2018 年度

Suzhou Air Quality

Analysis Report

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1 Introduction

Atmospheric pollution refers to the phenomenon that certain substances caused by human activities or natural processes enter the atmosphere, reaching sufficient concentration and sufficient time, and thus endanger human comfort, health and welfare or the environment. The original indicator of air pollution in China is the API (Air Pollution Index). In the first half of 2012, a new regulation was issued to replace the API with the new AQI (Air Quality Index) as a a new measure of pollution.

There are six different levels of AQI, namely level 1 - good (0-50), level 2 - moderate (51-100), level 3 - unhealthy for sensitive groups (101-150), level 4 - unhealthy (151-200), level 5 - very unhealthy (201-300), level 6 - hazardous (>300). The larger the index and the higher the level, the more serious the pollution is and the greater the harm to human health is. The six main pollutants included in the air quality evaluation are SO2, NO2, PM10, PM2.5, O3, CO, etc.

In the past year, PECC released the AQI index of the Blue Map APP on Weibo every day to record the air quality index and major pollutants in Suzhou, and to observe the change of air quality in 2018.

2 Analysis of Air Quality Index

(1) From a general point of view, the air quality in Suzhou in 2018 showed a good trend.

In 2018, the air quality in Suzhou was generally good and moderate, with the monthly average being lower than 100. From the perspective of the trend of change, the AQI basically showed a decreasing trend from January to August, indicating that the air quality was getting better and better, and reached the optimum from July to September, but after October, the AQI showed an increasing trend again.

(2) On an individual basis, the daily AQI varies significantly across multiple months in 12 months.

The difference between the maximum value and the minimum value of AQI is more than 100 for 8 months, accounting for 2/3 of the entire year.

Air quality changes most significantly in January, with AQI value as high as 300 (January 31), which is regarded as the very unhealthy pollution, and the minimum value as low as 19 (January 25), indicating good air quality, followed by February and November, with a maximum value of 227 (very unhealthy pollution) and a minimum value of 21 (good air quality) in both months.

The relatively stable change of air quality is in July. The maximum value is only 68, and the difference between the minimum value and the maximum value is 53. The next is August, with a maximum value of 77. From this, it can be judged that the air quality in these two months is relatively good, both above moderate.

(3) In 2018, the degree of air pollution in Suzhou was small in most of the time, and the air quality

showed a good trend (mostly in good or moderate).

In 2018, there were 189 days with good air quality in Suzhou, accounting for half of the whole year, and 139 days with moderate air quality, accounting for 38% of the whole year. Moreover, there were only 17 days with unhealthy and very unhealthy pollution, accounting for less than 5%.

Very unhealthy pollution occurs mainly in the months of relatively low temperatures (January, February, April and November), the good air quality in these months is less than half of the number of days in the month, especially in April, the number of days with good air quality is only 5 days. The months with good air quality accounting for more than half of the days of the month are mainly concentrated in months with relatively high temperatures, such as June, July, August, and September, of which August has the most days with good air quality, with a total of 30 days, followed by July, with 24 days.

3 Analysis of Comprehensive Ambient Air Quality Index

The comprehensive ambient air quality index is a overall assessment of the six pollutants including SO2, NO2, PM10, PM2.5, O3 and CO in the Ambient Air Quality Standard (GB3095-2012) in accordance with the Technical Specification for Ambient Air Quality Evaluation (HJ 663-2013), and the higher the index, the more serious the comprehensive pollution is. AQI only reflects the pollution of the most polluting of the 6 pollutants, while the comprehensive ambient air quality index reflects the comprehensive pollution degree of the 6 pollutants, which is more comprehensive and suitable for ranking the air quality of cities.

From June to September in 2018, the comprehensive ambient air quality index in Suzhou was low, and it was relatively high in January, February, and April, which is consistent with the analysis results of monthly air quality in Suzhou based on AQI in the second part of this report. In March and June, Suzhou ranked high among the 13 provincial municipalities, ranking 2nd and 3rd respectively, while in May and September, Suzhou ranked 9th. Overall, Suzhou ranked relatively high on average for ten months, at 5th place.

4 Analysis of Air Quality Changes at National/Provincial Controlled Monitoring Sites

The proportion of days with good/moderate air quality from January to October is from high to low in Gusu district, Xiangcheng District, Industrial Park, Wuzhong District and High-tech Zone. The proportion of days with good/moderate air quality increased the most in Xiangcheng District comparing with 2017, followed by Wuzhong District, Industrial Park and Gusu District, and the proportion of good/moderate-air-quality days in the High-tech Zone is not up but down. Based on the proportion of days with good/moderate air quality and the year-on-year change of 2017, High-tech Zone is relatively lagging behind. The average proportion of days with good/moderate air quality from January to October is 11.2% lower than that of the first-place Gusu District, and 7.9% lower than that of the first-place Xiangcheng District in 2017.

