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## Trend analysis of extreme climate indices during winter wheat growth period in China

Hanjiang Nie<sup>1,2</sup>, Tianling Qin<sup>1</sup>, Zhenyu Lv<sup>1,2</sup>, and Jianwei Wang<sup>1</sup>

<sup>1</sup>State Key Laboratory of Simulation and Regulation of Water Cycle in River Basin, China Institute of Water Resources and Hydropower Research, Beijing 100038, China (nhj199008@163.com; qintl@iwhr.com; LVZYIWHR@163.com; wangjw0603@163.com)

<sup>2</sup>Department of Hydraulic Engineering, Tsinghua University, Beijing 100084, China(nhj199008@163.com; LVZYIWHR@163.com)

In this study, the major winter wheat planting area of China is selected as the study area, with the time scale of the growth period of winter wheat (a total of 56 growth periods during 1961/10-2016/5). The significance, stability, magnitude of the trend and the average trend of the study area with 8 temperature indices and 7 precipitation indices of 453 meteorological stations are tested by Mann-Kendall method and Sen's nonparametric method. The following observation can be made: (1) the cold extreme indices show strong and stable downward trend in most of the stations in the study area, while the hot extreme indices show strong and stable upward trend, especially in the northern winter wheat planting area and the north of the southern winter wheat planting area. (2) The trends of extreme precipitation indices in most of the sites in the study area are insignificant and unstable. Only in R20mm, a significant and stable decreasing trend is showed in some stations, which mainly located in the northern winter wheat planting area and part of the central and western regions in study area. The results in some ways could enrich the references for understanding the climate change in the growth period of winter wheat in the region and help to formulate a better agronomic management practice of winter wheat.