

On coordinated development of BTH urban agglomeration subjected to atmospheric environmental capacity

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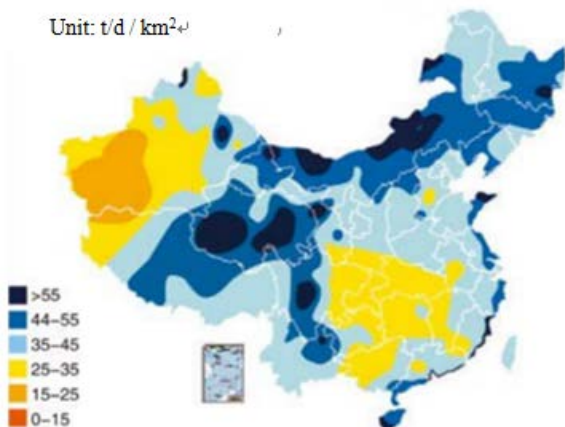
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The social economy of Beijing-Tianjin-Hebei (abbreviated BTH) region is experiencing the bottleneck of atmospheric environmental capacity resource. The development of urban community is the basic experience to break through this bottleneck. This paper analyzes the influence of traditional urban and economic development model on the regional atmospheric environment, reveals the interaction between urban agglomeration and atmospheric environment, and studies the optimal layout of the satellite city from the perspective of the influence of the atmospheric cover and tail plume. This paper puts forward some suggestions for mitigating and rebuilding the atmospheric environment capacity of the central city and reasonably allocating the regional atmospheric environmental capacity resources to the overall development of the regional economy.

Key words: BTH urban agglomeration, Atmospheric environmental capacity, Urban microclimate, Satellite city

INTRODUCTION

According to the National Meteorological Administration, the National Climate Center and the Environmental Planning Institute of the Ministry of Environmental Protection, the annual average atmospheric environmental capacity of Beijing, Tianjin and Hebei in 2015 is about 40 tons per day per square kilometer. The northwestern part of Hebei is close to Inner Mongolia, Can reach 50 t/d/km², Hebei, Henan, near the south of the smaller, about 30 t/d/km², see Figure 1.



Source: Central Meteorological Bureau, "2015 China Meteorological Bulletin"

Fig.1 2015 atmospheric environmental capacity mean nationwide

The precipitation in the BTH area is more abundant in summer than that in the summer (April-October). The atmospheric precipitation is obviously self-purifying and the ventilation is also good. The atmospheric environmental capacity is

about 120% of the annual average.), And the atmospheric environmental capacity is reduced by about 80% of the annual mean value. It is estimated that in the winter and winter of the BTH region in 2015, Atmospheric environmental capacity of 27 t/d/km² [1].

THE BTH REGION SHOWED BOTTLENECKS OF ATMOSPHERIC ENVIRONMENTAL CAPACITY

According to the data of China Meteorological Administration, the annual atmospheric environmental capacity of BTH area fluctuates greatly in the winter, and there is a phenomenon of repeated fluctuation in the short term, but the overall trend is obvious decrease. During the 25 years from 1970 to 1985, There are obvious volatility regressions in the interannual variation of atmospheric environmental capacity in the first half of the year, although there is still fluctuation in the period from 1985 to 2015, the overall decrease trend is obvious. See Table 1 and Fig 2.

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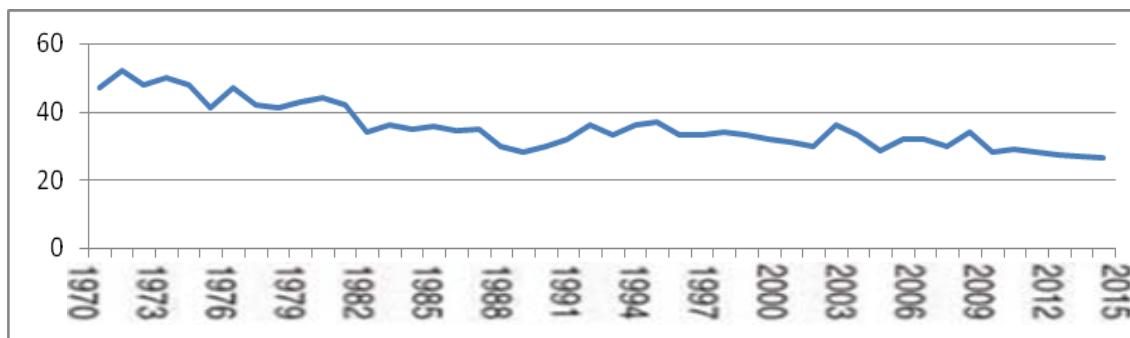
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Table 1. Perennial average and 2015 annual mean atmospheric environmental capacity in BTH region

	perennial average (1961-2015)	annual average 2015	perennial winter average(1961-2015)	winter average 2015
atmospheric environment capacity (t/d/km ²)	43	40	36	27

