In case of no available rainfall data at short duration intervals, many researchers suggested distributions that can be used as design hyetograph in humid regions; few papers treats design hyetographs in arid and semi-arid regions. This research aims to analyzing available short duration rainfall data in arid regions, (such as in Sinai, Egypt, and in some Gulf countries), in order to propose design hyetographs representatives of the recorded storms.

Rainfall data from some stations in arid regions where short duration rainfalls are available were collected. Then they are analyzed and frequency analyses on all storm durations are carried out. Rainfall hyetographs of these stations are compared with published rainfall distributions representatives of humid regions. This comparison shows which of these distributions (if any) are suitable for application and whether they are safe to be used for peak discharge estimation. Hydrologic simulations of rainfall-runoff modeling are carried out to determine the impact on peak discharges.

It was found that the well-known Bell ratios between different rainfall durations (developed for the USA) are valid for rainfall in arid regions for durations less than two hours. Also, the ratio of the one-hour rainfall, implemented in well-known design hyetographs such as the SCS type II rainfall to the dimensionless rainfall curve, can be used safely in design of drainage works for arid regions rainfall hours on the average. Nevertheless, the stations having extreme storm durations of more than one hour, the SCS rainfall dimensionless curve does not appear to give safe peak discharge results in rainfall runoff hours on the transformations for rainfall stations having extreme storm durations of less than average. A modified SCS dimensionless curve is suggested to remedy this unsafe discharge values when using the SCS curves. The rational of the modification is that since the total storm duration is limited to less than three hours, the total SCS dimensionless storm should be restricted in this storm duration. A modified SCS curves are used and the peak discharges were re-calculated for critical rainfall stations. It was found that the new discharges are equivalent or higher than the frequency storm discharges. As such, this research achieved a safe design with a simple modification of the SCS curves using information usually available about large storm total durations and without having to carry out the complete rainfall frequency analysis.