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Evaluation of blue and green water resources in the upper Yellow River basin of China

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Abstract The total amount of water resources severely affects socioeconomic development of a region or watershed, which means that accurate quantification of the total amount of water resources is vital for the area, especially for the arid and semi-arid regions. Traditional evaluation of water resources only focused on the qualification of blue water, while the importance of green water was not fully considered. As the second largest river in China, the Yellow River, plays an important role in socioeconomic development of the Yellow River basin. Therefore, the blue and green water resources in the upper Yellow River basin (UYRB) were evaluated by the SWAT model in this study. The results show that the average annual total amount of water resources in the UYRB was 140.5 billion m^3, in which the blue water resources is 37.8 billion m^3, and green water resources is 107.7 billion m^3. The intra-annual variability of the blue water and green water is relatively similar during the same period. The higher temperature, the greater difference between the blue and green water. The inter-annual variability of the blue and green water shows that the trends in precipitation, blue and green water have an relatively similar characteristic. The spatial distribution of the blue and green water is characteristic with gradually decreasing from the northwest to the southeast, and the blue water around the main stream is greater than that in the other areas.
Key words Blue water; Green water; SWAT model; Water resources; Yellow River