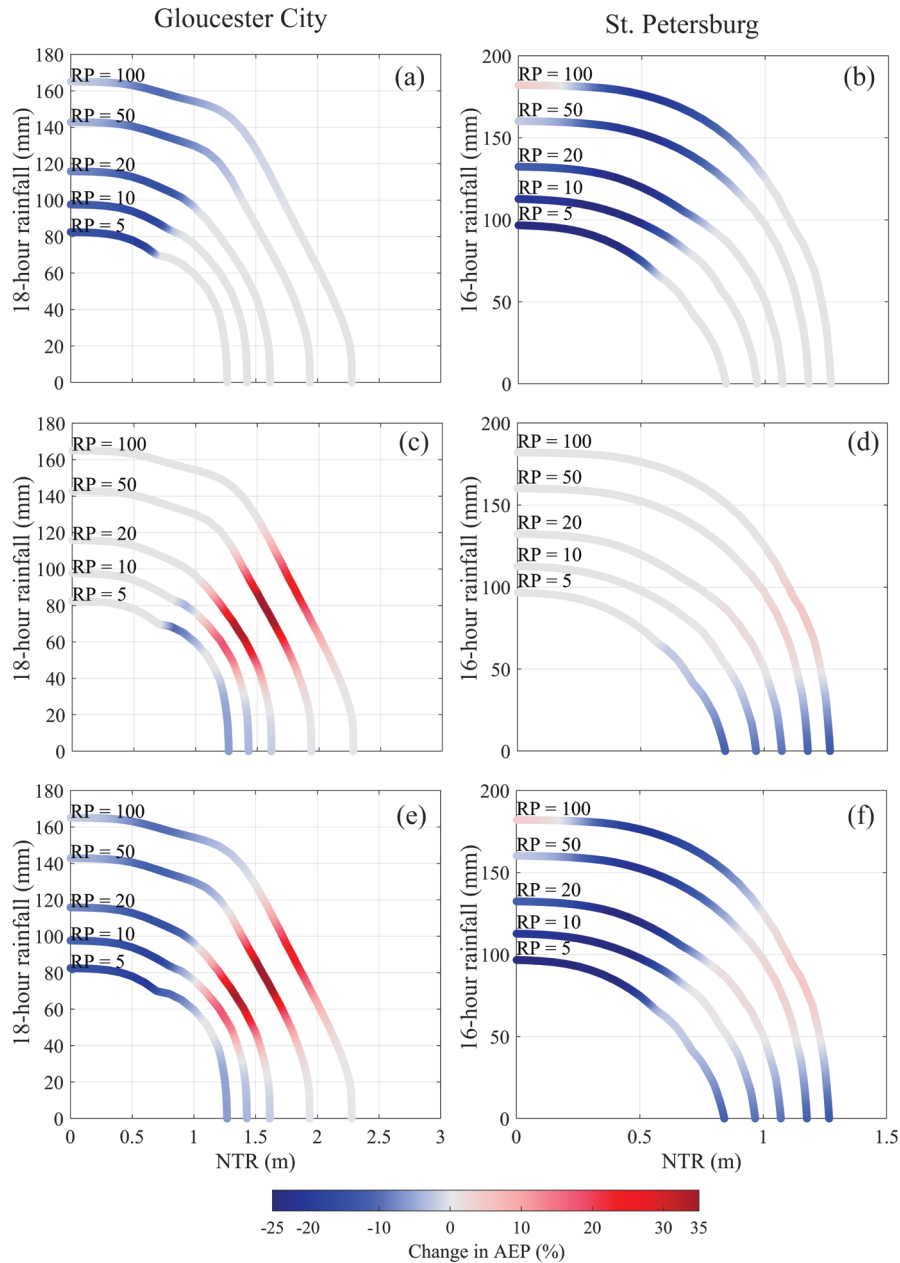**Supplementary**

Figure S1: Change in AEP of combined populations in Gloucester City (left) and St. Petersburg (right), allowing the selected copulas to be changed. (a), (b) when omitting the non-classified POT RF events; (c), (d) when omitting the non-classified POT NTR events; and (e), (f) when omitting all non-classified events. The change in AEP was calculated along the joint probability isolines derived for the analysis where events are stratified as TC and non-TC.

Table S1: Selected Copula families for each conditional sample for the analysis from 1950 to 2021

	Gloucester City				St. Petersburg			
	TC		non-TC		TC		non-TC	
	con. NTR	con. RF	con. NRT	con. RF	con. NTR	con. RF	con. NRT	Con. RF
Stratifying as TC & non-TC	Rot. Tawn type 2	Rot. Tawn type 2	BB8	Gaussian	Frank	Frank	Sur. BB7	Sur. Clayton
Removing non-classified POT NTR events			Gumbel	Gaussian			Gaussian	Sur. Clayton
Removing non-classified POT RF events			BB8	Clayton			Sur. BB7	Gaussian