Supplementary information – River suspended sediment response to tropical cyclone precipitation in the Eastern United States

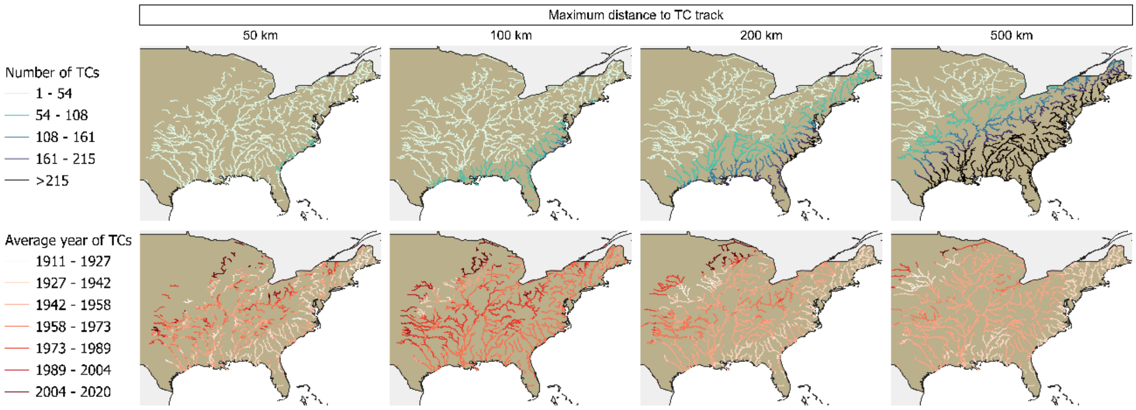

Figure S01 – Count of TCs in the International Best Track Archive for Climate Stewardship (IBTrACS) database[1] under each maximum distance for each Surface Water and Ocean Topography River Database (SWORD)[2] reach, and average year of the TCs under each maximum distance. Supporting the statement that tropical cyclone tracks are migrating inland, we can observe that the most affected areas are the coastal ones, and that some newly affected areas (most recent years, in average) are more inland than the ones that are more typically affected.

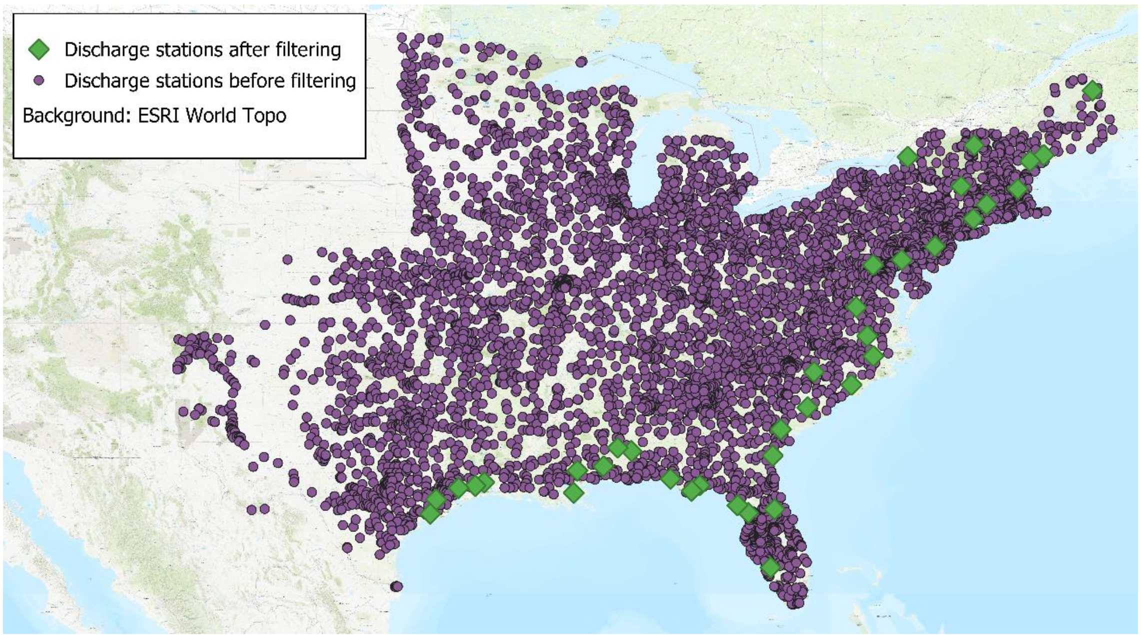

Figure S02 – Location of the USGS discharge stations existent and those which were selected to integrate the present study.

