

資料來源

空氣品質監測資料

自 2017 年 1 月 1 日至 2017 年 12 月 31 日的高雄地區空氣品質觀測資料，取自於行政院環境保護署空氣品質監測網 (<https://taqm.epa.gov.tw/taqm/tw/YearlyDataDownload.aspx>)，當中包含每日每小時的各項監測濃度，我們取用其中的 PM2.5、PM10、NO₂、NO、SO₂、CO 與 O₃，並計算每日的平均作為當日監測資料。

蕁麻疹就診人數資料

資料來自高雄榮民總醫院(皮膚科)，為 2017 年 1 月 1 日至 2017 年 12 月 31 日診斷 ICD-9 代碼為 995.3(過敏) 每日就診人數資料，此篇為過敏的結果。

univariate gam

Generalized additive Poisson model

$$\ln(patient) = Intercept + \beta \times Air + s(temperature) + s(humidity) + s(time) + s(rain) + s(windspeed)$$

s= a cyclic cubic regression splines

下列依不同的空汙指標分別做單變數 Generalized additive Poisson model，並以時間趨勢、當天的溫度、濕度、雨量與風速作為共變量做平滑函數的擬合，下列各空汙列出了不同的滯後天數 (row, 當天 前七天) 與不同的移動平均天數 (column, 當天平均 七天平均) 的模型結果 (p-value 與空汙估計係數)

CO

Table 1: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.593	0.790	0.824	0.403	0.765	0.826	0.807
2	0.309	0.262	0.378	0.558	0.964	0.823	0.621
3	0.240	0.826	0.469	0.602	0.860	0.755	0.879
4	0.112	0.997	0.563	0.453	0.508	0.685	0.956
5	0.669	0.601	0.742	0.798	0.563	0.656	0.846
6	0.372	0.998	0.466	0.964	0.697	0.473	0.469
7	0.225	0.884	0.883	0.505	0.952	0.750	0.606
8	0.999	0.692	0.651	0.786	0.841	0.721	0.984

row:lag days,col:moving average for the n days

Table 2: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.214	0.129	-0.121	-0.503	-0.198	0.160	0.193
2	0.418	0.551	0.480	0.349	0.029	0.162	0.387
3	-0.493	0.108	0.389	0.306	0.114	-0.224	-0.119
4	0.647	0.002	0.316	0.447	0.434	0.293	0.043
5	-0.182	0.261	-0.182	0.152	0.377	0.321	0.152
6	-0.378	-0.001	0.394	-0.027	0.256	0.520	0.572
7	0.493	-0.073	0.081	0.399	-0.040	0.231	0.406
8	-0.000	0.197	-0.249	-0.162	0.131	-0.258	-0.015

