

Supplement Materials for “ Topographic Enhancement of Tropical Cyclone Precipitation (TCP)
in Eastern Mexico”

Supplement 1. Comparison of elevation Standard Deviation for quantile TCP

Category	Daily TCP						Event TCP					
	P _{99.9} TCP	Elev Std	P ₅₀ TCP	Elev Std	P _{0.1} TCP	Elev Std	P _{99.9} TCP	Elev Std	P ₅₀ TCP	Elev Std	P _{0.1} TCP	Elev Std
Whole	164.15	105.88	7.99	88.24 ⁺	0.01	24.67 ⁺	318.09	45.14	15.30	144.29 [*]	0.04	71.34
Cluster 1	176.50	100.03	8.88	24.17 ⁺	0.01	20.94 ⁺	357.48	34.85	20.43	38.97	0.03	23.73
Cluster 2	122.49	269.30	7.38	163.43 ⁺	0.04	210.34 ⁺	220.49	235.84	13.20	171.28 ⁺	0.07	205.26 ⁺

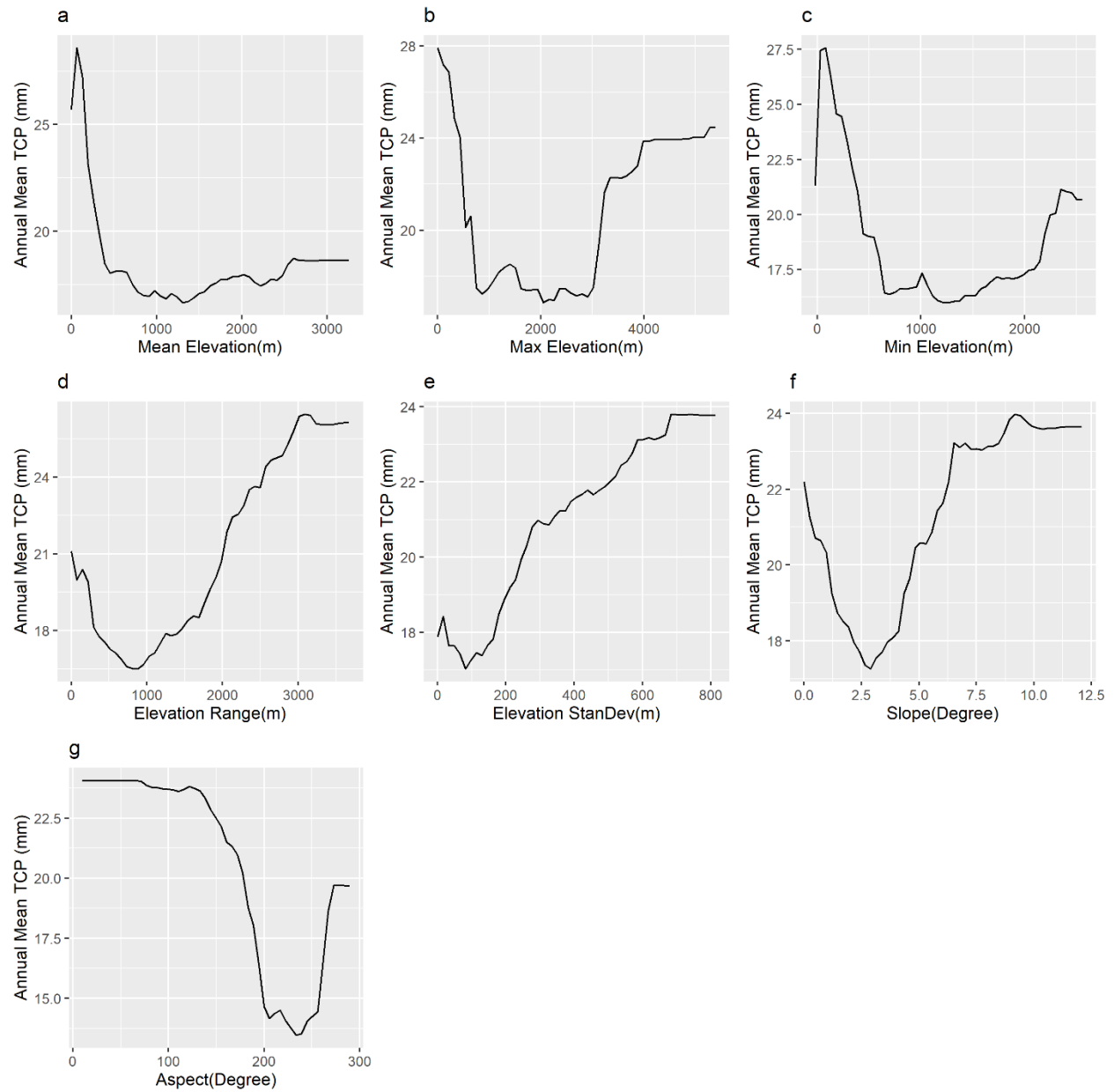
“+” indicates the current Elevation Standard Deviation sample median is smaller than the Elevation Standard Deviation sample for the P_{99.9} TCP in the same category, using the Mann-Whitney U-test at the 5% significance level. “*” indicates the current Elevation Standard Deviation sample median is greater than the Elevation Standard Deviation sample for the P_{99.9} TCP in the same category, using the Mann-Whitney U-test at the 5% significance level.