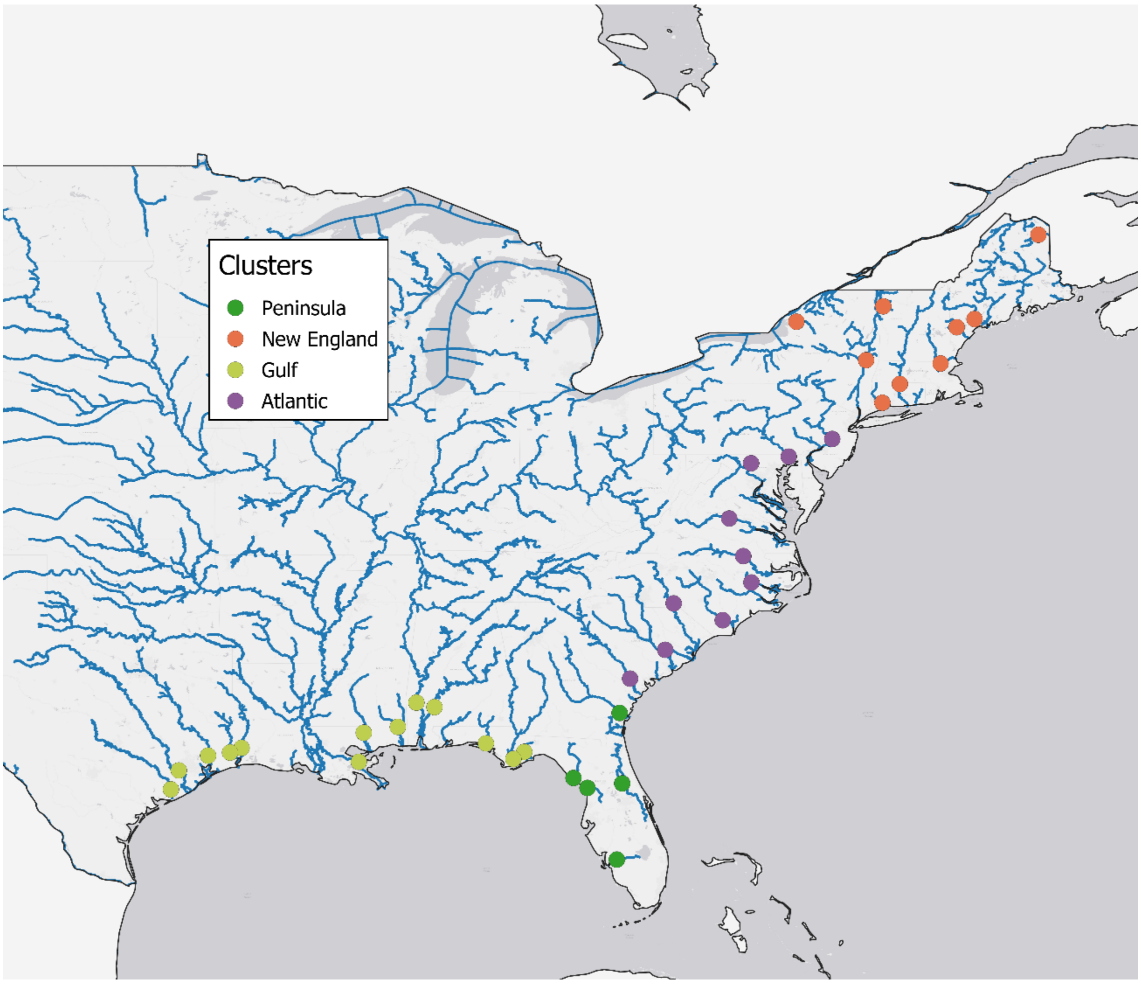

Figure S03 – Locations of the 4 geographical clusters used for our regional analyses.

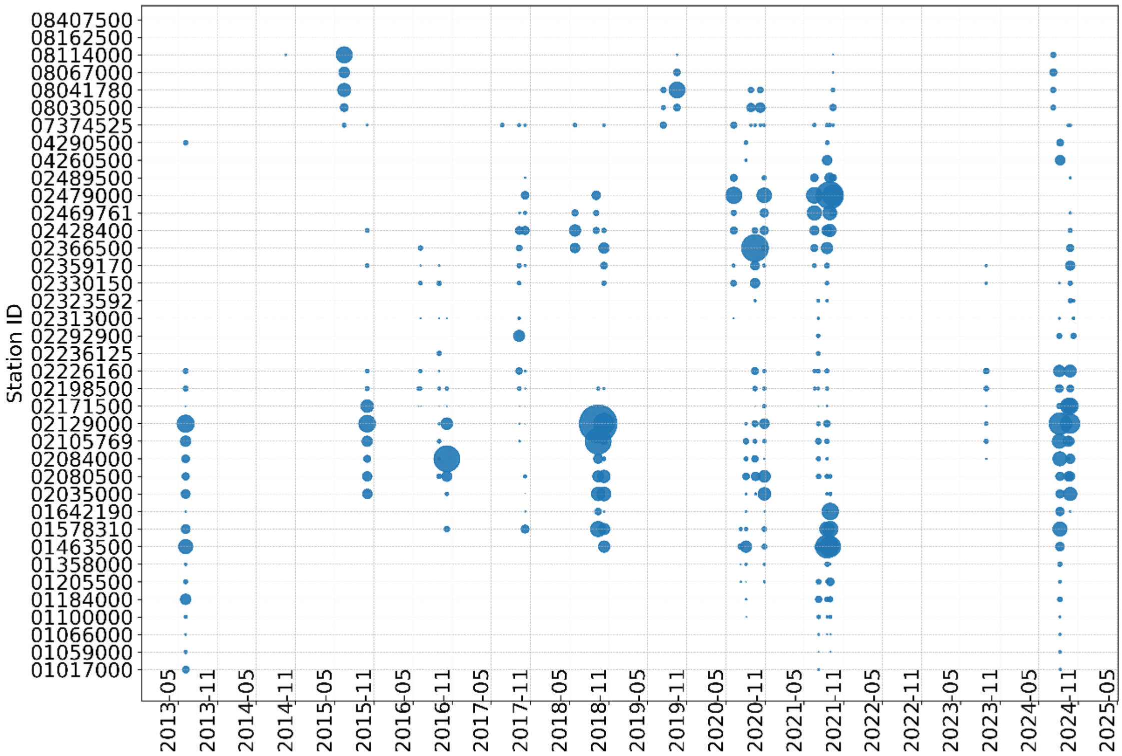

Figure S04 – Sediment mass (tons) represented by the dot size, relative to each event (date on x axis) and location (station ID on y axis).

