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A stochastic framework for rainfall intensity-timescale-return period relationships regionalized over Greece

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We develop a regionalization framework for rainfall intensity-timescale-return period relationships that is implemented across the Greek territory. The methodology for single-site estimation is based on a stochastic framework for multi-scale rainfall intensity modeling. Five parameters are first independently fitted for each site, and the resulting parameter variability is explored in terms of uncertainty and spatial variability patterns. Two parameters, the tail-index and a timescale parameter, are identified as constant in space and estimated using data pooling techniques. The remaining three parameters are regionalized across Greece using a combination of spatial interpolation and smoothing techniques, which are evaluated using cross-validation in a multimodel framework.