



SHAPING CHINA'S CLIMATE CHANGE EPISTEMIC COMMUNITY

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With the establishment of the National Climate Change Expert Committee (NCCEC) (中国国家气候变化专家委员会) in early 2007, the Chinese government recognized two important realities, first that a community of scientists with specialized knowledge of climate change existed in China, and second that there was a need for advanced scientific inputs to the formulation of policies to deal with climate change at the national as well as the international level. Two eminent scientists Ye Duzheng (叶笃正) and Qin Dahe (秦大河) proposed the NCCEC together with other academicians in a letter to the CCP Central Committee in June 2005. The committee was composed of people from a range of disciplines, but a majority were meteorologists and atmospheric physicists that had been trained during previous decades.¹ These members of the committee were seen as leading authorities in their special fields who would be able to provide useful policy advice for the government.

In a sense, the committee represented an institutionalization of the policy influence of an epistemic community that entailed knowledge-based networks of recognized experts in the field of climate research. The conceptual definition of epistemic communities is a group that “not only hold in common a set of principled and causal beliefs but also have shared notions of validity and a shared policy enterprise.”³ Scholars who regularly research the influence of international communities on climate change policy apply the notion of “epistemic communities” on their subjects. What’s more, climate change is primarily a political issue informed by the results of scientific research and therefore the community of the scientists warrants further exploration. This paper will look at the historical evolution of Chinese climate change science using the concept of epistemic communities.⁴ However, most research on epistemic communities focuses on transnational groups; here we are primarily interested in the formation of the Chinese epistemic community, even if we recognize that this community has strong links to international climate research networks.

Finding a Community, People, and Their Episteme

The climate change epistemic community in question has its roots in the Chinese meteorologists who raised the issues of climate change during the late twentieth century, trained a generation of Chinese scientists in the field, and developed links to international networks that warned governments of the consequences of global warming.⁵ The concept of an epistemic community may, however, include a broader set of actors with the professional and social stature to make authoritative claims on politically pertinent and socially relevant issues of the day; that is, concerned officials may join the community in addition to scientists.⁶ The China Meteorological Network compiled a list of leading climate scientists.⁷ Moreover, key actors in the community were also members of the NCCEC. On top of the three scientists chosen for this paper as representative of the Chinese epistemic community, there are a number of relevant experts who illustrate the community’s work, but space does not permit us to discuss all of these people in detail.

A further complication in analysing the epistemic community is that the knowledge that Chinese climate change actors have employed for policy advice in recent decades has evolved significantly in the face of both domestic and international challenges. As the discussion of key actors and their historical context below briefly enumerates, basic elements of meteorological climate research informed the initial understanding of natural and human factors in global warming. However, academics and policy makers gradually realized that the epistemic foundation for new policies required knowledge related to mitigation and adaptation. In the current stage, the expertise of the epistemic community increasingly relies on sophisticated models concerning the economic and political implications of China’s climate policy.

Epistemic communities must persuade decision-makers, and successfully navigate the machinery of government by aligning themselves into bureaucratic positions, if their consensual knowledge is to inform policy choices.⁸ The extent to which a Chinese climate science epistemic community has been able to influence China’s policies has also been contingent on the active support of the Chinese leadership over the last three decades. This can be illustrated by the careers of Ding Yihui (丁一汇), He Jiankun (何建坤), and Xie Zhenhua (解振华).

Ding Yihui: Climate Models for Warnings of the Future

Ding Yihui became a meteorologist after an early interest in atmospheric physics and geophysics at Peking University. From the 1970s on he developed his career in research on monsoon cycles, extreme rainfall, and weather forecasting.⁹ In the 1980s, Ding turned his attention increasingly to climate change and the development of quantitative, automated analysis based on computerized climate prediction models. In 1994, he became the first Director of the National Climate Center of the China Meteorological Administration, which received substantial funding. In his role as director he helped the center build a network of 700 scientists. When Ding was selected to represent China in the research of the Intergovernmental Panel on Climate Change (IPCC) an important new phase for Chinese climate science began. Ding was appointed vice-chairman of the working group on the scientific basis of climate change, which published the IPCC First Climate Change Assessment Report in 1992. He continued to advance in his role at the IPCC as a co-chair of the first working group for the Third Climate Change Assessment Report in 2001. His contributions earned him a reputation as a leading Chinese climate change scientist and a strong proponent of the view that the human impact on the climate had become more significant than the natural factors—one that was only gradually becoming accepted in China.

