

Analysis of Haze Phenomenon and Control Measures from the Perspective of Environmental Carrying Capacity

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Abstract. Without the use of energy, the development of society will stop. When we use energy, there will be emissions and the emissions will pollute the environment. Environmental management becomes more important under the current worse environment. This paper attempts to analyze the relationship between the more heavy haze and the environmental carrying capacity, discuss the basic reason that result in the haze and provides scientific basis for controlling haze.

Introduction

Haze phenomenon is one form of the air pollution, and also is the atmospheric aerosol pollution caused by the human activities. In recent years, this phenomenon is more and more serious and the scholars pay much attention on it which is the hotpot in the academic. In the existing studies have referred to the impact of haze on our country's economy[1-3] and the cause and control on haze[4-6] as well as the harm and protection on haze[7-9] and so on. The paper is based on previous studies, trying to analyze the haze from the perspective of environmental carrying capacity and hoping to have a valuable reference on the continuous study.

The Category of Environment

Environment can be divided into broad and narrow definitions. Broad environment includes material factors such as air, water, soil, plants, animals, microorganisms and other content, and includes intangible factors such as the contents of concepts, systems, codes of conduct, etc. Narrow environment is relative to a center of things. The different center things will result in different environments. The environment of center of things is consisted of external space, the terms and conditions around the center of things. The relationship among different environments is not isolated, the big environment and the small environment are closely linked to each other. Haze phenomenon itself can be seen as haze environment. The appearance of haze is directly linked to the carrying capacity of surrounding environment.

The Research Status of Environmental Carrying Capacity

The concept of environmental carrying capacity appeared earlier in the 1960s. Peng Zaide, Yang Kai et al (1966) defined the definition of environmental carrying capacity as “the capacity of the environment of the human system that can withstand a variety of social and economic activities”[10]. Bishop (1974) defined it as: “under an acceptable level of living conditions, the intensity of a region can carry the human activities permanently [11].” Chinese scholars Tang Jianwu, Ye Wenhui (1998): “Environmental carrying capacity is the ability of regional environmental system can withstand a variety of socio-economic activities under a certain period, certain state or condition within a regional

context, and under the premise of maintaining the structure of the regional environmental system without qualitative change, and environmental functions without destruction. Environmental carrying capacity is the maximum support threshold of environment to promote the development of regional social and economy, and is the basic property of environment, a measure of the ability of self-regulation [12].”Zeng Weihua, Wang Huadong et al (1998) defined the concept of environmental carrying capacity as the threshold of environment can withstand human social and economic activities at a certain time, a certain state or condition of a region [13].

With the further related research, the study on the environmental carrying capacity gradually refined different areas. Such as the water environmental carrying capacity, resource environmental carrying capacity, atmosphere environmental carrying capacity, population environmental carrying capacity and tourism environmental carrying capacity, and so on. Currently, the research on environmental carrying capacity from the overall research detailed to each field of the environment. And it is detailed to the negative impact of human economic activities on the environment under a certain period, state or condition. It also pointed out the environmental carrying capacity has features of mobility and tunability on the temporal and spatial distribution. Resource environmental carrying capacity in different periods is not the same. But the internal factors of causing changes in environmental carrying capacity and the interaction of environmental carrying capacity under different circumstances yet attracted researchers' attention.

The Relations of Environmental Carrying Capacity, Environment Capacity and Haze Phenomenon

Environmental capacity is the basis of the environmental carrying capacity, and it reflects the function that consumes the pollutions. On the basis of this point, environmental carrying capacity can represent totally the supporting and holding functions on human activities that the environmental system has. Environmental capacity has the relative constancy, but the environmental carrying capacity has the relative volatility. Detailed analysis of the relationship between them is as follows: Environmental capacity refers to achieving the maximum emissions allowed by the target environment atmospheric pollutants in some area according to natural purification capacity and in the given pollution layout and structure [14]. The environmental carrying capacity refers to the function of dissipate pollutions, which includes the natural purification capacity and human changing capacity. Environmental carrying capacity is fluctuating when it is affected by human activities. In the space of environmental capacity, only when people exceed the maximum carrying capacity, it can come up the accumulation of the human emissions, when the amounts of the accumulation reach some degree, and exceeding the environmental capacity that it will reflect the negative phenomenon, and haze is one of the negative phenomenon. Based on the above analysis can obtain causes of producing the haze phenomenon, as the Fig. 1 shows:

