Supporting Information

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Supplementary Material

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Table A. Summary of the study periods, number of locations, deaths, TC numbers and POC of the 494 study locations by countries or territories.

	Period	No. of locations	All-cause mortality		CVD mortality		RD mortality	
			No. of deaths	Average length of POC (SD)[a]	No. of deaths	Average length of POC (SD)[a]	No. of deaths	Average length of POC (SD)[a]
North America								
USA	1980-2006	123	18621976	30 (58.1)	6719977	22 (48.7)	1632564	25 (54.4)
Canada	1986-2015	104	3677546	20 (46.8)	1236246	15 (40)	314418	33 (58.4)
South America								
Brazil	1996-2019	8	286407	40 (51.8)	88366	47 (61.1)	32466	48 (75.3)
Latin America and the Caribbean								
Guatemala	2009-2016	1	62715	NA	NA	NA	NA	NA
Mexico	1998-2014	6	2551522	5 (11.6)	660859	24 (32.8)	244682	NA
Puerto Rico	2009-2016	1	26564	NA	NA	NA	NA	NA
French Caribbean	2000-2015	2	46190	15 (27.8)	NA	NA	NA	NA
Eastern Asia								
China Mainland	1996-2015	5	674842	29 (60.9)	234830	27 (63)	104144	24 (64.8)
Japan	1980-2015	62	14589419	16 (47.1)	4670454	17 (46.6)	1973044	10 (35.7)
South Korea	1997-2018	36	3070357	21 (48.8)	701638	18 (44.9)	222314	30 (61.6)
Taiwan	2000-2018	6	1740776	33 (58.3)	373288	21 (46.2)	183139	26 (50.7)
South-eastern Asia								
Philippines	2006-2019	12	796933	20 (45.6)	288555	26 (52.4)	116027	27 (57.3)
Thailand	1999-2008	5	102304	NA	14724	NA	9600	NA
Vietnam	2009-2013	1	6214	9 (15.6)	2215	53 (85)	166	NA
Southern Europe								
Portugal	1980-2018	1	802500	NA	319657	NA	71547	NA
Spain	1990-2014	3	199468	NA	80111	NA	18720	NA
Australia and New Zealand								
Australia	2009-2017	79	241352	5 (13.3)	71174	26 (58.9)	20436	17 (47.4)
New Zealand	2000-2018	39	244586	10 (30)	86373	20 (60.3)	21468	49 (61.8)
Overall		494	47741671	22 (51.3)	15548467	20 (47.4)	4964735	20 (49.6)

Abbreviations: CVD, cardiovascular diseases; NA, not available/applicable; POC, periods of concern; RD, respiratory diseases; SD, standard deviation; TC, tropical cyclone.
[a]Due to the limited number of TCs during the study period or the unavailability of cardiovascular or respiratory diseases mortality data, the POC distribution for some countries or regions could not be calculated and is therefore shown as "NA".

Table B. The estimated POC[a] of tropical cyclones for all-cause, CVD and RD mortality by excluding a different length of post-TC period[b] (30, 60, 90 days).