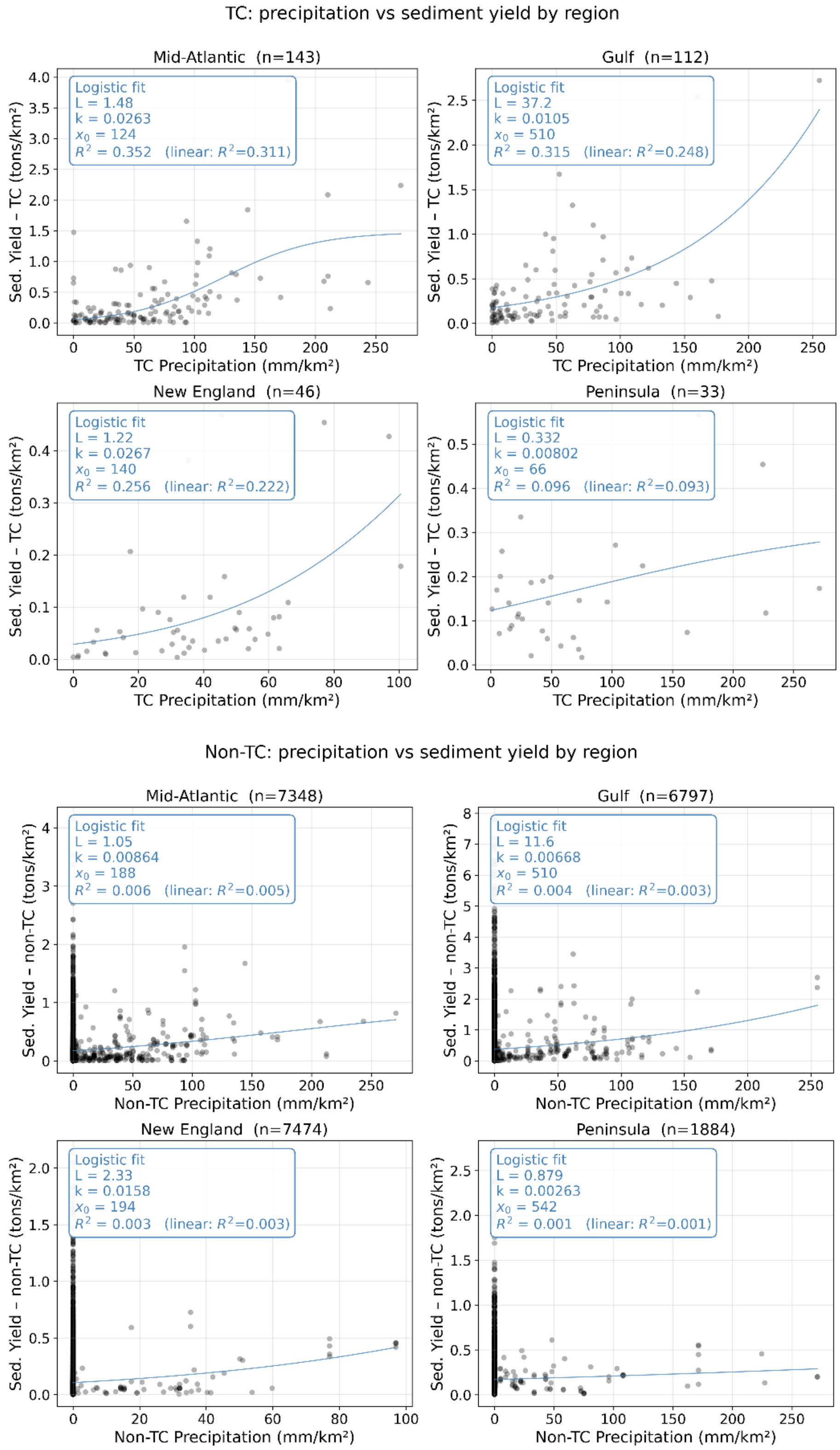

Figure S05 - Connections between TC precipitation and sediment transport in rivers. a) relationship between tropical cyclone precipitation and total (baseflow and quickflow) sediment yield. Each point represents the sediment transport response of one tropical cyclone in one basin. b) relationship between precipitation unrelated to tropical cyclone, and total sediment yield. Each point represents the sediment transport response of one precipitation event in one basin.