SO2

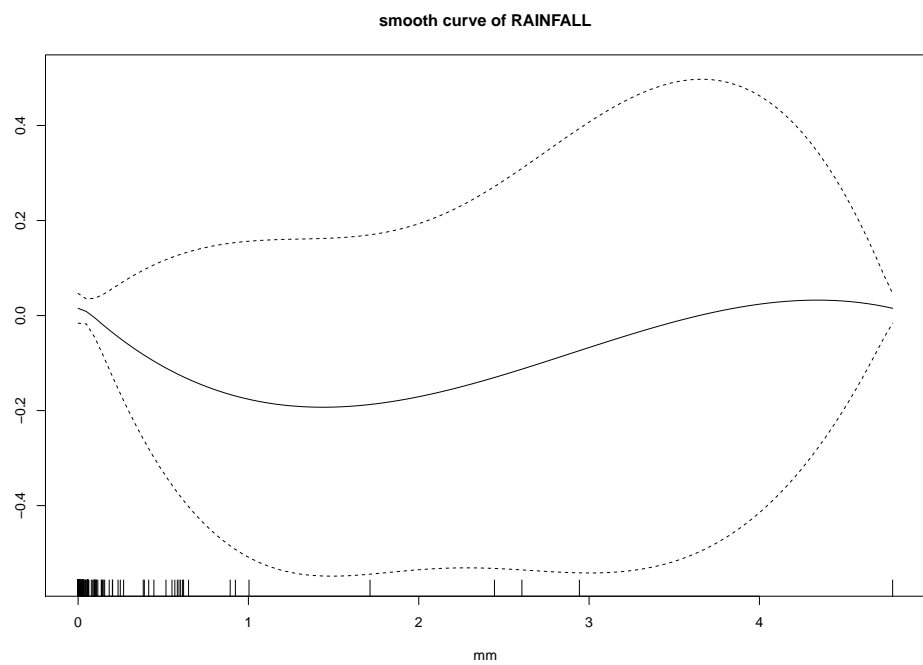
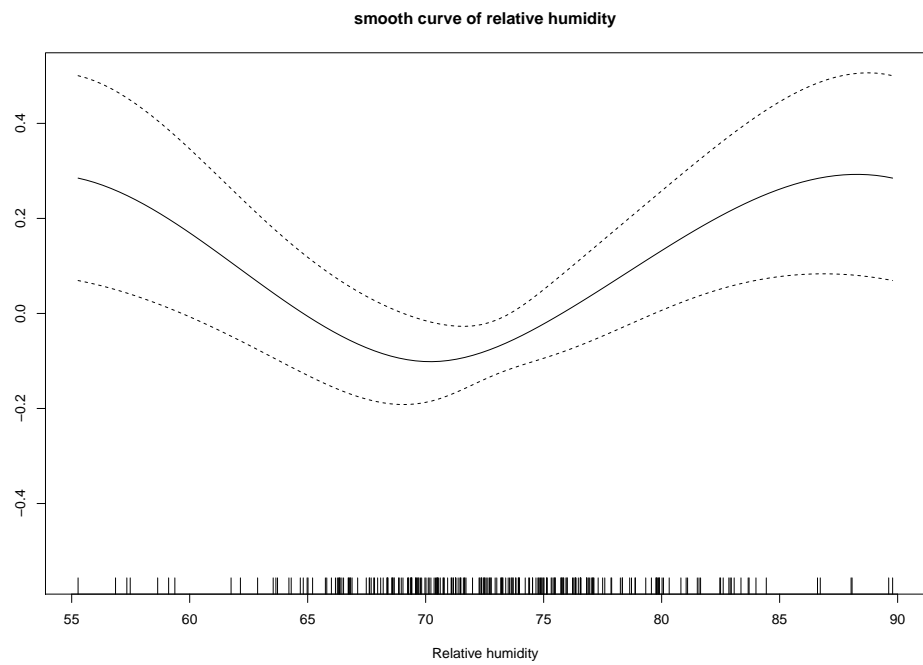
Table 3: linear term p-value with lag and moving average data

