comparable watershed, were significantly beyond the enveloped curve.

According to PMF analysis on more than 600 projects in the United States, attached to the 1977 edition of the *Guide to Regulations* issued by the Nuclear Regulation Commission (NRC), the enveloping curve of peak floods in the country has not exceeded the worldwide flood record (Wang G., 1999).

7.2.7.6 Comparison with results of frequency analysis

Storm and flood frequency analysis is an important approach for determining a design flood; the extreme values may be compared with PMP/PMF results.

The precondition for such a comparison is that the data series for the frequency analysis is long (typically more than 50 years). Furthermore, it should be representative of long-term streamflow characteristics.

Meanwhile, care should be taken when selecting the frequency model and method for parameter estimation.

Strictly speaking, the estimated storm/flood with a low frequency of occurrence and PMP/PMF are obtained by two different approaches and both have errors, so no fixed relationship between the two is likely to exist. As a result, it should not be a requirement that PMP/PMF should be larger than or smaller than a storm/flood with a defined frequency. As long as data and processes in each key step are reasonable throughout the analysis and calculation of PMP/PMF, the value should be regarded as being reasonable even if it is less than a 1 000-year storm/flood (Wang G., 1999).

7.2.7.7 Similar work in other countries

In HMR Nos 55A, 57 and 59 (Hansen and others, 1988; Hansen and others, 1994; Corrigan and others, 1998), PMP estimates were compared with large storms observed in the region, PMP in adjacent regions, historical PMP estimates and the 100-year rainfall in the region, in the United States. In HMR No. 55A (Hansen and others, 1988) and HMR No. 59 (Corrigan and others, 1998), PMP results were compared with the PMP of local storms and general storms.

In estimating the PMP/PMF of the Indus River basin, Pakistan, statistical checks were used to assess the relative magnitude of the PMF estimates. The frequency analysis indicated that the PMF of the basin was not far from a 200-year flood, raising concerns that the PMF was underestimated.

7.3 LOCAL MODEL METHOD

7.3.1 Applicable conditions

If there is a long record of rainfall data available for the design watershed, an individual significant storm could be selected to represent an efficient dynamic mechanism that could then be maximized to estimate PMP. This method is not appropriate when there is limited data, as the probability of identifying a storm representing the greatest possible rainfall is remote.

7.3.2 Model selection

This process generally reduces to a search through observed storm data to identify the largest rainfall event with characteristics matching those required for a particular project (see Table 7.1 for an example).

7.3.3 Model suitability analysis

An assessment of the selected storm is made to see how serious the resultant flood was compared with other floods in the watershed, particularly in terms of the flood control project (for exmaple, the flood storage capacity needs to be large or the flood discharge capacity of the reservoir needs to be large).

7.3.4 Model maximization

7.3.4.1 Summary

If the selected storm is a high-efficiency storm, only moisture maximization is required. However, with limited data from which to select storms, local models do not always provide for high-efficiency storms and both the moisture factor and the dynamic factor need to be maximized.

To minimize subjectivity in maximizing the moisture and the dynamic factors, the 100-year value from a frequency analysis can be used. The selection of the frequency model in deriving the moisture and dynamic maximization factors does not tend to impact on the estimate of the PMP.

Observed data show that the relationship between the moisture factor and the dynamic factor for a storm is complex, and that they can almost be