China's position in international negotiations had been largely defined by bureaucratic representatives participating in the National Climate Change Coordination Group that was set up in 1990 and re-staffed in 1998 and 2003. However, Ding Yihui became one of the vice-chairmen of the NCCEC in 2007 to provide expert opinions, which were often used in international negotiations. Under the leadership of Ding, a comprehensive evaluation of the specific implications for China of the results presented in the IPCC Fourth Assessment was produced to aid negotiators at the upcoming 15th COP climate summit in Copenhagen.¹⁰

In his formulation of the climate change episteme for China, Ding Yihui was most concerned about the potential damages that the fast-changing climate could bring about in China, and therefore maintained that it was necessary to develop more sophisticated long-term climate models with particular reference to Chinese conditions.¹¹ He also argued that, while the natural causes were impossible to control, the human impact had to be reduced. The importance of mitigation of greenhouse gas emissions at the global level, and for China specifically, became increasingly more vital for Ding. Over the past decade Ding has called for the development of climate models that could assist China in adapting to the future climate.¹²

He Jiankun: Mitigation and Low-Carbon Climate Policy

Professor He Jiankun, Vice-President at Tsinghua University, contributed to the climate change epistemic community with energy system engineering research and proposals for low-carbon development. He developed Chinese approaches to the mitigation of emissions by applying his expertise that went beyond atmospheric physics and meteorology; in particular, his engineering background was helpful for designing systems to control the main sources of greenhouse gas emissions, such as the production and consumption of energy. He Jiankun graduated from the

Department of Engineering Physics of Tsinghua University in 1970 and obtained a master's degree in management science and engineering in 1981. He was appointed Vice-President of the Tsinghua University in 2004 and joined the NCCEC as a Deputy Director in 2007, and then reappointed as a member of the committee, where he remains until today. In 2008 he became director of the Laboratory of Low-Carbon Energy at Tsinghua University and participated in a portfolio of major energy and climate change projects of the National Science and Technology Support Program during the Eleventh Five-Year Plan (2006-10) and Twelfth Five-Year Plan (2011-15).

He Jiankun was also appointed as a special researcher of the Counselor's Office of the State Council in November 2012, advising the highest organ in the government on green policy, low-carbon development, and climate change.¹³ He was also invited to participate as an advisor in the delegations that China sent for international climate negotiations at the UNFCCC Conference of Parties.

The core leitmotif for He Jiankun, as reflected in interviews related to the Copenhagen climate summit in 2009 and the Paris conference in 2015, has been the need to control greenhouse gas emissions and embark on a low-carbon development path.¹⁴ He argued that up to now research questions have focused on “why” e.g., “Why do we have to promote green and low-carbon development?” but the key question should now be “how” e.g., “How should we do it? How can we cut emissions?”

In order to address the “how” question, the Laboratory of Low-Carbon Energy at Tsinghua University strengthened research concerning future scenarios for China's economic and social development under a low-carbon perspective, including the development of advanced models for technical and economic conditions and projections. With the underpinning of this type of advanced research, He Jiankun became one of the anchors at Tsinghua University for research that prepared the scientific calculations that provided the foundation for Xi Jinping's 2020 announcement of the ambitions of the current Chinese leadership regarding carbon peaking and carbon neutrality, often called the “dual carbon” (双碳) climate goals of China.¹⁵

Xie Zhenhua: The Official Spokesperson

Probably the most well-known representative of the Chinese climate change epistemic community is Xie Zhenhua, who has served for decades as chief negotiator in international climate policy fora. In 1977 Xie graduated from the Department of Engineering Physics at Tsinghua University, and has been engaged in environmental protection work since 1982. Xie served as Director of the State Environmental Protection Administration from 1993–2005 and in 2006, he was appointed Deputy Director at the National Development and Reform Commission, the organization that became responsible for China's climate policies until this responsibility was moved to the Ministry of Ecology and Environment in 2018. A major event was his appointment in 2007 as the head of the Chinese delegation to the United Nations Climate Change Conference, a role that he subsequently occupied for more than a decade. At the same time, he was involved in the design of various policies that China implemented in order to reduce the carbon intensity of economic development, including the preparation of the Chinese government's official statement on climate change and a white

