

Supplementary Martial

Table S1. Number of dengue cases in 21 prefecture-level cities of Guangdong Province, 2015–2019

Prefecture-level city	Number of dengue case	Proportion (%)
Guangzhou	4234	31.96
Chaozhou	2003	15.12
Foshan	1060	8.00
Shantou	1022	7.72
Zhanjiang	1016	7.67
Shenzhen	895	6.76
Zhongshan	713	5.38
Jiangmen	562	4.24
Jieyang	448	3.38
Dongguan	360	2.72
Qingyuan	163	1.23
Zhuhai	149	1.12
Maoming	147	1.11
Huizhou	132	1.00
Yunfu	103	0.78
Yangjiang	79	0.60
Zhaoqing	75	0.57
Heyuan	55	0.42
Shaoguan	15	0.11
Meizhou	9	0.07
Shanwei	6	0.05

Table S2. Correlation matrix of weekly dengue cases, meteorological factors, and time-related variables

Variables	Weekly dengue cases	Weekly average temperature	Weekly average relative humidity	0–6 weeks moving average temperature	0–6 weeks moving average relative humidity	week of the year
Weekly dengue cases	1.00	0.16	-0.01	0.22	0.11	0.21
Weekly average temperature	0.16	1.00	0.57	0.92	0.71	0.28
Weekly average relative humidity	-0.01	0.57	1.00	0.43	0.74	-0.11
0–6 weeks lagged moving average temperature	0.22	0.92	0.43	1.00	0.65	0.51
0–6 weeks lagged moving average relative humidity	0.11	0.71	0.74	0.65	1.00	0.10
week of the year	0.21	0.28	-0.11	0.51	0.10	1.00

Table S3. Variance Inflation Factors (VIF) for the 0–6 week moving average temperature, 0–6 week moving average relative humidity, and week of the year

Variables	VIF
0–6 weeks lagged moving average temperature	1.93
0–6 weeks lagged moving average relative humidity	1.90
week of the year	1.06

Table S4. Descriptive statistics of weekly dengue cases and meteorological factors
across six cities in Guangdong Province during 2015–2019

Variable	Mean	SD	Min	P25	Median	P75	Max
2015							
Dengue cases	5	33	0	0	0	1	462
Temperature (°C)	22.43	5.16	11.04	17.71	23.79	26.83	31.12
Relative humidity(%)	78.93	7.7	56.78	74.44	80.64	83.86	95.15
2016-2019							
Dengue cases	7	20	0	0	0	3	164
Temperature (°C)	22.44	5.13	6.45	18.16	23.48	27.03	29.92
Relative humidity(%)	78.96	8.91	32.26	74.45	81.15	85.31	95.09

* SD, standard deviation; Min, minimum; P25, 25th percentile; P75, 75th percentile; Max, maximum.

Table S5. Descriptive statistics of the Dengue Meteorological Risk Index (DMRI) across the six cities in Guangdong Province during 2015–2019.

Year	Mean	SD	Min	P25	Median	P75	Max
2015-2019	51.49	26.78	0.00	30.68	48.75	76.88	100.00
2015	50.37	26.82	0.00	29.24	49.47	73.75	97.27
2016-2019	51.78	26.77	2.14	31.17	48.69	77.32	100.00

* SD, standard deviation; Min, minimum; P25, 25th percentile; P75, 75th percentile; Max, maximum.

Table S6. Comparison of model performance between the RF-weighted DMRI and equal-weight DMRI

Weighting Scheme	Marginal R-squared	Conditional R-squared
RF-weighted DMRI	0.17	0.38
Equal-weight DMRI	0.13	0.31

