

The human health impacts of global climate change

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Abstract. At present, the global effects of climate change have already gone beyond economic globalization. Man affects climate, and climate affects man. As an important part of the natural environment on which human beings live, any change of climate will have an impact on the natural ecosystem, social economic system and human health. Today, in the information age, human health is considered to be a combination of ecological, socio-cultural, economic and institutional decisions, and climate change has had an extremely important impact on human health. Therefore, this paper summarizes the trends of global climate change and the potential threats to human health, and proposes expectations for future development.

Keywords: The global climate , Human health, Extreme weather

1 Introduction

In the long-term evolution of the earth, climate has played a very important role. As an important part of the natural environment and natural resources on which human beings live, climate change is closely and inseparably related to human survival and social activities, and the study of climate change is the core content of global change research ^[1]. Research shows that the impact of climate change on human health is the focus of social public safety and sustainable development. In this paper, on the basis of summarizing the predecessors' research, the trend of global climate change, from warming, the frequency of the increasing incidence of extreme weather and air pollution is discussed, the trend for human health including the spread of disease and mortality, social psychological pressure have a very significant impact, through the relevant data and cases in recent years on the global climate change trend was described, and explains the general situation of the impact on human health.

2 Trends in global climate change

2.1 Global temperature warming under climate change

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In the process of global climate change, the most significant is the warming of temperature. In January 2020, global land and sea surface temperatures were 1.14 °C above the average January temperature of the 20th century (12 °C), surpassing the record set in January 2016. For the 44th consecutive January that exceeded the 20th century's average temperature, the 10 warmest Janes on record have all occurred since 2002. Arctic sea ice cover was 5.3 per cent below the 1981-2010 average, and Antarctic sea ice cover was 9.8 per cent below the 1981-2010 average. 2010-2019 was the warmest decade on record. The summer of 2019 has become the hottest summer on record in the northern Hemisphere, setting new records for the highest temperatures in many countries and regions^[2].

According to statistics released by the China Meteorological Administration, from January to August 2019, the average number of hot days nationwide reached 15.6, 5.8 days longer than the same period of the year. On July 26, 2019, a heat wave swept over 3.31 million square kilometers in the north and south of China, affecting 800 million people. A high temperature of over 35°C was observed in 27 provinces (autonomous regions and municipalities directly under the Central Government). Even Lhasa, on the snowy plateau, is not immune. At the end of June 2019, Lhasa experienced its first summer since the beginning of meteorological records, as the average temperature for five consecutive days was greater than or equal to 22°C.

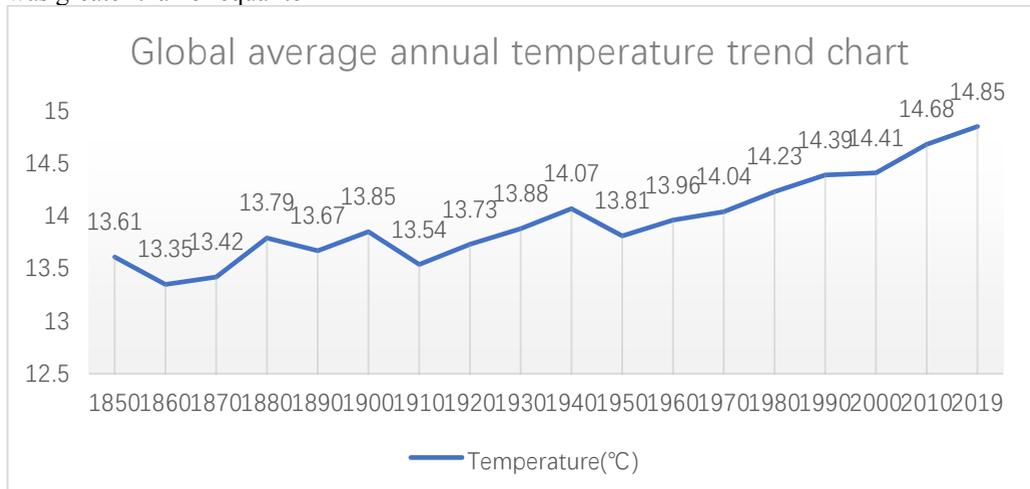


Figure 1. Global average annual temperature trend chart.

