Journal of Computational Science & Engineering 16 (2015) 566-568

Available at http://www.asocse.org ISSN 1710-4068

Urban Planning Thoughts and Exploration in the Smog Era

Qingshan Yuan, Hanqing Zhao, Lihui Zheng

Department of Petroleum and Chemical Engineering, Northeast Petroleum University, Qinhuangdao, Hebei 066004, China

Abstract: **Most parts of China have witnessed severe smog weather in recent years which affects people's life and travel to a great extent and has brought about great changes in people's life and many problems in China's urbanization progress. The relationship between urbanization development and air pollution gradually triggers deep thoughts. This paper gathered statistics and studied the smog situation at present in China, analyzed causes and harm of smog, and conducted relevant studies on the relations between smog and urbanization planning.**

Keywords: Smog; Urban planning; Urbanization

Received 11 December 2014, Revised 22 January 2015, Accepted 25 January 2015

* Corresponding Author: Qingshan Yuan, ale_yuan@126.com

1. Introduction

With continuous breakout of smog weather, most cities of China have been affected by smog weather and the air quality shows an obviously decreasing trend. According to the statistics tracked around the country, the air in over 33 cities is gravely polluted and it's the severest in Beijing, Tianjin and Hebei, followed by Central North and North China regions. Mostly smog happens in autumn and winter, and continuous smog weather not only makes the air quality poor but also greatly affects people's life. Smog is closely related with urban planning development so how to work out urban planning in case of smog weather is the primary issue at the current stage.

2. Causes for Smog

To solve the smog problem, causes for its formation should be analyzed. As a matter of fact, continuous smog weather and declining air quality are not new. In recent years, every autumn and winter especially winter, it happens in middle and eastern parts of China. It results from both weather and pollution discharge. MA Xuekuan, chief forecaster from National Meteorological Center of CMA, remarked that the fog in middle and eastern regions of China is known as radiation fog in meteorology. There are three reasons: first, the ground layer air in these regions is relatively humid; second, there's no obvious cold air, the wind power is weak and the atmosphere is relatively stable; third, it's sunny with few clouds, which is helpful to radiation cooling at night and makes the ground layer air with great humidity saturated and coagulated into fog. The large-scope smog weather mainly occurs when the cold air is weak, water vapor conditions are good under general atmospheric circulation and the low altitude goes through calm wind or breeze. Controlled by static and stable weather of the ground layer, the circulation of the air at both horizontal and vertical level is small and the atmospheric dispersion conditions are extremely poor. Under such conditions, the

Smog weather has affected both people's life and production. Based on statistics of related hospitals, it's likely for people to contact respiratory tract diseases in smog weather and the particulate matter in the air will severely harm people's respiratory pollution discharge of energy consumption required by local transportation, life and production in cities, be them large or small, is constantly accumulated. Meanwhile, owing to high humidity of smog weather and great water vapor, fog drops provide conditions for absorption and transformation from gaseous pollutants to liquid particulate matter. At the same time, particulate matter is likely to turn into condensation nucleus to accelerate the generation of pollutants. The two interact with each other and quickly lead to pollution [1]. The objective reason for smog weather is that due to the weather, pollutants cannot be spread in time but the objective reason, also the most important reason, is that people's life and production often discharge plenty of pollutants to the air, thus forming many air pollutants and thus the smog weather.

3. Harm of Smog Weather

tracts and cause upper respiratory infection. Even some people may die because of too much take-in of toxic substance. The sullen smog weather makes people feel sluggish, down in spirits and pessimistic with weak lights and low pressure, and easily carried away when they are frustrated. In smog weather, the visibility is low and the air quality is poor, which can cause traffic accidents [2]. The smog weather also has great impact on the environment and therefore gives rise to many problems of the city. Figure 1 for PM2.5 and PM10 concentration increasing mortality caused by questionnaire.

2015 © The American Computational Science Society. All rights reserved.

