Research article

The impact of climate change on China's central region grain production: evidence from spatiotemporal pattern evolution

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Appendix 1

The specific adjustments are as follows: (1) Abolish the old Chaohu (prefecture level). (2) To establish Chaohu (county level) based on the Juchao District of the old Chaohu (prefecture level) under the jurisdiction of Hefei (prefecture-level administrative unit). (3) Lujiang County of the old Chaohu (prefecture level) was transferred to the jurisdiction of Hefei (prefecture-level administrative unit). (4) Wuwei County of the old Chaohu (prefecture level) was transferred to the jurisdiction of Wuhu (prefecture-level administrative unit). (5) The main parts of Hanshan County and He County (excluding Shenxiang Township) of the old Chaohu (prefecture level) are transferred to the jurisdiction of Maanshan (prefecture-level administrative unit). Regarding the above adjustments, this study assigns the data of the five county-level administrative units of the old Chaohu (one district and four counties under the prefecture-level administration) to the prefecture-level administrative units which they belonged after the adjustments (some of the adjustments involving townships and villages might have a small margin of error).

Appendix 2

In this study, the modeling selection was made for 87 prefecture-level administrative units in the central region of China, involving three-time points of 2010, 2015, and 2020 data. Output Per Unit of Grain Sown Area (OPUGSA), Annual Average Temperature (AAT), Annual Precipitation (AP), and Annual Sunshine Hours (ASH) were selected and standardized in SPSS software. Standardized treatment: The Z-Score Normalization is calculated using the following equation.

$$X_{normalization} = \frac{x - \mu}{\sigma}$$

Where, x denotes the original data; μ denotes the mean of the original data; σ denotes the standard deviation of the original data; and $X_{normalization}$ denotes the normalized data.

The data for each variable within its respective three time points (2010, 2015, and 2020) totaled 261. The results are summarized in the table below.

Table. Global spatial autocorrelation results of grain production for China's central region in 2010, 2015, and 2020

	Numbers	Minimum	Maximum	Mean	Standard Deviation
Output Per Unit of Grain Sown Area (unit: kg/hm²)	261	2040	8049	5725.76	1028.473
Annual Average Temperature (unit: °C)	261	7	24	17.58	3.560
Annual Precipitation (unit: milliliters)	261	410	2759	1303.92	596.913
Annual Sunshine Hours (unit: h)	261	976	3267	1726.87	391.785