2.2 Extreme weather intensifies under climate change

Extreme weather and climate events are closely related to global climate change, which leads to significant changes in the frequency, intensity, space range, duration, and even the point of occurrence of extreme events. The first two decades of the 21st century have documented a geometric expansion of the impact of extreme events in climate change. On January 30, 2019, the morning temperature in Chicago fell to -23°C, breaking the 1966 record of -15 °C. In the southern hemisphere, Australia is sweltering. On January 24, Adelaide recorded a temperature of 46.6°C, breaking an 80-year record. On January 17, 2020, northeast Canada was hit by a severe snowstorm, breaking the single-day precipitation record set in April 1999. On February 17, Australia was again hit by rain and hurricanes, which affected many cities. Meanwhile, in the UK, a storm and heavy rainfall caused floods in many places^[3]. The frequency and severity of extreme weather events, such as storms, hurricanes, droughts and floods, have increased.

Throughout the country, in the summer of 2019 appeared more severe floods in China,

and the resulting secondary geological disaster such as mud-rock flow, Jiangxi, Guangdong, Guangxi and other provinces (autonomous regions) in under the influence of the superposition of several rounds of storm flood appeared significant casualties and economic losses, flooding in more than 20 provinces, more than 60 million people affected, direct economic loss of more than 1700 one hundred million yuan. In contrast, the drought in the yellow and Huaihe rivers and the southwest regions, which should have abundant and beautiful waters, lasted for several months, resulting in the worst drought in decades.

2.3 The degree of air pollution is aggravated by climate change

Air pollution and climate change are among the world Health Organization's top 10 health threats for 2019. From the perspective of impact risks, compared with conventional pollution problems, global climate change has a larger spatial and temporal scale, a global and widespread impact, and a more lasting impact on human beings and the responsibility system. From the regional situation of global air pollution, the main air pollution is concentrated in Asia and Africa, followed by the eastern Mediterranean region, Europe and The Americas. Research shows that 9 out of 10 people in the world are breathing air with high concentration of pollutants^[4].

Global climate change is mainly caused by the increasing concentration of greenhouse gases in the atmosphere, while air pollution is mainly caused by atmospheric aerosol particles suspended in the air, which are mainly formed by the combustion and emission of fossil fuels. Haze in cities is the biggest pollution phenomenon. The burning of fossil fuels, including coal and oil, is not only a major source of air pollution, but also a major contributor to climate change. Since air pollution and climate change largely share the same causes, action to mitigate and control air pollution and to reduce greenhouse gas emissions should be consistent with action to protect the climate.

3 The human health impacts of global climate change

3.1 The impact of warming temperatures on human health

The most direct impact of global warming on human health is the thermal effect caused by high temperature. The intensity and duration of high temperature heat waves increase, leading to the increase of diseases or death rates mainly caused by the heart and respiratory system. Heat increases the burden on the human circulatory system, and heat waves increase mortality. Insect-borne malaria and other infectious diseases are closely related to temperature, which may increase or reoccur malaria, lymphatic filariasis, schistosomiasis, kala-azar, dengue fever and encephalitis in many countries^[5]. At high latitudes, the risk of transmission of these diseases may be greater.

Dutch study results showed that the mortality rate and ambient temperature change between a "V" shaped, daily mortality rate of the low temperature range in the 20 to 25 °C, as the change of environmental temperature and cooling, mortality rates rising, namely the cold and hot has direct and indirect influence of death, its influence is usually reflected in temperature change after a week^[6]. In 2019, India continued to experience high temperatures, resulting in dozens of deaths from heat. The correlation between death and temperature was particularly evident among the elderly, possibly due to their poor tolerance to different temperatures. Among the many weather factors, high temperature is the main factor affecting the death rate, while humidity and wind speed are the secondary factors. Only when the temperature exceeds the heat threshold, other weather factors will have a significant impact.

3.2 The impact of extreme weather on human health

Under the global climate change, the frequency and intensity of extreme weather events, such as floods, droughts, hurricanes, tropical cyclones, typhoons and snow and ice disasters, have increased greatly, resulting in increased mortality, disability and infectious diseases, which seriously threaten the safety of human life and property. The occurrence of extreme weather events and disasters has damaged the existing health care system and the basic necessities of life, such as water, food and shelter, as well as the basic infrastructure of life, and has seriously affected the mental health of the population. For example, the impact of floods on health can be divided into short -, medium - and long-term effects, with the short term leading to casualties, the medium term to an increase in infectious diseases and the long term to mental harm caused by economic hardship and loss of life and property caused by floods. The increased frequency of extreme weather events not only directly increases mortality and disability rates, but also indirectly increases the incidence of infectious diseases, affects ecosystem stability, damages public health and infrastructure, and increases psychosocial stress.

Increased frequency of extreme weather will directly damage the food availability, access, efficiency and stability, because agricultural high sensitivity to climate change, the department of agriculture is the main source of rural poor food and livelihood, extreme weather, soaring food prices and unstable, the consumption of food quantity, quality and diversity of dietary cause adverse effect, cause food insecurity and malnutrition situation is getting worse, is not conducive to the improvement of human health life quality.