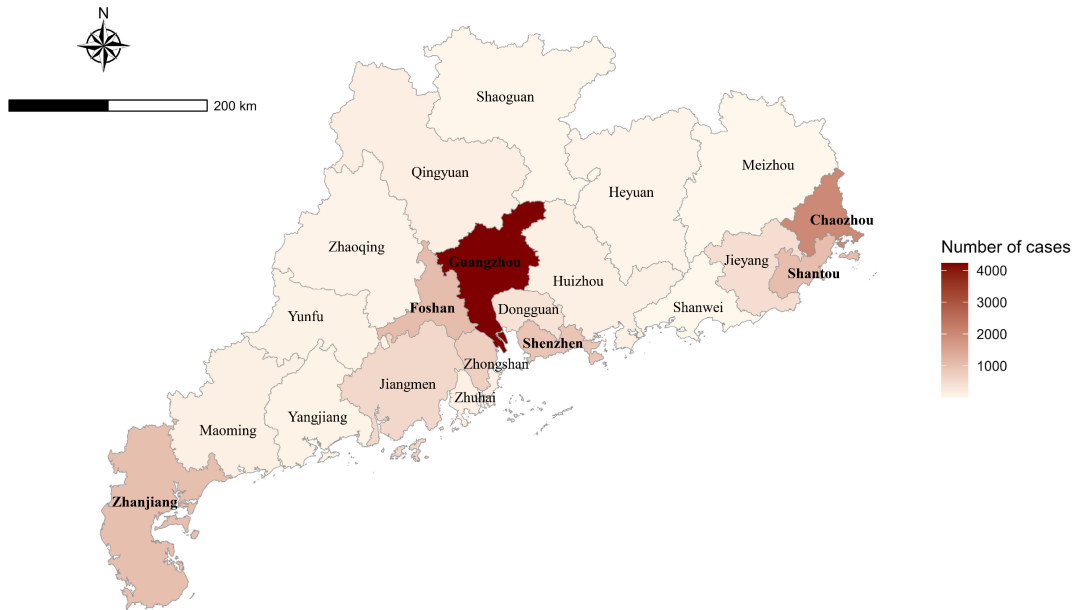


Figure S1. Spatial distribution of dengue cases in Guangdong Province, 2015–2019
(Note: Cities in bold were selected for subsequent modeling analysis)

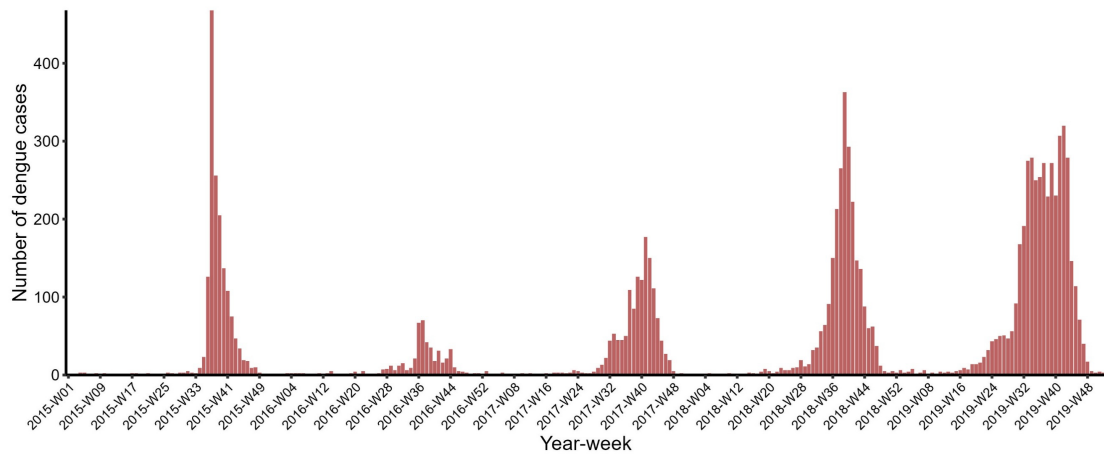


Figure S2. Weekly number of dengue cases in 6 cities of Guangdong Province, 2015–
2019