Supplement 2. Information about Random Forest Models developed for three TCP variables:

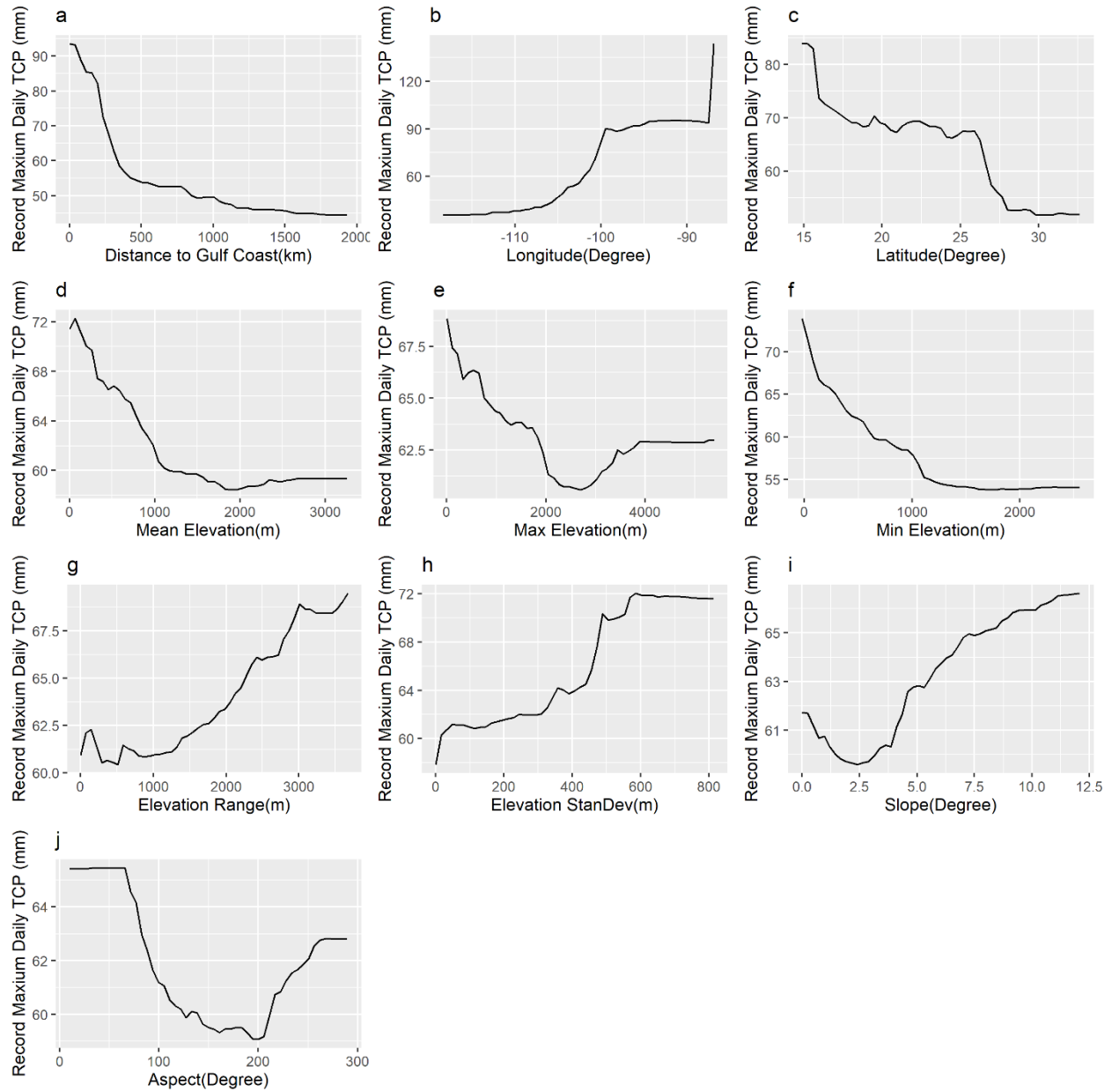
MaxDTCP and DTCPGP95. The importance is calculated as the percentage of increased MSE