Source: Central Meteorological Bureau, "2015 China Meteorological Bulletin"



Source: Central Meteorological Bureau, "2015 China Meteorological Bulletin" Unit: t/d / km²

Fig. 2. Variation of atmospheric environmental capacity mean of the winter 1970-2015 in BTH region

According to the research of Wang Jinnan, the environmental planner of the Ministry of Environmental Protection, the atmospheric environmental capacity overload of Beijing, Tianjin and Hebei is serious, that is, the emission of air pollutants far exceeds the allowable limit of environmental capacity. Data show that SO₂ atmospheric environmental capacity overload rate of 300% in 2012, NO_x atmospheric environmental capacity overload rate of 300%, smoke dust atmospheric environmental capacity overload rate of 500% [2], leading to the atmosphere of SO₂, NO_x, smoke dust And other pollutants seriously exceed the safety limits, showing air pollution. As we all know, the BTH regional population is increasing, the vehicle is increasing, the industry is increasing, that is to say, the pollution emission is increasing, and the atmospheric environmental capacity is decreasing. In 2013 and 2014, the air pollution in Beijing, Tianjin, The overload rate is not lower than this value. Such a high rate of atmospheric environmental capacity overload, seriously troubled the BTH region's industrial production growth, affecting the region's comprehensive social development, regional economic and social progress has become a serious bottleneck.

TO DEVELOP URBAN COMMUNITY TO ALLEVIATE THE ENVIRONMENTAL CAPACITY BOTTLENECK

Small-scale high-intensity continuous pollution emissions is very easy to break through a place of

atmospheric environmental capacity limits, Beijing and Tianjin there are a number of such emissions points, that is, the city. The BTH region accounts for 2% of the country's total land area, but its population accounts for 8% of the national total. The GDP of the whole country accounts for 10.9%, the urbanization rate of population is more than 50% and the urban resident population is over 6 million. One, of which 10 million population of the mega-cities 2, Beijing urban resident population reached 20 million. This excessive urbanization affects the atmospheric environment at two levels, one is the small-scale high-intensity living and production emissions consume atmospheric environmental capacity, the other is to change the local natural landscape Lake City Lake artificial lake construction affect the regional wind and rain climate, The atmospheric environmental capacity.

Single city to multi-level group-style cluster development is the international development trend. In the modern sense, the urban agglomeration is a relatively independent urban agglomeration, which is the sum of the urban inter-city relations in the region. It is the result that the developed countries have experienced the rapid development of the industrial cities, and the result of rethinking, repositioning, re-planning and re-constructing the urban development to solve the "big city disease" of production, life, resources, environment and ecology. , Which is characterized by "reverse urbanization" and the rise of the satellite city. It is the advanced structural organization form of the urban development to the mature stage, which is characterized by the strengthening of the inter-city

inner contact and the rural space. Western urban agglomeration development experience "individual urban development and growth - central industry and population spillovers - transport and facilities distribution network - center and peripheral multi-dimensional integration - urban groups mutual benefit" five stages. Environmental capacity and other ecological environment and resource constraints are individual urban spillovers and then integrated the formation of urban agglomeration of the underlying motivation. In the first stage, most of them belong to the ignorant and wanton destruction. After the two stages, they belong to the avoidance behavior after understanding environmental pollution. However, because of the continuing construction and prevention of environmental pollution, Control awareness and measures are not in place, the atmospheric environmental capacity of the damage is still in the rising stage. Industry, resources, ecology, environment, management and other factors in the metropolitan area, the ecological environment in the continuous improvement of effective remediation measures gradually turn for the better under the metropolitan area within the scope of the function of the city, The fifth stage to achieve the coordinated development of urban agglomeration and ecological environment. US economists Grossman and Krueger (1992) summarize the early high-growth, high pollution in developed countries, the latter part of the environmental quality of economic growth has improved data, the relationship between environmental and economic development described as environmental Kuz The EKC (environment Kuznets curve) hypothesis [3], see Figure 3.

