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RESEARCH ARTICLE

Issues concerning global warming today

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Abstract The global weather of today is growing significantly warmer; this is an indisputable fact. However, the scientific community has not yet reached consensus on the causes of global warming and its possible consequences. This paper introduces the causes of global warming and summarizes its results, which both involve a series of huge and complex system issues. Our top priority is to pinpoint the main reason and the interrelated links between causative factors by adopting a macro-approach, or comprehensive comparison analysis. Its physical mechanism was then determined and its digital model established after quantitative study.

Keywords weather warming, cause, result, thought

It is an indisputable fact that the global climate is getting warmer. However, no consensus has yet been reached among scientists on the cause of global warming and its potential effects.

1 The causes of global warming today

Most local and international scientists unanimously hold that the rapid increase of carbon dioxide and other greenhouse gases in the atmosphere is the main cause of global warming which began almost a century ago and intensified in the 1980s, when the global atmospheric temperature increased by 0.74°C (IPCC the 4th Evaluation Report, 2007). However, other scientists also believe that the intensifying effects of solar radiation in the last 30 years is another important factor that should not be overlooked.

Some Chinese researchers who are involved in the comprehensive study of universe–earth–biosphere–mankind believe that both human activities and natural factors can result in the greenhouse effect. The natural factors mainly refer to the influence of astronomical variables. First, there has been a general trend of enhancement in solar activities since nearly a century ago (Ren, 1997). This has been confirmed by scientific measurement since the 1980s. With the enhancement of solar activities, the surface temperature of Mars has increased by 0.65°C and the ice cap of the south pole of Mars has gradually melted in the last two decades (Ren X P, 2007). Since the growth of all plants and creatures relies on the sun, it is hardly possible that the enhancement of solar activities has no effect on the global climate. Second, our studies (Ren, 1990) indicate that the climate vicissitude in a 1 000–1 400-year cycle is mainly caused by the moment effect produced by the geocentric convergence and the geocentric angular $\leqslant 47^{\circ}$ of the eight major planets in the solar system. At present, the Earth is in the warming phase of this cycle (it should be noted that it has already been 400 years since the last ice age of the 17th century). We believe that the effect of the two abovementioned astronomical phenomena on the global climate must be taken into account, and it is clearly one-sided and unobjective to attribute present-day global warming solely to human activities.

2 Are the effects of global warming all negative?

Contrary to the views of many scientists, during historical climatic variation (Ren, 1990), or at least the climatic warming phase measured on a scale of thousands and hundreds of years, severe global warming disasters are often comparatively less severe and rather less frequent. On the reverse side, during the climatic cooling phase, severe natural disasters are much more intense and more frequent. By comparing and analysing variations in several current environment parameters, we believe that global warming has both positive and negative effects, and even relatively more positive effects on developing countries in summer monsoon areas, such as China. The effects of global warming are disastrous, according to some scientists. Results based on certain models for NWP reveal that at the end of the 21st century, the growing carbon dioxide in the atmosphere will result in a 1.8–4.8°C increase in global temperature (IPCC the 4th Evaluation

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Report, 2007); drought damage and desertification in many regions across the globe will intensify, and 250 million people in Africa will have a serious problem in obtaining an adequate supply of drinking water; the Qinghai–Tibet plateau "Water Tower" formed by the glaciers will gradually diminish due to the accelerated melting of ice; extreme synoptic climate events will occur more and more frequently; the rise in sea level will lead to the flooding of many islands at low sea level and seaside areas. Some scholars also maintain that the extreme synoptic climate events depicted in the film "The Day After Tomorrow" will occur 100 years later (Chen, 2005). With regards to all these arguments, we will concentrate on several specific effects of global warming:

(1) Will the Qinghai–Tibet plateau "Water Tower" diminish? Some glaciologists estimate the richness or dryness of precipitation in terms of the development or melting of glaciers. This is misleading when viewed from a historical perspective. Taking the warming phase 6 000 years ago as an example, the global temperature at that time was about 2.5–3°C higher than that of today, or generally identical to the global temperature at the end of the 21st century as estimated by certain models for NWP. However, precipitation at the Qinghai–Tibet plateau 6 000 years ago was quite abundant (Ren, 1999), and the water level of lakes at the Qinghai–Tibet plateau were about 8–60 m higher than the present levels; the Xinjiang Talimu River and the Luobubo lake also had great volumes of water. Thus, the melting of plateau glaciers due to global warming is not tantamount to a decrease in total precipitation in several years. It is not in accordance with historical and natural evolution to predict the diminishing of the Qinghai–Tibet plateau "Water Tower" based merely on temperature rise and glacial melting, and appears to be an alarmist statement.

