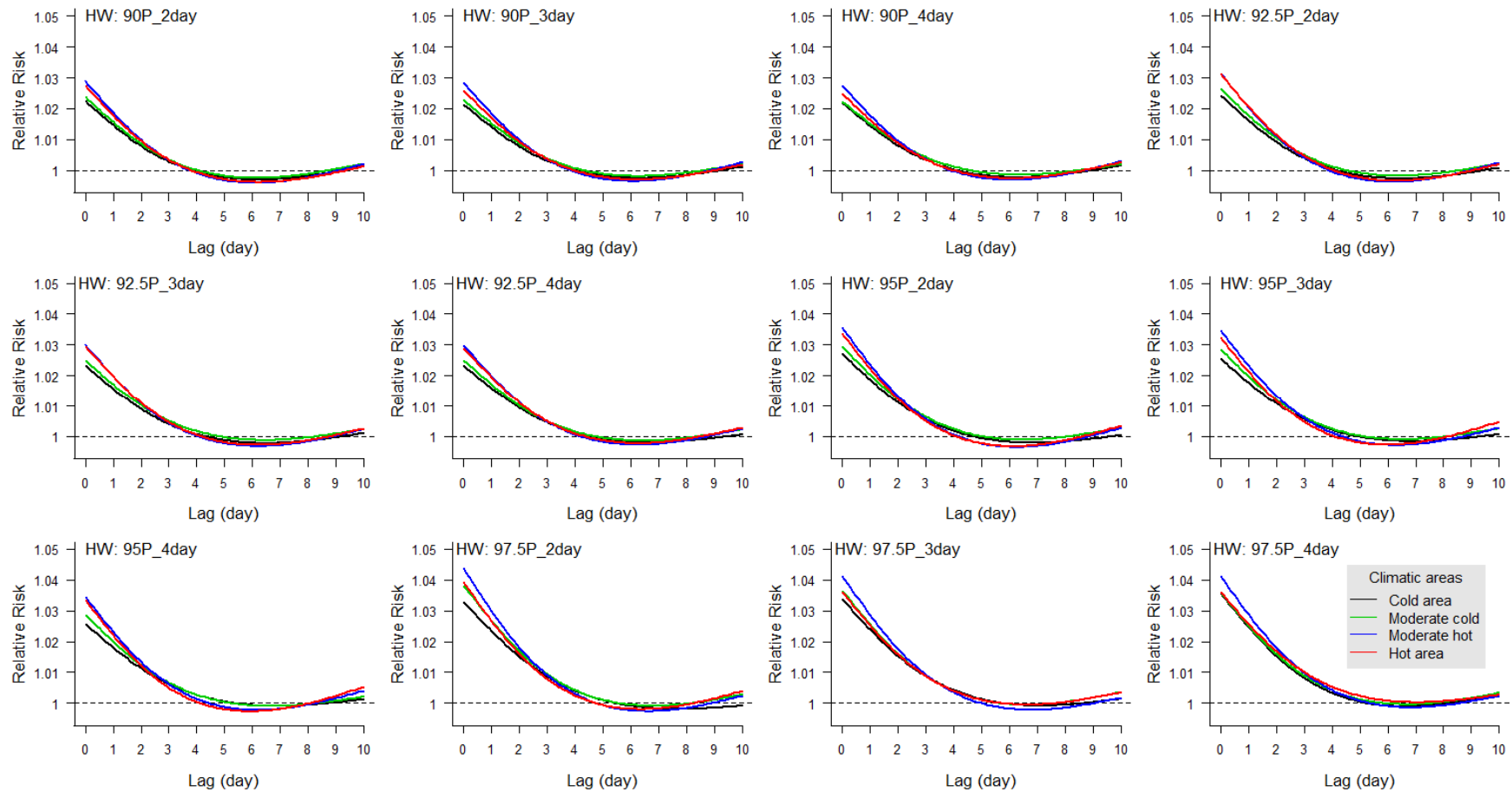


Figure S13: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Vietnam. Cold areas: mean temperature of hot season  $\leq 20.7$  °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season  $>27.6$  °C. Please refer table 1 for heatwave definitions.

