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、NO_2、NO、SO_2、CO 與 O_3，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= 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 (colum, 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	0.422	0.557	0.845	0.610	0.840	0.837	0.917
2	0.594	0.546	0.670	0.773	0.908	0.923	0.667
3	0.052	0.567	0.947	0.987	0.940	0.751	0.957
4	0.340	0.660	0.835	0.628	0.652	0.849	0.873
5	0.436	0.937	0.497	0.985	0.688	0.721	0.849
6	0.108	0.495	0.804	0.722	0.904	0.673	0.676
7	0.202	0.955	0.805	0.472	0.998	0.698	0.552
8	0.528	0.923	0.378	0.559	0.968	0.712	0.917

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	0.282	0.257	0.099	-0.295	-0.130	0.147	0.081
2	0.188	0.261	0.214	0.165	-0.074	0.069	0.332
3	-0.735	-0.253	-0.034	-0.009	-0.048	-0.225	0.042
4	0.335	-0.195	0.106	0.277	0.289	0.136	-0.123
5	-0.288	0.035	-0.346	-0.011	0.258	0.253	0.147
6	-0.612	-0.306	0.126	-0.205	0.078	0.301	0.325
7	0.449	0.025	0.126	0.414	0.002	0.277	0.463
8	-0.235	-0.043	-0.454	-0.338	0.026	-0.264	0.081

SO2

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

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.026	0.512	0.864	0.235	0.722	0.609	0.540
2	0.596	0.710	0.105	0.268	0.798	0.461	0.651
3	0.952	0.894	0.634	0.287	0.522	0.979	0.481
4	0.502	0.516	0.623	0.387	0.623	0.909	0.679
5	0.058	0.405	0.614	0.631	0.896	0.209	0.331
6	0.224	0.818	0.894	0.786	0.788	0.538	0.701
7	0.875	0.273	0.782	0.511	0.405	0.413	0.249
8	0.501	0.470	0.990	0.634	0.854	0.929	0.911

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	-0.097	0.035	-0.011	-0.082	-0.027	-0.040	-0.051
2	0.023	-0.020	0.101	0.076	0.019	0.058	0.037
3	-0.003	0.007	-0.029	0.073	0.048	0.002	0.058
4	-0.029	-0.035	-0.030	-0.059	0.037	0.009	-0.034
5	0.084	0.045	0.031	0.033	0.010	0.099	0.081
6	-0.054	0.012	-0.008	-0.019	-0.020	-0.048	0.032
7	-0.007	-0.059	-0.017	-0.046	-0.062	-0.065	-0.095
8	0.030	0.039	-0.001	0.033	0.014	0.007	0.009

O3

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

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.156	0.213	0.632	0.690	0.703	0.827	0.866
2	0.771	0.688	0.803	0.594	0.499	0.554	0.457
3	0.960	0.758	0.736	0.827	0.723	0.578	0.582
4	0.160	0.561	0.808	0.879	0.854	0.496	0.399
5	0.671	0.694	0.833	0.853	0.839	0.736	0.418
6	0.217	0.283	0.785	0.724	0.630	0.561	0.548
7	0.856	0.442	0.343	0.609	0.538	0.440	0.381
8	0.226	0.514	0.312	0.286	0.567	0.554	0.501

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	-0.005	-0.005	-0.002	-0.002	-0.002	-0.001	-0.001
2	-0.001	-0.002	-0.001	0.002	0.003	0.003	0.004
3	-0.000	-0.001	-0.001	-0.001	0.002	0.003	0.003
4	0.005	0.002	0.001	0.001	0.001	0.003	0.004
5	-0.001	0.002	0.001	0.001	0.001	0.002	0.004
6	-0.004	-0.004	-0.001	-0.002	-0.002	-0.003	-0.003
7	-0.001	-0.003	-0.004	-0.002	-0.003	-0.004	-0.004
8	-0.004	-0.002	-0.004	-0.005	-0.003	-0.003	-0.003

PM2.5

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

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.617	0.383	0.432	0.916	0.958	0.726	0.347
2	0.009	0.135	0.455	0.092	0.554	0.439	0.734
3	0.039	0.924	0.849	0.544	0.731	0.593	0.752
4	0.396	0.504	0.565	0.794	0.926	0.441	0.952
5	0.378	0.262	0.983	0.432	0.709	0.977	0.451
6	0.161	0.268	0.268	0.950	0.434	0.604	0.806
7	0.167	0.116	0.167	0.134	0.493	0.197	0.316
8	0.877	0.377	0.184	0.198	0.200	0.630	0.308

