Geophysical Research Abstracts, Vol. 8, 06283, 2006
SRef-ID: 1607-7962/gra/EGU06-A-06283

Assigning return periods to extreme floods

F. Naef
Institute of Environmental Engineering, Swiss Federal Institute of Technology, Zurich

Usually the return periods of floods are estimated by adapting flood frequency distributions to time series of measured discharges and then extrapolating the distribution to the required return period. Far-reaching implications of this method, which become critical for long extrapolation periods, are discussed in the presentation, namely:

- that the same processes causing small or medium floods lead to extreme floods.

- that the frequency distribution of floods is the same in the future as it was in the past.

Extreme floods in rivers often show up as outliers in the frequency diagram, making it impossible to assign a meaningful return period to them. Examples from different rivers are presented where processes not relevant in smaller events increased the discharge to such an extent that it became an outlier. High rainfall intensities might change runoff formation on some soils. Retention volumes along a river might be exceeded. In delayed reacting catchments, where the slope of the frequency curve is flat, the small difference between the 100- and the extrapolated 300year flood can easily be surpassed. Such mechanisms can be recognized, if runoff formation in a catchment is well understood. Only then, a meaningful return period can be assigned to extreme events

In Switzerland, the period from 1910 until 1980 was relatively quiet. From 1987 onwards, however, the frequency of large floods increased. In the last 7 years, a number of catchments experienced several floods with return periods of over 100years. This accumulation might be purely random, there might be a cyclic component of increased flood activities as in the period between 1830 and 1870 or there could be a strong trend due to a climatic change. Consequences of these assumptions on the return period are discussed.