Country or territories	All-cause mortality			CVD mortality			RD mortality		
	30 days	60 days	90 days	30 days	60 days	90 days	30 days	60 days	90 days
Australia	4 (11.7)	5 (13.3)	5 (14.1)	25 (58.7)	26 (58.9)	26 (59.1)	13 (40.3)	17 (47.4)	13 (39.3)
Brazil	41 (51.7)	40 (51.8)	42 (52.7)	47 (61.1)	47 (61.1)	48 (61.9)	47 (75.1)	48 (75.3)	49 (75.5)
Canada	20 (46.9)	20 (46.8)	20 (47.1)	14 (39.7)	15 (40.0)	15 (40.0)	35 (58.1)	33 (58.4)	33 (58.8)
China Mainland	32 (60.7)	29 (60.9)	33 (61.6)	27 (63.0)	27 (63.0)	20 (55.4)	22 (63.4)	24 (64.8)	28 (66.3)
French Caribbean	14 (27.2)	15 (27.8)	15 (29.0)	NA	NA	NA	NA	NA	NA
Guatemala	NA	NA	NA	NA	NA	NA	NA	NA	NA
Japan	16 (47.1)	16 (47.1)	17 (47.6)	17 (46.3)	17 (46.6)	18 (46.4)	10 (35.4)	10 (35.7)	11 (36.6)
Mexico	5 (11.2)	5 (11.6)	5 (11.6)	23 (31.9)	24 (32.8)	25 (34.3)	NA	NA	NA
New Zealand	NA	10 (30.0)	11 (32.0)	20 (59.7)	20 (60.3)	20 (60.0)	51 (70.7)	49 (61.8)	61 (64.5)
Philippines	20 (46.7)	20 (45.6)	21 (45.1)	27 (53.3)	26 (52.4)	28 (51.3)	27 (57.6)	27 (57.3)	27 (57.1)
Portugal	NA	NA	NA	NA	NA	NA	NA	NA	NA
Puerto Rico	NA	NA	NA	NA	NA	NA	NA	NA	NA
South Korea	21 (49.0)	21 (48.8)	22 (50.1)	16 (40.9)	18 (44.9)	18 (41.9)	30 (61.7)	30 (61.6)	30 (61.7)
Spain	NA	NA	NA	NA	NA	NA	NA	NA	NA
Taiwan	35 (61.9)	33 (58.3)	36 (56.9)	21 (49.4)	21 (46.2)	23 (47.8)	28 (56.6)	26 (50.7)	31 (57.0)
Thailand	NA	NA	NA	NA	NA	NA	NA	NA	NA
USA	30 (58.1)	30 (58.1)	29 (57.1)	22 (49.1)	22 (48.7)	22 (49.1)	26 (55.2)	25 (54.4)	25 (53.8)
Vietnam	9 (15.6)	9 (15.6)	8 (13.9)	53 (83.0)	53 (85.0)	52 (87.2)	NA	NA	NA
Overall	22 (51.8)	22 (51.3)	23 (51.2)	19 (47.2)	20 (47.4)	20 (46.9)	20 (50.4)	20 (49.6)	21 (50.4)

Abbreviations: CVD, Cardiovascular disease; NA, not applicable; POC, periods of concern; RD, respiratory diseases; SD, standard deviation.

[a]Due to the limited number of TCs during the study period or the unavailability of CVD or RD mortality data, the POC distribution for some countries or regions could not be calculated and is therefore shown as "NA".

[b]To exclude the effects of other TCs (if any) when estimated the POC for the TC of interest, a certain length of post-TC periods was excluded for other TCs.

Table C. The country or territory-specific overall RR[a] (with 95% CI) associated with TC for all-cause, CVD and RD mortality by excluding a 30-, 60- or 90-day post-TC period[b].

