



Underestimation of the decrease in areal precipitation due to the effect of increasing aerosols on orographic precipitation

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Exact estimation of areal precipitation is important for studying hydrologic cycle and assessing water resources. Areal precipitation is generally interpolated from gauge precipitation. In recently years, many researches have revealed a suppressive effect of increasing aerosols on orographic precipitation. In this present research, 2 catchments located in northern China were selected for analyzing the spatial variability of the precipitation change trend during the past 50-years. The results showed that the ratio of mountaintop precipitation to precipitation at mountain foot (R_o) had a significant decrease (at about 20%), i.e. more decrease of precipitation is at mountain top. Because few gauges were set at the top of mountains, generally extremum of the decrease in precipitation can not be captured when interpolating precipitation. It indicates that decrease in areal precipitation is underestimated in mountainous areas with polluting air and declining precipitation, while it suggests an improvement of interpolation method and/or precipitation monitoring network design.