(%IncMSE) if the variable is removed

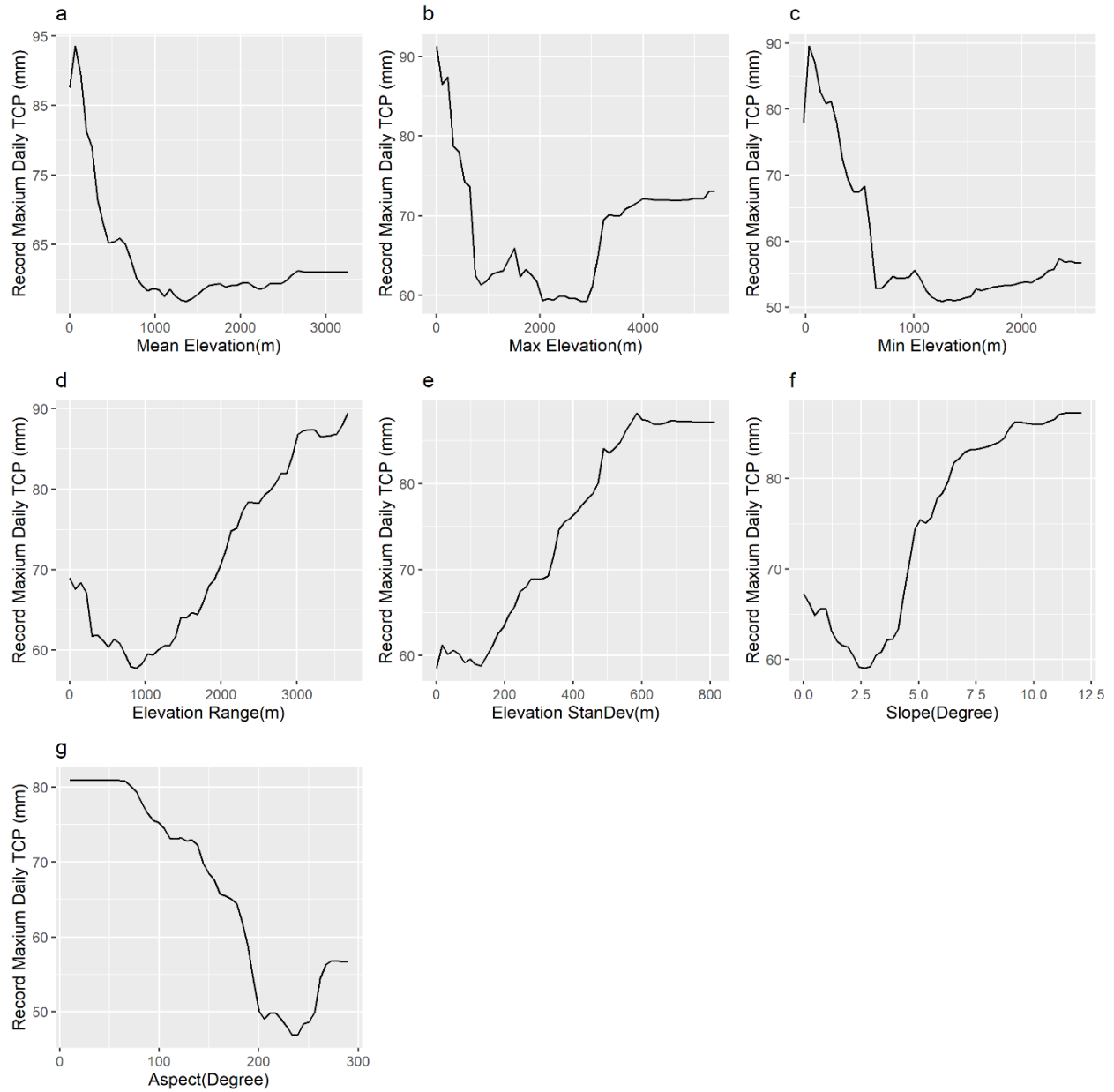
		MaxDTCP		MaxDTCP		DTCPGP95		DTCPGP95	
		Total Model		Topo Model		Total Model		Topo Model	
Variance Explained		80.28%		47.43%		91.05%		52.06%	
Importance Rank	Var Name	%Inc MSE	Var Name	%Inc MSE	Var Name	%Inc MSE	Var Name	%Inc MSE	Var Name
1	Lon	41.38	Asp	49.22	Lat	45.05	Asp	71.94	
2	Lat	40.76	Slope	37.83	Dist	39.21	Slope	41.62	
3	Dist	31.80	Range	29.55	Lon	37.83	Std	33.33	
4	Min	26.10	Std	29.22	Min	18.79	Range	28.53	
5	Mean	23.23	Min	27.88	Range	16.94	Max	24.55	
6	Slope	18.85	Mean	27.82	Max	15.91	Mean	22.85	
7	Max	18.23	Max	24.23	Std	15.57	Min	20.80	
8	Std	17.16			Slope	14.94			
9	Range	16.48			Mean	14.14			
10	Asp	11.44			Asp	14.06			