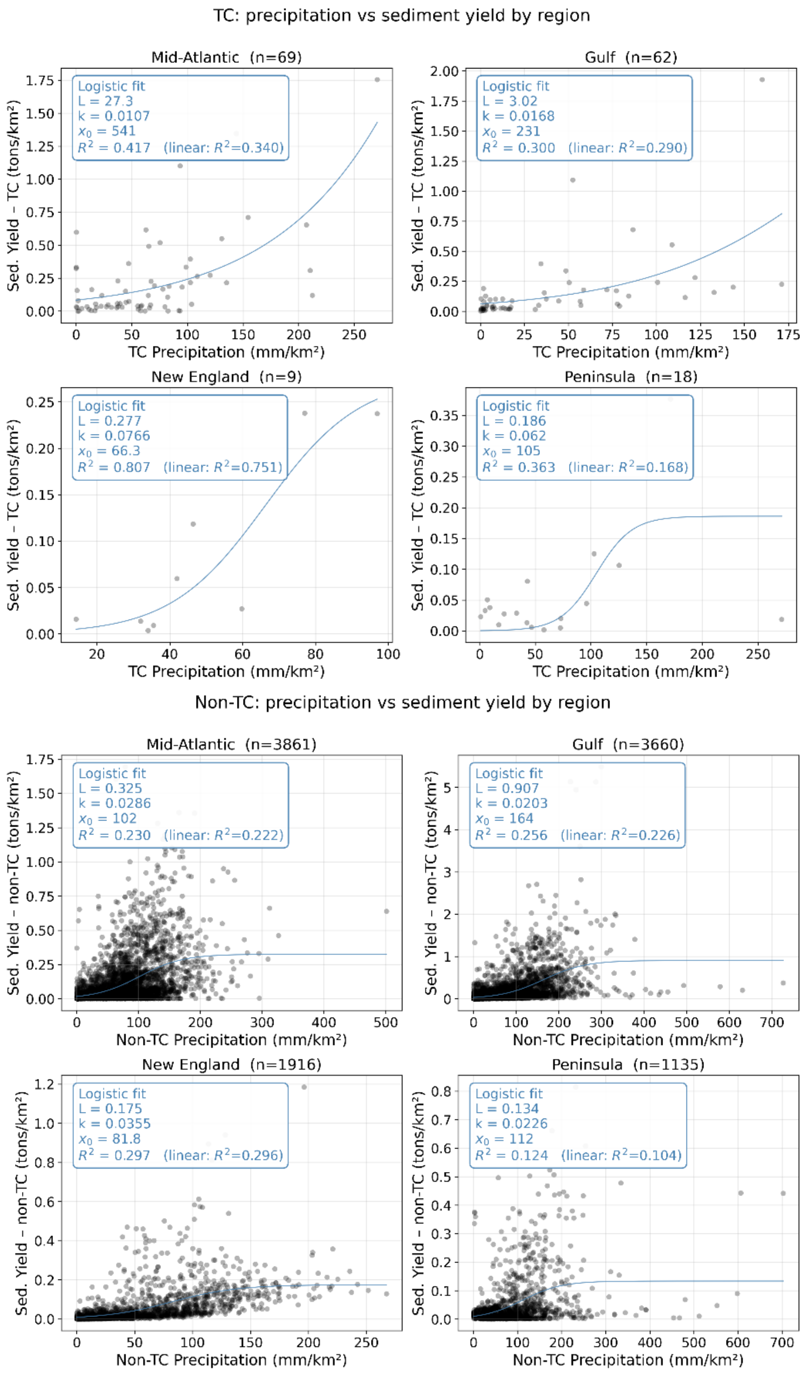

Figure S06 - Connections between TC precipitation and sediment transport in rivers, for events with at least one SSC observation. a) relationship between tropical cyclone precipitation and excess sediment yield. Each point represents the sediment transport response of one tropical cyclone in one basin. b) relationship between precipitation unrelated to tropical cyclone, and excess sediment yield. Each point represents the sediment transport response of one precipitation event in one basin.

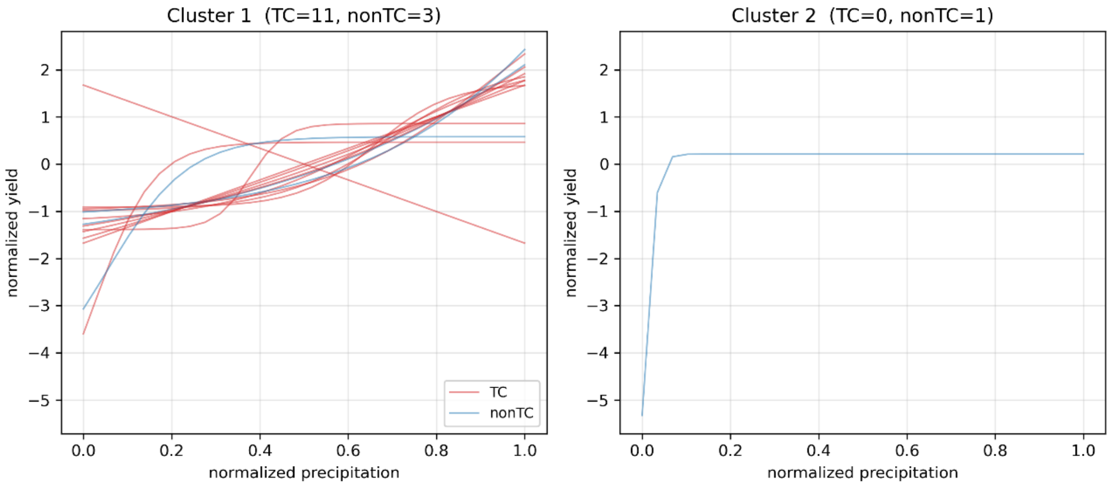

Figure S07 – Total (baseflow and quickflow) sediment response shapes for each station for TC and non-TC precipitation, clustered in two groups.

