

The CCRIF Excess Rainfall (XSR) Model

Historical events database



Data collected and sources

CCRIF has created a database of **historical rainfall events** that occurred in the Caribbean and Central America from 1998 to 2015 and the **resulting economic losses**. A number of reports and databases were considered, such as those from NOAA¹, EM-DAT², DFO³, CDEMA⁴, DesInventar⁵, Swiss Re, Munich Re and AON. Figure 1 shows the number of events gathered from each source.

¹ NOAA: National Oceanic and Atmospheric Administration, U.S. Department of Commerce

² EM-DAT: Emergency Events Database, Centre for Research on the Epidemiology of Disasters (CRED)

³ DFO: Dartmouth Flood Observatory

⁴ CDEMA: Caribbean Disaster Emergency Management Agency

⁵ DesInventar: Disaster Information Management System

The information collected includes event start and end dates, event types (i.e., tropical cyclone, flood/rain or unknown), maximum Saffir-Simpson scale category (applicable to tropical cyclones only), economic losses, number of deaths, and number of people affected and displaced, when available. The distribution of the events among the different event types is presented in Figure 2.

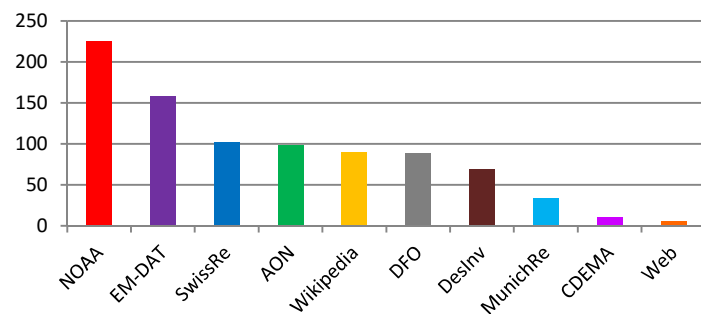


Figure 1. Number of events (1998-2015) gathered from each source for both Caribbean and Central America regions

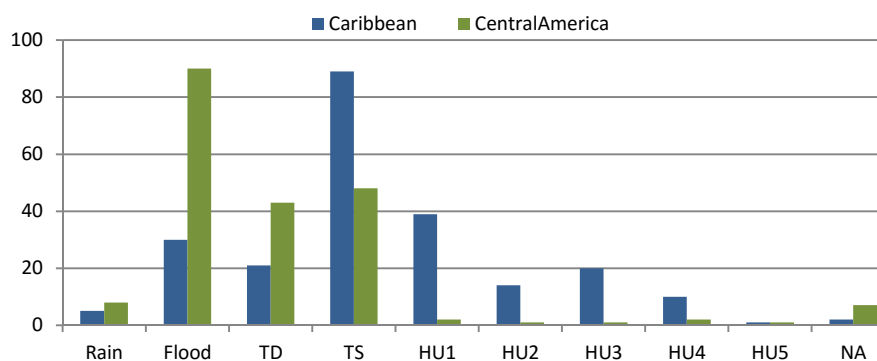


Figure 2. Number of events for each event type. The tropical cyclone severity scale includes TD (Tropical Depression), TS (Tropical Storm), and HU (Hurricane) categories from 1 to 5 in the Saffir-Simpson hurricane wind scale)

The database consists of 231 single reported events for the Caribbean region and 203 for Central America, as shown in Table 1 and Figure 3. Events affecting more than one country were counted as a “single” event for each of those countries. Data regarding the impacts of these events on the population and built environment were collected and analyzed for at least 7 events for each country in the Caribbean region and at least 15 events for each country in Central America.