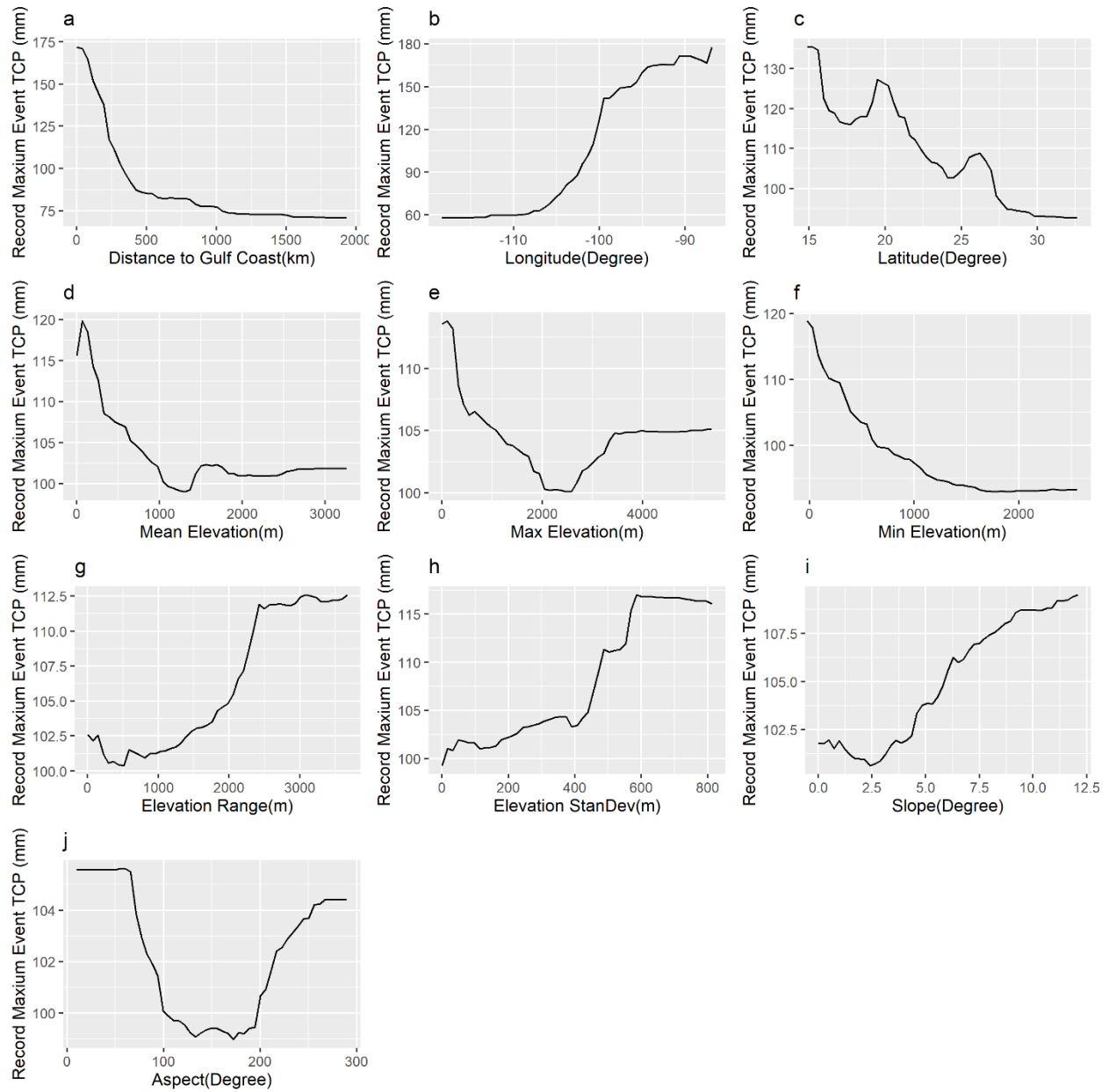
Supplement 3. Partial Importance Plot for variables in the topographic RF model for the Annual Mean TCP.



