



## Real-Time Forecasting System (RTFS)

RTFS ... A Tool for Understanding Hurricane Risks and Enhancing Preparedness during Hurricanes

### Real-Time Forecasting System (RTFS)

The Real-Time Forecasting System (RTFS) is a storm impact forecast tool which provides users with real-time hurricane hazard and impact information. The RTFS is an integrated, 3D, high-resolution modelling platform which is able to produce detailed information on the expected hazard levels and the impacts from tropical cyclones for the entire Caribbean region.

The RTFS therefore enables all active members of CCRIF to access real-time estimates of the expected levels of certain hazards (wind, wave, surge and precipitation) and their impacts on population and infrastructure for all tropical cyclones during the hurricane season.

### A REVIEW OF THE PERFORMANCE OF THE RTFS DURING THE 2010 HURRICANE SEASON

At the start of the Hurricane Season 2010, the Caribbean Catastrophe Risk Insurance Facility (CCRIF) provided all its members as well as many of the Region's international development partners (IDPs) with access to its upgraded Real-Time Forecasting System (RTFS). This was made possible with technical support from Kinetic Analysis Corporation (KAC) and the Caribbean Institute of Meteorology and Hydrology (CIMH). CCRIF provides this tool to its Members to improve their understanding of hurricane risks and to support enhanced disaster preparedness. CCRIF member countries are provided with access to the RTFS at no cost. This service is accessed through the secure RTFS homepage on the CCRIF website – [www.ccrif.org](http://www.ccrif.org).

The RTFS model simulations provided CCRIF members (more specifically, emergency and disaster managers, meteorological officers and finance/economy officials) with valuable real-time estimates of the expected hazard levels and impacts on population and territory for all active storms during the 2010 hurricane season. This review provides a summary of the performance of the RTFS during the 2010 Hurricane Season along with information related to: use of the RTFS; resources provided; and storm briefings based on RTFS outputs.

# CCRIF

The Caribbean Catastrophe Risk Insurance Facility



## The 2010 Atlantic Hurricane Season – The Impacts on CCRIF Member States

The 2010 Hurricane Season was very active compared to the 2009 season and also compared to the average annual activity in the Atlantic. Global climate features strongly influenced this year's hurricane activity, as they often do. During 2010, record warm Atlantic waters, combined with the favourable winds coming off Africa and weak wind shear aided by La Niña provided ample energy to developing storms. There were nineteen named storms – tied with 1887 and 1995 for third highest on record – and of these, twelve became Hurricanes with five of them reaching a status of Major Hurricanes (Category Three and higher.)

In 2010, the Hurricane policies for four CCRIF member countries were triggered due to the passage of Tropical Cyclones Earl and Tomas. CCRIF made a payment of US\$4,282,733 to the Government of Anguilla following the passage of Tropical Cyclone Earl which passed close to that island on 30 August. Payments were made to the Governments of Barbados, Saint Lucia and St. Vincent & the Grenadines following the passage of Tropical Cyclone Tomas which passed close to these islands on 30 and 31 October. The total payouts for these three countries were as follows: Barbados - US\$8,560,247; Saint Lucia - US\$3,241,613 and St Vincent & the Grenadines - US\$1,090,388.

## Benefits to Members of Using the RTFS

### Contingency Planning

- Use the information to obtain a preview of what might happen if a given storm continues along its projected path, and activate appropriate contingency plans based on this insight
- Update country plans as needed with new information from latest forecast

### Shelter Management

- Identify impact areas and shelter locations to support shelter location decisions
- Identify potential damage to shelters, and plan for alternatives

### Emergency Interventions

- Identify areas where population is at risk and issue warnings, plan for assistance

## Description of the RTFS Product and New Features Included During Hurricane Season 2010

With technical support from the Kinetic Analysis Corporation (KAC) all active tropical storms globally are simulated using the KAC TAOS Real-time Impact Forecasting System (TAOS-RTFS), which then produces detailed information on the expected hazard levels and their impacts from these storms for the entire Caribbean region. Storm hazard and impact data are updated each time the National Hurricane Center releases new Official forecasts for an active tropical storm in the Atlantic Basin (typically at least once every 6 hours). KAC storm hazard and impact estimates are available less than 30 minutes after receipt of an updated official forecast.

For the 2010 season, the *following products* were included in the CCRIF RTFS package:

### Hazards Maps:

- a) Wind hazard: maximum wind speed [mph]
- b) Wave hazard: maximum significant wave height [feet], with enhanced wave propagation and refraction
- c) Surge hazard: maximum water elevation, above Mean Sea Level (MSL) or above land [feet]
- d) Precipitation: cumulative rainfall, for the duration of storm forecast [inches], with orographic effect of topography on rainfall and leeward drying

### Estimated impacts of hazard forces:

- a) Map showing the qualitative impact of wind forces on vegetation and the built environment (based on the Beaufort scale)
- b) Tabular report of population affected, by hazard level, and by administrative unit (by country, and by parish for some countries).

- c) Operational impact expected at major ports and airports in each country.