A	ISO/year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total	
	AIA	2	2											1	1	1		1		8	
	ATG	2	2	1								1		1	1			1		9	
	BHS	2	2		1			2	3	1	1	3		4	2	1	1	3	2	28	
	BMU	1	1	1	1		2		2	1		1	1	3	3	3	1	2	1	24	
	BRB		1			1		1			2			1					1	7	
	CYM			1	1	3	1	2	1		1	2		1						13	
	DMA	1	2		1						1				2	1	1		1	10	
	GRD		1					2	2		1				1					7	
	HTI	1	1		2	1	5	2	4	2	6	4	1	3	4	4			2	44	
	JAM	1			2	5	2	2	5		2	4		2	1	1				27	
	KNA	2	2									1		1		1		1		8	
	LCA		1		1	1	1	1			1	1		1			1			9	
	TCA		1					2		1		3		1	1				2	11	
	TTO			1		1		3	2		1	1		1		2				12	
	VCT		1		1	1		3	2		1			2	1			2		14	
	total	12	17	4	10	13	11	20	21	5	17	21	2	22	17	14	6	13	6	231	
	B	ISO/year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
	BLZ	1	1	1	2				2		2	4			3	1		1		18	
	CRI	1	1		1	2	1	1	2		3	3	1	2	1	1				2	22
	GTM	1	1	5	1	3	1	2	3		3	7	3	6	4	2	3	2	1	48	
	HND	2	1	1	2	8	1		11	1	4	5	1	5	1	1	1	1		46	
	NIC	1	2	2	4	2	1	1	3		2	3	1	5	1	1	1	1	2	32	
	PAN	1	2				1	2			1		1	1	2		2	1	1	15	
	SLV	1	1	2	1	1			3		2	1	1	4	3			1		22	
	total	8	9	11	11	16	5	6	24	2	16	24	8	27	11	7	8	6	4	203	

Table 1. Number of single events by year and country in the Caribbean region (A) and in the Central America region (B). Note: the country codes are listed in the Glossary.

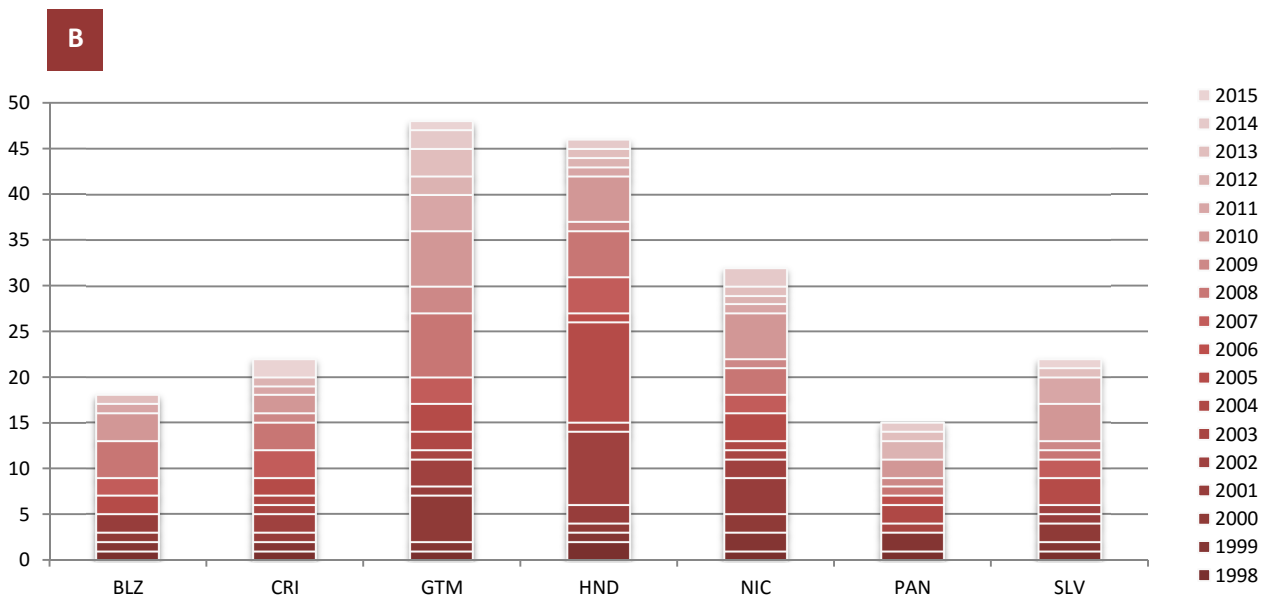
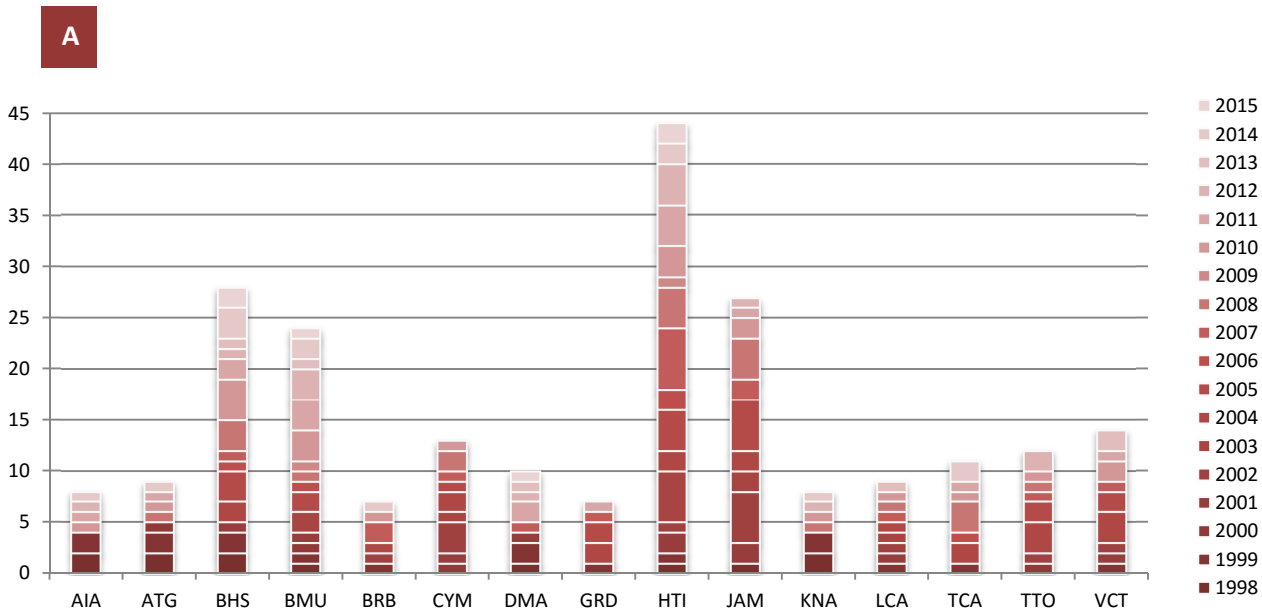