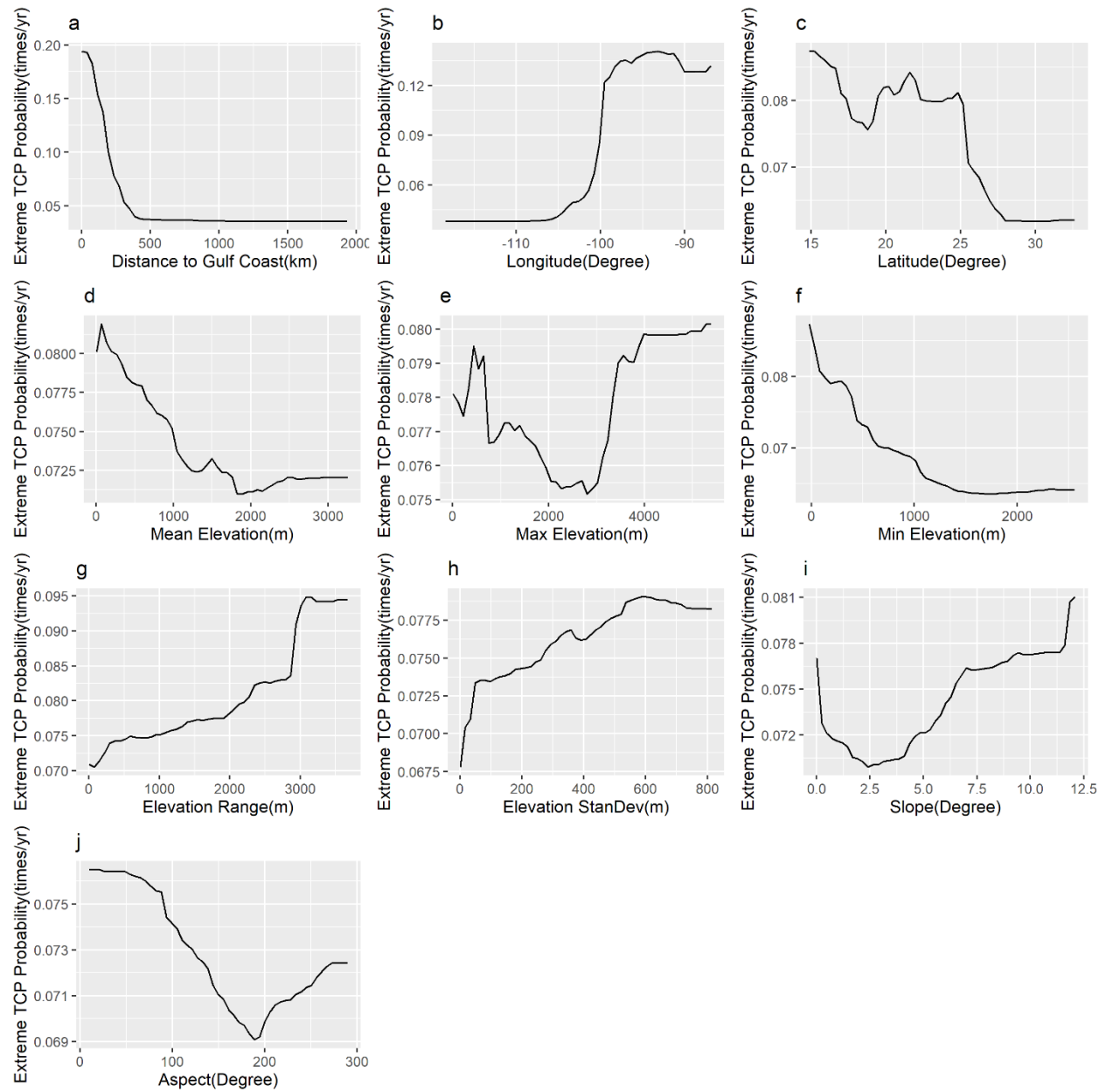
Supplement 4. Partial Importance Plot for variables in the total RF model for the Maximum Daily TCP.



