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EDITED AND REVIEWED BY

Hong Liao,
Nanjing University of Information Science
and Technology, China

*CORRESPONDENCE

Wei Shui,
✉ shuiweiman@163.com

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Editorial: Climate change and adaptive capacity building

Wei Shui^{1*}, Wanyu Shui², Junyu Qi³, Haijun Deng⁴ and Shaoquan Liu⁵

¹College of Environment and Safety Engineering, Fuzhou University, Fuzhou, China, ²Department of Geography and Resource Management, The Chinese University of Hong Kong, Shatin, Hong Kong SAR, China, ³CMNS-Earth System Science Interdisciplinary Center, University of Maryland, College Park, College Park, MD, United States, ⁴School of Geographical Sciences, Fujian Normal University, Fuzhou, China, ⁵Institute of Mountain Hazards and Environment, Chinese Academy of Sciences (CAS), Chengdu, China

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Editorial on the Research Topic

Climate change and adaptive capacity building

The impacts of climate change that have been observed in recent years are significant and multifaceted, and climate change is having far-reaching effects on both natural and socio-economic systems. Climate change is a present and ongoing concern for humanity, and its adverse effects are driven by both critical infrastructure systems and increasing human activity, which pose risks that can be mitigated through appropriate adaptation measures. In order to better address the various challenges posed by long-term adaptation to climate change and to enhance human capacity for sustainable survival and development in the face of global climate risks, there is a need to strengthen regional case studies on climate change adaptation and to increase the assessment and prediction of climate change impacts on human economic and social activities.

This Research Topic, *Climate Change and Adaptive Capacity Building*, presents one review paper and 13 original research papers, from seven different countries (57 authors), and has papers that span the field of climate change, gives insight into ongoing Research Topic, and provides a basis for further study on reducing climate risk and strengthening adaptive capacity building. Here, we summarized some of the highlights derived from the 13 articles published in this Research Topic.

Air temperature is the primary indicator of climate change. Reanalysis temperature products play an important role in temperature estimates. However, some systematic biases exist between reanalysis data and observations affecting the accuracy of model prediction (Dyakonov et al., 2020; Rakhmatova et al., 2021). Therefore, bias correction of the ERA-Interim reanalysis data is essential, many methods have been constructed to correct bias like GPCP method and temperature lapse rate method (Szczypta et al., 2011; Gao et al., 2017). Zhao et al. used the temperature lapse-rate method to correct ERA-Interim reanalysis-temperature data in the Qilian Mountains of China from 1979 to 2017. The results of these researchers showed that correction methods based on ERA were reliable for bias correction, and will be especially applicable to mountainous areas with few observation stations. Islam et al. investigated probable temperature changes across Bangladesh using CMIP5 GCM temperature simulation, and is the first to use all available CMIP5 models to project temperature over the country. The dynamic assessment of

urban thermal vulnerability in the southeast coastal metropolis by (Shui et al., 2022), and reveals the main factors affecting the formation and spatial differentiation of UHV.

For a long time, there has been significant interest in understanding how climate change affects vegetation cover across various fields of study. A substantial amount of literature has been explored, indicating that the most significant phenomenon of climate change is that climate change affected the alteration of vegetation growth in the long time series and large spatial scale (Myneni et al., 1997; Tucker et al., 2001). The existing literature on vegetation cover change in China is very extensive, especially on NPP and its influencing mechanism, and there is little research on Evi (Shui et al., 2018). Feng et al. analysis the correlation between the vegetation cover change about 20 years and climate factors in the Guangdong-Hong Kong-Macao Greater Bay Area, their results indicated that the EVI changing trend in the future by R/S analysis method is affected by climate and human factors together and there are no significant factors. Besides, they found a significant positive correlation between the EVI trend and two climate factors (relative humidity and wind speed), which could make sense in the protection and establishment of the ecological environment in the GBA.

In order to reduce the risks associated with climate change, it is crucial to prioritize ecological protection and restoration efforts. Ecological water conveyance is an effective method for restoring the environment. Jiao et al. quantitatively assessed the impact of ecological water conveyance on ecological restoration in the Tarim River basin over the past 20 years, and concluded that ecological water conveyance has a positive effect on groundwater recharge and ecological restoration by constructing a basin ecological environment quality evaluation system. Wang et al. developed a production-living-ecological space (PLES) classification system which takes into account the land-use type and ecological environment in a comprehensive aspect. It serves as a crucial criterion for determining the appropriate combination of land-use functions and the current state of the ecological environment in the basin, preparing for future ecological restoration and other work.

Lakes can record the effects of climate change and human activities on regional hydrological processes at different time scales. Additionally, they play a crucial role in transmitting valuable data about global climate change and regional responses (Zhang et al., 2011; Tao et al., 2015). Wang et al. investigated the changes and attributions of typical lakes in Xinjiang from 1986 to 2020 using remote sensing big data cloud platform and mathematical and statistical methods. The results show that human activities and precipitation are the main factors affecting the changes of lakes.

Looking back at the past is also a crucial part of understanding climate change. Stable isotope signals in modern precipitation along with ancient isotope records preserved in natural archives can help reconstruct past climate and hydrological cycles (Yao et al., 2013). Cai et al. studied the isotopic variation characteristics of precipitation in different seasons (non-summer wind and summer wind) and proposed that the transfer of water vapor sources during water vapor transport

and the intensity of upstream atmospheric convection jointly affect the seasonal variation of precipitation isotopes.

In recent years, climate change has affected global ecological, economic and social systems in various ways. As we all know, trees in urban green spaces have positive effects and cool urban temperatures. Feng et al. studied the microclimate factors under the canopy of four evergreen trees in humid and hot regions and the relationship between microclimate factors and tree physiological parameters, which can optimize the selection of tree species for urban planning and improve the living environment of urban residents. Zhou et al. analyzed the climate and precipitation changes in Xinjiang in the past 60 years, explored the relationship between climate change and atmospheric circulation in Xinjiang at multiple scales. The results of the study can provide a reference for evaluating and predicting climate change in XJ (Sein et al.). The fluctuations in precipitation on both annual and seasonal scales, as well as the correlation between precipitation parameters and anomalies in sea surface temperatures (SST) in Myanmar from 1970 to 2014. An active response to climate change is necessary from an economic and social perspective. Ma et al. explores the effects of farmers' space-time perception of climate change. The results show that farmers' space-time perception of climate change significantly affects farmers' adaptive behavior. And Peng et al. points out that extreme climate has a significant positive effect on crime rates. All of the above can help the government to make decisions and maintain economic and social stability. Stavi et al. conducted a review of major climate change occurrences around the world and analyzed the efforts made by the international community to combat climate change from 1992 to 2021. The review suggests the need for increased policy development aimed at addressing climate and environmental concerns.

Author contributions

The authors make equal contributions to the editorial.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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