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	0.002	0.004	-0.004	0.001	-0.000	0.003	0.007
2	-0.011	-0.007	-0.004	-0.010	-0.004	-0.006	-0.003
3	0.008	-0.000	0.001	0.004	-0.002	0.004	0.002
4	-0.003	0.003	-0.003	-0.002	0.001	-0.006	0.000
5	-0.004	-0.005	0.000	-0.005	-0.002	-0.000	-0.006
6	-0.006	-0.005	-0.006	-0.000	-0.005	-0.004	-0.002
7	-0.006	-0.008	-0.008	-0.009	-0.005	-0.009	-0.008
8	0.001	-0.004	-0.007	-0.008	-0.009	-0.004	-0.008

PM10

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

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.016	0.189	0.335	0.543	0.640	0.859	0.365
2	0.238	0.312	0.396	0.500	0.923	0.931	0.851
3	0.159	0.843	0.096	0.142	0.980	0.566	0.538
4	0.074	0.767	0.436	0.515	0.558	0.530	0.932
5	0.048	0.936	0.430	0.729	0.118	0.135	0.711
6	0.097	0.594	0.720	0.769	0.841	0.457	0.563
7	0.001	0.002	0.201	0.053	0.200	0.112	0.535
8	0.875	0.036	0.010	0.227	0.098	0.318	0.208

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	0.004	0.003	-0.003	-0.002	-0.002	-0.001	0.004
2	-0.002	0.002	0.002	-0.002	-0.000	-0.000	0.001
3	0.003	0.000	0.005	0.005	0.000	0.002	0.002
4	-0.004	-0.001	-0.002	0.002	0.002	-0.002	-0.000
5	0.004	0.000	0.002	0.001	0.006	0.006	0.002
6	-0.003	0.001	-0.001	0.001	-0.001	0.003	0.002
7	-0.007	-0.008	-0.004	-0.006	-0.005	-0.006	-0.002
8	0.000	-0.005	-0.008	-0.004	-0.006	-0.004	-0.005

NO

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

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.093	0.088	0.513	0.997	0.856	0.712	0.907
2	0.025	0.399	0.632	0.269	0.131	0.236	0.290
3	0.337	0.102	0.446	0.645	0.347	0.167	0.284
4	0.545	0.455	0.171	0.423	0.529	0.235	0.102
5	0.723	0.895	0.910	0.431	0.653	0.637	0.329
6	0.934	0.326	0.424	0.613	0.979	0.699	0.573
7	0.419	0.602	0.295	0.355	0.484	0.780	0.544
8	0.833	0.903	0.879	0.466	0.474	0.559	0.825

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	0.046	0.055	0.024	0.000	0.008	0.017	0.006
2	-0.064	-0.028	-0.018	-0.045	-0.066	-0.055	-0.052
3	-0.027	-0.054	-0.028	-0.019	-0.041	-0.065	-0.053
4	-0.017	-0.025	-0.051	-0.033	-0.028	-0.056	-0.080
5	0.009	0.004	-0.004	-0.032	-0.019	-0.022	-0.048
6	0.002	0.032	0.029	0.020	-0.001	0.018	0.028
7	0.023	0.017	0.038	0.037	0.031	0.013	0.030
8	-0.006	0.004	0.006	0.029	0.031	0.027	0.011

NO2

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

	p.pv	mv2	mv3	mv4	mv5	mv6	mv7
1	0.145	0.291	0.472	0.480	0.353	0.612	0.697
2	0.000	0.157	0.357	0.067	0.133	0.104	0.218
3	0.582	0.034	0.378	0.580	0.164	0.263	0.289
4	0.007	0.051	0.004	0.069	0.128	0.019	0.035
5	0.980	0.116	0.211	0.044	0.237	0.303	0.091
6	0.321	0.637	0.718	0.779	0.250	0.602	0.716
7	0.156	0.146	0.613	0.212	0.230	0.052	0.155
8	0.653	0.336	0.206	0.622	0.322	0.393	0.140

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	0.016	0.014	-0.011	-0.012	-0.017	-0.010	-0.008
2	-0.041	-0.019	-0.014	-0.031	-0.028	-0.032	-0.026
3	-0.006	-0.029	-0.013	-0.009	-0.026	-0.022	-0.022
4	-0.031	-0.027	-0.044	-0.031	-0.028	-0.046	-0.044
5	-0.000	-0.021	-0.019	-0.034	-0.022	-0.020	-0.035
6	-0.011	0.006	-0.005	-0.005	-0.021	-0.010	-0.008
7	-0.016	-0.020	-0.008	-0.021	-0.022	-0.039	-0.030
8	0.005	-0.013	-0.019	-0.008	-0.018	-0.017	-0.031