methods that are based on a storm area approach. The former aims to generalize the areal mean precipitation depth within an isohyet while the latter aims to generalize a point (gauge station) precipitation depth. The point can be taken as a mean precipitation depth for an area less than 10 km^2 to derive PMP. The PMP from areal mean precipitation depth within an isohyet and the PMP from a point (gauge station) precipitation depth are then converted to obtain the PMP of the design watershed.

1.4.3.1.1 *Main steps for the generalized estimation method*

The main steps for PMP estimation via this method include (Wang G., 2004):

High-efficiency storm
↓
Moisture maximization
↓
Transposition
↓
Enveloping
↓
PMP
↓
PMF

High-efficiency storm, simply speaking, is a major storm (observed data) with the assumption that its precipitation efficiency has reached its maximum.

Moisture maximization is the process of adjusting the moisture factors of high-efficiency storms to their maximum.

Transposition is the rainfall distribution map transfer of moisture-maximized and high-efficiency storms in meteorologically homogeneous zones.

Enveloping means that enveloping values are taken from the DAD relation plotted according to the transposed storms, thereby maximizing the precipitation depth for various areas and durations.

PMP is the possible maximum precipitation that comes from the application of the above DAD enveloping values for the design watershed.

PMF is the assumption that the flood (together with base runoff) created by PMP is the possible maximum flood in the design area.

The methods described in Chapters 5 and 6 are examples of generalized estimation methods.

1.4.3.1.2 *Main steps for the statistical estimation method*

The main steps for PMP estimation via this method include (Wang G., 2004):

Largest storm K_m
↓
Enveloping
↓
Transposition
↓
PMP

Largest storm K_m is a statistical representation of the maximum value in the observed storm series, given by:

$$K_m = \frac{X_m - \overline{X}_{n-1}}{\sigma_{n-1}} \tag{1.1}$$

where X_m is the maximum observed storm value; $\overline{X}_{n-1}$ and σ_{n-1} are, respectively, the mean value and standard deviation computed excluding the extraordinarily large value.

Enveloping shows K_m values for various durations D at each gauged station as a dotted line on a correlation plot of K_m~D~$\overline{X}_{n-1}$. The enveloping curve, or the K_m~$\overline{X}_{n-1}$ relationship, varies with the value of D.

Transposition transposes the K_m value in the above enveloping curve to the design station. The procedure computes the mean value $\overline{X}_n$ from the storm series using all the observed n years at the design station, and K_m is the value of the design station from the above correlation plot.

PMP is the possible maximum precipitation at the design station, which can be computed with the following formula:

$$\text{PMP} = \overline{X}_n + K_m \sigma_n = \overline{X}(1 + K_m C_{vn}) \tag{1.2}$$

where σ_n and C_{vn} are, respectively, the standard deviation and the coefficient of variation of the precipitation series for the n years of data at the design station ($C_{vn} = \sigma_n / \overline{X}_n$).

It can be seen from the above that the statistical estimation method is similar to storm transposition. However, what is transposed is not a specific storm rainfall but, rather, an abstracted statistical