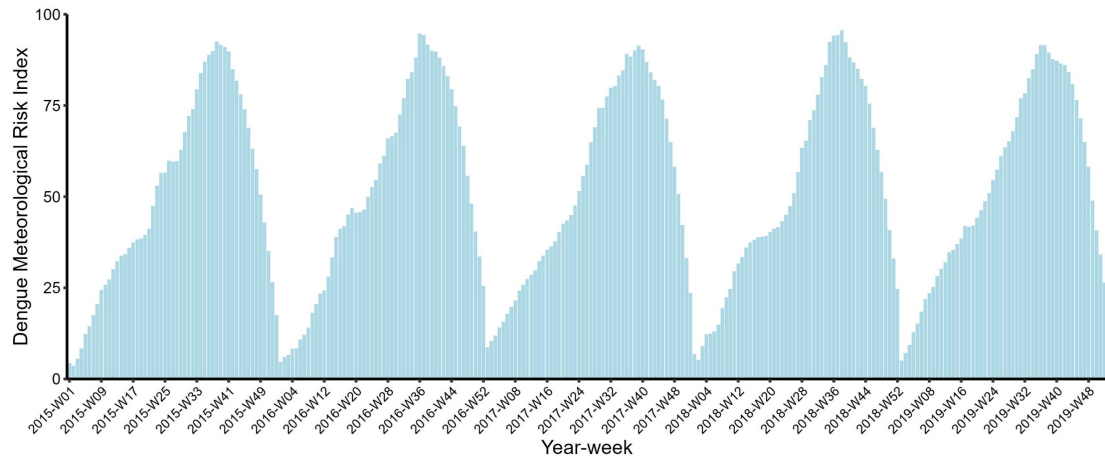
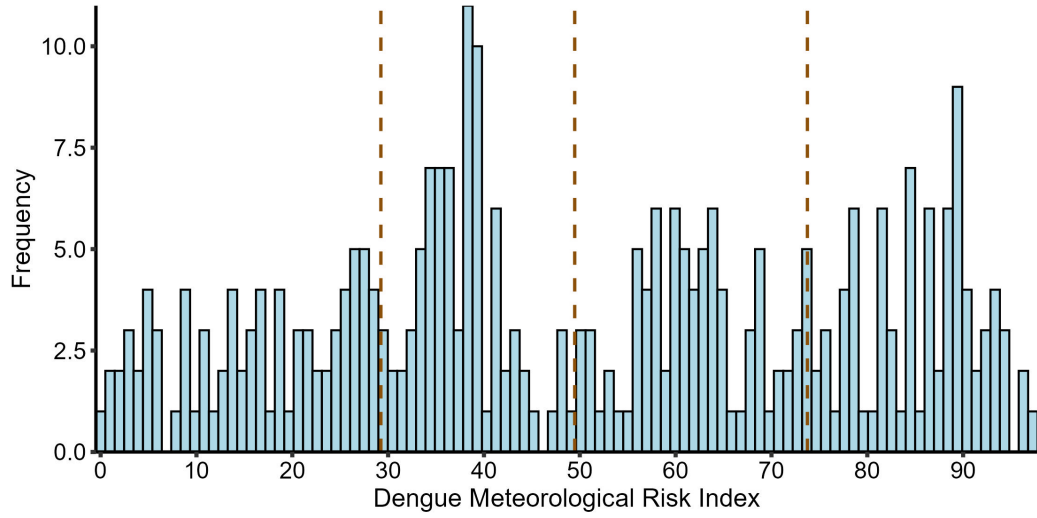


Figure S3. Weekly Dengue Meteorological Risk Index (DMRI) in 6 cities of Guangdong Province, 2015–2019

A. 2015



B. 2016-2019

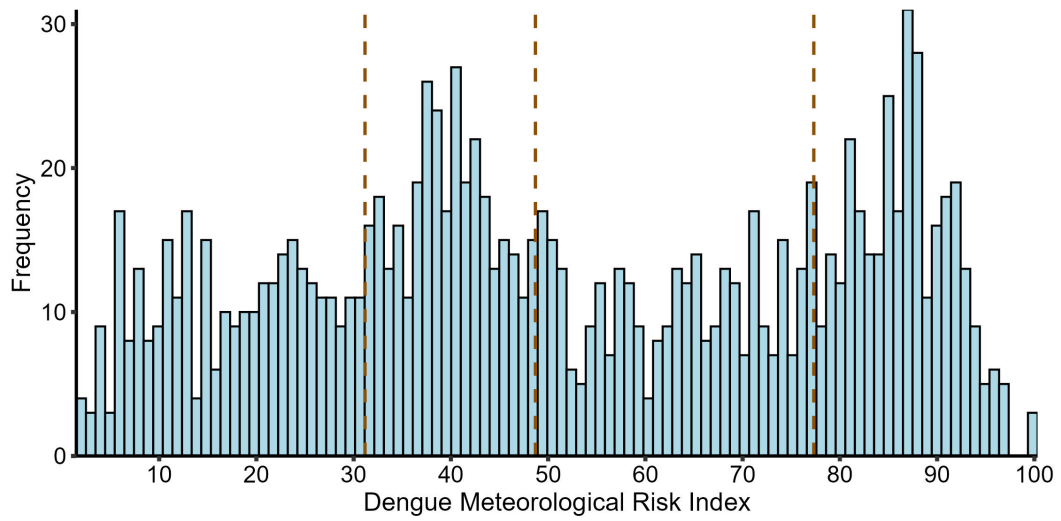


Figure S4. Distribution of the Dengue Meteorological Risk Index (DMRI) across six cities during the validation (2015) and training (2016–2019) periods (Vertical dashed lines indicate the 25th, 50th, and 75th percentiles)

