Supplementary Figure S1. Distribution of weather conditions during study period, birth weight, maternal and neonatal *GPR61* methylation levels. Abbreviations: AP, atmospheric pressure (hPa); SSD, sunshine duration (h); RH, relative humidity (%); T, average daily mean temperature (°C); DTR, daily temperature range (°C).

Supplementary Table S1. Primers for *GPR61* gene for QMSP

Primers	Sequences (5'–3')	Tm (°C)	Lengths of PCR products (bp)
MF	TGTGTTAGGTTATTGGAGAGGTTAC	53	166
MR	CCCTATTTTATAAATAAAAAACCGAA		
UF	TTGTGTTAGGTTATTGGAGAGGTTAT	53	167
UR	CCCTATTTTATAAATAAAAAACCAAA		

Note. M: Methylation; U: Unmethylation; F: Forward; R: Reverse.

Supplementary Table S2. The distribution of methylation levels by sex of the newborn

	Boys	Girls	*t*	*P*
Maternal *GPR61* promoter methylation (%)	71.98 ± 11.11	70.99 ± 11.29	1.052	0.293
Neonatal *GPR61* promoter methylation (%)	73.94 ± 12.24	73.93 ± 11.58	0.009	0.993

Supplementary Table S3. Characteristics of weather conditions and air pollutants

Weather conditions	Entire pregnancy (mean ± SD)	Trimester 1 (mean ± SD)	Trimester 2 (mean ± SD)	Trimester 3 (mean ± SD)
Precipitation (mm)	278.81 ± 40.90	283.78 ± 129.74	257.85 ± 95.88	294.81 ± 103.75
AP (hPa)	1003.53 ± 1.99	1004.20 ± 6.85	1003.73 ± 6.99	1002.66 ± 6.78
SSD (h)	4.81 ± 0.34	4.89 ± 0.87	4.87 ± 0.74	4.67 ± 1.02
RH (%)	55.83 ± 5.14	56.29 ± 10.51	54.76 ± 9.46	56.44 ± 10.48
T (°C)	15.24 ± 2.58	14.44 ± 8.72	14.83 ± 8.75	16.44 ± 8.49
DTR (°C)	9.78 ± 0.58	9.84 ± 1.11	9.86 ± 0.95	9.64 ± 1.26
PM_{10} (μg/m³)	106.72 ± 5.50	105.49 ± 15.64	107.43 ± 10.23	107.04 ± 10.96
SO_2 (μg/m³)	50.15 ± 7.28	51.96 ± 20.39	51.24 ± 19.74	47.22 ± 18.97
NO_2 (μg/m³)	44.21 ± 2.77	44.64 ± 8.16	44.60 ± 7.53	43.36 ± 7.22

Note. Abbreviations: AP, atmospheric pressure (hPa); SSD, sunshine duration (h); RH, relative humidity (%); T, average daily mean temperature (°C); DTR, daily temperature range (°C); PM_{10}, particular matter 10; SO_2, sulfur dioxide; NO_2, nitrogen dioxide.

Supplementary Table S4. Spearman correlation of weather conditions and air pollutants

		Precipitation	AP	SSD	RH	T	DTR	PM_{10}	SO_2	NO_2
Entire pregnancy	Precipitation	1.00	−0.52	−0.47	0.74	0.52	−0.60	−0.58	−0.51	−0.58
	AP		1.00	0.18	−0.29	−0.97	0.29	0.42	0.84	0.85
	SSD			1.00	−0.48	−0.19	0.71	0.17	0.19	0.41
	RH				1.00	0.24	−0.80	−0.52	−0.01	−0.38
	T					1.00	−0.21	−0.41	−0.86	−0.83
	DTR						1.00	0.44	0.06	0.46
	PM_{10}							1.00	0.19	0.26
	SO_2								1.00	0.76
	NO_2									1.00
Trimester 1	Precipitation	1.00	−0.82	−0.02	−0.69	0.79	−0.52	−0.59	−0.83	−0.82
	AP		1.00	−0.32	−0.61	−0.98	0.31	0.65	0.93	0.95
	SSD			1.00	−0.24	0.29	0.64	0.00	−0.14	−0.16
	RH				1.00	0.67	−0.66	−0.66	−0.58	−0.56
	T					1.00	−0.28	−0.68	−0.93	−0.90
	DTR						1.00	0.45	0.36	0.41
	PM_{10}							1.00	0.65	0.60
	SO_2								1.00	0.93
	NO_2									1.00
Trimester 2	Precipitation	1.00	−0.76	−0.06	0.53	0.72	−0.43	−0.50	−0.73	−0.73
	AP		1.00	−0.23	−0.51	−0.97	0.33	0.67	0.91	0.91
	SSD			1.00	−0.39	0.21	0.67	0.01	−0.10	−0.10
	RH				1.00	0.59	−0.73	−0.60	−0.47	−0.47
	T					1.00	−0.32	−0.72	−0.90	−0.90
	DTR						1.00	0.40	0.41	0.41
	PM_{10}							1.00	0.68	0.57
	SO_2								1.00	0.93
	NO_2									1.00
Trimester 3	Precipitation	1.00	−0.76	−0.06	0.53	0.72	−0.43	−0.50	−0.74	−0.73
	AP		1.00	−0.23	−0.51	−0.97	0.33	0.67	0.94	0.91
	SSD			1.00	−0.39	0.21	0.67	0.01	−0.20	−0.10
	RH				1.00	0.59	−0.73	−0.60	−0.42	−0.47
	T					1.00	−0.32	−0.72	−0.94	−0.90
	DTR						1.00	0.40	0.29	0.41
	PM_{10}							1.00	0.68	0.57
	SO_2								1.00	0.93
	NO_2									1.00