Country or territories	All-cause mortality			CVD mortality			RD mortality		
	30 days	60 days	90 days	30 days	60 days	90 days	30 days	60 days	90 days
USA	1.028 (1.023, 1.032)	1.028 (1.023, 1.032)	1.027 (1.022, 1.032)	1.043 (1.035, 1.051)	1.043 (1.035, 1.052)	1.044 (1.036, 1.053)	1.125 (1.110, 1.139)	1.122 (1.106, 1.138)	1.121 (1.106, 1.136)
Canada	1.044 (1.027, 1.062)	1.044 (1.026, 1.062)	1.045 (1.028, 1.063)	1.053 (1.021, 1.085)	1.055 (1.023, 1.088)	1.092 (1.032, 1.155)	1.228 (1.162, 1.297)	1.184 (1.130, 1.241)	1.189 (1.135, 1.246)
Mexico	1.033 (0.981, 1.088)	1.034 (0.981, 1.089)	1.034 (0.981, 1.090)	1.046 (0.999, 1.094)	1.048 (1.002, 1.097)	1.051 (1.007, 1.096)	1.092 (0.954, 1.251)	1.095 (0.957, 1.253)	1.096 (0.958, 1.255)
French Caribbean	1.000 (0.936, 1.068)	1.001 (0.936, 1.070)	1.004 (0.938, 1.075)	NA	NA	NA	NA	NA	NA
Brazil	1.082 (1.032, 1.135)	1.083 (1.033, 1.135)	1.086 (1.036, 1.139)	1.153 (1.071, 1.242)	1.154 (1.071, 1.243)	1.160 (1.077, 1.250)	1.211 (1.052, 1.393)	1.214 (1.058, 1.392)	1.222 (1.067, 1.400)
Philippines	1.019 (1.008, 1.029)	1.018 (1.007, 1.029)	1.021 (1.010, 1.032)	1.038 (1.023, 1.053)	1.039 (1.024, 1.055)	1.044 (1.029, 1.060)	1.070 (1.031, 1.110)	1.070 (1.025, 1.117)	1.070 (1.026, 1.116)
China Mainland	0.999 (0.978, 1.021)	0.993 (0.969, 1.017)	1.000 (0.972, 1.029)	0.996 (0.956, 1.038)	0.998 (0.955, 1.043)	1.005 (0.958, 1.055)	1.011 (0.940, 1.088)	0.991 (0.919, 1.068)	0.999 (0.835, 1.196)
Taiwan	1.013 (1.006, 1.021)	1.014 (1.005, 1.024)	1.018 (1.006, 1.029)	1.020 (1.006, 1.034)	1.021 (1.003, 1.040)	1.024 (1.005, 1.043)	1.030 (1.005, 1.055)	1.029 (0.995, 1.064)	1.041 (1.004, 1.079)
South Korea	1.038 (1.026, 1.050)	1.040 (1.028, 1.052)	1.043 (1.030, 1.055)	1.102 (1.073, 1.132)	1.123 (1.087, 1.161)	1.114 (1.084, 1.145)	1.193 (1.147, 1.241)	1.208 (1.160, 1.258)	1.191 (1.150, 1.234)
Japan	1.010 (1.007, 1.013)	1.011 (1.008, 1.014)	1.010 (1.006, 1.013)	1.019 (1.013, 1.026)	1.021 (1.014, 1.028)	1.021 (1.010, 1.031)	1.037 (1.021, 1.052)	1.051 (1.039, 1.064)	1.054 (1.041, 1.068)
Thailand	0.964 (0.867, 1.073)	0.963 (0.865, 1.072)	0.963 (0.865, 1.072)	1.140 (0.869, 1.496)	1.142 (0.872, 1.497)	1.146 (0.875, 1.501)	1.223 (1.036, 1.443)	1.225 (1.036, 1.447)	1.225 (1.037, 1.448)
Vietnam	1.164 (1.006, 1.347)	1.146 (0.990, 1.327)	1.110 (0.957, 1.288)	1.208 (1.033, 1.414)	1.139 (1.022, 1.269)	1.112 (0.999, 1.239)	NA	NA	NA
Australia	1.008 (0.940, 1.080)	1.011 (0.942, 1.085)	1.012 (0.943, 1.086)	1.083 (0.989, 1.186)	1.088 (0.994, 1.190)	1.093 (1.000, 1.195)	1.307 (1.110, 1.540)	1.311 (1.099, 1.563)	1.309 (1.113, 1.539)
New Zealand	1.061 (0.985, 1.144)	1.083 (1.016, 1.154)	1.088 (1.022, 1.159)	1.106 (0.998, 1.226)	1.106 (0.999, 1.225)	1.109 (1.001, 1.228)	1.292 (1.107, 1.508)	1.321 (1.142, 1.527)	1.291 (1.274, 1.308)
Guatemala	1.136 (1.008, 1.281)	1.145 (1.024, 1.281)	1.158 (1.063, 1.261)	NA	NA	NA	NA	NA	NA
Puerto Rico	1.012 (0.937, 1.092)	1.015 (0.940, 1.096)	1.014 (0.940, 1.095)	NA	NA	NA	NA	NA	NA
Portugal	1.041 (0.942, 1.150)	1.038 (0.939, 1.147)	1.036 (0.937, 1.145)	1.323 (0.858, 2.041)	1.331 (0.864, 2.052)	1.337 (0.868, 2.062)	NA	NA	NA
Spain	0.941 (0.836, 1.059)	0.940 (0.836, 1.058)	0.939 (0.835, 1.057)	0.780 (0.605, 1.006)	0.781 (0.606, 1.005)	0.779 (0.605, 1.004)	1.120 (0.782, 1.605)	1.122 (0.783, 1.606)	1.123 (0.785, 1.608)

Abbreviations: CVD, Cardiovascular disease; CI, confidence interval; NA, not applicable; RD, respiratory diseases; RR, relative risk; SD, standard deviation.