(2) Is global desertification becoming more serious? This issue concerns two situations: First, due to overpopulation, the consumption of water for human, agricultural and industrial requirements seriously exceeds the capacity of local water resources, leading to serious damage caused by drought and desertification in such areas. Scientific research is urgently required on the issue of harmonious development between mankind and nature and on effective countermeasures (including research on drought, rainscarce areas and the bearing capacity of desertification outskirt areas). Second, from the perspective of the evolution of natural deserts (Ren, 1999), most of the world's main desertification areas are now located at the outskirts of the summer monsoon areas and these areas might benefit from global warming. Due to the warmer temperatures, the summer monsoon intensifies, and warm and humid air flows can penetrate further into the continents, providing greater precipitation to the dry and desertification outskirt areas, resulting in wetness, agricultural development, ecological improvements and flourishing culture in these areas (Ren, 1994). For example, during the warming phase 6,000 years ago when the world's four great civilizations came into being, the present Sahara desert was a large grassland, or unmoving sand dunes at best. The Takalama desert in south Xinjiang, northwest China, was also much smaller than it is today. Thus, the conclusion we drew from a comprehensive study of the Universe–Earth–Biosphere–Mankind system is this: The effects of global warming, are not necessarily all negative. Global warming has both disadvantages and advantages, which may benefit China and many developing nations greatly. However, we still hold the opinion that the interests of many nations should be taken into consideration and carbon dioxide emission must be actively reduced, because the Earth might enter into a new of ice age in another 50000 years, according to estimates based on astronomical parameters. The active reduction of carbon dioxide emissions today is actually sacrificing the great benefits brought to China for the sake of the people in the world.

(3) What are the exact causes for the extreme weather events in China in recent years? Many areas of China have recently experienced extreme weather events. One cause is related to global warming, because as the atmospheric temperature increases the out-of-order severe local convection weather occurs more easily. However, studies by the author reveal that the extreme weather events occurring in the last two years in China were all directly caused by coupling between the cosmos and the earth. For example, the six extreme weather events which occurred in China in 2006 (Ren, in press) – the rare massive dust and sand storm on April 9 in east Xinjiang, Northwest China; the abnormally early frost on in the first week of September in northern China; the strongest typhoon in the last 50 years in May in Hainan; the especially extensive rainfall in Hunan caused by tropical storm Bilis; and the Sangmei super strong typhoon nicknamed the King of Typhoons – all occurred when the weather conditions were conducive to their formation and triggered by the extraordinary superposition of the tide-generation force resonance (TGFR). The drought last year in Chongqing, southwest China was caused by the superposition of many tide-generation force resonance (compression TGFR) in the Chongqing area, resulting in abnormal control within the area by subtropical high.

On July 17th of this year, in Shanpingba in Chongqing, the precipitation reached up to 226.6 mm, the highest in 115 years, and claimed the lives of 55 people. It was triggered by the superposition of two tide-generation force resonance (decompression TGFR). During the overflow of the Huaihe River, the largest volume of rainfall on July 8th (the daily rainfall deposited by the storm in three counties in Anhui Province exceeded 250 mm), was caused by the superposition of three tide-generation force resonance (decompression TGFR) which occurred in the areas on that day. At the 2007 Natural Hazard Prediction Symposium held in April this year organized by the Committee of Natural Hazard Prediction for the China

Geophysics Society, I predicted that the heaviest torrential rain might occur on July 8th in the down stream area of the Yangtze River. The heaviest rain did occur on that day, but in the Huaihe River area. The prediction is in accurate only in terms of the site which is about 1–2 latitudes further northern from the predicted one.

