Discussion and Closure: Optimal Pumping from Skimming Wells.
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ABSTRACT

DISCUSSIONS AND CLOSURES

Discussion of "Updated Precipitation Frequency Estimates for Kansas City: Comparison with TP-40 and HYDRO-35" by C. Bryan Young and Bruce M. McEnroe

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Young and McEnroe (2006) present a revised set of precipitation frequency estimates for the Kansas City area motivated by availability of new data. However, this study is based on several assumptions that were not tested by Young and McEnroe. The goal of this discussion is to examine some of the assumptions by using the hourly precipitation data of Indiana.

There are three variables in rainfall characterization—depth or intensity, duration, and frequency or return period. Given a duration and return period, the intensity is established by using well-fitted probability distributions whose parameters are established by data analysis. In the procedure developed by Hershfield (1961), and later used by Huff and Angel (1992), the 24-h rainfall depth corresponding to a given frequency is estimated. The rainfall depths corresponding to other durations are fixed proportions of the 24-h rainfall depth. This assumption deserves some investigation.

Hourly data from 20 stations in Indiana within about 100 km in a region where the rainfall is homogeneous were used in the investigation presented herein. The average data length is about 30 years. We fitted generalized extreme value (GEV) distributions to the data. Examples of the distributions fitted are shown in Fig. 1. K_T is the frequency factor of GEV (Rao and Hamed 2000). The GEV distribution fitted the observed data well according to both the χ^2 and Kolmogorov–Smirnov goodness-of-fit tests. The rainfall depths for different durations and frequencies were extracted from the fitted distributions. The ratios of rainfall
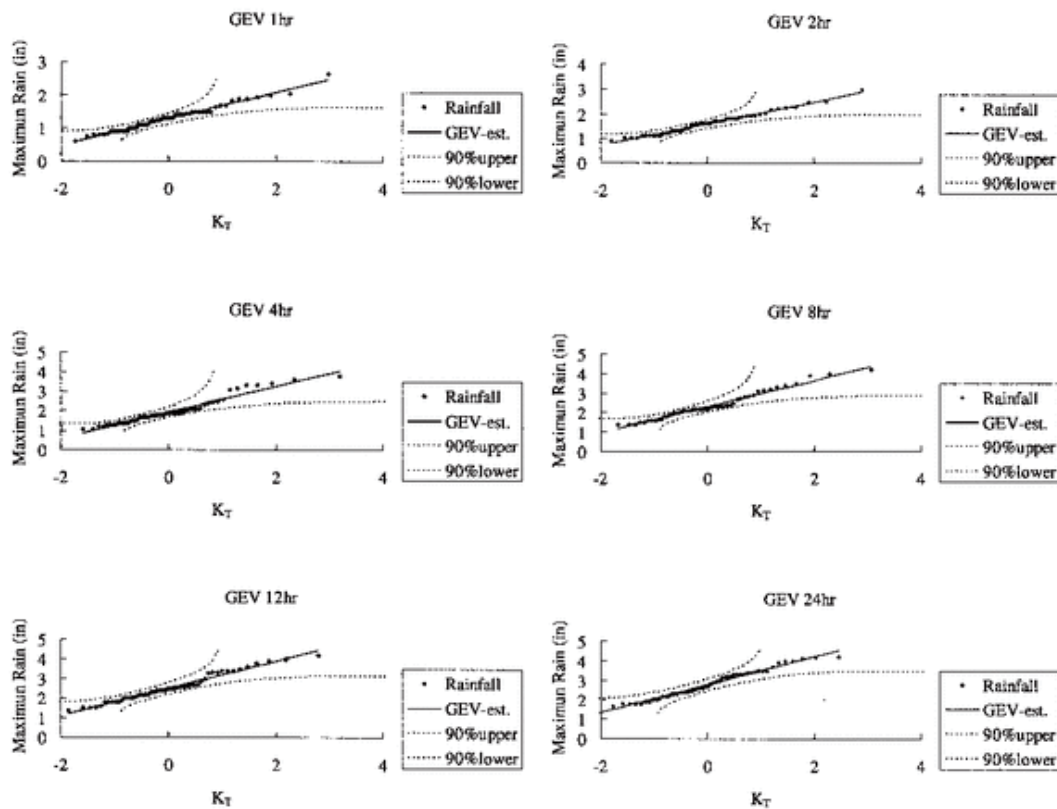
Fig. 1. Examples of probability fitting for station West Lafayette (COOPID: 129430) under various rainfall durations using generalized extreme value distribution