Geophysical Research Abstracts,
Vol. 11, EGU2009-7502-1, 2009
EGU General Assembly 2009

Spatial and temporal distribution of highly erosive rainfalls in the watershed of Lake Balaton, Hungary

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The exact erosion potential of the rainfall is necessary to assess soil erosion but detailed calculations are still missing in Hungary. Rainfall, runoff and erosion data of an erosion monitoring station at Somogybabod were used for this study to determine real erosion potential of excessive rainfalls. Precipitation in five-minute intervals was measured with rain gage, runoff from the 7 sqkm catchment was measured with Parshall channel, samples from runoff were taken and analysed in the laboratory for suspended solid and erosion was calculated for the period of 2004-2007. Historical data from meteorological stations in the area were used to assess spatial distribution of highly erosive rainfall events in the watershed.

At Somogybabod, ten percent of the rainfall events of higher than 10 mm were especially erosive in the investigated period. These rainfalls always were larger than 20 mm and they occurred between May and August. Linear relationship between logarithms of calculated erosion potentials and measured erosion could be improved if total rainfall of the preceding five days was taken into consideration as correction factor.

We have developed a relationship by which the real erosion potential (based on five-minute interval data) can be calculated from hourly measurements. However, daily records can only be used to assess risk of highly erosive events based on the daily rainfall amount (above 20 mm) season (between May and August) and preceding total rainfall of five days. These data have been available for the main meteorological stations. Raster map of high rainfall erosivity with one sqkm pixel size has been calculated for the watershed based on the calculated risk data, location and elevation.

The frequency of rainfalls with high potential of erosivity was 10-20 % larger in the investigated period than in the historical records. Thus, risk of nutrient load into the lake increased in spite of the slightly decreasing annual rainfall.