[a]Due to the limited number of TCs during the study period or the unavailability of CVD or RD mortality data, the RR for some countries or regions could not be estimated and is therefore shown as "NA".

[b]To exclude the effects of other TCs (if any) when estimated the POC for the TC of interest, a certain length of post-TC periods was excluded for other TCs.

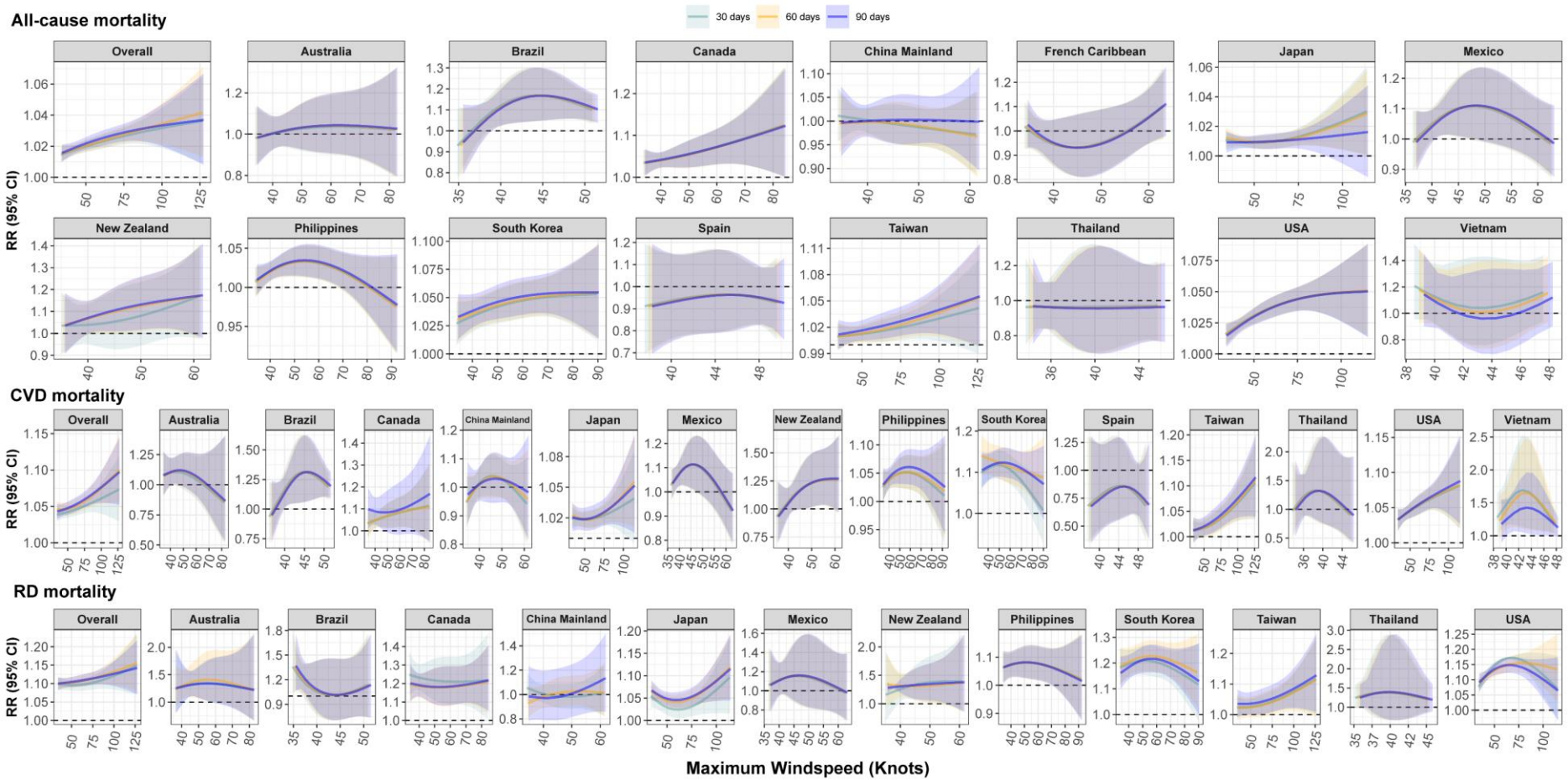

Fig A. The exposure-response (ER) relationship of the relative risks (RR) for all-cause, cardiovascular disease (CVD) and respiratory disease (RD) mortality with tropical cyclone (TC)-related maximum sustained windspeed (knots) by countries or territories. The ER relationships were fitted using TC-specific RRs estimated by excluding a 30-, 60- or 90-day post-TC period.