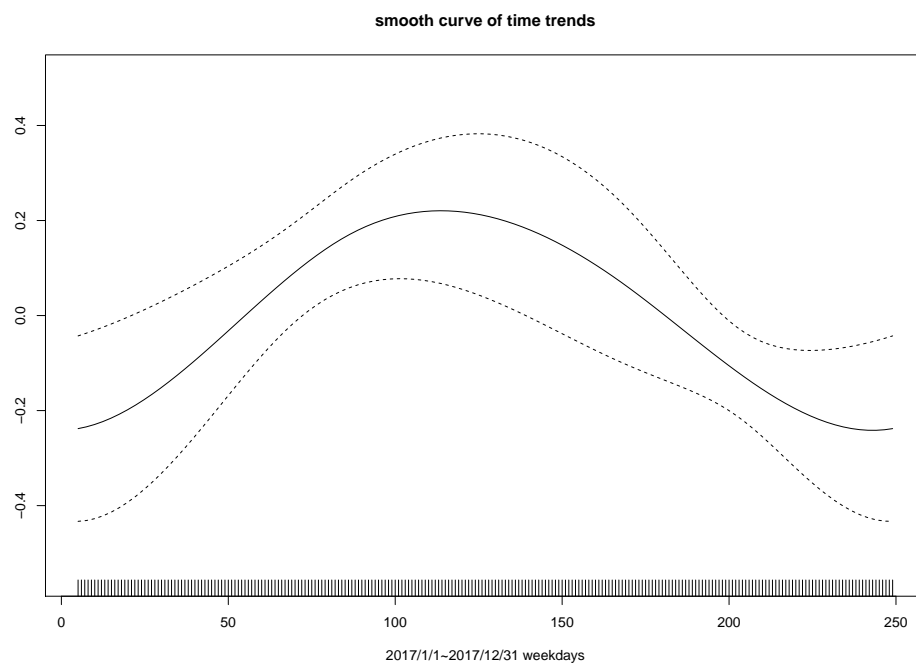
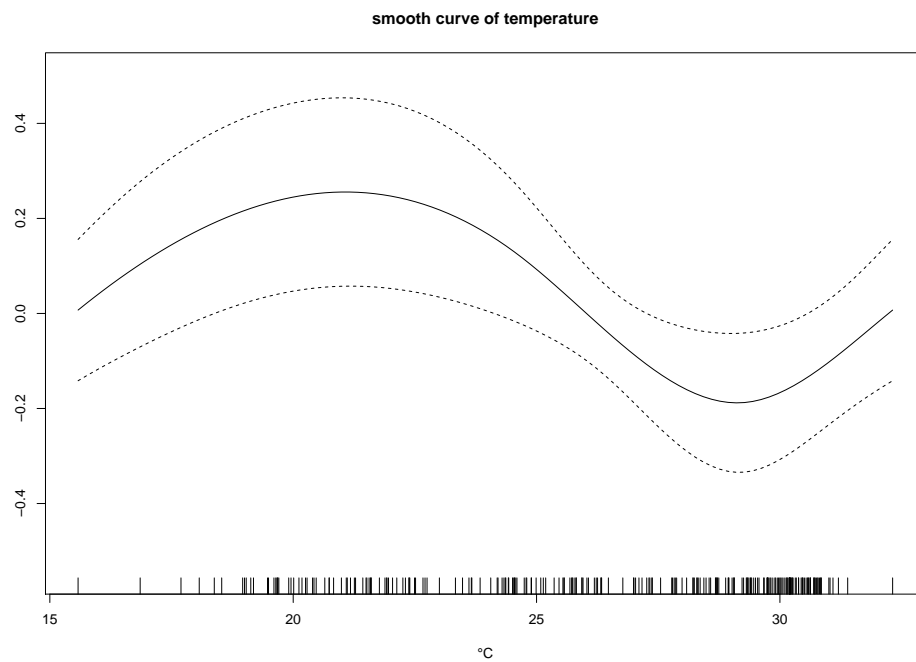
	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.021	0.364	0.967	0.331	1.000	0.866	0.812
2	0.572	0.620	0.109	0.296	0.891	0.506	0.729
3	0.580	0.517	0.986	0.152	0.416	0.862	0.411
4	0.664	0.701	0.800	0.521	0.431	0.682	0.900
5	0.038	0.389	0.621	0.671	0.966	0.229	0.378
6	0.670	0.212	0.421	0.584	0.605	0.846	0.211
7	0.662	0.132	0.540	0.331	0.255	0.255	0.137
8	0.292	0.307	0.808	0.545	0.842	0.916	0.943

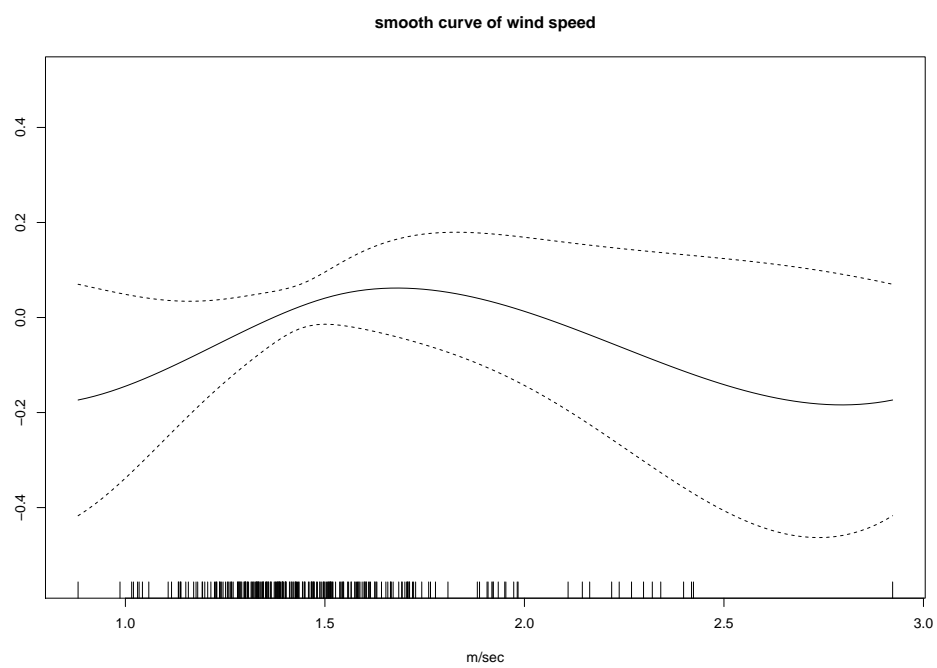
row:lag days,col:moving average for the n days

