

Supplementary Materials: Tropical Cyclone Landfall Frequency and Large-Scale Environmental Impacts along Karstic Coastal Regions (Yucatan Peninsula, Mexico)

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Table S1. Top ten tropical cyclones (TC) that impacted the Yucatan Peninsula (Mexico) and ranked according to the affected population across Mexico. N/A = Not available for events prior to 2000; intensity is assigned according to the Saffir-Simpson scale.

Rank	Year	TC Name	Number of DisasterAreas	Population Affected	Landfall	
					Intensity	Date
1	2005	Stan	0	1,954,571	TS	2-Oct
2	2005	Wilma	80	1,000,000	H4	20-Oct
3	2002	Isidore	93	500,030	H3	22-Sep
4	2010	Karl	0	230,000	TS	15-Sep
5	2007	Dean	26	140,000	H5	21-Aug
6	1988	Gilbert	N/A	100,000	H5	14-Sep
7	1995	Roxanne	N/A	20,000	H2	11-Oct
8	2016	Earl	0	11,000	H1	4-Aug
9	1995	Opal	N/A	3,000	TD	28-Sep
10	2005	Emily	58	0	H4	18-Jul

Table S2. Cloud cover animation and storm trajectories using Geostationary Operational Environmental Satellite-12 (GOES-12) data.

Storm Name	Landfall Date	Channel	Weblink
Emily	18 July, 2005	Water vapor	https://metbcs.cicese.mx/LSU/animation_emily_wv.gif
		Infrared	https://met-bcs.cicese.mx/LSU/animation_emily.gif
Wilma	21–22 October, 2005	Water vapor	https://met-bcs.cicese.mx/LSU/animation_stan_wv.gif
		Infrared	https://met-bcs.cicese.mx/LSU/animation_stan.gif
Stan	2 October, 2005	Water vapor	https://met-bcs.cicese.mx/LSU/animation_wilma_wv.gif
		Infrared	https://met-bcs.cicese.mx/LSU/animation_wilma.gif
Dean	21 August, 2007	Water vapor	https://met-bcs.cicese.mx/LSU/animation_dean_wv.gif
		Infrared	https://met-bcs.cicese.mx/LSU/animation_dean.gif

Table S3. Landfall general parameters for a selection of TCs that crossed the YP in the period 1955–2007. (*); accumulation in five days estimated by regional meteorological stations network; **R63 and R119 = maximum wind for speed > 63 and >119 km/h; bold font indicates the maximum value; N/A = no available.

Tropical Cyclone (yr)	Latitude (°N)	Max. speed (km/h)	Motion (km/h)	Rainfall Maximum(mm)*	Average radius	
					R63 ((km)**	R119 ((km)**
Janet (1955)	18.4	278	44	186	N/A	N/A
Gilbert (1988)	20.7	259	49	350	N/A	N/A
Emily (2005)	20.3	213	21	300	153	21
Stan (2005)	19.8	65	6	339	97	N/A
Wilma (2005)	20.6	213	9	770	287	132
Dean (2007)	18.7	278	34	351	266	79

Table S4. Geophysical variables and population (1970–2015) in the Yucatan Peninsula (YP), Mexico and Belize.

Country	State	Area (km ²)	Coastline (km)	Density (people/km ²)		
				1970	2015	Change (%)
Mexico		1,967,183	11,122	24.5	60.8	148
	<i>YP</i>					
	<i>Campeche</i>	51,833	425	4.9	17.4	255
	<i>Quintana Roo</i>	50,350	1,176	1.8	29.8	1,555
	<i>Yucatan</i>	39,340	340	19.3	53.3	176
Belize		22,966	386	5.2	16.5	217

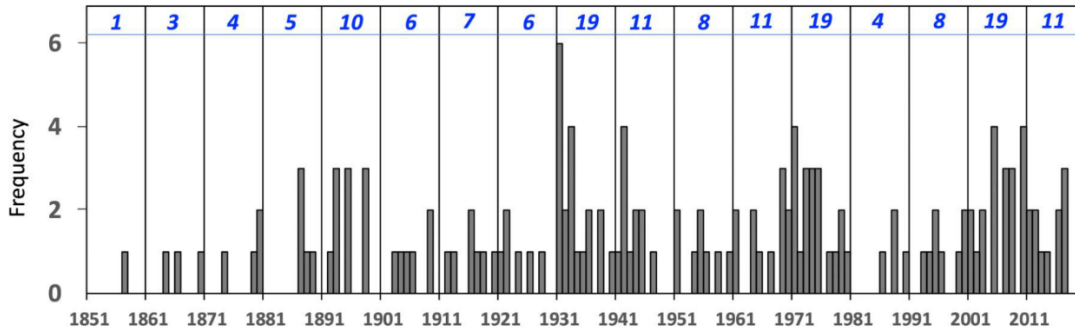


Figure S1. Frequency of TCs from 1851–2019. Only the year at the beginning of each 10-year period is listed in the X-axis. The number (blue) at the top is the total number of events per decade.