Our studies show that local convection weather is caused by intensive exchanges between the upper and lower atmosphere. It often occurs on the day the moon TGFR compression induces downshafts, when the convection weather is already quite intensive. From 17:00 to 20:30 of July 18th of this year, the precipitation in Jinan reached 180 mm within 3 hours, during which the precipitation reached 151 mm within 1 hour (from 18:50–19:50). This was the time when the moon TGFR compression affected the area on that day. On the evening of Aug. 1st of this year, the high altitude trough moved southwards, which activated convection weather to develop in the Beijing area in the warmth zone. As a result, a sudden rainstorm (80 mm at the Anhua flyover) occurred in the evening during 20:00–23:00, delaying many flights at the Beijing airport. Calculations show that the moon TGFR occurred in Beijing from 19:36 to 21:42, corresponding with the time when the sudden rainstorm struck. Similarly, at 16:00–18:00 on July 10th, 2004, sudden torrential rain hit the Beijing area. Between 16:00–17:00, the precipitation reached 50.6 mm at the Temple of Heaven and 17:00–18:00 57.5 mm at Xizhimen. This caused flooding at many flyovers, and severe traffic jams in many parts of the city. The sudden torrential rain fell under the effect of moon TGFR compression which triggered the downshaft of the air. When the south-north direction cloud system passed through the Beijing area, at 15:54–17:20, the downshaft of the air caused the super strong convection and the sudden torrential rain struck.

(4) Will the extreme climate events depicted in the film ''The Day After Tomorrow'' occur in 100 years? Some climatologists hold the following views (Ren, in press): It is estimated that the average global surface temperature will rise by 1.4–5.8°C within the next 100 years. More fresh water will flow into the north seas with the rising temperature (due to the melting of the icebergs and the increase in rainfall in the north). Because of the massive in-flow of fresh water, the salt content of the sea water in the north will be diluted, causing such sea water to become ''lighter''. Since it is difficult for ''lighter'' sea water to sink, there is no dynamic for it to flow back to the equatorial region. As soon as this regulator of temperature-salt circulation is turned off, the atmospheric temperature of the northern hemisphere will suddenly drop and gradually enter into an ice age, which will cause the temperature of northern Europe to drop by 20°C. At the same time, it will cause dramatic changes to the global weather. The present climate changing trend indicates that the temperature-salt circulation break depicted in the film ''The Day After Tomorrow'' might occur in 100 years.

We disagree with the above opinions after a comprehensive study of the Universe–Earth–Biosphere–Mankind system. The cause of the Earth's interglacial age, has already been universally recognized (Ren, 1990): It is caused by the variations of the three parameters of the Earth's revolution around the Sun (i.e. the eccentricity, the obliquity of ecliptic and the relative advance of perihelion), and the simulation of its values has also been successfully achieved by local and international scientists. Throughout the Earth's geological history, the glacial epoch is always related to the above astronomical factors, and cannot be solely caused by the ''turning off of the regulator of the temperature-salt circulation''.

3 Discussion of the patterns of scientific thinking

A review of the historical development of science indicates that there are two main patterns of scientific thinking (Ren, 2007). One is Western formal logic characterized by linear and analytical analysis; the other is image logic characterized by nonlinear and entirety analysis. These two thinking patterns have both contributed greatly to the historical development of science. However, with the development of civilization and science, linear and analytic thinking is proving inadequate, especially with a complex system, which has revealed its disadvantages in practice. It is easy to make the mistake of ''only seeing the trees, not the entire forest'' with linear and analytic thinking. Many scientists today, including some pioneers in the development of western science and technology, find it necessary to learn from the East, especially the thinking methods of the Chinese to make up for all kinds of disadvantages in their thinking patterns dating back to the industrial revolution. We contend that we should make full use of the advantages of both the western and eastern scientific modes of thought when deciding the strategy for science and technology development from the 21st century onwards, following the teaching of *The Book of Changes*, a Chinese classic: ''Viewing upwards to observe the rules of astronomy, looking downwards to study the reasons of the Earth, is the approach to fully understand both sides of issues''. I strongly advocate the approach (Ren, 2006) of paying attention to modern physical issues contained in the scientific thinking pattern of Chinese traditional culture. It may be a huge mistake for modern meteorology not to take into consideration the effect of astronomical factors.

The cause of global warming today and its possible effects involve a series of huge and complex system issues. The top priority should be to pinpoint the main reason and the interrelated links between causative factors by adopting a macro-approach, or comprehensive comparison analysis. Its physical mechanism should be determined and its digital model established after quantitative study.

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