Assessment of spatial rainfall variation on runoff in Wadi Sudr, Sinai Peninsula

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Rainfall gauge network, especially in arid regions, is a key driver for hydrologic modeling to evaluate flash floods runoff. These gauges are utilized to develop an interpolated spatial surface of rainfall data used as an input for hydrological analysis. Several factors could control the accuracy of creating this surface. The location and spacing of stations, the density of the gauge network, and the interpolation scheme have various effects on estimated surface. Errors resulting from interpolation methods could then propagate to models and affect the outcomes. In this research, 4 scenarios of creating rainfall surfaces and their effects on the estimated runoff will be examined for Wadi Sudr in Sinai Peninsula. The four rainfall surfaces are developed from Thiessen polygons method, the WMO area of effect for each rain gauge, spatial interpolation techniques (inverse distance weighted, Spline) and the last scenario by merging the last two surfaces. The four scenarios are compared with respect to the runoff calculated from observed water levels at the outlet of Wadi Sudr. Results reflect that the peak discharge of the runoff is highly affected by the elected method of creating the spatial surface. The outcomes also reflect to which extent the location of the raingauge, area covered by each gauge and the interpolation technique affect the estimated runoff.

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