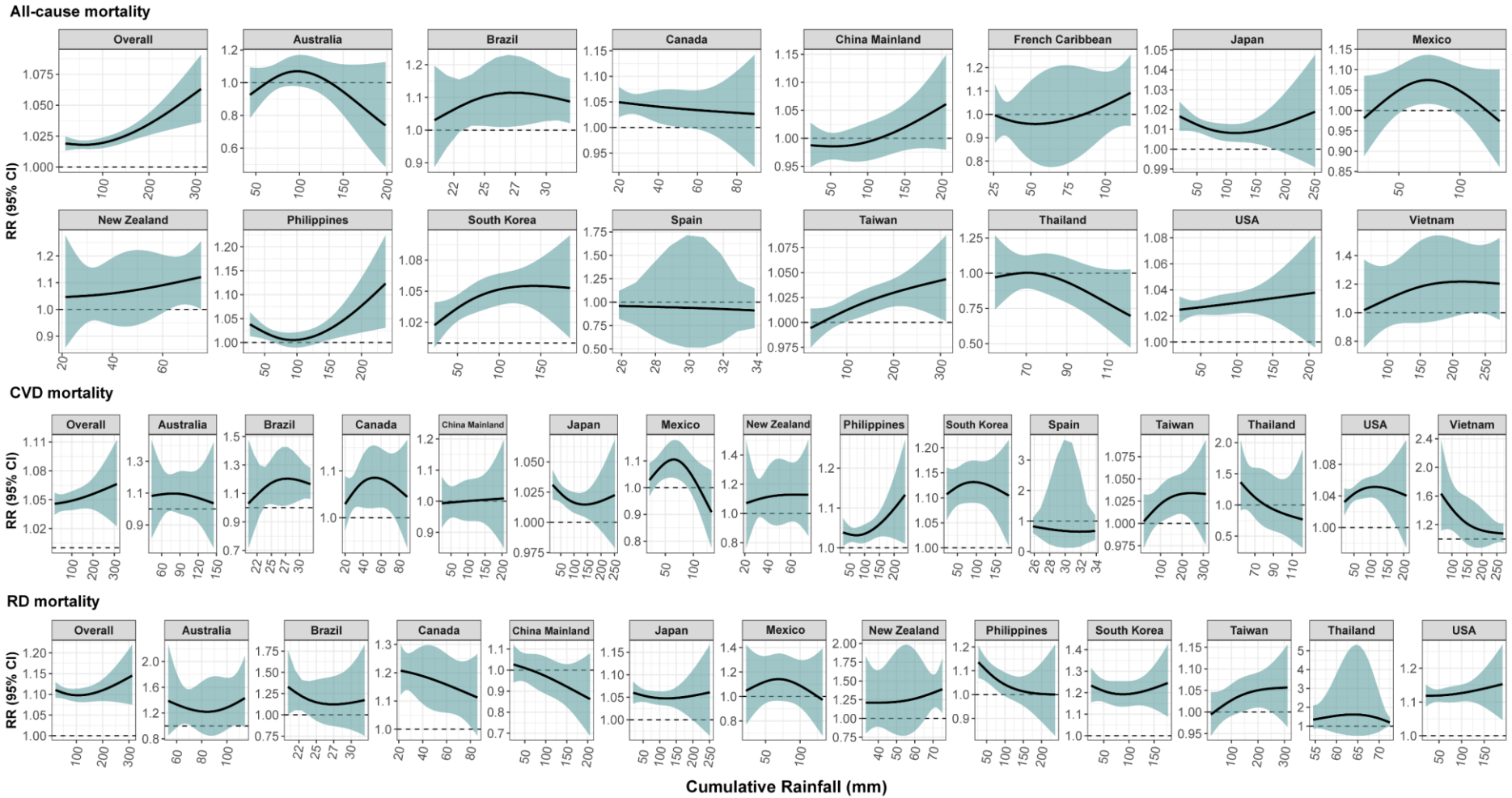

Fig B. The exposure-response relationship of the relative risks (RR) for all-cause, cardiovascular disease (CVD) and respiratory disease (RD) mortality with TC-related cumulative rainfall (mm) by countries or territories.