Table 4: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	-0.107	0.051	0.003	-0.070	0.000	-0.014	-0.020
2	0.026	-0.028	0.104	0.074	0.010	0.054	0.029
3	0.025	0.037	0.001	0.102	0.062	0.014	0.070
4	-0.020	-0.022	-0.016	-0.046	0.061	0.033	-0.011
5	0.096	0.049	0.032	0.030	0.003	0.098	0.075
6	-0.020	0.071	0.052	0.039	0.040	0.016	0.108
7	-0.020	-0.086	-0.040	-0.070	-0.088	-0.092	-0.126
8	0.049	0.058	0.016	0.043	0.015	0.009	0.006







O3

Table 5: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.626	0.625	0.903	0.859	0.874	0.756	0.697
2	0.294	0.321	0.485	0.874	0.735	0.783	0.683
3	0.976	0.857	0.995	0.936	0.536	0.478	0.529
4	0.075	0.397	0.693	0.768	0.744	0.402	0.313
5	0.293	0.993	0.920	0.933	0.980	0.911	0.564
6	0.782	0.824	0.399	0.503	0.661	0.799	0.823
7	0.437	0.190	0.162	0.368	0.334	0.273	0.230
8	0.156	0.460	0.332	0.305	0.602	0.545	0.457

row:lag days,col:moving average for the n days

Table 6: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	-0.002	-0.002	0.000	0.001	0.001	0.002	0.002
2	-0.004	-0.004	-0.003	0.001	0.002	0.001	0.002
3	0.000	-0.001	0.000	0.000	0.003	0.003	0.003
4	0.007	0.003	0.002	0.001	0.002	0.004	0.005
5	-0.004	-0.000	-0.000	-0.000	-0.000	0.000	0.003
6	0.001	0.001	0.004	0.003	0.002	0.001	0.001
7	-0.003	-0.005	-0.006	-0.004	-0.004	-0.005	-0.006
8	-0.005	-0.003	-0.004	-0.005	-0.002	-0.003	-0.004

PM2.5

Table 7: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.290	0.149	0.630	0.585	0.627	0.367	0.115
2	0.002	0.071	0.356	0.049	0.397	0.302	0.537
3	0.011	0.759	0.485	0.337	0.773	0.701	0.946
4	0.597	0.226	0.817	0.973	0.705	0.584	0.752
5	0.270	0.178	0.959	0.328	0.563	0.799	0.295
6	0.858	0.825	0.966	0.302	0.893	0.799	0.631
7	0.052	0.027	0.056	0.051	0.297	0.109	0.194
8	0.794	0.387	0.199	0.188	0.153	0.472	0.161

row:lag days,col:moving average for the n days

Table 8: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.004	0.008	-0.003	0.004	0.003	0.007	0.013
2	-0.013	-0.010	-0.006	-0.013	-0.006	-0.008	-0.005
3	0.011	0.002	0.004	0.006	-0.002	0.003	-0.000
4	-0.002	0.006	-0.001	0.000	0.003	-0.004	0.002
5	-0.005	-0.007	-0.000	-0.006	-0.004	-0.002	-0.008
6	-0.001	0.001	0.000	0.007	0.001	0.002	0.004
7	-0.008	-0.012	-0.012	-0.013	-0.007	-0.012	-0.010
8	0.001	-0.005	-0.008	-0.009	-0.010	-0.005	-0.011