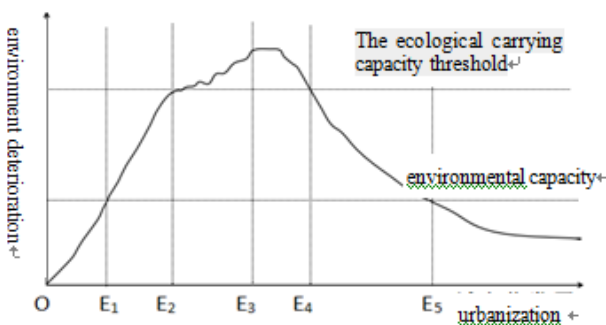


Fig.3 EKC-Urbanization and the ecological environment interaction

EKC curve indicates that the new bright future of the construction of the urban agglomerations of the BTH region, however, it should be noted that the EKC curve from the summit of the mountain began to decline is not naturally appear out of thin air, is to want from ideology, coordinated action and management measures to the technology and equipment of systemic activity combination can

emerge as a result, the urban agglomeration is a reasonable layout, the functional satellite cities to realize reasonable collocation $1 + 1 > 2$ effect. Change of enclosed booth pie development mode, press the counter urbanization, community, road, mutual symbiotic satellite city construction level type, relieving metropolitan population and industry, on the basis of atmospheric environmental capacity, optimize the urban layout and intercity relations, is a traditional urban agglomeration to the new urban agglomeration of BTH region basic direction.

BTH URBAN AGGLOMERATION DEVELOPMENT CAN BREAK THE ENVIRONMENTAL CAPACITY CONSTRAINT

City community development is the starting point to solve the problem of lack of atmospheric environmental capacity from the point of the original city emissions, atmospheric capacity cost point, into a regional city face more emissions, cost a large area of atmospheric environmental capacity, similar to the relationship between pressure and the pressure in physics. If outside the city center to relief functions and industries, and construction of satellite receiving functional industrial base and at the same time, more moderate structure adjustment and technology upgrade, cut down the emissions is moderate, the effect will be better. Problems far more than these, however, need to stress is that due to the strong liquidity diffusivity atmospheric environment, urban agglomeration within urban atmospheric environment influence each other between the obvious, regardless of the atmospheric environmental characteristics and the simple relief and blindly accept industry do not necessarily can rise to alleviate the effect of the atmospheric environmental resource constraints.

The basic principles of urban atmospheric pollution of the environment

Atmospheric pollution of the environment is the external performance of atmospheric environmental capacity has been broken. Atmospheric environment of the city there are two kinds of extreme cases, one is in good condition, under the circumstance of high winds and precipitation is high intensity inversion are the present state of extreme lower environmental capacity, in addition, urban atmospheric environment obvious stratification structure, covering layer, boundary layer and the tail of level. Urban air from the ground to the buildings on the top of the part is called the city layer, BTH region has broken through four city's tallest building is 500 meters, the

majority of more than 300 meters, the normal construction above 150 meters, covering layer of the atmosphere by the "solid" sticky chain construction, liquidity affected by a lot, its composition by building density, height, shape, street width, the density of vehicles, coating materials, pavement emission effect is apparent, such as life and production is often in the pollution state, form the urban dust cover or dust cap.

Top up to the middle of cumulus height of the part by building known as the urban boundary layer, it is covering layer of the atmosphere and wide scope of city street connection layer of the atmosphere, more than the average height between 600-1000 meters, and the city of matter and energy exchange in layer exists, and the urban terrain, surroundings, and the effects of regional climate. Atmospheric pollution is serious, boundary layer will also appear obvious pollution condition, thus the dust cap brim overhanging obviously, huddling with neighboring city overlap, in urban agglomeration of regional pollution. Under normal weather, the city of the wind direction wind will form a city tail layer, also known as the city of tail gas layer, the "tail", as if full of atmospheric pollutants on the influence of wind direction generally up to 30-100 km. Means downwind tail layer within the scope of the big cities, even without pollution, air quality will be affected by the obvious, or rather, the city not only consume their covering layer of atmospheric environmental capacity, and consumption of atmospheric environmental capacity of a few tens of kilometers of wind. This is must be fully considered in the construction of urban agglomeration.