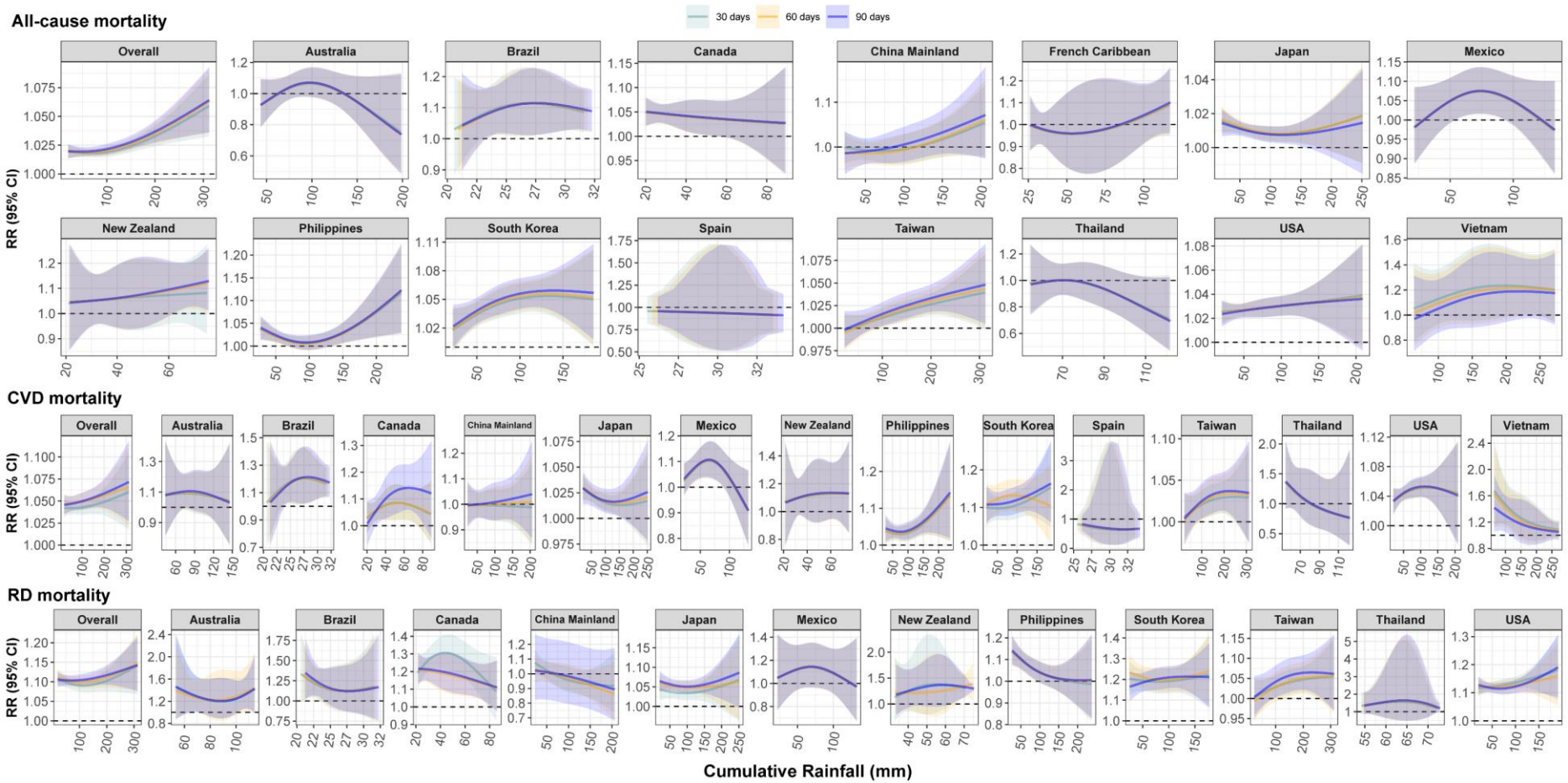

Fig C. The exposure-response (ER) relationship of the relative risks (RR) for all-cause, cardiovascular disease (CVD) and respiratory disease (RD) mortality with tropical cyclone (TC)-related cumulative rainfall (mm) by countries or territories. The ER relationships were fitted using TC-specific RRs estimated by excluding a 30-, 60- or 90-day post-TC period.