From January to October, the proportion of good/moderate-air-quality days in descending order was

Changshu, Zhangjiagang, Kunshan, Taicang and Wujiang. Changshu had the largest year-on-year increase in the proportion of days with good/moderate air quality compared to 2017, followed by Zhangjiagang, Kunshan and Taicang. The proportion of days with good/moderate air quality in Wujiang District did not increase but declined. Based on the percentage of good/moderate-air-quality days and the year-on-year change in 2017, Wujiang District has relatively underperformed. The average proportion of good/moderate-air-quality days from January to October is 11.2% lower than that of Changshu, and the year-on-year change in 2017 is 15.1% lower than that of Changshu.

5 Changes of Ambient Air Quality in Urban Area of Suzhou from 2013 to 2018

In the past six years, the ambient air quality in the urban area of Suzhou has shown an overall improvement trend. Excluding the data for December in 2018, although the average AQI has fluctuated in the past six years, the proportion of days with good/moderate air quality has been steadily increasing. From 2013 to 2017, the cumulative number of days with good/moderate air quality increased by 44 days. From 2013 to 2018, the cumulative number of days with good/moderate air quality increased by 14.5%.

6 Analysis of Reasons

The main factors affecting air quality are pollution sources and diffusion conditions. The former of these include local sources of pollution as well as imported pollution from other regions, while the latter is mainly influenced by topographic and meteorological conditions.

(1) Affected by seasonal weather

Analysis of the causes of the large differences in air quality in each month begins with the formation of static and stable weather. Static and stable weather is a weather condition in which pollutants accumulate on a large scale due to the presence of persistent meteorological conditions unfavorable to diffusion and eventually reach pollution levels.
"Static" refers to low wind speed, "stable" refers to the stability of the atmosphere. In winter, the ground emits less heat, with light warm air on the top and heavy cold air on the bottom, forming a stable structure. Static and stable weather mainly occurs from October to December, and sometimes from January to April, but generally does not occur from June to September. As a result, the air quality in Suzhou is better in July and August, but worse in spring, autumn and winter.

(2) Affected by imported pollution
Secondly, it is affected by imported pollution in the north. The severe haze weather in the north in winter is related to coal-fired heating. The cold air going south carries pollutants to the south, which, together with unfavorable diffusion conditions, aggravates the air pollution in the south. In March 2018, there were several rounds of sand and dust pollution in the northern region. The main pollutant of sand and dust days is PM10, which was carried southward by cold air and air currents.

(3) Local pollutant reduction needs to be strengthened

In addition, the lack of regional air quality improvement in the entire Yangtze River Delta region is also a cause of unhealthy and very unhealthy weather. The list of 20 cities with relatively poor air quality improvement in the first half of 2018 released by the Ministry of Ecology and Environment shows that the Yangtze River Delta occupies nine cities, including Suzhou, which ranked 163rd. It can be seen that the environmental quality and the degree of air quality improvement of the entire Yangtze River Delta region does not match the level of economic and social development, and even has been lagging behind. Compared with the Beijing-Tianjin-Hebei region and its surrounding areas as well as the Pearl River Delta, the air quality improvement in the Yangtze River Delta is obviously weak. In terms of energy structure, the energy structure of the Yangtze River Delta is dominated by fossil energy, accounting for up to 85%. Industry is the main sector of energy consumption in the Yangtze River Delta. In particular, high energy-consuming industries drive economic growth while consuming the vast majority of total energy. The structural pollution effect in the Yangtze River Delta region is very prominent. The clustered industrial chain and dense transportation network also bring huge environmental pressure to this region. In terms of transportation structure, the road traffic in the Yangtze River Delta region is characterized by high-speed growth, high-density aggregation and high-intensity use. In addition, the Yangtze River Delta region has not yet unified the early warning classification standard, and the regional emergency linkage also needs further improvement.

(4) The control measures of atmospheric pollution are beginning to bear fruit

From 2013 to 2018, the overall trend of ambient air quality in Suzhou urban area has improved. Excluding the December data in 2018, the proportion of days with good/moderate air quality increased by 14.5%, thanks to the unremitting efforts of Jiangsu Province and Suzhou City in air pollution prevention and control. At the same time, Jiangsu focuses on compacting the responsibility of enterprises, improving market-oriented and law-based means such as information disclosure, credit evaluation, tax leverage and emission permits, guiding all kinds of subjects to take the initiative to cure pollution and consciously reduce emissions, and increasing judicial linkage to crack down on environmental violations in accordance with the law.

7 Conclusion

Overall, the air quality in Suzhou showed a good trend in 2018. The percentage of days with good air quality in the year is 89.9%, which is suitable for the general population to carry out outdoor activities. From January to October, Suzhou ranked fifth among the 13 provinces and cities in Jiangsu on average, which is relatively high. However, except for July, August, and September, the air quality in other months is affected by unfavorably proliferating weather conditions and imported pollution in the north, so the monthly average air quality is not as good. Therefore, people should pay attention to the air quality of the day before outdoor activities and do a good job of protection.

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