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### Stochastic modeling of daily precipitation in China

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A stochastic model for daily precipitation simulation in China was developed based on the framework of a 'Richardson-type' weather generator that is an important tool in studying impacts of weather/climate on a variety of systems including ecosystem and risk assessment. The purpose of this work is to develop a weather generator for applications in China. The focus is on precipitation simulation since determination of other weather variables such as temperature is dependent on precipitation simulation. A framework of first order Markov Chain with Gamma Distribution for daily precipitation is adopted in this work. Based on this framework, four parameters of precipitation simulation for each month at 672 stations all over China were determined using daily precipitation data from 1961 to 2000. Compared with previous works, our estimation for the parameters was made for more stations and longer observations, which makes the weather generator more applicable and reliable. Spatial distributions of the four parameters are analyzed in a regional climate context. The seasonal variations of these parameters at five stations representing regional differences are discussed. Based on the estimated monthly parameters at 672 stations, daily precipitations for any period can be simulated. A 30-year simulation was made and compared with observations during 1971-2000 in terms of annual and monthly statistics. The results are satisfactory, which demonstrates the usefulness of the weather generator.

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**关键词:** weather generator; precipitation; Markov Chain; Gamma distribution; China doi: 10.1360/gs/040404