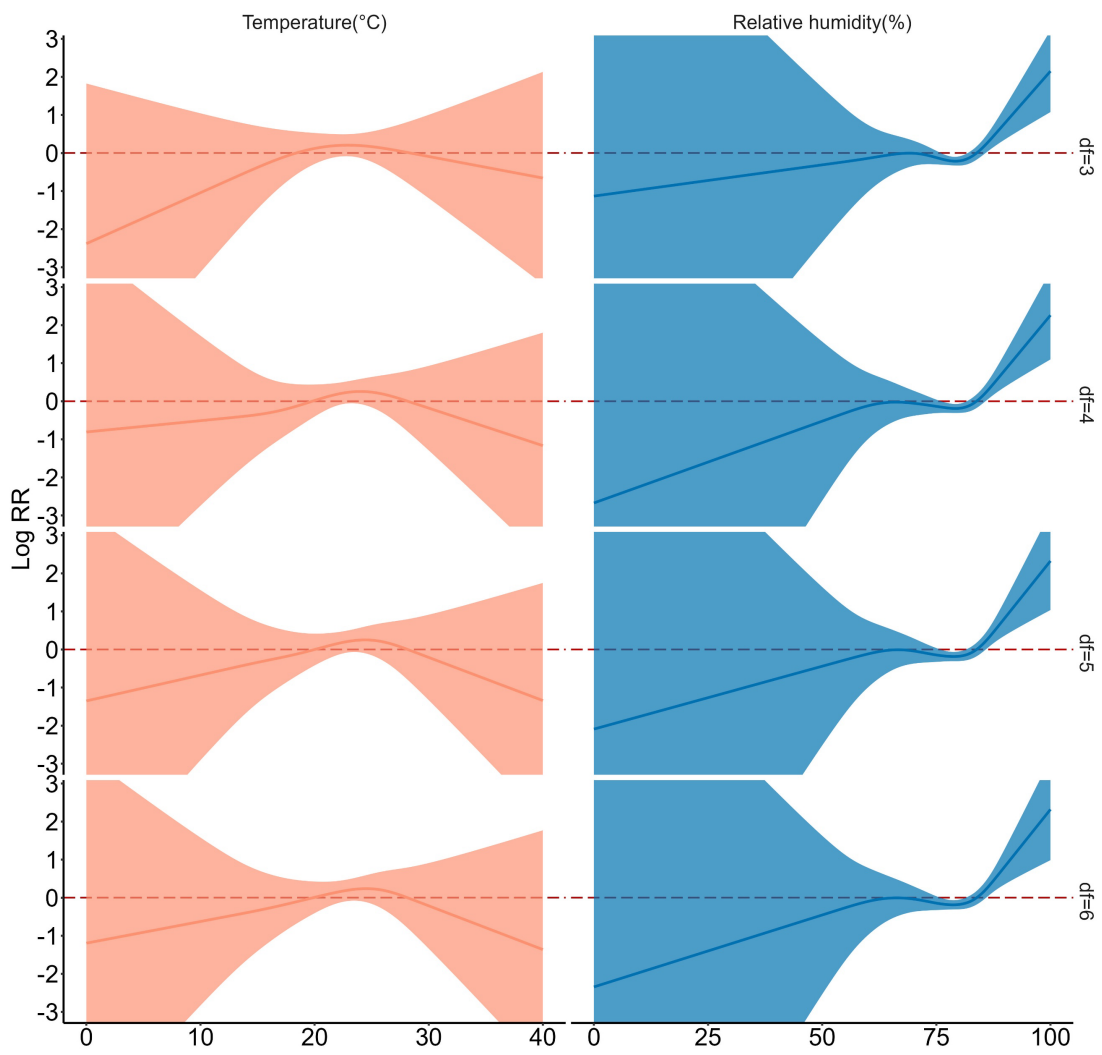


Figure S5. Sensitivity analysis varying the degrees of freedom (df = 3–6) for temperature and relative humidity

