Applications of Spatial Interpolation for Climate Variables Based on Geostatistics: A Case Study in Gansu Province, China

WenzeYue, Jianhua Xu, Hongjuan Liao, and Lihua Xu

Department of Geography, East China Normal University, Shanghai, 200062, P. R. China

Abstract

Based on reviewing the origin, development and basic principles of Geostatistics, this article mainly introduces two interpolation methods: Ordinary Kriging and Cokriging. As an optimal one among so many methods to spatial interpolation for climate variables is not available, the article discusses Geostatistics-based interpolation methods by using 30-year average precipitation and evaporation data in Gansu province from 1961 to 1990. According to different semivariogram theory models, we adopt Ordinary Kriging and Bivariate Cokriging interpolation methods, and compare research results. We draw the following conclusions: (1) Both 30-year average precipitation and evaporation present obvious gradient change on space, in a great range. But the former's is larger than the latter's. 30-year average precipitation decreases gradually from southeast to northwest, however, evaporation increases gradually from southeast to northwest. (2) According to semivariogram cloud plots and experiment variance minimum principle, we select suitable theoretical semivariogram models based on Geostatistics interpolation, which can simulate the spatially continuous distribution patterns of the special regionalized variables in a better way. Compared with Ordinary Kriging, Cokriging considers the influence of altitude on precipitation and evaporation and thereby has higher interpolation accuracy. (3) Though Geostatistics methods can better reflect the general space patterns of climate variables, their interpolations precision is not high as we expect and can be improved further.