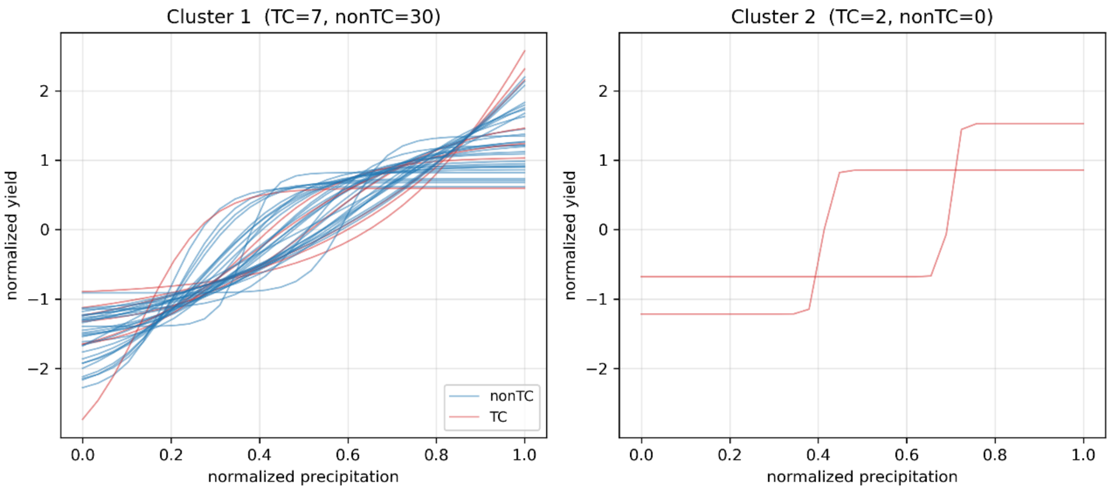

Figure S08 – Sediment response shapes for each station for TC and non-TC precipitation with at least one SSC observation, clustered in two groups.

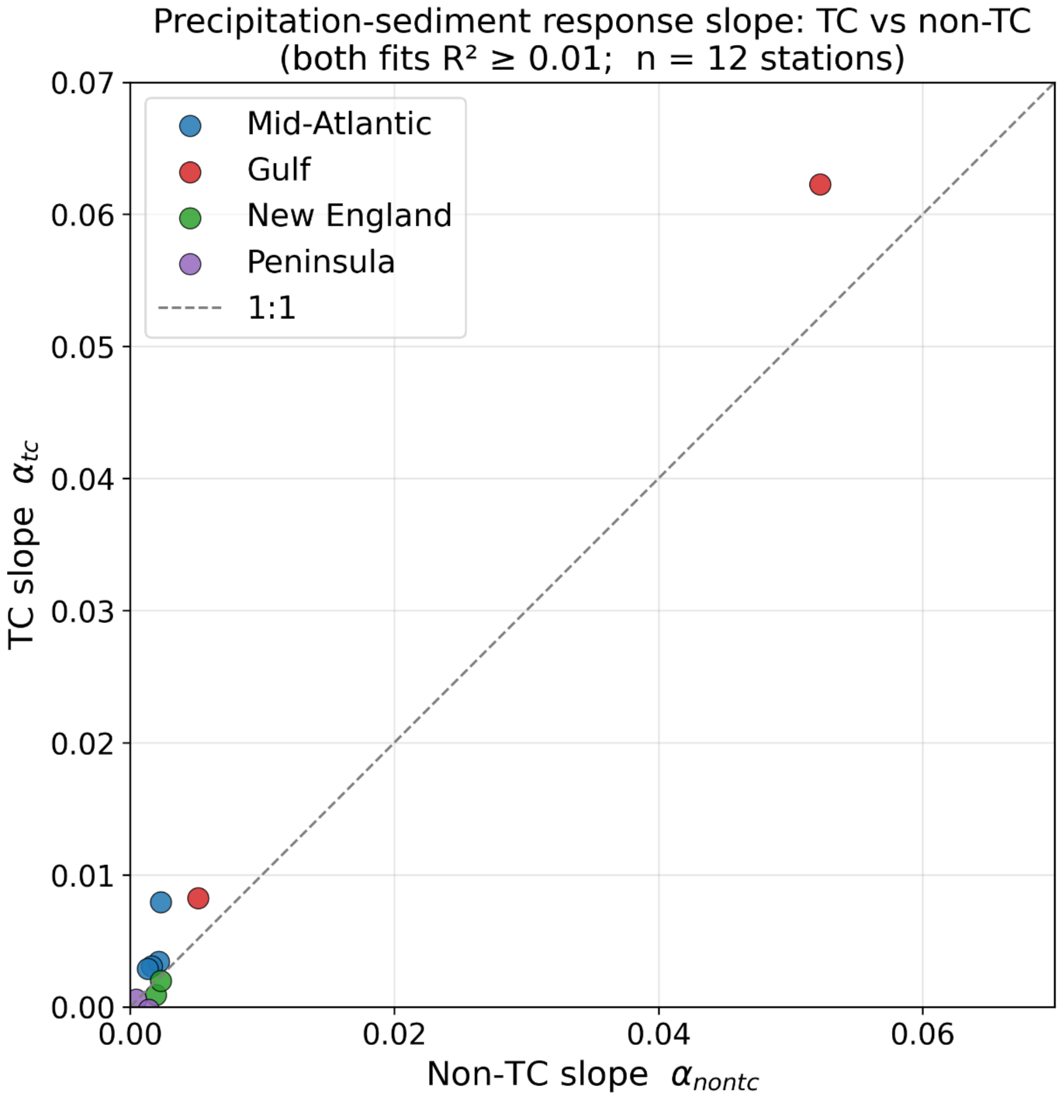

Figure S09 – alpha parameter (slopes) for linear approximations of the relationships between event precipitation and total (baseflow and quickflow) sediment response for TC and non-TC events. Only basins which had linear correlations over 0.01 for both, considered meaningful, are presented in this figure.

