

Abstract:

Depth-Duration-Frequency (DDF) relationships have a significant impact on peak discharge estimation. Unfortunately, in many regions, only 24-hour rainfall is available. Therefore, the designer of flood protection works is constrained either to assume a uniform rainfall distribution over the total storm duration, which leads to underestimation of peak discharges; or adopt predetermined ratios between short duration rainfall values, which were derived for other countries and other climates.

This research studies DDF relationships in the Sudr Region, Sinai Peninsula, Egypt. Available short duration rainfall records are analyzed for six stations, all located in the Wadi Sudr catchment. Short duration ratios are derived via two approaches: the first is by using all independent storms in the records to maximize the use of scarce information; and the second is by performing frequency analysis on peak-over-threshold series for each storm duration, and then derive ratios for DDF rainfalls at different return periods.

The results of the two approaches are compared with regionalized USA and other international short duration ratios. Finally, generalized depth-duration-frequency equations are developed and compared with equations from previously published studies both in humid and arid climates.