Urban agglomeration economy layout must be based on environmental capacity distributio

According to the principle of urban agglomeration in the economic development, urban atmospheric environment between individuals are closely linked together, not with the transfer of human activities, with the coal transport oil resources such as iron ore to transfer, it requires must be comprehensively considered from the perspective of regional groups, based on urban area atmospheric environment capacity distribution, avoid tail layer, to avoid the dust cap. Otherwise, urban agglomeration would be a wider range of big city, regional economy will fall into irreparable atmospheric environmental capacity resources trap. Langfang in this city, for example, about 40 kilometers in Beijing downwind, in the extreme temperature inversion of secondary pollution

situation in Beijing, in Beijing under the tail feather coat, never may possess.

From meteorological data can be realized, the BTH region urban wind frequency distribution is different, see figure 4. Beijing under the auspices of the wind cover area is about 30 degrees 30 degrees south things area and west of due north direction, tianjin has spread around the average characteristics of the northwest to southeast bidirectional effect is greater than the other direction, shijiazhuang to south to southeast area 45 degrees and the northwest, handan two-way cover for the south north, tangshan basic for north and south, east area and west 25 degrees south direction, baoding is the southwest and northeast bidirectional approximate average distribution. Considering the BTH regional atmospheric environmental capacity during summer and winter seasons influence factors, the difference between the summer rainfall is relatively abundant, can effective rinse clean air, environmental capacity is superior to the winter, so the BTH region city winter under the prevailing wind direction, most of the south by east direction (tangshan east) as about 40 km area, affected by the central city of tail layer is relatively obvious, the atmosphere environmental capacity supply nervous, not suited to encourage and support the satellite city economic development.

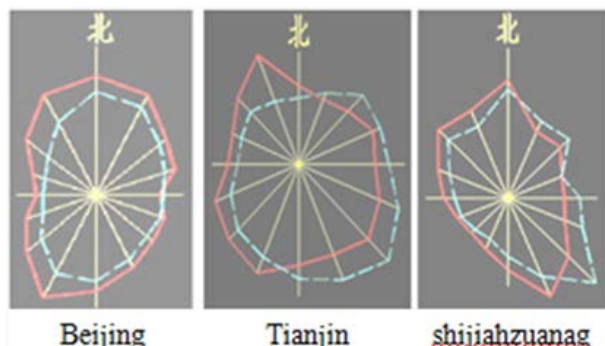


Fig. 4. Major cities of the BTH region perennial average wind rose.

Big city suburb area, the city along the outside layer and nearly cover atmospheric turbulence of boundary layer, the dust cap cap hat type city along the extending outward, even without industrial emissions, air quality is poor, so, suburban doesn't suit the migration resettlement of core city communication industry, clustering set industrial zone is a kind of practice against law of atmospheric environmental capacity resource allocation.

Out set the town, due to the old thinking

BTH urban agglomeration in the process of economic development, is a kind of typical for

satellite city status, for relief industry situation, big cities divided into districts have participated, city, county, town its self advantages are substantially listed resource, population, labor, industry, urban construction, which have no access to place out of the atmospheric environmental capacity resources to compare with other regions. This is already on a path that is not correctly understand and use of BTH resources environment seriously overloaded the "new normal".

Accompanied with the competition form, is a kind of mean type, everybody on a piece of sound, ring all counties and cities of Beijing for Beijing satellite city development direction, ring all the counties and cities of tianjin, with the aim to develop tianjin satellite city ring all facility of city divided into districts and counties to change a city divided into districts, a satellite city as the construction goal, completely because the original is a county town, because the city is close or belong to a city, because of what you've got some kind of industrial base or urban construction conditions. On April 30, 2015, with the highest standard of the political bureau of the CPC central committee meeting examined and approved the program for the coordinated development of the BTH region, put forward "build in Beijing as the core of world class urban agglomeration and the modernized new capital circle", and stressed that "must be based on the capacity of regional resources and environment" [4][5]. If ignore the atmospheric environmental capacity resources, is considered in the traditional sense of the allocation of resources such as land, labor, capital, management, but not to deviate from the prescribed in the central documents, more can make the previous phase of atmospheric environmental capacity resources by super serious fog haze, improvement of BTH urban agglomeration construction ways and measures of social and economic development.

