



Agriculture Drought Assessment in Northeast China Based on Distributed Hydrological Model Simulation

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There are plenty of indexes to assess agriculture drought, but most of them are proposed based on pure mathematical methods. Regional differences need to be considered in practical application, because they are established within specific geographic regions and time scopes, having appropriate spatial and temporal scales. The Soil Moisture Anomaly Percentage Index (SMAPI) can objectively evaluate the regional drought in a specific climatic and geographic condition where economy has adapted to its climate and environment, thus it has better versatility to evaluate regional drought.

This study chose SMAPI to assess agricultural drought in Northeast China, but both of long series of in-site observation of soil moisture and a criterion on drought classification don't exist in China. With a view to obtain long series of continuous soil moisture data, the large-scale distributed hydrological model VIC was used to simulate grid daily soil moisture at 30km × 30km from 1950 to 2010 over China. This paper comprehensively analyzed daily soil moisture data at the 0–20 cm depth of 20 representative grids in Northeast China, and calculated SMAPI for every grid. Historical drought data and frequency analysis tool has been used to establish practical and quantitative agricultural drought evaluation standard based on the anomaly percentage of soil moisture. And the standard was used to simulate typical drought in history and compared with the actual occurrence of drought.

The results show that the simulated agriculture drought in Northeast China is consistent with historical data, which implies the agricultural drought evaluation standard based on SMAPI is reasonable, and the proposed approach could be applied to other regions for agriculture drought assessment.

Key words Soil Moisture Anomaly Percentage Index; drought; drought index; VIC model