Analysis of the dominant climatic factors of evaporation change over the main basins in mainland China based on Budyko and Bouchet hypotheses

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Abstract Actual evaporation ($E$) has different change trends over various regions. It is important to understand why actual evaporation changes and what the dominant climatic factors are. Based on the Budyko and Bouchet hypotheses, we established a water-energy coupled balance model that can quantify the effects of radiation, precipitation and temperature on regional actual evaporation. Furthermore, the analysis, according to this model and meteorological data from about 700 stations across mainland China during 1961–2005, revealed the regional change of actual evaporation and its dominant climatic factors. The results show that temperature is the key factor in the Song-Liao River basin; while precipitation is the major factor in the Northwest River basin, the Hai River basin, the Yellow River basin, and the Southwest Rivers basin. In addition, net radiation controls $E$ in the Huai River basin, the Yangtze River basin, the Southeast Rivers basin, the Pearl River basin, and Hainan province.

Key words climate change; evaporation; dominant factors; Budyko hypothesis; Bouchet hypothesis