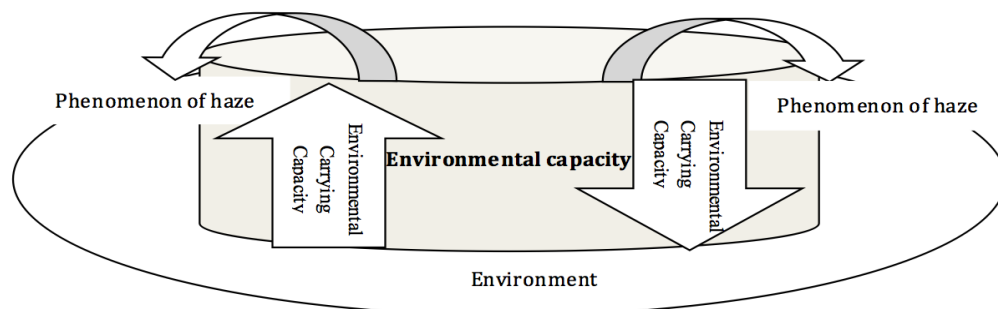


Figure 1. Generation of haze

The Relations of Haze Phenomenon and Each Environment Carrying Capacity

The key cause of the haze producing is the emissions from human activities exceeding the nature's ability to dissipate and so produced the negative environmental. The negative environment is not isolated, and it is the complex performance led by environment carrying capacity overload. The environments have the relation with the haze are as follows: combustion, climate, population, industrial, automotive, urban and others, the combustion environment include industrial, life combustion; climate environment contain wind speed, humidity, and so easy to produce inversion layer and others; population environmental have population density, population range; industrial environmental involve industrial sectors, emission pollution category and others; automotive environmental include the amount of fuel, the quality of fuel and others; urban environmental involves distance between cities, urban construction planning and other.

Haze phenomenon has an interaction with the environment carrying capacity overload and affecting each other, and each environment having some relations and not isolated acting on haze phenomenon. For example, with area population density rises, it can let the industrial having vigorous development, and industrial activities becoming frequent, the use of automotive fuel will be rises, and producing large amounts of combustion emissions; in the same time, population density rising will lead to urban construction intensive, wind speed becoming slow down stopped by the construction, having disadvantages to emissions dissipation, and easily leading to haze phenomenon. When the haze phenomenon produced, it must be do harm to people's production and living, and people will take related measures to govern environment, and this government will have effect on environment carrying capacity. Haze phenomenon has an interaction between the various environmental carrying capacity and it will continue until the haze disappears.

The Prevention and Control Measures of Haze

Environmental carrying capacity has variability, and human economic activities may affect both environmental carrying capacity, and can change the surrounding environment. Therefore, the analysis program and plan of atmospheric environment carrying capacity of each region have some differences [15], and these differences are influenced by different environmental factors and human activities [16].

In a certain environment space, environmental capacity is relatively unchanged, which is the reference dimensions to prevent haze. Various environmental factors interact and influence each other, there are positive and negative two contribution values to the environmental carrying capacity. Based on the environmental capacity metrics and in line with the principle that reduce the negative and increase the positive environmental factors, to establish the following precautions:

Key Control the Emissions of Produce New Substances. Development constantly demand the production of new materials, and new materials meet people's life, at the same time, causing a great burden for the natural purification. These new substances are into the natural environment accompanied by the industrial discharges, beginning to accumulate in the absence of sufficient environmental purification capacity. From the dimension of purification capacity, chemical enterprises are the key of the haze prevention and control.

Increase the Environmental Carrying Capacity. In the process of haze prevention and control, if we can increase the carrying capacity of the environment, which can ease the haze phenomenon to a certain extent. Such as: planting a large area of the plant, both can purify the air, but also can reduce dust; increasing the air humidity to reduce dust in the air; for construction projects plan, reasonable construction plan will in favor of dust diffusion; and so on.

Mitigate Emissions Rate. Environment for harmful material abreaction need a time process, when the scope of the emission speed within the region, the discharge frequency increased, the discharge point increased, the accumulation of hazardous substances will speed up, and exceeds the environmental capacity and a negative phenomenon in a relatively short period of time. Such as: Every

central heating season, there will be heavy air pollution phenomenon with reduced visibility. This is mainly because of the season coal-fired heating boiler has just started burning emissions of smoke volume is the largest, containing a large amount of incomplete combustion of material. According to this principle we can ease the pressure of the environmental carrying capacity by controlling the discharge time and discharge rate. Ease the pressure on environmental natural dissipation by taking time difference burners to gain time for natural dissipation of the environment.

Improve the Technical Dimensions. The rising number of motor vehicles and the rapid development of industrialization have brought many benefits to people's life and also brought great load to the environment at the same time, how should we face? Try to reduce the use of motor vehicles and industrial development not only will bring great inconvenience for residents' life, but also seriously affect economic development. In order to reduce the impact on economy, the key measures should be taken such as improving fuel quality, strict emission standards and seeking green power energy and so on.

Establish and Improve the Haze Prevention and Supervision System. The formation of haze is a process of environmental accumulation, but also reflects the lack of system or the disadvantage of execution. Haze prevention should follow the principle of practice, and the prevention must have the scale standard to prevent excessive and inadequate prevention, thus establishing a sound system of haze prevention standards is imperative. In addition, we should strengthen the supervision of the relevant industries and make them abide by the relevant system strictly, and control energy usage correctly and reasonably. Only in this way, can we take full advantage of the system to realize the effective governance and the prevention and control of the haze.

Conclusions

One of the main reasons of haze phenomenon is the environment carrying capacity overload. We can reduce the occurrence of this phenomenon by taking the above measures and realize the prevention and control of haze.

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