Fundamental Principles behind Climate Change

Haiyan DAI*

Ecological and Agricultural Meteorological Center in Inner Mongolia, Huhhot 010051, China

Abstract The attribution of climate change is complex, and the current mainstream view is more inclined towards human activities and carbon dioxide emissions from fossil fuels. Any complex problem is composed of basic principles. This article elaborates on the basic logic behind climate change (a global hot topic) through basic principles such as reaction types, carbon thermal properties of biomass energy, greenhouse gas attribution, ecological basic theory, and energy cycle.

Key words Climate change; Feedback mechanisms; Fundamental principles; Disasters

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When studying hot topics related to climate change, we often search for answers in literature. When the problem reaches a certain height, there are very few things that can be referenced. This requires starting from basic principles and deeply understanding the essence of things to find the key to the problem. From a fundamental perspective, the issue of climate change can be attributed to the processes of respiration and photosynthesis, as well as corresponding endothermic and exothermic reactions. From an ecological perspective, it can be simplified as producers and consumers, and from an energy perspective, it can be attributed to solar energy, biomass energy, and thermal energy. From the analysis of the relationship between basic types, it can be concluded that climate warming is the result of an increase in exothermic reactions, while atmospheric CO_2 increment is only a subsidiary product of the exothermic reaction. The root cause of climate warming lies in the proportion of producers and consumers. And atmospheric circulation, ocean current changes, El Niño, and other factors are all superimposed on climate change as interference factors, not the fundamental cause of climate warming. This theory can explain historical climate fluctuations, Arctic amplification effects, rapid warming in the Northern Hemisphere, significant nighttime warming, and the essence of carbon emissions reduction, providing a fundamental theoretical basis for scientific analysis of the evolution of the Earth's climate.

1 Foundation type

Solar energy is the main source of energy on Earth, and the organic matter formed by photosynthesis is the source of life for consumers. Compared to the energy accumulation process of producer photosynthesis, the respiration of consumers is the process of releasing energy, and the decomposition and oxidation process of all organic matter is equivalent to respiration. Photosynthesis and respiration constitute the two most basic types of reactions in nature, and the corresponding energy processes are mainly endothermic and exothermic reactions. Photosynthesis is an endothermic process, while respiration is an exothermic process. This also determines the two main types of organisms in nature, producers and consumers, of which one absorbs heat and accumulates energy, and the other releases heat and consumes energy. From the perspective of energy utilization, decomposers can also be defined as small consumers.

2 Essence of warming (carbon heat homology)

Biomass is the main source of energy in nature. Producers use solar energy and CO_2 through photosynthesis to produce bio organic matter, while consumers decompose and utilize organic matter through respiratory oxidation, releasing heat and CO_2. Climate warming is not the result of an increase in atmospheric CO_2 concentration. In theory, carbon and heat are in a symbiotic relationship with the same variation curve. From the perspective of basic reaction types, climate warming is the result of an increase in exothermic reactions, and atmospheric CO_2 increment is only a subsidiary product of the exothermic reaction process. The complex issue of climate change can be simplified into types such as respiration and photosynthesis, endothermic and exothermic reactions. As for the atmospheric circulation, wind, ocean currents, and various weather systems, they are all interference factors superimposed on climate change. They can be understood as the uneven reception of solar radiation by the Earth, resulting in movements to balance the Earth's surface temperature. These movements themselves do not cause climate warming, but rather warming causes changes in these movements.

3 Greenhouse gases

The main greenhouse gases include water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), Freon (CFCS), methane (CH_4), *etc.* Among them, the main sources of CO_2 are the burning of fossil fuels, deforestation, land use change and other major human activities; the main sources of CH_4 include further processing of fossil fuels, human and animal excreta, agricultural

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* Corresponding author.

production waste landfill and other human activities; the main source of Freon is industrial products such as refrigerants, aerosols and foamed plastics; N_2O is mainly from fertilizer use, agricultural production and burning of fossil fuels. Overall, except for water vapor, all greenhouse gases can be attributed to human activities. The water vapor in the atmosphere comes from the phase change of surface water, and water molecules circulate between the atmosphere and the surface. The heat absorption and release during the phase change process also cancel out each other, which is not the fundamental reason for climate warming.

4 Ecological theory

From an ecological perspective, respiration and photosynthesis, as well as endothermic and exothermic reactions, can be classified as producers and consumers, where producers absorb heat and gather energy, while consumers release heat and consume energy. The issue of climate change can be ecologically simplified as producers and consumers. The life cycle of producers absorbs more heat than it releases, and only death and decomposition are heat sources, while consumers are always heat sources. The impact of human activities on the Earth's biosphere has ushered in a new geological era——the human century. The biomass of humans and livestock far exceeds that of wild mammals, while the biomass of poultry is more than twice that of wild birds. Aquaculture exceeds marine fishing, and humans have completely changed the natural pattern of animal populations, resulting in a significant increase in consumer heat source attributes. Due to mutual constraints, consumer prosperity inevitably leads to a decrease in producers, and the total biomass of plants has decreased by about twice compared to before the beginning of human civilization[1]. The biomass of primary producers on land is much greater than that of consumers, while in the ocean, primary producers are more efficient and can support five times the biomass of consumers, forming an inverted biomass distribution pattern[2]. Therefore, the improvement of livestock breeding efficiency has a doubling effect on the contribution of climate change.