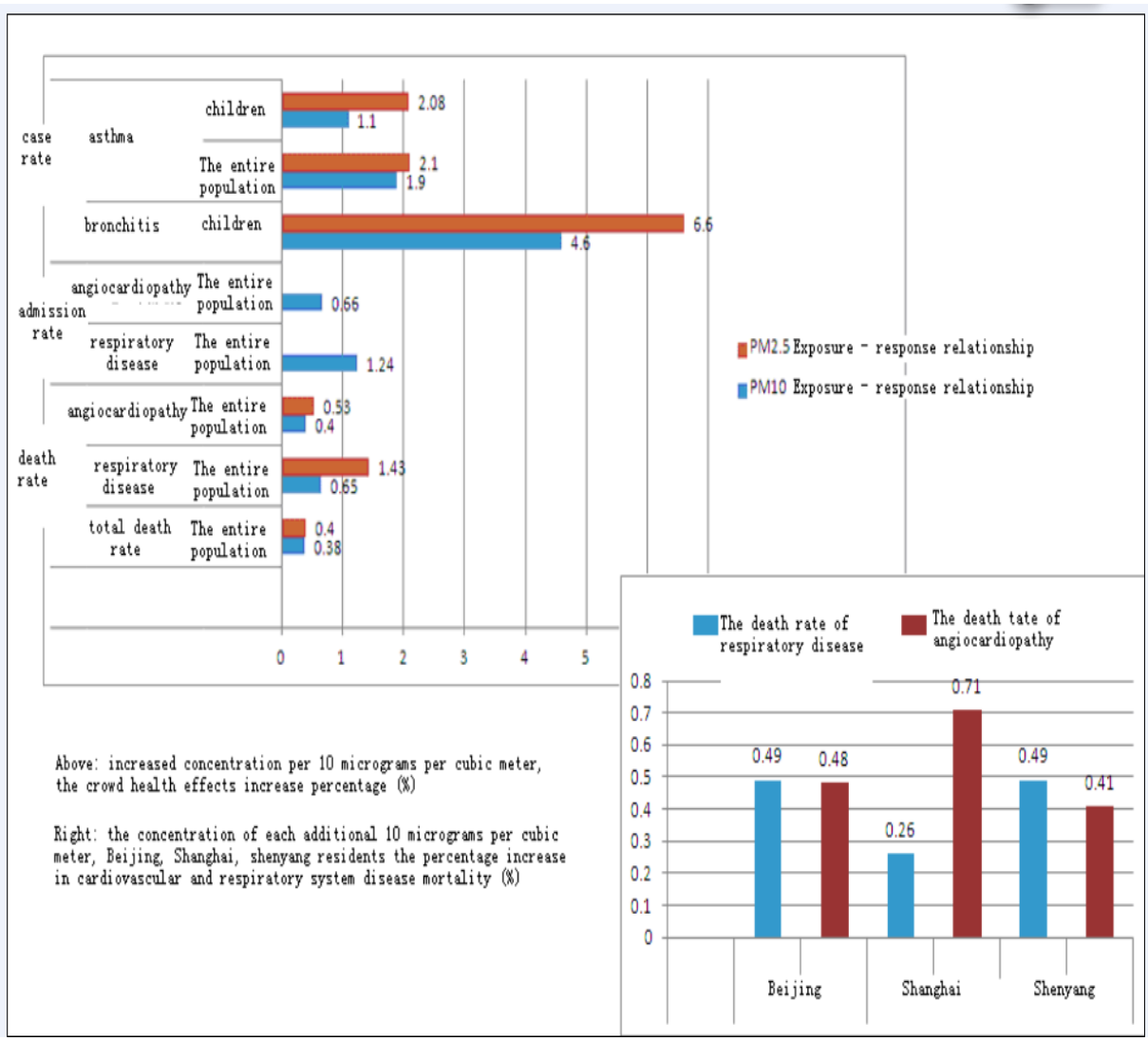

Figure 1. PM2.5 and PM10 concentration increase the dangers of 10 micrograms per cubic meter.

4. Studies on Urban Planning in Case of Smog

The smog weather has extremely severe impact on people's life. In addition, it triggers people's common thoughts on urban development and environmental protection. Urbanization progress cannot be affected by the smog weather; instead, reasonable thoughts should be worked out for urbanization development and planning so that urbanization can be better implemented [3].

4.1. Relations between Smong and Urbanizatoin Development

While analyzing causes for smog weather, experts maintain that the primary reason is excessively rapid urbanization development which greatly expedites the national economy but the environment quality decreases rapidly. In the meantime, the formation of smog is also ascribed to lack of in-depth systems. For a long time, the bidding process of China's urban construction infrastructure and garden afforestation is "hand-in-hand" over-the-counter transactions. Back and forth there are just few fixed entities. External advanced management and competition technologies as well as environmental protection and pollution treatment philosophies cannot have access to such semi-open bilateral transactions. Smog is actually a superficial phenomenon due to lack of such in-depth system.

In the past of quite a long time, many areas aspire to economic growth and ignore the environmental factors, so the phenomena of unreasonable industrial layout, mismatching urban infrastructure and arrears of industrial pollution control are caused. Especially, the unreasonable industrial layout and industrial emissions of pollutants are important aspects of air pollution. Figure 2 shows data statistics of industrial emissions of sulfur dioxide:

2015 © The American Computational Science Society. All rights reserved.