Note. All *P* < 0.05. Abbreviations: AP, atmospheric pressure (hPa); SSD, sunshine duration (h); RH, relative humidity (%); T, average daily mean temperature (°C); DTR, daily temperature range (°C); PM_{10}, particular matter 10; SO_2, sulfur dioxide; NO_2, nitrogen dioxide.

Supplementary Table S5. Spearman correlation of trimesters of pregnancy exposures to weather conditions and air pollutants

Meteorological conditions	Trimester 1 *vs.* trimester 2	Trimester 1 *vs.* trimester 3	Trimester 2 *vs.* trimester 3
Precipitation	−0.35	−0.28	−0.25
AP	−0.10	−0.95	−0.08
SSD	−0.52	0.08	−0.47
RH	0.15	−0.57	0.08
T	−0.10	−0.97	−0.03
DTR	−0.24	0.11	−0.15
PM_{10}	−0.06	−0.48	−0.10
SO_2	−0.12	−0.90	−0.01
NO_2	−0.10	−0.83	−0.04

Note. All *P* < 0.05. Abbreviations: AP, atmospheric pressure (hPa); SSD, sunshine duration (h); RH, relative humidity (%); T, average daily mean temperature (°C); DTR, daily temperature range (°C); PM_{10}, particular matter 10; SO_2, sulfur dioxide; NO_2, nitrogen dioxide.

Supplementary Table S6. Analysis of the relationship between weather conditions and maternal/neonatal *GPR61* promoter methylation levels after adjusting PM_{10}[a]

Meteorological factors	n	Entire pregnancy		Trimester 1		Trimester 2		Trimester 3	
		β (95% *CI*)	P	β (95% *CI*)	P	β (95% *CI*)	P	β (95% *CI*)	P
Maternal methylation									
Precipitation (mm)[b]	567	0.07 (0.02, 0.11)	0.003	0.02 (0.00, 0.03)	0.024	−0.02 (−0.03, −0.00)	0.033	0.03 (0.01, 0.04)	< 0.001
AP (hPa)[c]	567	0.78 (0.08, 1.47)	0.030	−0.16 (−0.47, 0.15)	0.315	0.28 (0.03, 0.59)	0.031	0.27 (−0.05, 0.58)	0.093
SSD (h)[c]	567	1.37 (−2.13, 4.87)	0.443	−1.41 (−2.80, −0.01)	0.049	1.18 (−0.48, 2.84)	0.164	0.45 (−1.00, 1.90)	0.539
RH (%)[d]	567	−0.67 (−0.94, −0.40)	< 0.001	−0.17 (−0.35, 0.02)	0.075	−0.28 (−0.47, −0.08)	0.005	−0.31 (−0.45, −0.16)	< 0.001
T (°C)[c]	567	−0.34 (−0.96, 0.29)	0.294	0.20 (−0.01, 0.40)	0.059	−0.23 (−0.46, −0.01)	0.043	−0.19 (−0.38, −0.00)	0.047
DTR (°C)[c]	567	4.08 (2.23, 5.93)	< 0.001	0.66 (−0.39, 1.71)	0.219	2.59 (1.41, 3.77)	< 0.001	0.68 (−0.29, 1.66)	0.170
Neonatal methylation									
Precipitation (mm)[b]	567	0.11 (0.07, 0.15)	< 0.001	0.02 (0.01, 0.04)	0.003	−0.01 (−0.03, 0.01)	0.197	0.03 (0.02, 0.04)	< 0.001
AP (hPa)[c]	567	0.57 (−0.11, 1.24)	0.102	−0.06 (−0.40, 0.30)	0.762	0.27 (0.03, 0.51)	0.026	0.46 (0.19, 0.73)	< 0.001
SSD (h)[c]	567	−0.62 (−4.08, 2.84)	0.727	−1.45 (−2.79, −0.12)	0.033	1.85 (0.14, 3.56)	0.034	−0.78 (−2.37, 0.80)	0.332
RH (%)[d]	567	−0.87 (−1.12, −0.62)	< 0.001	−0.35 (−0.52, −0.17)	< 0.001	−0.29 (−0.48, −0.11)	0.002	−0.32 (−0.47, −0.17)	< 0.001
T (°C)[c]	567	−0.11 (−0.67, 0.45)	0.697	0.13 (−0.12, 0.37)	0.305	−0.19 (−0.41, 0.03)	0.087	−0.34 (−0.52, −0.15)	< 0.001
DTR (°C)[c]	567	3.85 (1.85, 5.85)	< 0.001	0.75 (−0.33, 1.84)	0.174	3.29 (2.10, 4.48)	< 0.001	0.15 (−0.92, 1.23)	0.783