5 Disasters

Disasters have two functions: one is to accumulate energy through disasters, such as the formation of coal and oil in history, and the other is to reduce the number of individuals consuming energy, such as the extinction of historical organisms. Disaster is the metabolism of the Earth and the process of maintaining its own order. Every major extinction process involves significant fluctuations in climate and sea level fluctuations[3-8]. From the basic theory of climate change, as consumers prosper and the sea level rises due to climate change, and consumer prosperity and decline are the main reasons for climate fluctuations. Human beings should not overlook the law that climate warming – extreme weather – disaster occurrence are equivalent to carbon sinks through fundamental principles to reduce warming factors (reducing exothermic reactions, respiration, and consumers) and restore the order of the Earth's climate. Of course, the destructive nature of disasters is bidirectional, but due to the faster extinction and recovery rates of producers than consumers, atmospheric CO_2 concentration always lags behind temperature changes[9-10].

6 Feedback mechanism

With the continuous increase in the number of consumers and the rapid improvement of human material life, even clean energy requires the conversion and processing of one-time energy to secondary energy, and the process cannot avoid carbon and heat emissions. Carbon neutrality essentially has many limitations. The utilization of wind and hydropower can also slow down atmospheric motion, exacerbate climate warming, and lead to extreme weather and disasters. Climate warming can be classified into several basic types, and energy can also be attributed to solar energy, biomass energy, and thermal energy. So from the basic principle of climate alternation in Fig. 1, it can be concluded that there is logical confusion in CO_2 as the main cause of climate warming. From the basic principle, carbon and heat are a twin relationship. At present, the carbon neutrality policy reduces fossil energy consumption, and afforestation is the right direction. However, there is a greater need to transition from reducing carbon emissions to reducing exothermic reactions and respiration. Reducing energy conversion and controlling consumer numbers are particularly important. From the feedback mechanism in Fig. 2, it can be seen that disasters play an important role in human climate change in the 21st century. Disasters are a carbon sink, and whether disasters can be scientifically recognized and utilized is a key factor for human adaptation to climate change. When climate change exceeds the critical value, a mass extinction of organisms will occur, leading to the decline of dominant ecological niches, and the Earth will restart the replacement of ecological niches.

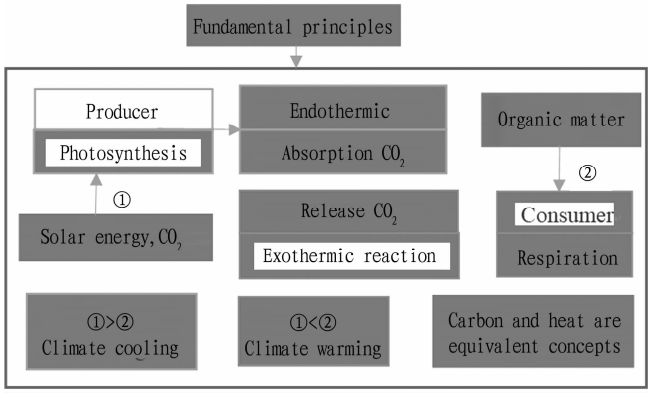

Fig. 1 Basic principle of climate alternation between cold and warm

7 Conclusion

(1) From the perspective of basic principles, photosynthesis and respiration, endothermic and exothermic reactions, and producers and consumers are three different expressions. Although the classification angles are different, the three are equivalent. Its equilibrium fluctuations are the fundamental cause of climate change.

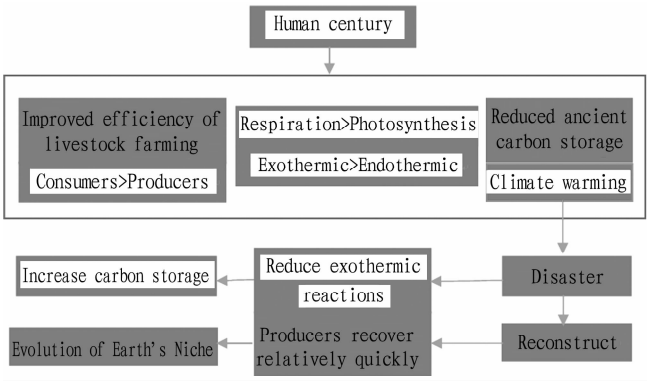

Fig. 2 Feedback mechanism of climate alternation between cold and warm

(2) Biomass is the main energy source of the Earth, and climate warming is not the result of an increase in atmospheric CO_2 concentration. In theory, carbon and heat are a twin relationship.

(3) Climate warming-extreme weather-disaster occurrence-reducing the factors of warming through basic principles, restoring the order of the Earth's climate, and scientifically understanding disasters are particularly important for human society.

The article describes three expressions of the causes of climate change through basic principles, and proposes the scientific issues of carbon heat homology, the reasons why CO_2 concentration lags behind temperature changes, the doubling effect of improving livestock breeding efficiency on climate change, and the important significance of scientific understanding of disasters for human adaptation to climate change. Overall, the feedback mechanism of climate has always been a global challenge, and the literature available for reference is disorganized. This requires starting from the basic principles and finding the key to the problem. If the basic principles are correct, it is not far from uncovering the essence of things. I am very grateful to Mr. Frank Wilchek for his inspiration in publishing the book *Fundamentals*. Although there is still a lot of work to be done in terms of CO_2, thermal energy, global energy cycling, and the causes of biological extinction, it is undoubtedly correct to think about climate change from the perspective of "fundamental principles".

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