Smart city planning under the climate change condition

Dexiang Deng\textsuperscript{1, 2, a}, Yue Zhao\textsuperscript{2, b}, Xi Zhou\textsuperscript{1, 2, c}

\textsuperscript{1}No.28 Xianning west road, School of Human Settlements and Civil Engineering, Xi'an Jiao Tong University, Beilin District, Xi'an, China
\textsuperscript{2}No.2, Chongwen Road, College of Media and Arts of Chongqing, University of Posts and Telecommunications, Nanan District, Chongqing, China

E-mail: a)118169528@qq.com(*Corresponding author), b)423207045@qq.com, c)342862686@qq.com

Abstract. With the aggravation of climate change, extreme weather events occur continuously, cities are not resilient to climate change, and we need to change the concept of urban planning, centering on climate research and its research achievements, combining with the modern intelligent technology and formulating a smart city that resilience to the climate change, realizing the sustainable development of human, city, environment and society.

1. Introduction
The urbanization process is one of the main factors of global climate change. A large number of industrial revolution and the rapid development of city activities caused by emissions of carbon dioxide, the greenhouse effect, heat island effect and global warming intertwine with each other and it is becoming increasingly fierce, hit the earth of “fever” of a series of record like the domino effect, it accompanying the series of problems with a vicious cycle hindering the development of progressive malignant city. In recent years, the world climate change greatly exceeded what we expectations, regardless of the temperature, carbon dioxide or the north polar, sea ice ocean heat dagger changes in 2015, which reached a record level, ecosystem destruction, water and soil resource imbalance. Rapid climate change under strong convective extreme weather makes the city so extreme panic stricken, the rising sea level, city level turbulence, waterlogging, cold heat, precipitation mutation and storm and so on become a city’s unbearable!

Nowadays, El Nino events and La Nina phenomenons are becoming more and more frequently, resulting in global climate anomalies. The occurrence of super strong El Nino is closely related to the phase of the Pacific Decadal Oscillation(PDO). The positive phase of PDO is favorable for the occurrence of strong El Nino events and the maintenance of El Nino events. At present, PDO has shifted from the negative to the positive phase. This change or transition may change the world climate pattern and make global warming more pronounced.\textsuperscript{1} Although the temperature rise has a long time background, but other climate factors on the prediction of climate change trajectory, the climate of the city can not change traditional wisdom to deal with regulatory capacity, city development is facing all kinds of new difficulties, adapt to the bearing capacity of the same generation change, in order to breaking the predicament, the construction of climate change self-perception, can adapt to climate change and self-adjustment, sustainable development of smart city is the best choice of smart city, construction and development planning of the smart city will usher in a hitherto unprecedented opportunities and challenges.
2. The support for the smart city planning from the smart meteorology

With the global smart city’s construction and development planning push forward steadily, the intelligence meteorological service smart city development research has become a hot spot. In 2015, as China Meteorological Bureau combined with compilation of 13th “Five-Year” meteorological development planning, clearly clarify the development of ideas like wisdom weather, wisdom put forward to promote the integration of meteorological and smart city, intelligent transportation, smart agriculture and other fields by information technology, make the meteorological modernization to a higher level, for the society and city development, public management and decision making the production and livelihood of the people, with fine, professional, personalized inclusive meteorological service; In November 8, 2016, a joint laboratory of China Meteorological Bureau of the economics of climate change simulation Chinese Academy of Social Sciences published writing, Social Sciences Documentation Publishing House “green book of climate change: climate change report (2016)” released in Beijing, it involving the international climate governance process, the latest progress of domestic policies and actions to address climate change, climate change related issues research topics and hot issues, which provides a strategy reference for climate change to the wisdom of the city development planning. Blakely suggest that “research on the natural risk of climate change and the relationship between urban design must be applied to the research area such as the geographical position, the development scale and the assessment of new natural risks in residential communities that are threatened with climate change. Each urban area must estimate its potential risk type to formulate the corresponding urban design policy”2

All over the word, in an effort to improve the meteorological intelligence level, the development of high resolution and fine weather service user location and prediction based on requests, improve the weather forecast service targeted, accuracy, response to climate change to meet the city disaster prevention and reduction of the city planning and development needs and other needs of the public. The local government of urban construction management has paid great attention to the trend of climate and its consequences in urban construction and planning. In May 18, 2016, it held in the city of Shanghai smart city construction work conference, the deployment of key meteorological support work including the wisdom weather and wisdom of Shanghai city construction and development planning based on the promotion of smart sensing, data monitoring, data inspection to prevention and mitigation, and provide data support to adapt to climate change, planning and construction. Around the city planning at the national and provincial meteorological data meteorological intelligence internet service, the local meteorological historical data, real-time data using cloud computing data analysis of climate change and its use of data to draw the actual climate and its variability data, to guide city development planning.