### Control for temperature variability

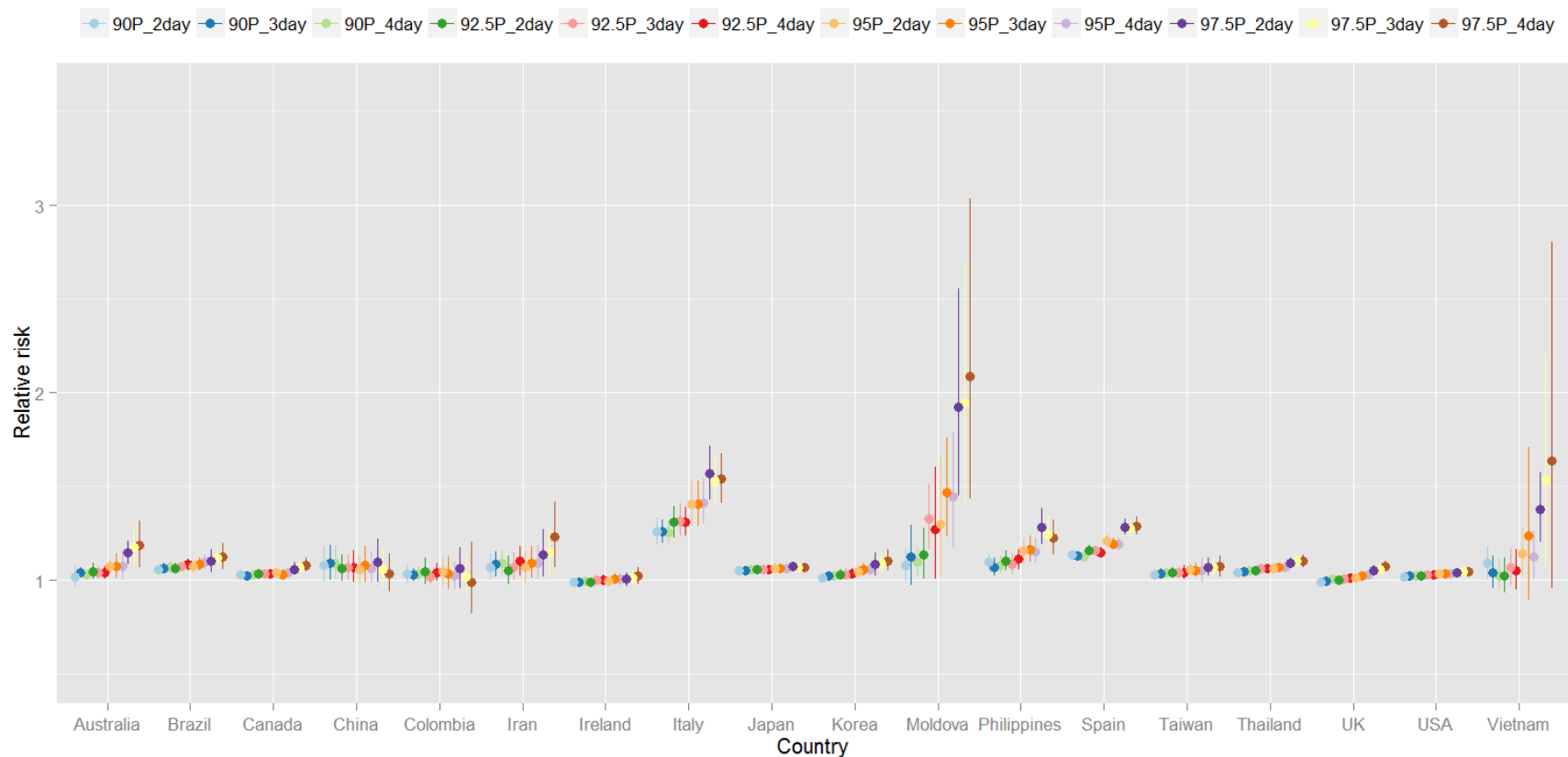


Figure S14: Cumulative effects of heatwaves on mortality over lag 0–10 days after controlling for temperature variability (standard deviation of 10 days' daily mean temperatures) in 18 countries/regions for 12 types of heatwave definitions. Please refer table 1 for heatwave definitions.