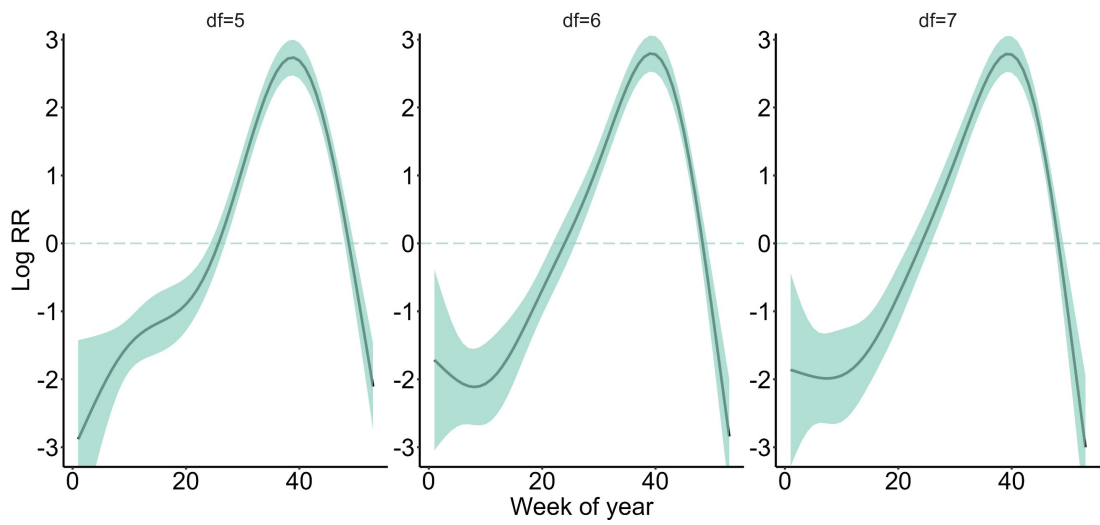


Figure S6. Sensitivity analysis varying the degrees of freedom ($df = 5-7$) for week of year variable

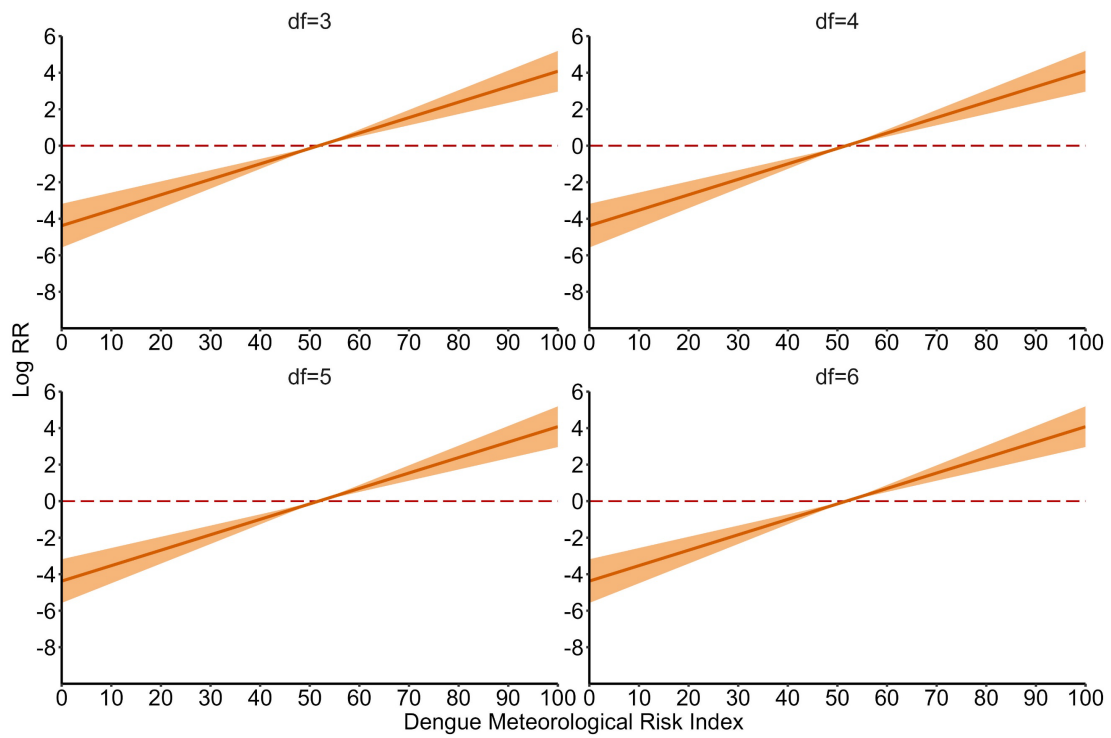


Figure S7. Sensitivity analysis varying the degrees of freedom ($df = 3-6$) for Dengue Meteorological Risk Index