3. Smart city planning concept of replying for climate change

Nowadays, the technologic revolution and its application in the city have greatly improved the level of smart city. Smart city planning based on big data, cloud computing and other new generation technology support has brought great changes to the methods and models of urban governance, and it improves the comprehensive operation efficiency and management level of the city; relying on remote sensing cloud technology to integrate spatial data resources, geological information resources and climate data resources for urban planning, so as to scientifically construct urban three-dimensional planning system. Smart city planning can use data intelligence to enhance the city’s scientific management capacity of smart cities in climate change., implementing effective management of smart cities in climate change.

Climate change poses a major problem in urban construction, urban planning and urban management. As far as urban planning is concerned, the past planning awareness, planning experience and planning methods have been unable to cope with all kinds of problems caused by climate change. Urban planning and management department, urban planning agencies, and urban planners should plan as a whole with urban’s function, urban’s environment with the core technology and wisdom of the city with climate change awareness, focus on adapting to climate change the city bearing capacity
of disaster prevention and mitigation capacity planning and climate change in the future of city planning.

Climate change and meteorological data has been the attention of scientific research of city planning, but the trend and the consequences of climate change have far more than expected, at present, the city planning is a serious shortage of capacity of climate change, city ecological is very fragile, and it looks weak under bad weather conditions. Smart city planning to dealing with climate change, it must be studied combing and integration of information on climate change, to make judgments in the future climate change trend, In combination with the wisdom of the city’s networking, cloud computing, big data, 3S(GIS, GPS, RS) and so on a new generation of communication technology research and scientific and reasonable layout and application to lead the city construction to achieve things and objects, objects and people, people and people interoperability, enhance the intelligent perception of climate change and climate information for comprehensive utilization, realize the city’s efficient government management, convenient public services and sustainable industrial development.

Smart city planning to tackle climate change should begins with four main aspects. First, energy saving and emission reduction should be optimized to mitigate climate change; to effectively regulate the use of energy sources and the supply side; to reduce greenhouse gas emissions; to strengthen urban greening level and improve urban carbon sequestration capacity. Second, according to the climate change tendency, the bearing capacity of scientific and predictability of city planning increasingly frequent extreme weather events, including sea level rise, heat, cold, drought, flood, typhoon, dust storms and other kinds of weather disasters. Third, create the future deployment of smart city strategic intelligence meteorological public cloud platform for city disaster prevention and mitigation and adaptation to climate change planning and construction to provide a full range of seamless weather information service for the society and the public. Fourth, make full use of smart city technology and develop smart city technology, build big weather data “incubator”, intelligent induction, monitoring climate development and change situation, feeding back the optimization and dynamic adjustment of urban planning.

In the smart city planning, we should treat the planning with universality and particularity differently, and make concrete analysis of the specific problems of different cities. We should have foresight and local conditions to plan the wisdom of different cities. Different city with different geographical climate meet the phenomenon is not the same, basic research must be based on the overall environment and environment of city long time of gas changes, make scientific judgments on the climate phenomenon of current and future trend of climate change, rational planning of new phenomena by climate, incubation of new formats, to avoid adverse climatic factors and the measures of city planning, the formation of facing the future climate change. As far as China’s urban planning is concerned, the mountainous areas in Southwest China have large rainfall, high mountains and steep slopes, landslides, debris flows, and changes in the water level of the river bed, all of which are sensitive climate problems and special coping plans; city waterlogging, disaster problems of extreme weather events caused by the southeast coast, is the implementation of drainage tunnel engineering and wind engineering planning; city planning for urban heat island effect, by reducing the density of population, the development of small and medium sized city planning, avoid the problem of population density.

4. Conclusion
Taking climate research and its results as the center, and with meteorology, environment, economics, ecology, sociology and other disciplines to promote the sustainable development of smart city planning.

References
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