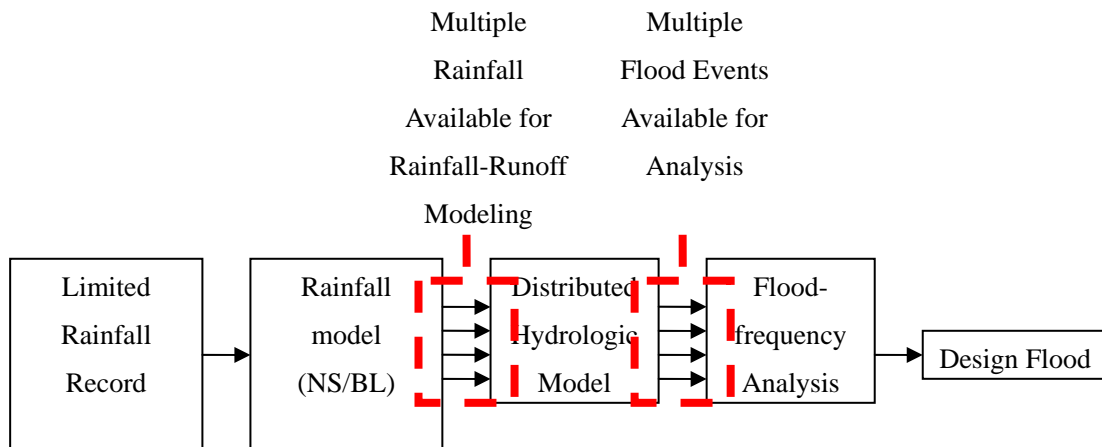# Poisson Rectangular Pulse Rainfall Modeling for Design Flood

○ Carlo Arturo Mondonedo, Yasuto Tachikawa, Kaoru Takara

A Clustered Poisson Rectangular Pulse Rainfall Model is a stochastic technique whereby one is able to generate an artificial rainfall record of lengths applicable for (among others) design flood evaluation. This method is advantageous for areas with limited or sparse rainfall data. In this method, statistical parameters are evaluated from short rainfall data sets to calculate parameter sets for the Neyman-Scott (NS) and the Bartlett-Lewis (BL) Rectangular models. Both methods make use of Poisson process-based arrival of rainfall, with assumed exponentially displaced origins of rain cell clusters and storm origin. In the NS process, the positions of the location of the rainfall distribution are determined from the time origin. In the BL process, the interarrival times of successive cells are independent identically distributed random variables. Rainfall time series can then be generated from the two process models, possessing the multivariate properties (mean, standard deviation, and autocorrelation coefficient order 1) consistent with the study area. The rainfall sets generated can then be applied as input to a distributed hydrologic model to produce an ensemble of peak flow discharges, time to peaks and other flooding characteristics of the study area that would otherwise be unavailable due to rainfall data sparcity. In this study, this flood-generating method is used on some watersheds to aid in the evaluation of its design flood.

Fig. 1. Concept of the Study *Poisson Rectangular Pulse Rainfall Modeling for Design Flood*.