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Application of the Long Short-term memory network for Hydrologic forecasting on Guanshan River Basin

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In small mountain basins, hydrologic forecasting is particularly difficult, where spatial heterogeneity of rainfall is difficult to monitor by limited rainfall data. In response to this challenge, hydrologists have done a great deal of work on hydrologic forecasting, including statistical calculations, hydrologic mechanisms, and data-driven methods. As the most popular method in data-driven method, deep learning algorithm has considerable application prospects in hydrologic forecasting. LSTM's deep learning method with long-term memory ability has a natural advantage in hydrological forecasting, and the multiple eigenvalue setting makes the model calculation not completely dependent on the single indicator of rainfall, so that LSTM is more suitable for small mountain basins. Taking the Guanshan River Basin as an example, this paper constructs a traditional hydrologic model and a long short-term memory (LSTM) model to simulate the runoff of the Guanshan River and compare the simulation effects of the two schemes. The Nash-Sutcliffe efficiency coefficient of the traditional hydrologic model is 55%, and the corresponding Nash-Sutcliffe efficiency coefficient of the LSTM is 70%, under the same inspection period. The results show that the long-term and short-term memory (LSTM) model can better simulate the runoff in the Guanshan River Basin compared with the traditional hydrologic model.