### Location-specific hazard values for Haiti:

In support of the international relief effort, the 2010 RTFS included estimates for the wind speed and storm surge values (for offshore points) as part of the 6 hourly updates for 15 locations in Haiti. This was requested by the World Food Programme, the coordinating agency on logistics for the international community in Haiti.

### Summary of the New Features of the RTFS

The 2010 RTFS product included several new features as follows:

- Once a storm died out, a full storm simulation was run using the actual best track information. The post-event storm outputs represented the best estimate of hazard footprints and impacts as they happened during the storm.
- Location-specific hazard outputs for a total of 15 sites in Haiti. Estimates of the maximum hazard levels that can occur at these sites were made as part of every 6-hourly forecast. These sites represented the main relief warehouses, the airport and ports where supplies are received, and concentrations of refugee camps.
- Delivery of the RTFS output files via the CCRIF web site thereby offering more flexibility in providing the files to users.

### Delivering the RTFS to CCRIF Members

As soon as the modeling of an active storm based on the latest official track forecast was completed, KAC made the KML-format results available to CCRIF on a secure web page. CCRIF then uploaded the map information to its own secure site for distribution to the Participating countries.

The KML format was retained as the distribution format for the hazard and impact information, since it allows the user to display the storm impact maps as overlays in Google Earth. Google Earth is a widely used, free viewer for geographic information. This interface displays the hazard and impact information on top of satellite imagery, which provides the user with a useful and realistic context for viewing and interpreting the potential impact of the hazard forces for emergency preparedness and evacuation decisions, as well as for contingency planning to secure critical infrastructure and operations.

## Support to Member States for the Use of the RTFS

CCRIF issued over 100 usernames and passwords to its members, staff and other stakeholders including International Development Partners working in the region in the area of disaster management. Throughout the course of the 2010 Hurricane season, many countries made use of the tool.

### Manuals and User Guides

Information to help users access and interpret the RTFS products is available in the following documents, which are also posted on the CCRIF website.

- RTFS User Guide (for accessing secure RTFS site on CCRIF's website)
- RTFS Data User Guide
- Google Earth Notes
- TAOS-RTFS Outputs for user selected locations
- A Guide to Understanding the Real-time Impact Forecasting System

### RTFS Training Sessions

As was done in previous years, the Caribbean Institute of Meteorology and Hydrology (CIMH) conducted training sessions before the start of the hurricane season to introduce the RTFS model outputs to disaster managers and meteorological service personnel in the region. Participants also were provided with a training manual.



# CARIBBEAN CATASTROPHE RISK INSURANCE FACILITY



## About CCRIF

CCRIF is a risk pooling facility, owned, operated and registered in the Caribbean for Caribbean governments. It is designed to limit the financial impact of catastrophic hurricanes and earthquakes to Caribbean governments by quickly providing short-term liquidity when a policy is triggered. It is the world's first and, to date, only regional fund utilising parametric insurance, giving Caribbean governments the unique opportunity to purchase earthquake and hurricane catastrophe coverage with lowest-possible pricing. CCRIF represents a paradigm shift in the way governments treat risk, with Caribbean governments leading the way in pre-disaster planning. CCRIF was developed through funding from the Japanese Government, and was capitalised through contributions to a multi-donor Trust Fund by the Government of Canada, the European Union, the World Bank, the governments of the UK and France, the Caribbean Development Bank and the governments of Ireland and Bermuda, as well as through membership fees paid by participating governments.

## Use of the RTFS in 2010

During the 2010 Hurricane Season, the RTFS site was accessed 331 times by 11 CCRIF member states. The site was visited primarily during Tropical Cyclones Igor, Richard, Nicole, Matthew, and Tomas. Jamaica was by far the largest user, with one third (111) of the visits, followed by Haiti with 54, Barbados with 41. Belize, Bahamas, Turks and Caicos, Anguilla, Dominica, Cayman Islands, Trinidad and Tobago and Bermuda also visited the site. International agencies operating in Haiti accessed the site from the United States, Switzerland and the UK.

Apart from Haiti, no other country took up the offer to identify locations for which they would receive hazard trigger values during the course of a storm. Additionally, information from the RTFS was used in some instances by CIMH in the preparation of its Tropical Weather Briefing Papers which were submitted to Caribbean Disaster and Emergency Management Agency (CDEMA) each time a tropical disturbance posed any imminent danger to territories under the responsibility of CDEMA.

CCRIF hopes to increase the use of the RTFS by its members during the 2011 Hurricane season and is currently taking steps to better define members' needs with respect to the RTFS and the adequacy of its current support of the system. An evaluation also will be done to identify other personnel within governments to be provided with access. Efforts also will be made to expand outreach and training programmes in 2011. CCRIF already has started to assess the RTFS and additional features that would be useful to its members such as making available a storm-specific archive on its web-server, which would store all RTFS forecast outputs for use by emergency managers who may need to refer to past forecasts during an active storm.



### Sixteen governments are currently members of CCRIF:

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

Published by: Caribbean Catastrophe Risk Insurance Facility (CCRIF)

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