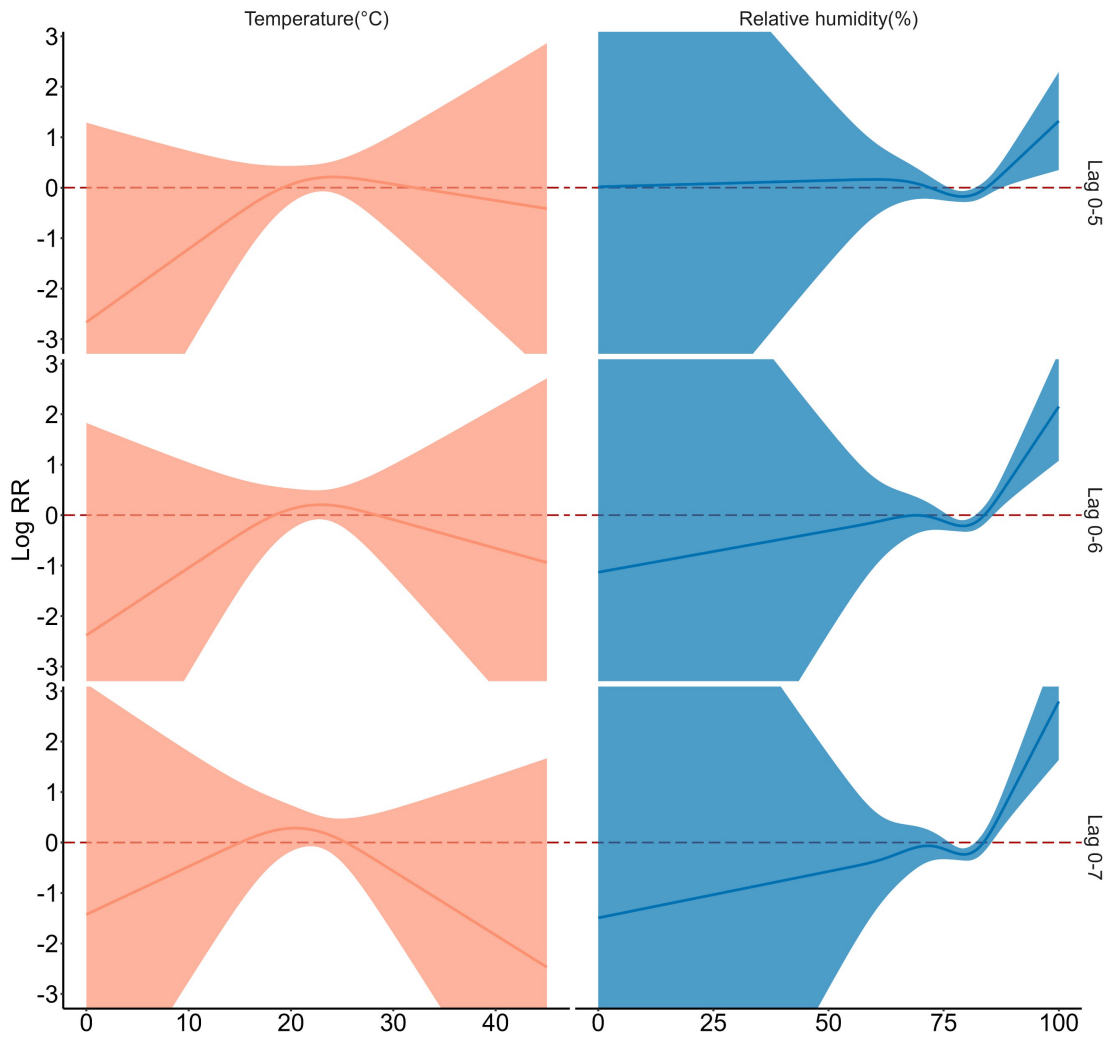


Figure S8. Sensitivity analysis varying moving average lag periods for temperature and relative humidity