Note. [a]The assessments of β and the 95% *CI* were for 1 unit (mm for precipitation, hPa for AP, h for SSD, % for RH and °C for T and DTR) increment of weather conditions. [b]Adjustments: RH, gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake, birth season and PM_{10}. [c]Adjustments: gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake, birth season and PM_{10}. [d]Adjustments: precipitation, gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake, birth season and PM_{10}. Abbreviations: AP, atmospheric pressure (hPa); SSD, sunshine duration (h); RH, relative humidity (%); T, average daily mean temperature (°C); DTR, daily temperature range (°C); PM_{10}, particular matter 10; SO_2, sulfur dioxide; NO_2, nitrogen dioxide.

Supplementary Table S7. Analysis of the relationship between weather conditions and birth weight after adjusting PM_{10}[a]

Meteorological factors	n	Entire pregnancy		Trimester 1		Trimester 2		Trimester 3	
		β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P
Precipitation (mm)[b]	567	−0.40 (−1.77, 0.97)	0.567	0.04 (−0.44, 0.51)	0.883	0.43 (−0.05, 0.90)	0.077	0.14 (−0.13, 0.60)	0.536
AP (hPa)[c]	567	−3.49 (−30.49, 23.51)	0.800	−4.50 (−13.67, 4.67)	0.336	−1.69 (−10.44, 7.06)	0.705	7.60 (−1.93, 17.14)	0.118
SSD (h)[c]	567	40.67 (−93.78, 175.12)	0.553	−5.89 (−60.60, 48.83)	0.833	30.11 (−26.09, 86.31)	0.294	2.46 (−51.85, 56.78)	0.929
RH (%)[d]	567	−19.21 (−29.20, −9.21)	< 0.001	−8.18 (−15.24, −1.12)	0.023	−11.25 (−17.21, −5.30)	< 0.001	−7.70 (−13.44, −1.96)	0.009
T (°C)[c]	567	3.90 (−18.96, 26.76)	0.738	3.73 (−3.01, 10.47)	0.278	2.30 (−6.04, 10.64)	0.589	−5.14 (−11.37, 1.09)	0.106
DTR (°C)[c]	567	121.93 (50.30, 193.56)	< 0.001	28.40 (−11.12, 67.91)	0.159	67.28 (19.66, 114.91)	0.006	28.57 (−9.95, 67.09)	0.146

Note. [a]The assessments of β and the 95% CI were for 1 unit (mm for precipitation, hPa for AP, h for SSD, % for RH and °C for T and DTR) increment of weather conditions. [b]Adjustments: RH, gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake, birth season and PM_{10}. [c]Adjustments: gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake, birth season and PM_{10}. [d]Adjustments: precipitation, gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake, birth season and PM_{10}. Abbreviations: AP, atmospheric pressure (hPa); SSD, sunshine duration (h); RH, relative humidity (%); T, average daily mean temperature (°C); DTR, daily temperature range (°C); PM_{10}, particular matter 10; SO_2, sulfur dioxide; NO_2, nitrogen dioxide.

Supplementary Table S8. Association between weather conditions and birth weight with further adjusting exposures during all trimesters of pregnancy

Weather conditions		n	Birth weight	
			β (95% CI)	P
RH[a]	Trimester 1	567	−6.26 (−12.17, −0.36)	0.038
	Trimester 2	567	−8.86 (−16.40, −1.32)	0.021
	Trimester 3	567	−2.99 (−7.87, 1.89)	0.230
DTR[b]	Trimester 1	567	49.27 (15.74, 82.76)	0.004
	Trimester 2	567	92.09 (45.70, 138.49)	< 0.001
	Trimester 3	567	14.86 (−20.11, 49.83)	0.405

Note. [a]Adjustments: precipitation, gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake and birth season. [b]Adjustments: gestational age, sex of the newborn, maternal age, maternal education, family income, pregestational BMI, net weight gain, passive smoking, folic acid intake and birth season. Abbreviations: RH, relative humidity (%); DTR, daily temperature range (°C).