

7.2.7.1 Checking each step

Basic data and the processing and applicability of methods used should be checked thoroughly during each step of the calculation process.

The representation and reliability of the basic data should be checked, including the uncertainty/error introduced through any analysis techniques. It is important to ascertain whether data on extraordinary storms/floods in and around the design watershed were available and taken into account.

It is also important to check that an appropriate model storm is used for the region and project in question. For local models, the check should ensure that the model storm represents the largest possible storm of this type for this region. For transposition models, the check should focus on the limits of where a storm could realistically be transposed and, in particular, the orographic correction applied. For combination models, the check should focus on the appropriateness of the combination schemes.

For the maximization process, the check should focus on the applicability of the methods for maximization and whether the selection of maximization parameters is reasonable.

For PMF, the check should focus on whether the selection of methods and parameters for the calculation of runoff yield and concentration is reasonable. In addition, attention should be paid to whether there are risks of dam breaks as well as overflows and bursts at dykes along the river when the water level is high.

7.2.7.2 Comparison with historical extraordinary storms/floods in the watershed

For a particular watershed, the probability of extraordinary storms/floods occurring is small in any short period of time. However, the probability becomes much larger over a long period of time. It is thus reasonable to assume that for any particular watershed or station, the longer the historical record and assessment of storms and floods, the closer the estimated maximum design value will be to reality. PMP/PMF estimates can be compared with data on historical extraordinary storms and floods (inclusive of those observed, surveyed or recorded in literature) for the watershed. Clearly, the total rainfall for the PMP estimate and the flood peak and flood volume of PMF should not be less than those of extraordinary storms and floods that have happened in the history of the watershed.

Nonetheless, in areas with a long historical record, PMP/PMF should also not be excessively large when compared with historical extraordinary storms/floods. Whilst it is most unlikely that a PMP will have occurred in the watershed, extraordinary storms and floods should provide some guidance of what is possible. This statement will clearly become more appropriate the larger the area of transposition or the longer the historical record of data. In China, where records are commonly available for a period of approximately 600 years, observed estimates generally begin to converge towards the PMP (Wang G., 1999).

7.2.7.3 Comparison with adjacent watersheds

For a particular period of record, the probability of the occurrence of large storms/floods for a given watershed is small, but the probability increases if a wider area is considered, for example, a region having similar characteristics to the design watershed. In regions with similar geographical characteristics, the larger the region of reasonable transposition of storms and floods, the closer the results will be to the actual PMP. Therefore, PMP/PMF results should be compared with those derived in adjacent watersheds.

If PMP/PMF estimates are available for adjacent watersheds, these results can be compared with the design watershed to see whether there is general agreement.

7.2.7.4 Comparison with historical estimation results

If PMP/PMF estimates are available from previous studies in the watershed or region, current estimates can be compared with those. The comparison should highlight the differences in terms of data and methods of estimation. It should then be possible to rationalize the new PMP/PMF estimates with the changes in current procedure, for instance PMP estimates may have increased due to the application of a generalized method as opposed to a local storm approach, which may have incorporated new data on significant storms not within the immediate region. In such a case, it is anticipated and quite acceptable that the estimates would increase.

7.2.7.5 Comparison with worldwide storm and flood records

Worldwide storm and flood records may be used to approximate PMP/PMF. It would be surprising, therefore, if PMP/PMF estimates, assuming a