# Probabilistic properties of the Curve Number

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The determination of the Curve Number (CN) is fundamental for the hydrological rainfall-runoff SCS-CN method which assesses the runoff volume in small catchments. The CN depends on geomorphologic and physiographic properties of the catchment and traditionally it is assumed to be constant for each catchment. Many practitioners and researchers observe, however, that the parameter is characterized by a variability. This sometimes causes inconsistency in the river discharge prediction using the SCS-CN model. Hence probabilistic and statistical methods are advisable to investigate the CN as a random variable and to complement and improve the deterministic model. The results that will be presented contain determination of the probabilistic properties of the CNs for various Slovakian and Polish catchments using statistical methods. The detailed study concerns the description of empirical distributions (characteristics, QQ-plots and coefficients of goodness of fit, histograms), testing of the statistical hypotheses about some theoretical distributions (Kolmogorov-Smirnow, Anderson-Darling, Cramer-von Mises, $\chi 2$, Shapiro-Wilk), construction of confidence intervals and comparisons among catchments. The relationship between confidence intervals and the ARC soil classification will also be performed. The comparison between the border values of the confidence intervals and the ARC I and ARC III conditions is crucial for further modeling. The study of the response of the catchment to the stormy rainfall depth when the variability of the CN arises is also of special interest.