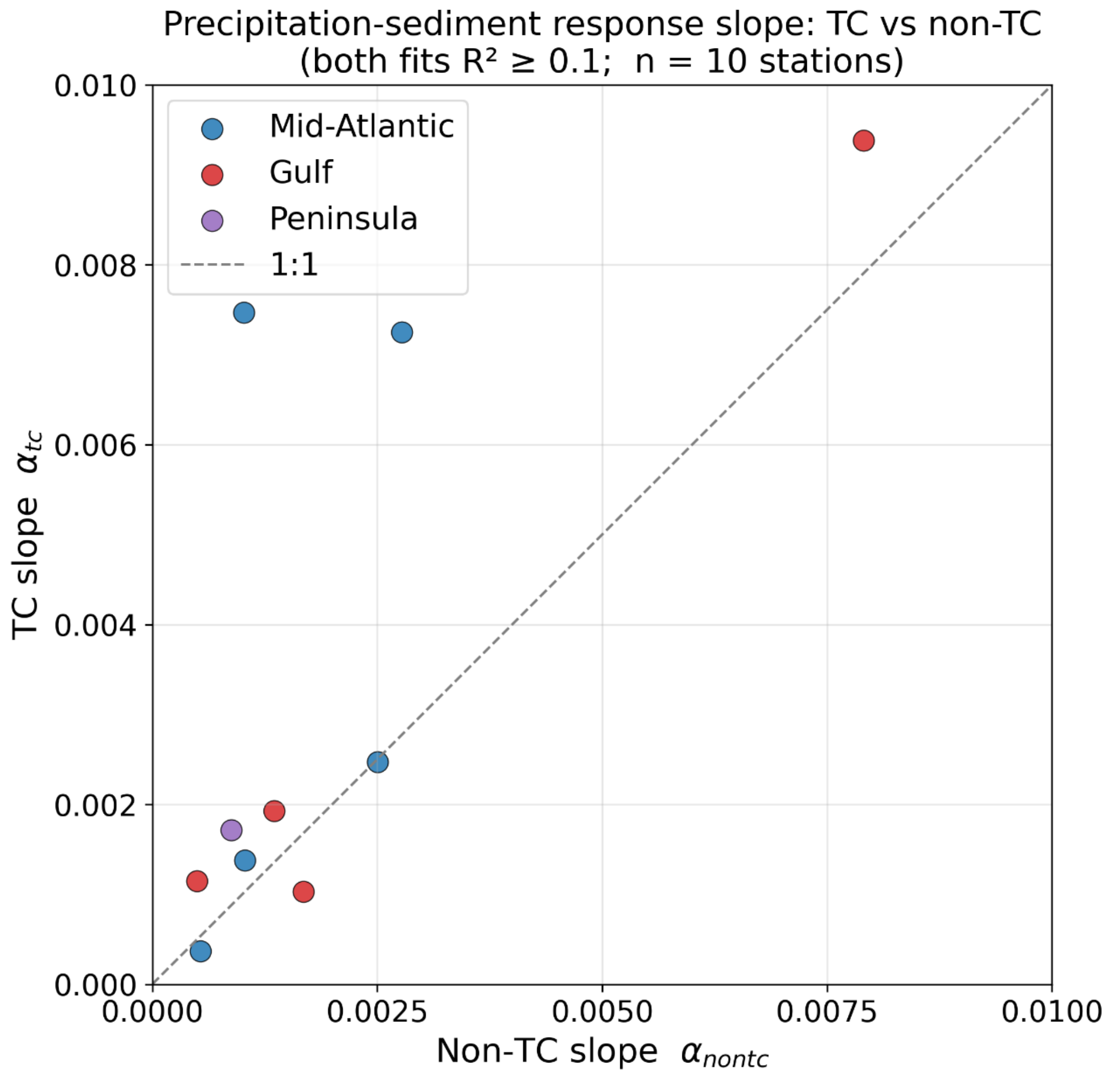

Figure S10 – alpha parameter (slopes) for linear approximations of the relationships between event precipitation and excess sediment response for TC and non-TC events with at least one SSC observation. Only basins which had linear correlations over 0.1 for both, considered meaningful, are presented in this figure.