PM10

Table 9: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.005	0.095	0.500	0.785	0.922	0.844	0.166
2	0.186	0.354	0.455	0.389	0.777	0.790	0.976
3	0.089	0.761	0.079	0.131	0.978	0.652	0.731
4	0.109	0.948	0.536	0.438	0.471	0.619	0.945
5	0.061	0.944	0.520	0.881	0.166	0.190	0.901
6	0.345	0.215	0.840	0.410	0.753	0.212	0.270
7	0.000	0.001	0.131	0.031	0.138	0.074	0.410
8	0.895	0.028	0.007	0.180	0.070	0.231	0.117

row:lag days,col:moving average for the n days

Table 10: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.005	0.004	-0.002	-0.001	-0.000	0.001	0.006
2	-0.003	0.002	0.002	-0.003	-0.001	-0.001	-0.000
3	0.003	0.001	0.005	0.005	-0.000	0.002	0.001
4	-0.003	-0.000	-0.002	0.003	0.003	-0.002	0.000
5	0.004	-0.000	0.002	0.000	0.005	0.005	0.000
6	-0.002	0.003	0.001	0.003	0.001	0.005	0.005
7	-0.008	-0.009	-0.005	-0.007	-0.005	-0.007	-0.003
8	0.000	-0.006	-0.008	-0.004	-0.007	-0.005	-0.006

NO

Table 11: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.525	0.411	0.854	0.370	0.561	0.721	0.547
2	0.099	0.823	0.889	0.604	0.314	0.491	0.561
3	0.949	0.336	0.751	0.944	0.463	0.246	0.430
4	0.522	0.431	0.159	0.403	0.501	0.204	0.080
5	0.270	0.471	0.686	0.748	0.965	0.921	0.531
6	0.611	0.682	0.879	0.810	0.422	0.752	0.909
7	0.255	0.417	0.174	0.205	0.304	0.567	0.365
8	0.611	0.520	0.604	0.276	0.333	0.390	0.607

row:lag days,col:moving average for the n days

Table 12: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.019	0.028	-0.007	-0.038	-0.026	-0.017	-0.030
2	-0.050	-0.008	0.005	-0.022	-0.046	-0.033	-0.029
3	0.002	-0.034	-0.012	-0.003	-0.033	-0.056	-0.040
4	-0.019	-0.027	-0.055	-0.036	-0.030	-0.061	-0.088
5	0.032	0.025	0.016	-0.014	-0.002	-0.005	-0.032
6	-0.015	0.014	0.006	-0.010	-0.036	-0.015	-0.006
7	0.034	0.028	0.052	0.053	0.046	0.028	0.046
8	0.015	0.022	0.020	0.046	0.043	0.041	0.026

NO2

Table 13: linear term p-value with lag and moving average data

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.229	0.424	0.285	0.319	0.303	0.605	0.735
2	0.000	0.206	0.468	0.092	0.157	0.112	0.221
3	0.403	0.230	0.942	0.967	0.268	0.331	0.313
4	0.004	0.062	0.005	0.081	0.149	0.022	0.041
5	0.606	0.172	0.312	0.066	0.289	0.333	0.095
6	0.862	0.209	0.947	0.992	0.334	0.769	0.893
7	0.062	0.075	0.517	0.178	0.207	0.045	0.138
8	0.105	0.708	0.445	0.918	0.434	0.482	0.158

row:lag days,col:moving average for the n days

Table 14: Parametric coefficients with lag and moving average data

	beta	mv2	mv3	mv4	mv5	mv6	mv7
1	0.015	0.011	-0.017	-0.017	-0.019	-0.010	-0.007
2	-0.050	-0.018	-0.011	-0.029	-0.026	-0.032	-0.026
3	0.011	-0.018	-0.001	0.001	-0.020	-0.019	-0.022
4	-0.038	-0.028	-0.046	-0.030	-0.027	-0.046	-0.043
5	0.007	-0.020	-0.016	-0.032	-0.019	-0.019	-0.035
6	-0.002	0.018	0.001	-0.000	-0.018	-0.006	-0.003
7	-0.025	-0.026	-0.010	-0.023	-0.024	-0.040	-0.031
8	0.021	-0.005	-0.012	-0.002	-0.015	-0.014	-0.030