3.3 The impact of air pollution on human health

The air pollution caused by global climate change is becoming more and more serious. The air polluted by various harmful substances will directly or indirectly affect human health. Study shows that air pollution is complex, regional pollution status, the main air pollutants affect human body health have particulate matter, sulfur dioxide, nitrogen oxides, ozone, volatile organic compounds, etc., under the long-term effects of low concentration of air pollutants, pollutants enter human body through respiratory tract, easy to cause the upper respiratory tract inflammation, chronic bronchitis, bronchial asthma, and a variety of diseases such as emphysema ^[7]. Among non-communicable diseases, the contribution rate of air pollution to lung cancer is 26%, and that to heart disease and stroke is 17% and 12% respectively ^[8].

With the increase in global warming, air quality has declined significantly. When the air becomes hot, the direct sunlight will produce ozone smog damage the lungs and trees, vegetation, temperatures can make the atmosphere environment pollution to speed up the process of secondary pollution, and greenhouse gas is given priority to with chlorofluorocarbons in gas has great destructive to the ozone layer, increase sunlight ultraviolet (uv) radiation, may increase the incidence of skin cancer, cataract and snow blindness ^[9]. The sandstorm weather which has been harmful for many years in northern cities of China is originally the result of strong cold air activity, but if the sandstorm enters the seriously polluted urban areas, the harm it brings cannot be underestimated.

4 Conclusions

The enormous risks of climate change already pose serious threats to human health, food security and socio-economic security. To comprehensively enhance the capacity to cope with the risks of climate change has become the core demand for sustainable development.

Scientific research shows that even after global action to reduce emissions, modern climate warming will not stop or reverse, but only slow down the pace of change to allow biological systems and human societies more time to adapt. In other words, future climate change and disasters are inevitable, so it is necessary to pay attention to attitudes and adaptation actions.

Under the concept and action of global climate governance, the establishment of a global climate change early warning and defense system is an effective means and positive action to reduce the increasing threat of climate risks and the impact of disasters. It is also a major initiative and plan with a high degree of consensus and implementation for the global response to climate change^[10]. In short, the global climate governance in addition to take active action to reduce emissions of greenhouse gases, and at the same time actively take various measures to respond to climate impact, especially attaches great importance to the construction of global climate change, early warning and defense system, to ensure that under the effects of climate change can promote the sustainable development of the nation, safeguard national and public life and property safety.

References

1. Wendong Hua, Jian Wang, A review of the causes and impacts of global climate change [J]. *Regional Governance*, 2020,03;138-140.
2. Zhenghong Chen, Guifang Yang, Research progress on the effect of temperature on human health in the context of climate change [J]. *Public Health in China*, 2014, 30(10);1318-1321.
3. Xiaopeng Guo, Yun Liu, The world is facing a serious climate crisis [J]. *Ecological economy*, 2020,36(1);1-4.
4. Rongrong Sheng, Chuansi Gao, Changchang Li, The impact of global climate change on the health of occupational populations [J]. *Public Health in China*, 2017,08(33);1259-1263.
5. Haochen Wang, Feng Lun, Review of studies on the impact of climate change on population health in China [J]. *Tech review*, 2014,22;109-116.
6. Anna Zhang, Ertai Shang, The impact of climate change on human health [J]. *Environmental protection and circular economy*, 2009,05;52-54.
7. Xiaomin Wu, Yongsheng Wu, Advances in research on the relationship between climate change and infectious diseases [J]. *Public Health in China*, 2010, 30(1) :127-128
8. Feng Lu, Research progress on the relationship between meteorological factors and cardiovascular diseases [J]. *Foreign Medical hygiene Section*, 2008,35(2);83-86.
9. Wenjuan Ma, Research progress on climate change and population health in China [J]. *Chinese Journal of Preventive Medicine*, 2011, 45(9): 845-848.
10. Chenxia Shi, The new situation of global climate change governance and the new mission of the United Nations [J]. *Hubei Social Sciences*, 2020,05;48-57.
11. McMichael AJ, Haines A, Slooff R, et al. *Climate change and human Health* [R]. Geneva: WHO, 1996.
12. Mueller N, Rojas-Rueda D, Cole-Hunter T, et al. Health impact assessment of active transportation: a systematic review [J]. *Preventive Medicine*, 2015, 76: 103-114
13. McGille N. Vulnerable populations at risk from effects of climate change [J]. *American Journal of Public Health*, 2016, 46: 1-14
14. Information on <https://www.in-en.com/data/HB/>