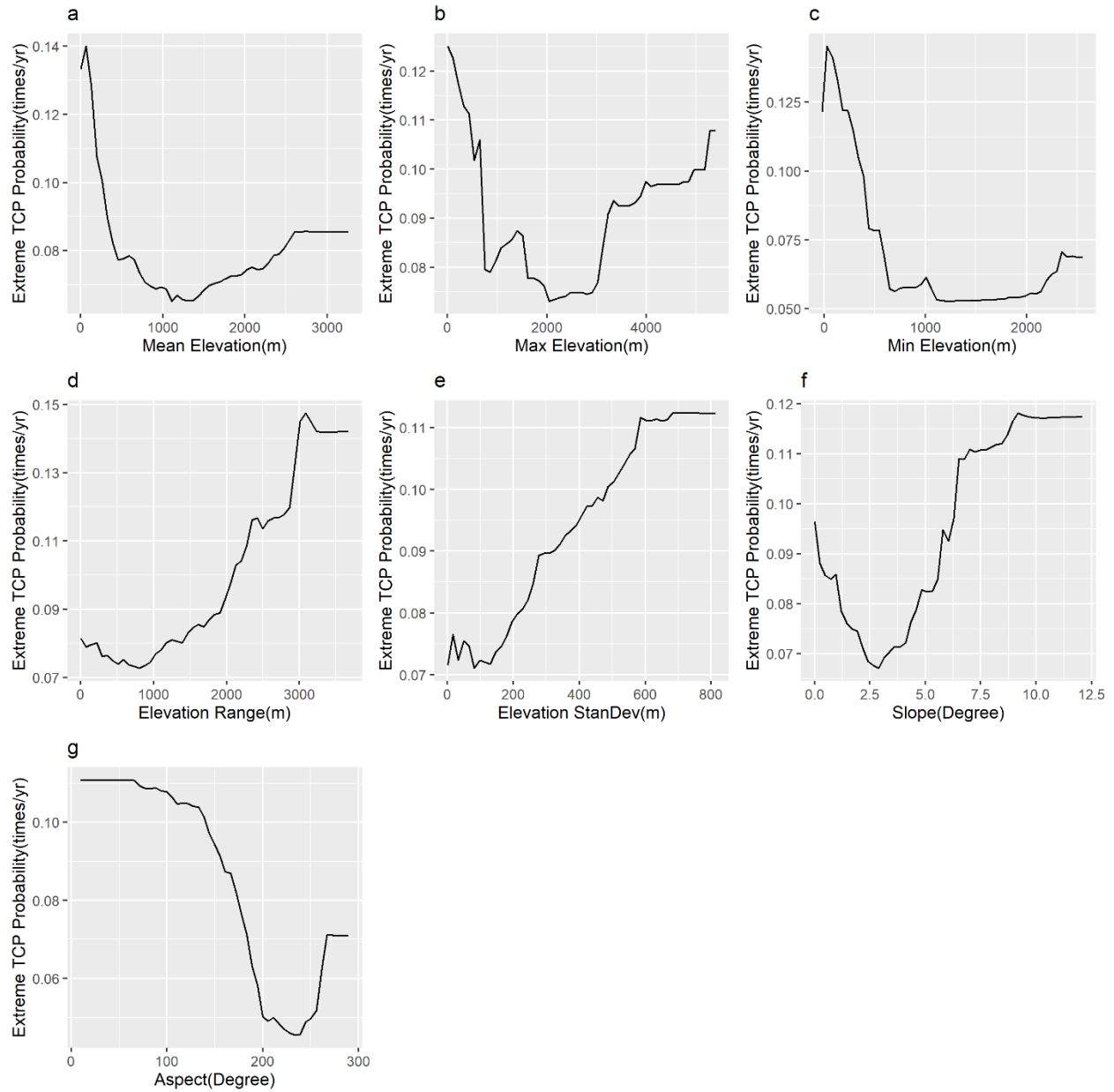
Supplement 5. Partial Importance Plot for variables in the Topographic RF model for the Maximum Daily TCP.