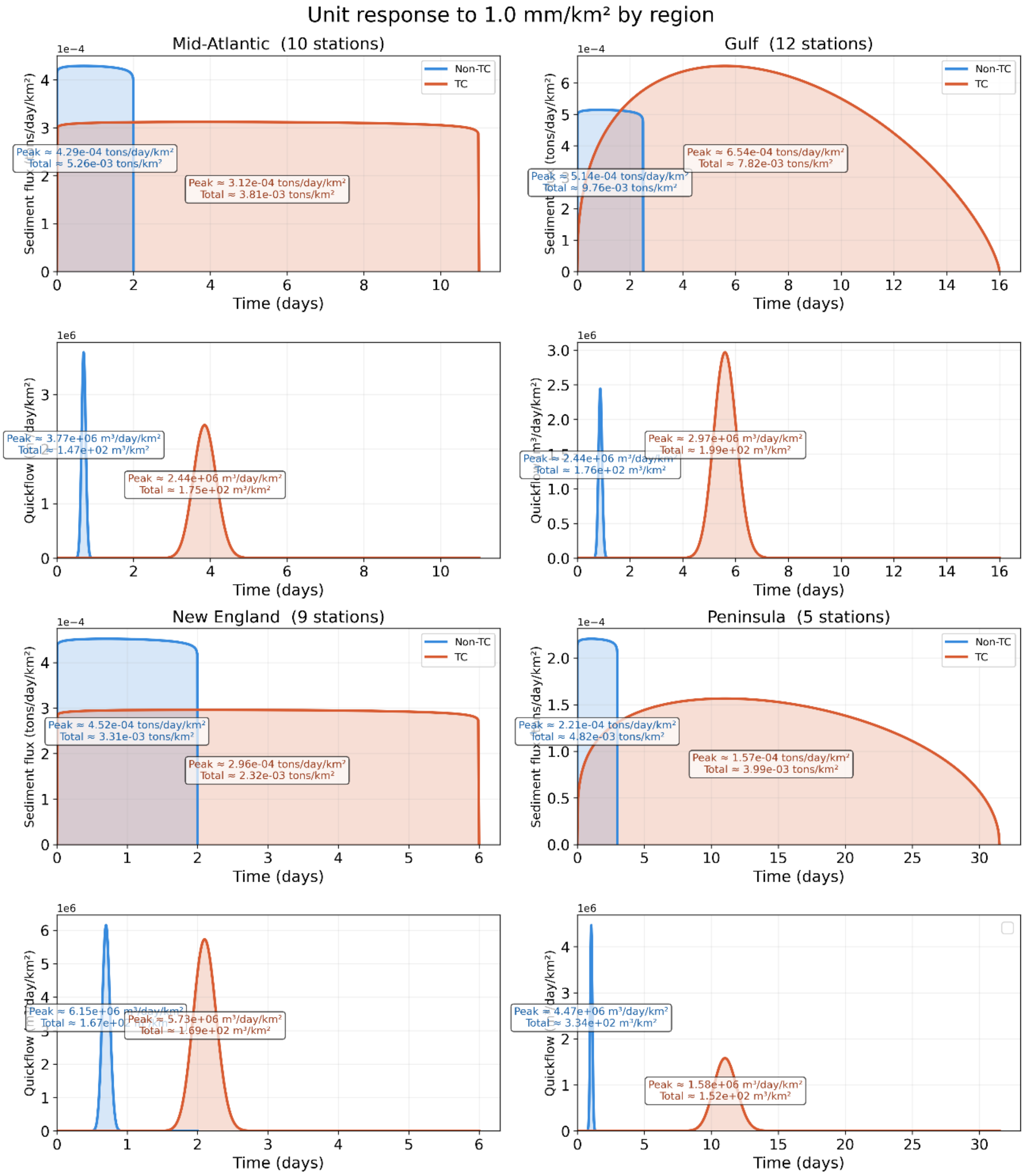

Figure S11 – Unit responses to 1 mm/km2 of TC and non-TC precipitation, for total sediment flux and discharge, aggregated by clusters.

