Table 7.10. Methods for deriving PMP/PMF for four key projects in China

Project			*Name*			
			Qikou	*Sanmenxia*	*Ertan*	*Manwan*
Method for deriving PMP for major region	Design duration (d)		12	12	3	10
	Major time interval	Days	5	5	1	5
		Method for deriving PMP	Hydro-meteorological methods	Hydro-meteorological methods	Hydro-meteorological methods	Hydro-meteorological methods
	Remaining time interval				Hydrological methods	Hydrological methods
Method for deriving PMF for entire watershed	Major reach	Major time interval	Hydro-meteorological methods	Hydro-meteorological methods	Hydro-meteorological methods	
		Remaining time interval	Hydrological methods W_5 – W_{12}	Hydrological methods W_5 – W_{12}	Hydrological methods	Hydro-meteorological methods
	Upstream section within the reach		Hydrological methods (the discharge is based on the discharge capacity of dykes along the Inner Mongolia reach)	Hydrological methods (the discharge is based on the discharge capacity of dykes along the Inner Mongolia reach)	Hydrological methods (the discharge is based on the average of the observed maximum and the surveyed maximum)	Hydrological methods (the discharge is based on the typical inflow proportion in 1966)

area distribution, the location of the major storm area, the storm trend and the rough storm temporal distribution are estimated based on data on storm floods recorded in literature and survey field notes.

(b) Several large storms that are of the same type and in the same season as the historical extraordinary flood are selected from the observed data under a principle that states if weather causes of storms are similar in a particular region in a particular season, then basic characteristics of those storms are similar.

(c) Selected storms are ranked into a combined storm sequence according to the rough storm temporal distribution of the historical extraordinary flood estimated above.

(d) Runoff yield and concentration for the combined storm sequence is calculated through the rainfall runoff model in order to determine the flood hydrograph. This should approximate the hydrograph of the historical flood (it should approximate the historical flood in terms of the flood peak and the flood volume of the major time interval). Its source region should also approximate that of the historical flood. If the approximations are inaccurate, the storm sequence should be adjusted properly (temporally and spatially) till the derived flood hydrograph approximates the hydrograph of the historical flood. The duration–area distribution of the storm is that of the storm corresponding to the historical flood.

At this step, the rainfall runoff model needs to be verified by observed data on large floods.

7.7.3.3.2 *Estimation of the representative dewpoint of the storm corresponding to the historical flood*

The representative dewpoint of the storm corresponding to the historical flood can be approximated by an extraordinary storm selected from among observed data on large storms in the region, which has the same weather cause as the one that caused the historical flood. It may also be determined through the correlation between representative dewpoints of storms of the same type and the maximum 1-day areal mean precipitation depth plotted in the design watershed.

7.7.3.4 Example calculations

Multiple methods were used to estimate PMF for the Three Gorges Project (the controlled watershed area is one million square kilometres), including the storm simulation method for historically extraordinary floods. An extraordinary flood in July 1870 was simulated to generate a storm, which was then maximized.