MUTUALLY BENEFICIAL SYMBIOTIC COMMUNITY COMMUNITY RELATIONSHIP BUILDING

At close range is not a group of urban agglomeration in collectively, but emphasize the connection between the city and the relationship, is a community of similar biological community concept. Group of individuals within each other through various channels interact and influence each other, a provides the conditions for another, the survival of a dependent on another's assistance. Urban agglomeration is based on central city, between central city and satellite city and satellite cities between each other, each other, using each

other, each other service organisms, any city, should not be complete in functions and division of labor, and is just one part of the whole urban agglomeration devotion chain, otherwise, he can independence from the group, it is not necessary to become a member of the group.

Alienation from the city center building, building a green belt hose wind belt segregation of mutually beneficial symbiotic community and functional areas. BTH urban development went west in the early industrial revolution "industrial urbanization" of the old road, and urban industrialization go further than the west, formed a strict separation of workers and peasants, between rural and urban areas in recent 30 years, has created industrial country, but the farmland has failed to keep a point in the city. Equivalent to industrial and commercial city, reject planting, exclusion of Lin was development, this model soon brought itself into an ecological disaster and environmental hazards. In the west in the early 20th century had noticed this problem, and began to take industrial area separated from the living quarters. Late last century, this mode also began to show defects: centralized layout of industrial emissions intensity per unit area is too large, the coating pollution concentration is high, the boundary layer sending clear, tail feather layer affects tens of kilometers, 1 km to the original design of the isolation you never even effect the green gallery, and caused a huge traffic industrial area and living area.

The end of last century, the new city layout concept began to appear, the industrial, commercial, residential, auxiliary function mixed layout into urban community, a number of community combined into cities, the small area has a green belt between the hose space, each community has the wide green belt between the hose or natural landscape space, community green belt between the hose throughout the whole city, green belt is not only grass, also can be a farmland or woodland, both guarantee the creature through the city, and safeguard the city supply of fruits and vegetables, can also act as ventilated corridor, formed the workers and peasants, workers live business mix, the urban regional space pattern. Germany, Canada, Australia, the United States, Japan and other countries some cities have taken the analog of the original city layout is reformed[6][7][8]. BTH center city is an urgent need to tear the city from a piece of pie became a number of relatively independent, interval field, forest, slope, river, lake city of loose combination. Center city headquarters economy, science and technology development of economy, finance,

economy, culture, economy, comprehensive service economy to obtain the atmospheric environment on a nest.

Satellite to cooperate with each other, small towns construction functions of obvious characteristics. Function of Beijing in the communication industry and, in fact, according to the urban agglomeration is a symbiotic community relations, that other 12 districts, also should adjust their function, and on the basis of industry and the function of relieving, no relief from the city center, the satellite towns (level 2) from the city center can not be effective as the center city services, by the same token, the secondary industry and functions of the center city relief not bottom go to, the secondary satellite can provide effective services for center city. Center city are made to satellite city do? Center city if it is not a massive transformation and industry transformation, and its environmental capacity can't accommodate the new industry, construction and population. Similarly, satellite, between industry must prevent repetition, to cooperate with each other, common meets the needs of the center city function, choose the right industry and the function, docking with the center city, work, business, culture, education, tourism and leisure, but also can fish farmers.

CONCLUSION

BTH urban agglomeration economy, the direction of the regional economic development is the economic development of urban agglomeration typical of atmospheric environmental capacity constraints. Mutualism first within the urban agglomeration of atmospheric environmental capacity resources mutually beneficial symbiosis, in industrial distribution, industrial adjustment and satellite city layout, the function of satellite positioning, satellite industry development, should fully consider the atmospheric environmental

capacity resource problems. At present, this kind of resource supply and demand changes directly contact the local air quality is not enough, the marketability is not obvious, the configuration is not enough timely and flexible, easily ignored by enterprises and relevant departments, but don't forget that this resource is the coordinated development of BTH, and BTH urban agglomeration of national strategy, is the basic reason for the transformation of the regional economic development. Which is blind to this point, urban agglomeration economic development may be again in the near future in the resource bottleneck.

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