





CCRIF SPHERA

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Background



- In 2007, the Caribbean Catastrophe Risk Insurance Facility was formed as the first multi-country risk pool in the world, and was the first insurance instrument to successfully develop parametric policies.
- It was designed as a regional catastrophe fund for Caribbean governments to limit the financial impact of devastating hurricanes and earthquakes by <u>quickly</u> providing financial liquidity when a policy is triggered.
- CCRIF offers earthquake (EQ), tropical cyclone (TC) and excess rainfall (XSR) policies to Caribbean and Central American governments.



Background



- Since September 2015 ERN-RED is the Risk Management Specialist for CCRIF SPC (Caribbean Catastrophe Risk Insurance Facility), providing the services of:
 - Risk management.
 - Financial planning.
 - Catastrophe modelling.
 - Coordination of reinsurance placement.
- One of the full time (24/7) activities is Monitoring and Calculation Agent, for the estimation of possible triggering events and payouts for CCRIF's member countries.
- In 2017 we had two catastrophic hurricanes in the Caribbean:
 - Irma and Maria.

Calculation Agent



Perils

- Earthquake (EQ)
- Tropical Cyclone (TC)
- Excess Rainfall (XSR)







- Protocol.
- Insurance policy. •



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Monitoring

Hurricane Irma (TC & XSR)









Irma TC+XSR = \$31,201,633.06

TO					
IC	Country	Event Date	Payout (USD)	Disaster Alert	Type Of Event
	AIA	6/9/2017	\$6,529,100.00	Yes	Triggering Event
	ATG	6/9/2017	\$6,794,875.31	Yes	Triggering Event
	KNA	6/9/2017	\$2,294,603.43	Yes	Triggering Event
					Triggering Event under
	HTI	8/9/2017	\$162,000.00	Yes	ADC
	TCA	8/9/2017	\$13,631,864.52	Yes	Triggering Event
					Triggering Event under
	BHS	9/9/2017	\$234,000.00	Yes	ADC
	Total		\$29,646,443		

XSR

Country	Start Date	End Date	Disaster Alert	Payout	Type Of Event
					Triggering
AIA	6/9/2017	7/9/2017	43824	\$158,823.20	Event
					Triggering
TCA	7/9/2017	9/9/2017	43824	\$1,232,768.60	Event
					Triggering
BHS-SE	8/9/2017	9/9/2017	43824	\$163,598.00	Event
Total				\$1,555,189	

Hurricane Maria (TC & XSR)







Maria TC+XSR = \$23,816,521

ТС	Country	Event Date	Payout (USD)	Disaster Alert	Type Of Event
					Triggering
		10/00/2017	\$122 750 00	Voc	Event under
		19/09/2017	\$125,750.00	165	Triggering
	DMA	19/09/2017	\$19,294,800.00	Yes	Event
					Triggering Event under
	ATG	20/09/2017	\$32,400.00	Yes	ADC
					Triggering Event under
	KNA	20/09/2017	\$27,150.03	Yes	ADC
					Triggering Event under
	AIA	20/09/2017	\$29,250.00	Yes	ADC
	TCA	23/09/2017	\$419,372.12	Yes	Triggering Event
	Totals		\$19,926,722		

XSR

Country	Start Date	End Date	Disaster Alert	Payout	Type Of Event
BRB	18/09/2017	19/09/2017	44009	\$1 917 506	Triggering
	10/00/2017	20/00/2017	44000	¢1,051,000	Triggering
DMA	18/09/2017	20/09/2017	44009	\$1,054,022	Event Triggering
VCT	19/09/2017	19/09/2017	44009	\$247,257	Event
LCA	19/09/2017	19/09/2017	44009	\$671,013	Triggering Event
	Tot	\$3,889,799			

2017: Irma + Maria





Harvey, Irma, Maria

TC= \$49,573,165 XSR= \$5,444,988 TC+XSR = \$55,018,153





SPHERA



- The Caribbean Catastrophe Risk Insurance Facility (CCRIF SPC) decided in 2017 the development of his own tropical cyclone (TC) and earthquake (EQ) risk model, which is part of the platform called SPHERA (System for Probabilistic Hazard Evaluation and Risk Assessment), to underpin its TC and EQ parametric insurance program in the following years.
- Perils: Earthquake and Tropical Cyclone (Wind + Storm Surge).
- Countries: 34 (Caribbean + Central America)
- Most updated model for the region.
- Team:







Countries





- Group 1: Anguilla, Antigua and Barbuda, the Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands.
- Group 2: Dominican Republic, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama.
- Group 3: Aruba, British Virgin Islands, Curaçao, Guadeloupe, Guyana, Martinique, Montserrat, Bonaire-Saba-Saint Eustatius, Sint Maarten, Puerto Rico, Suriname.

SPHERA model





EQ Hazard Module



 Seismic hazard model with 141 sources using different geometrical characteristics with coverage of all countries that are part of CCRIF.



TC Hazard Module



- Synthetic catalogue: methodology.
 - The paths of the observed hurricanes are statistically perturbed to obtain alternative paths.



Hazard Validation TC / EQ





TC Hazard (Wind)





EQ Hazard (PGA)





PGA (in g) on soil for 475-year return period

Exposure module TC / EQ

SPHERA exposure:

- Asset ID
- Longitude
- Latitude
- Taxonomy
- Occupancy
- N. of buildings
- Area
- Replacement cost



Residential buildings

Commercial buildings



Industrial facilities



Hotels and restaurants



Healthcare infrastructure



Education infrastructure



Public buildings

Vulnerability TC / EQ

 Representation of: building typologies, construction material, code compliance, #floors, etc.









Real Time Operation

• Post-event (or quasi real-time) operational workflow

1 - NOAA activates a tropical cyclone alert





2 - NOAA produces a best

Gracias







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