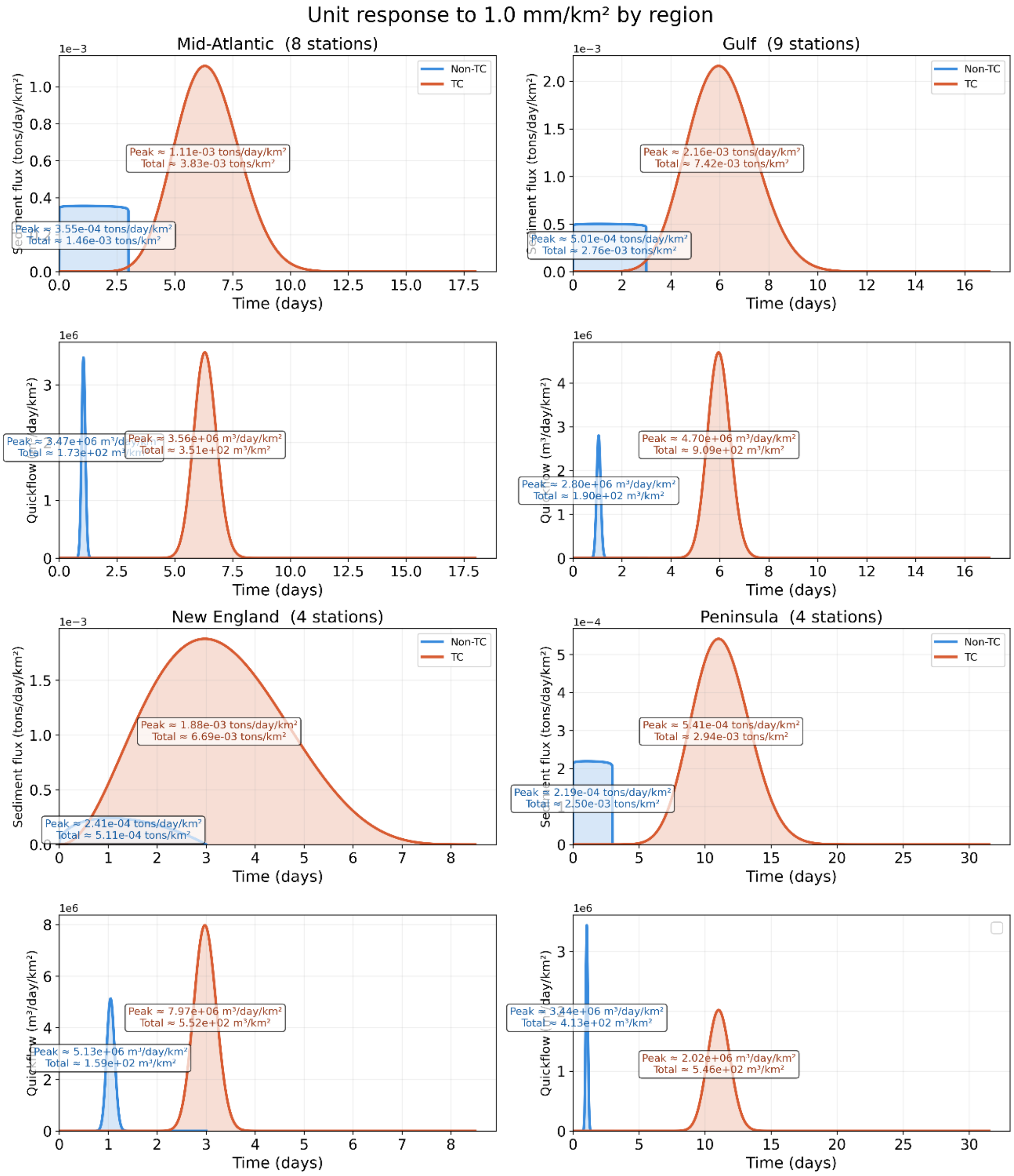

Figure S12 – Unit responses to 1 mm/km2 of TC and non-TC precipitation, for excess sediment flux and quickflow (baseflow-separated discharge), aggregated by clusters. Unit responses generated based only on events with observed SSC.

Station ID	Basin	Annual Mass (t)	Annual TC Prec. Mass (t)	% from TCs
1017000	Aroostook River	18,043.71	50.43	0.28%
1059000	Androscoggin River	27,605.61	35.94	0.13%
1066000	Saco River	8,080.68	9.78	0.12%
1100000	Merrimack River	24,513.74	104.75	0.43%
1184000	Connecticut River	108,624.75	1,214.47	1.12%
1205500	Housatonic River	9,584.03	106.00	1.11%
1358000	Hudson River	143,955.86	265.88	0.18%
1463500	Delaware River	88,853.97	6,038.59	6.80%
1578310	Susquehanna River	396,314.75	18,489.18	4.67%
1642190	Monocacy River	6,236.05	160.55	2.57%
2035000	James River	107,086.40	3,426.41	3.20%
2080500	Roanoke River	68,042.55	5,143.37	7.56%
2084000	Tar River	21,464.79	1,976.48	9.21%
2105769	Cape Fear River	63,546.07	4,267.88	6.72%
2129000	Pee Dee River	200,362.32	14,171.30	7.07%
2171500	Santee River	27,354.32	6,245.06	22.83%
2198500	Savannah River	116,882.40	1,631.28	1.40%
2226160	Altamaha River	145,905.29	5,837.45	4.00%
2236125	St. Johns River	No Data	No Data	No Data
2292900	Caloosahatchee River	8,605.59	12.06	0.14%
2313000	Withlacoochee River	1,658.37	23.69	1.43%
2323592	Suwannee River	31,190.90	303.11	0.97%
2330150	Ochlockonee River	16,721.63	267.30	1.60%
2359170	Apalachicola River	215,282.24	3,851.30	1.79%
2366500	Choctawhatchee River	83,198.17	3,017.57	3.63%
2428400	Alabama River	340,569.27	10,005.09	2.94%
2469761	Tombigbee River	370,331.43	6,327.94	1.71%
2479000	Pascagoula River	277,902.68	7,443.64	2.68%
2489500	Pearl River	182,012.79	984.55	0.54%
4260500	Black River	20,370.02	197.81	0.97%
4290500	Winooski River	15,588.38	53.73	0.34%
7374525	Mississippi River	7,592,893.04	163,066.74	2.15%
8030500	Sabine River	107,620.29	1,849.60	1.72%
8041780	Neches River	219,114.48	3,365.65	1.54%
8067000	Trinity River	209,001.15	1,904.59	0.91%
8114000	Brazos River	771,675.41	6,640.58	0.86%
8162500	Colorado River	99,465.52	-	0.00%
Total / Avg.		**12,145,658.65**	**278,489.74**	**2.92%**

Table S01 – Total annual mass of sediment transported in each station, excess sediment mass transported annually due to TCs, and the percentual of the total sediment mass directly attributed to TCs.

References (SI)

1. Knapp, K. R. *et al.* International best track archive for climate stewardship (IBTrACS) project, version 4. *NOAA National Centers for Environmental Information* **10**, (2018).
2. Altenau, E. H. *et al.* The Surface Water and Ocean Topography (SWOT) Mission River Database (SWORD): A Global River Network for Satellite Data Products. *Water Resources Research* **57**, e2021WR030054 (2021).