Runof mapping using the SCS-CN method and artifcial neural network algorithm, Ratga Basin, Iraq

Ahmed Shahadha Muneer1 · Haitham Abdulmohsin Afan2 · Ammar Hatem Kamel1 · Khamis Naba Sayl

Abstract

The traditional Soil Conservation Service)SCS(process for calculating the runof depth tends to be a very tedious and time time-consuming hydrological modeling process. Therefore, a geographic information system (GIS) is now being utilized as a tool alongside the common SCS-CN method for runof calculations. This research aims to estimate the spatial distribu tion of runof depth from Ratga, an agricultural watershed from the Iraqi Western Desert, using the SCS-CN method, GIS, generalized regression neural network (GRNN), feld observation dataset, and remote sensing data. The GRNN model was used to predict the soil type based on spectral refectance data. The results refer to an excellent performance of this model with the maximum absolute error was 8.44%, 14.11%, and 4.15% for sand, silt, and clay soil, respectively, and the sandy soil has the highest correlation coefcient (0.83). The outcome of the SCS method showed the CN value ranged from 70 to 85 of normal conditions. This investigation outline that the maximum volume of surface runof of the 2018 to 2020 years was 4,324,528 m3 . This paper proves that incorporating GIS with the SCS-CN model and ANN provides a robust tool for calculation runof depth in the Iraqi Western Desert, representing barren catchments of Ira