

**Licznar, P., Szlag, B. Temporal Variability Analysis of Atmospheric Precipitation in Warsaw (Poland). *Ochrona Srodowiska* 2014, Vol. 36, No. 3, pp. 23–28.**

**Abstract:** Synthetic precipitation hyetographs are often used as input data for hydrodynamic modeling of urban drainage systems. Euler (type II) model rainfall is nowadays a common synthetic hyetograph used by engineers in Poland. Adoption of the German model results mostly from lack of local studies on rainfall temporal variability. Therefore, the aim of the study was to analyze temporal variability of atmospheric precipitation over Warsaw (Poland). Special attention was given to development of proper and objective methodology of precipitation hyetograph temporal variability analysis. The research was based on rainfall time series recorded by 25 modern electronic gauges deployed over the city area. A total of 669 precipitation events was identified. Studies were focused on the set of 423 most intense precipitation events of total duration time not exceeding 420 min, further divided into 9 subsets depending on precipitation total duration times. Shapes of normalized precipitation hyetographs were compared by means of cluster analysis. Dendrograms resulting from aggregation procedure displayed clearly wide range of precipitation temporal variability that cannot be adequately described by deterministic pattern of a single synthetic hyetograph. Rather, it should be only handled stochastically by means of random rainfall generators. For precipitation events exceeding 180 min, the Euler (type II) model rainfall shapes significantly deviated from the recorded precipitation hyetographs. In conclusion, it is strongly advised to shift from urban drainage modeling based on model rainfalls only to more advanced probabilistic modeling based on random rainfall generators.

**Keywords:** Precipitation hyetograph, Euler (type II) model rainfall, cluster analysis, modeling, drainage system.