Geophysical Research Abstracts
Vol. 17, EGU2015-2984, 2015
EGU General Assembly 2015

Influence of the natural variability on the maximum discharges Q(p%)

Radu Drobot, Aurelian Florentin Draghia, Romica Trandafir, and Daniel Ciuiu
Technical University of Civil Engineering Bucharest, Romania

The maximum discharges during the flood period are quite variable from one year to another. For the design of the hydraulic structures the maximum discharges Q(p%)corresponding to probabilities of exceedance P% outside the current measured values are of practical interest. The maximum discharge Q(p%) is still not a unique value, but it depends on the data set used for the statistical processing. Thus for the same value of P%, during very wet years the values Q(p%) increase, while after a dry period the same characteristics decrease. In the present paper the influence of the sequence of maximum discharges on the magnitude of the values Q(p%) is put into evidence.
First, based on a set of 78 values of maximum annual discharges at Turnu Magurele on the Danube river a set of 1000 values is generated by keeping as close as possible the statistical parameters of the initial set of data. Using a different number of sequence values (from 80 to 1000) the cumulative distribution functions are obtained. Even for medium probabilities of exceedance (meaning 1%) the curves dispersion is significant, the magnitude of the interval between the highest and the lowest values for Q(1%) being approximately 1300 m3/s. This interval is much larger for 0.1% probability of exceedance, reaching 1870 m3/s, which represent almost 10% of the most probable value of the maximum discharge Q(0,1%).
The second approach is based only on the registered values. The initial set of 78 maximum discharges was split into an initial set of 30 values; further analysis were carried out by increasing step by step the number of the considered values from 31 to 78 values. The conclusions are the same: the maximum discharges are found in a quite large interval of uncertainty.
This large interval could also be the consequence of climate changes. Still, a statistical test did not put into evidence any trend of the maximum discharges. The explanation is due probably to the large size of the Danube river basin, which is able to compensate the regional effects of the climate changes.
Generally, one can conclude that the interval of uncertainty of the discharges Q(p%) is influenced not only by the climate changes, but also by the natural variability of the maximum discharges.