paper entitled *China's Policies and Actions to Address Climate Change* in 2008 that drew on the expertise of Chinese climate scientists.¹⁶ Xie Zhenhua has been acknowledged for his role in securing a positive outcome of COP21 in Paris in 2015, where China signed the Paris Agreement, a binding agreement that all nations undertake efforts to limit global warming to well below 2°C, preferably to 1.5°C. Consequently, in 2017 he received the Lui Che Woo Prize for his efforts to tackle global climate change.¹⁷



US Secretary of State John Kerry and US Special Envoy for Climate Change Todd Stern with Chinese National Development and Reform Commission Vice Chairman Xie Zhenhua.¹⁸

Nevertheless, in 2019 Xie officially withdrew from his position as China's special representative on climate change and became a senior advisor to a large group of researchers at Tsinghua University over the next two years. This research group, which included He Jiankun, studied the effects of climate change in China and assessed the necessary scope of economic restructuring and technological innovation to reach ambitious low-carbon goals in 2050.¹⁹ The result was a comprehensive assessment and report which proposed pathways for carbon neutrality goals and the quantitative evaluation of carbon emission reductions, technology needs, economic costs, and environmental impacts.²⁰ This research supported the decision of President Xi Jinping to announce the goal of carbon peaking before 2030 and carbon neutrality in 2060 at the United Nations meeting in September 2020.²¹

Subsequently, Xie Zhenhua was reappointed as a special envoy for climate change affairs in February 2021, and has since followed up on his mission to address climate issues and China's position in international negotiations at the UN's 2021 COP26 climate summit in Glasgow and COP27 summit at Sharm el-Sheikh, Egypt, in November 2022.

Conclusion: The Influence of Three Proponents of China's Climate Change Epistemic Community

The narrative above is intended to show how three key actors illustrate key aspects of China's climate change epistemic community and their influence on climate policy. All three were members of the NCCEC, and often possessed direct links to the Chinese leadership. The episteme that they helped formulate evolved from a deeper scientific understanding of the forces of climate change and their impacts in China on the realization that China was becoming a major contributor of greenhouse gas emissions, and the consequent need to develop low-carbon development paths for the Chinese economy. This episteme was effective in persuading the Chinese leadership that concrete action was required in terms of policy measures in China, and defended at international climate summits with skill and a willingness to compromise in the end.

One of Ding Yihui's main concerns was how to improve the Chinese capabilities in advanced scientific research that would help to alert both a global audience and the Chinese leadership to current and prospective effects of global warming. With his work on international scientific evidence of climate change as a prominent author of IPCC reports, he was able to provide inputs to Chinese policy regarding the need to mitigate carbon emissions and, later, to raise awareness about essential adaptation to the effects of climate change in China.

The need to find viable technical and economic solutions for climate change mitigation was a primary motivation for the research and debate on climate by Professor He Jiankun, who assembled a strong group of people at Tsinghua University. His comprehensive approach to reducing emissions became influential in the design of policies to promote clean energy and structural transformation of the Chinese economy. Having a position as special advisor to the State Council allowed him to interact directly with the leadership.

Finally, Xie Zhenhua's career illustrates the role of an administrator and CCP party cadre who developed an interest and a competence in environmental and climate change issues that could be translated into political action in international circles.

These three vignettes also illustrate the diversity of China's climate change epistemic community. Although each had different disciplinary backgrounds and focused on different aspects of a wider understanding of the climate and its effects, they helped develop a consensus around the actions that were necessary to help China manage mitigation of greenhouse gasses. This episteme started as a scientific issue, but gradually became a question of technical priorities and action, and finally extended beyond China's borders as a framework for defending China's interests in geopolitical struggles. Unfortunately, space does not allow a detailed review of the evolution of the particular Chinese episteme for climate change in this Observations Paper. The formation and evolution of the wider epistemic community would be a worthwhile research topic. Such a project could analyze the extent to which the community included scientists as well as administrators and members of social movements and both quantitatively and qualitatively explore the debates on possible policy measures for mitigating and adapting to climate change.

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