



On the Stationarity of Flood Peaks for the Eastern United States

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Annual maximum flood peak time series from 572 stations with a record of at least 75 years in the eastern United States are used to examine the validity of the stationarity assumption in flood peak distributions from a regional perspective. Abrupt changes in the mean and variance of flood peak distributions are examined through change-point analyses and temporal trends in the flood peak records through non-parametric tests. Abrupt changes, rather than slowly varying trends, are typically responsible for non-stationarities in annual flood peak records in the eastern US and detected change points are often linked to regulation of river basins. Trend analyses for the 572 eastern US gaging stations provide little evidence at this point (2009) for increasing flood peak distributions associated with human-induced climate change.

Given the profound changes that these catchments have undergone (e.g., construction of dams, changes in land use / land cover), an alternative way of examining the validity of the stationarity assumption for these time series is by describing the flood peak record in terms of “mixtures” of different flood generating mechanisms, with landfalling tropical cyclones and extratropical systems playing central roles. We present analyses of long-term trends in counts of landfalling tropical cyclones for the eastern US, together with results concerning changes in the frequency of tropical cyclones in a warmer climate.