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The impact of interpolation method on the accuracy of meteorological variables in distributed hydrological model

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Precipitation and other meteorological variables are very important input data for distributed hydrological models, which determine the simulation accuracy of the models. It is a normal way to subdivide the large area watershed into numerous subbasins to reflect the spatial variation, and the value is usually unique within each subbasin. In most model application, the values of meteorological variables are interpolated from meteorological station observed data to the centroid point of the subbasin with interpolation method (called one-cell interpolation). Because the centroid point could not represent the whole subbasin, the one-cell interpolation will bring input data uncertainty to the model. In this study, a new method is introduced to analysis this uncertainty, which firstly interpolate the values into numerous cells smaller than the subbasin then sum up to the subbasin (called multi-cells interpolation). The results show that one-cell interpolation way is not always consistent with the results of multi-cells interpolation, and the variance is greater in summer than in winter. The consistency grows with the increase of the number of the cells, which indicates that dozens of the cells could got the stable state. The variance is also influenced by the density of meteorological station, but the minimal cell number is almost the same. Thus, in the interpolation of the meteorological variables in distributed hydrological model, it recommends to interpolate the values to numerous smaller cells then sum up to the subbasins, rather than only interpolate to the centroid point.