Figure 3. Number of single events for each country from 1998 to 2015 in the Caribbean region (A) and in Central America region (B). Note: the country codes are listed in the Glossary.

Most harmful events

Hurricane Georges in 1998 and Hurricane Mitch also in 1998 were the most harmful events that have struck the Caribbean countries and Central America countries, respectively, in the last 20 years (Figure 4). Figure 4 summarizes the losses caused by the most severe events affecting the Caribbean and Central America countries. When multiple values were obtained from reports, the average values were presented in the table. Note that these losses are estimates of rain-induced losses only; wind induced losses are not included. The fraction of the total losses induced by tropical cyclones on a country was estimated on the basis of the Saffir-Simpson scale category of the storm when it hit that country. The original reported loss values were updated to 2016 dollar values using a macro-economic approach that accounts for the trend of GDP per capita, inflation and population growth from the time of the event.

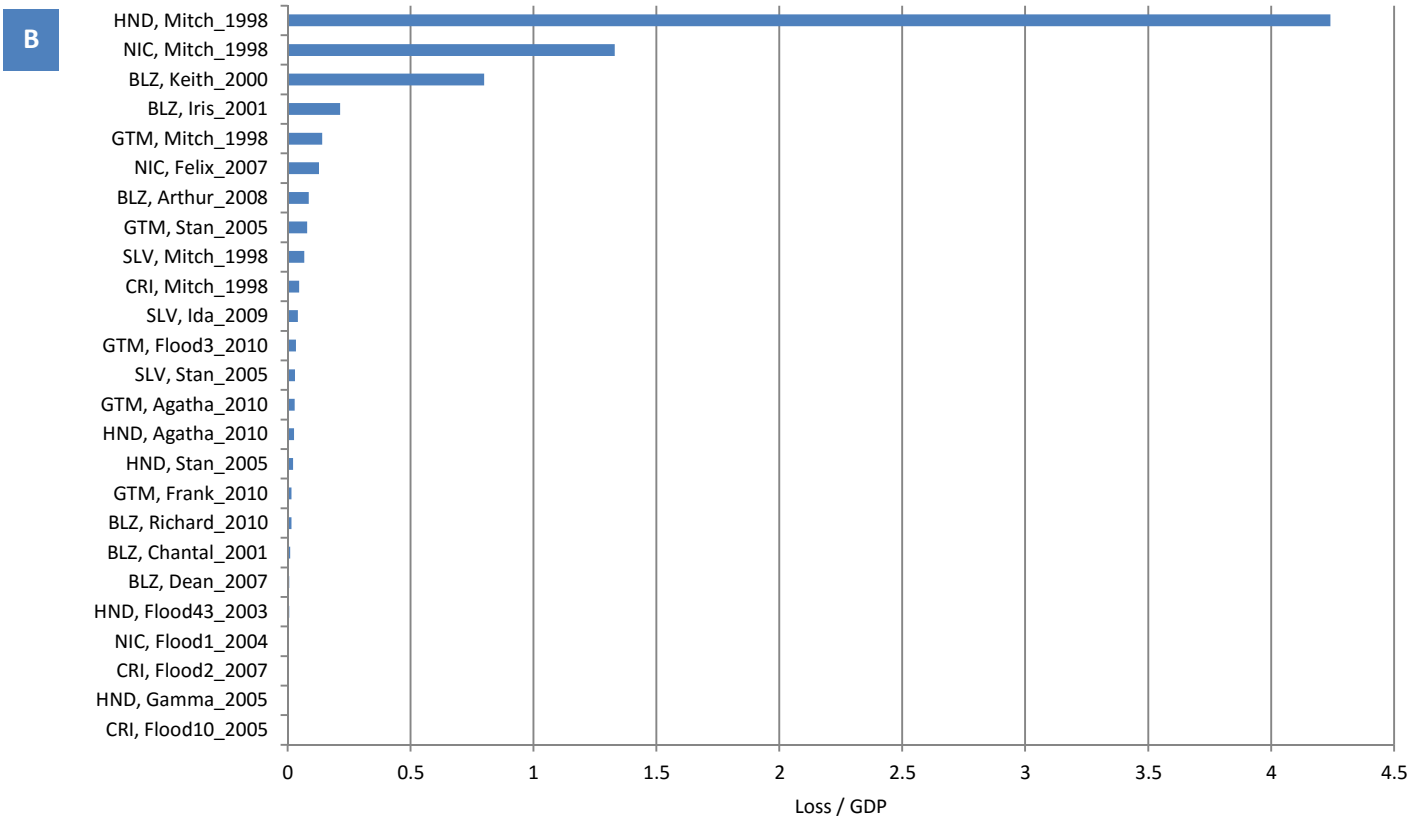
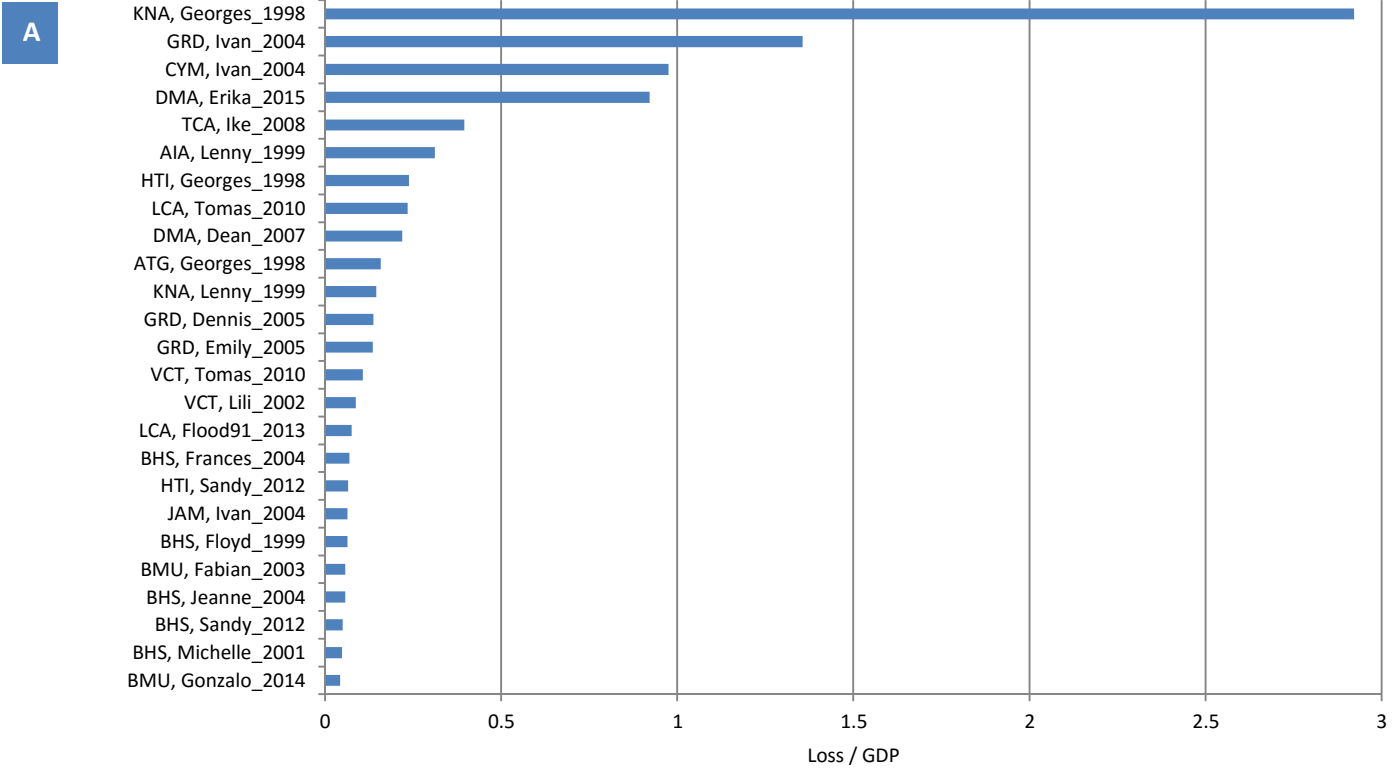
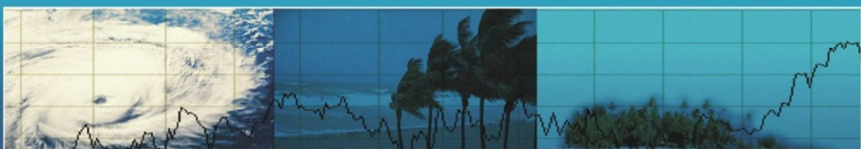


Figure 4. Ratio of rain-induced losses to GDP for the 25 most harmful events from 1998 to 2015 in the Caribbean region (A) and in the Central America region (B). For each event, country code, name (if cyclone) and year are reported.



Glossary

Code	Country
AIA	Anguilla
ATG	Antigua and Barbuda
BHS	Bahamas
BLZ	Belize
BMU	Bermuda
BRB	Barbados
CRI	Costa Rica
CYM	Cayman Islands
DMA	Dominica
GRD	Grenada
GTM	Guatemala
HND	Honduras
HTI	Haiti
JAM	Jamaica
KNA	Saint Kitts and Nevis
LCA	Saint Lucia
NIC	Nicaragua
PAN	Panama
SLV	El Salvador
TCA	Turks and Caicos Islands
TTO	Trinidad and Tobago
VCT	Saint Vincent and the Grenadines

The current members of CCRIF are:

Caribbean – Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts & Nevis, Saint Lucia, St. Vincent & the Grenadines, Trinidad & Tobago and Turks & Caicos Islands

Central America – Nicaragua