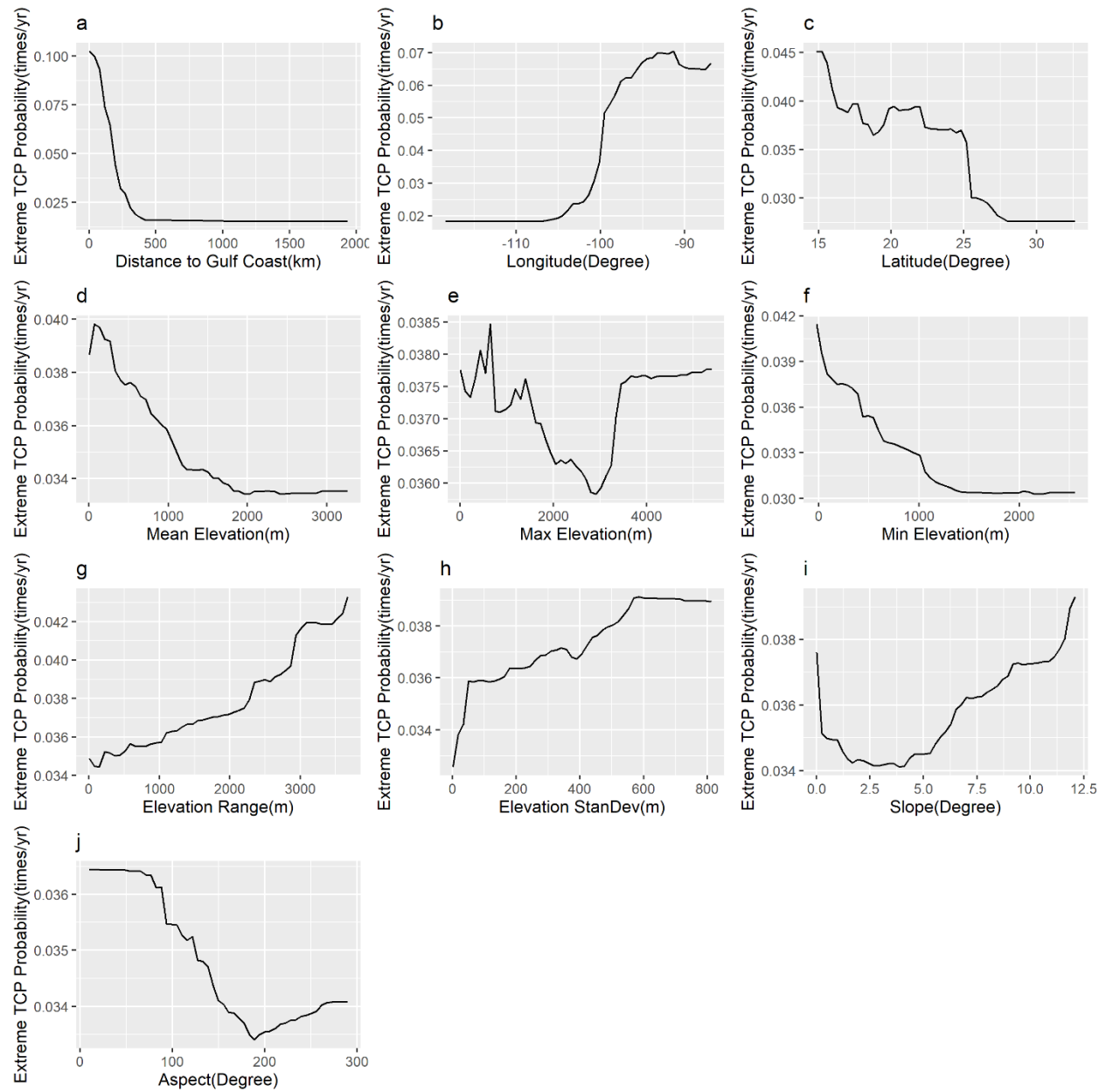
Supplement 6. Partial Importance Plot for variables in the Total RF model for the Maximum Events TCP.