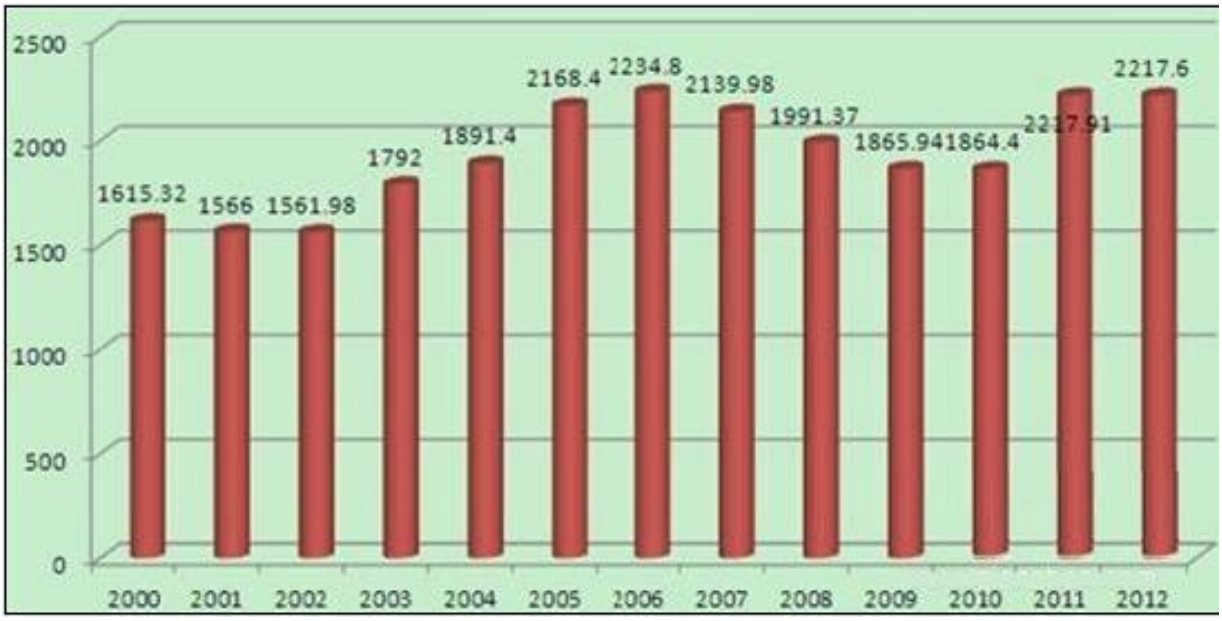

Figure 2. Data of industrial emissions of sulfur dioxide during 2000-2012(Units: ten thousand tons).

The current urban development pays excessive attention to economic enhancement and ignores environmental protection with the fact of sided pursuit of immediate interest and ignorance of long-term development. Much as the social benefits are improved, the environment is severely damaged. Many people have misunderstanding and hold that the higher the efficiency of urbanization development, the better the urban development, which is an extremely blind cognition in development. Urbanization development shouldn't just focus on economic benefits; instead, it should be aimed to narrow the urban and rural gap and further facilitate social development which shouldn't be built on damaged environment [3]. The appearance of smog weather is an "early warning" of the current development and tells people that we should make reasonable use of our natural resources and protect the environment we relies on while accelerating urban and rural integration and enhancing the urbanization rate.

4.2. Urban Planning in Case of Smog

In terms of urban layout, the sources of pollution for smog weather should be identified first, usually being pollution discharge enterprises in cities. Their pollutions scope should be measured effectively for the sake of reasonable layout. The environmental protection department should make greater efforts to supervise such enterprises with law enforcement so as to reduce pollutants discharged to the air. Besides, urban afforestation construction should be strengthened in order to guarantee ecological environment of cities. Clean energy should be selected as much as possible to develop public transportation industry. The meteorological department should take proactive part in conducting urban meteorological disaster risk assessment, that is, development and utilization of urban space layout. Ventilation channels should be kept in urban buildings, streets, building density and height as well as green belts so as to let it spread. In other words, it's aimed to enhance the capacity of urban atmospheric environment, make urbanization development in harmony with industrialization development, and better facilitate urbanization development [5].

5. Conclusion

The rough urban development model and long-term backwardness of ecological environment governance lead to rapid decline in urban environmental quality. The appearance of smog weather has great impact on people's life and health. The rapid development of urbanization at present makes people pay excessive attention to economic benefits and ignore the protection of ecological environment. Today, with high-speed development of social economy, scientific planning and design should be worked out in terms of urbanization development while solving the smog problem. Only in this way can economic development and environmental protection be coordinated.

References

[1] E. Rifkin, The Third Industrial Revolution, 2011.
[2] Fitzgerald, Emerald City, 2007.
[3] M. Kahn, Green Cities, Urban Studies, 10 (2011) 1006-3862.
[4] Z. Q. Wu, D. H. Li, Principles of Urban Planning, 2010.

2015 © The American Computational Science Society. All rights reserved.