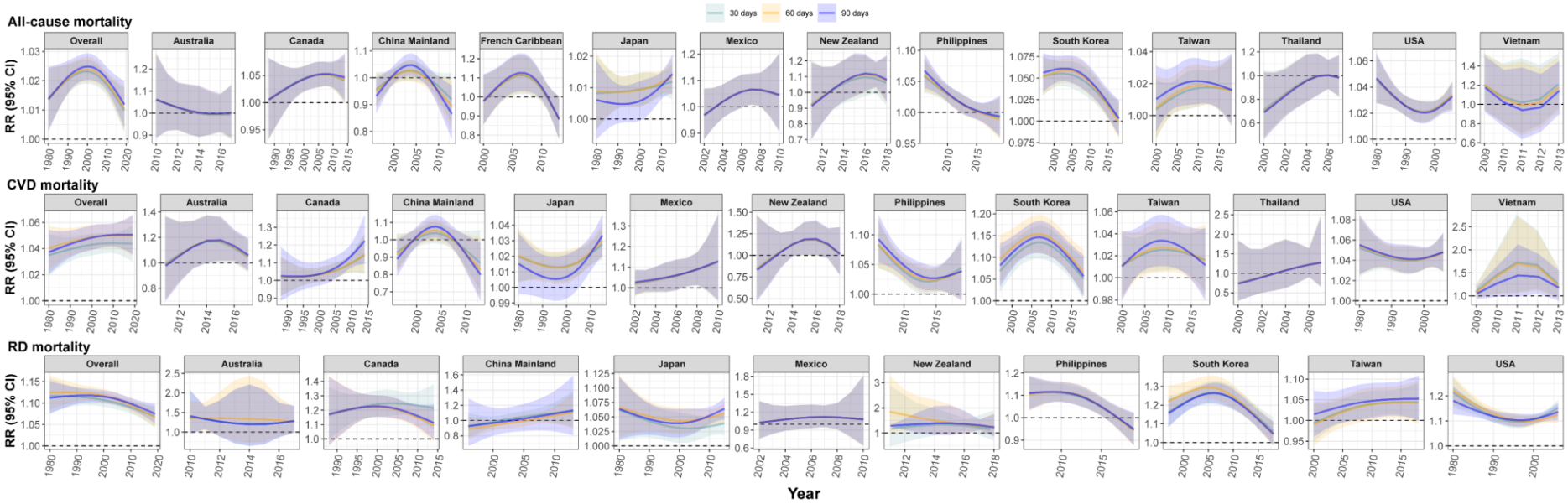

Fig D. The temporal trend of the relative risks (RR) for all-cause, cardiovascular diseases (CVD) and respiratory diseases (RD) mortality after TC exposure from 1980 to 2019 by countries or territories. The temporal trends were fitted using TC-specific RRs estimated by excluding a 30-, 60- or 90-day post-TC period.