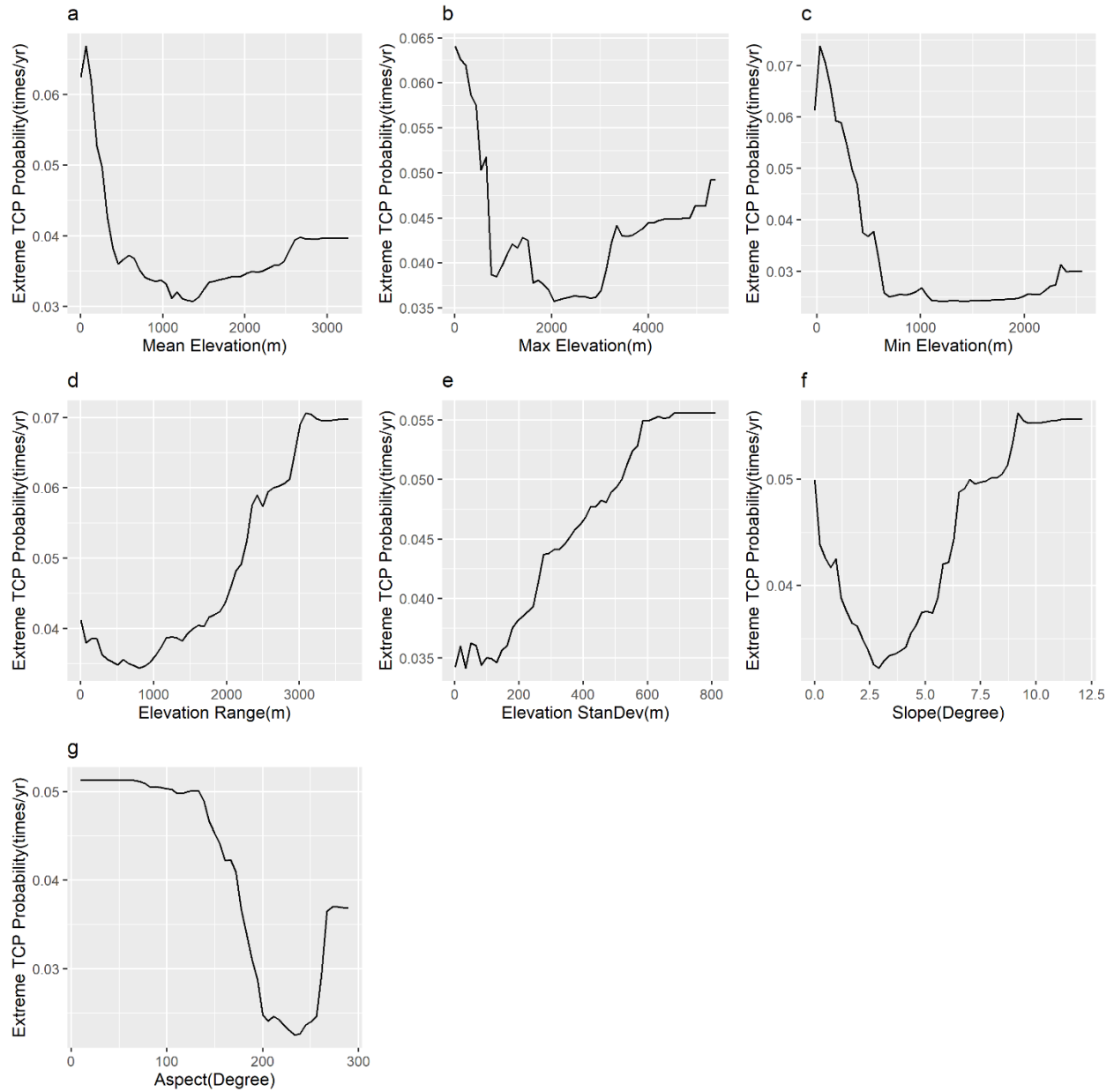
Supplement 7. Partial Importance Plot for variables in the Total RF model for the Probability of Daily TCP with greater than the P_{95} .



Supplement 8. Partial Importance Plot for variables in the Topographic RF model for the Probability of Daily TCP with greater than the P_{95} .



Supplement 9. Partial Importance Plot for variables in the Total RF model for the Probability of Event TCP with greater than the P_{95} .



Supplement 10. Partial Importance Plot for variables in the Topographic RF model for the Probability of Event TCP with greater than the P_{95} .

Supplement 11. Comparison of elevation standard deviation for quantile locations TCP for three
most intense storms

Storm	Hurricane Alex				Hurricane Igrid				Hurricane Beulah			
Quantile	P ₉₀ TCP		P ₄₅ to P ₅₅ TCP		P ₉₀ TCP		P ₄₅ to P ₅₅ TCP		P ₉₀ TCP		P ₄₅ to P ₅₅ TCP	
Category	TCP	Elev Std	TCP	Elev Std	TCP	Elev Std	TCP	Elev Std	TCP	Elev Std	TCP	Elev Std
Cluster 1	164.89	23.50	76.80	26.48	197.41	192.13	62.02	68.65 ⁺	238.84	27.85	217.70	18.71 ⁺
Cluster 2	162.87	217.64	43.66	121.08 ⁺	107.69	263.22	31.95	169.46 ⁺	66.71	189.11	67.02	159.51

“+” indicates the Elevation Range sample median for P₄₅ to P₅₅ TCP locations is smaller than the Elevation Range sample for the P₉₀ TCP locations, using the Mann-Whitney U-test at the 5% significance level. TCP has unit of mm and Elevation Range has unit of meter