Estimation of Areal Reduction Factor Using a Mixed Gamma Distribution

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This study proposed to use a mixed distribution for the derivation of areal reduction factor (ARF). The use of a mixed distribution has an advantage of considering the spatial intermittency of rainfall, especially the characteristics of areal average rainfall with respect to the area size can be effectively represented by the mixed distribution. This study used a mixed Gamma distribution for the derivation of ARFs in the Geum River Basin, Korea, for the wet summer season (June to September).

The ARFs derived in this study were compared with those from other researches, among which Jung et al. (2002) were found to be most similar to this study. However, this study has an advantage of using point rainfall, not the contemporaneous observations of spatially well distributed rainfall events used in most other methods. Also, this method has advantages of potential use of hourly rainfall data from incomplete and sparse rain gauge networks.

This study used a daily rainfall, but assumed the ARFs derived to be the same as those for 24 hour rainfall data. This is because the daily rainfall would be the same as 24 hour rainfall events as the number of events considered increases. The basic statistics will become similar parsimoniously. However, the ARFs of 2 days or 48 hours would be different from those of 1 day or 24 hours, so the same 2-day rainfall data should be used to derive the ARFs.

References

[1] J. H. Jung, C. J. Na, and Y.-N. Yoon, *Proceedings (I)*, 2001 Annual Meeting of Korea Water Resources Association, 371 (2001).