

# CCRIF

The Caribbean Catastrophe Risk Insurance Facility



CARIBBEAN CATASTROPHE  
RISK INSURANCE FACILITY

*CCRIF, a not-for-profit company, is the first multi-country risk pool in the world*

## **A Guide to Understanding the Real Time Impact Forecasting System (RTFS)**

**A QUESTION  
& ANSWER  
BOOKLET**

# A Guide to Understanding the Real – Time Impact Forecasting System (RTFS)

---

## **A Question and Answer Booklet**

### **Published by:**

Caribbean Catastrophe Risk Insurance Facility  
Harbour Place, 1<sup>st</sup> Floor,  
103 South Church Street  
P.O. Box 1087,  
Grand Cayman, KY1 – 1102  
Cayman Islands

**June 2010**

Design and Layout: Sustainability Managers, Communications Manager, CCRIF  
Printed by: MAPCO Printers Limited, Kingston, Jamaica



## About this Booklet

---

“A Guide to Understanding the Real-Time Impact Forecasting System: A Question and Answer Booklet”, has been produced by CCRIF to enable key officials such as disaster and emergency managers in our member countries to effectively utilise the real-time hurricane hazard and impact information that this tool provides during the hurricane season. By providing advanced knowledge of a hurricane’s expected site-specific impacts, the Real-Time Impact Forecasting System (RTFS) can support effective hurricane preparedness, response and evacuation.

This book provides a series of questions about the RTFS and answers to those questions in a user-friendly, easy to understand format. You will therefore find information on: the key features of the RTFS; how the RTFS data is made available; how to access the RTFS; the hazard and basic impact data provided; and using Google Earth to view RTFS outputs. We hope that you will find this information useful and helpful in enabling you to effectively use the RTFS tool. We also look forward to expanding the document to include answers to other questions as they emerge. This book also will be used as a resource document during the various training sessions offered by Caribbean Institute for Meteorology and Hydrology (CIMH) on the RTFS.

This book is available on the CCRIF website at [www.ccrif.org](http://www.ccrif.org).



# CCRIF

The Caribbean Catastrophe Risk Insurance Facility



**CARIBBEAN  
CATASTROPHE  
RISK INSURANCE  
FACILITY**

## **The Caribbean governments' insurance fund for hurricanes and earthquakes**

### **VISION STATEMENT**

*CCRIF will be a key partner with the Caribbean region in its disaster risk management strategies to support long-term sustainable development goals.*

### **MISSION STATEMENT**

*Our Mission is to serve Caribbean governments and their communities in reducing the economic impact of natural catastrophes. We provide immediate liquidity through a range of affordable insurance products in a way that is financially responsible and responsive to their needs.*

***CCRIF, a not-for-profit company, is the first multi-risk pool in the world.***

# List of Acronyms

---

ASOS	Automated Surface Observatory System
ATCF	Automatic Tropical Cyclone Forecast
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CPU	Central processing unit
CDEMA	Caribbean Disaster Emergency Management Agency
CIMH	Caribbean Institute for Meteorology and Hydrology
GIS	Geographical Information Systems
KAC	Kinetic Analysis Corporation
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NHC	National Hurricane Center
OAS	Organisation of American States
RAM	Random-access memory
TAOS RTFS	The Arbiter of Storms Real-Time Forecasting System
USAID	United States Agency for International Development
WMO	World Meteorological Organisation

# Inside this Book

---

<b>About this Booklet</b>	i
<b>List of Acronyms</b>	iii
<b>Message from the Chairman, Mr. Milo Pearson</b>	vi
<b>CCRIF – A Natural Catastrophe Risk Insurance Mechanism...</b>	viii
<b>What is the TAOS Real-Time Forecasting System (RTFS)?</b>	1
<b>Benefits and Purpose of the RTFS</b>	2
<b>History of TAOS RTFS</b>	3
<b>Operational Steps</b>	5
<b>Key Features of the RTFS/Product Description</b>	6
<b>Definitions of the various TAOS RTFS hazards</b>	10
<b>RTFS Relevance to Earthquakes</b>	11
<b>Availability of RTFS</b>	11
<b>How often is the RTFS Feed Updated?</b>	12
<b>How are the RTFS Data made Available?</b>	12
<b>How are the Storm Hazard and Basic Impact Data Provided?</b>	13
<b>Using Google Earth to View RTFS Outputs</b>	17
<b>Google Earth System Requirements</b>	18
<b>How can users enable optimal viewing and use of the RTFS</b>	19

<b>Training and Capacity Building Exercises in RTFS</b>	21
<b>Country Support in RTFS</b>	22
<b>How will Users be able to Access the RTFS Product?</b>	23
<b>Is my Access to the RTFS Automatic from Year to Year?</b>	26
<b>Main Users of the RTFS Product</b>	27
<b>RTFS and Emergency Preparedness/Evacuation Decisions</b>	28
<b>Policy Makers and Cabinet Ministers Use of RTFS</b>	29
<b>Selecting Locations to be Incorporated in the Product</b>	29
<b>Frequency of Use of RTFS during the Course of a Storm</b>	30
<b>Relationship Between RTFS and CCRIF Hurricane Policies</b>	31
<b>RTFS and the Triggering of a CCRIF Policy</b>	32
<b>RTFS and CCRIF's Second Generation Loss Model</b>	32
<b>RTFS and CCRIF's New Excess Rainfall Product</b>	33
<b>Role of CIMH in the Use of the RTFS</b>	34
<b>Special RTFS Product for Haiti</b>	35

# Message from the Chairman, Mr. Milo Pearson

---



I am very pleased to introduce the Caribbean Catastrophe Risk Insurance Facility's (CCRIF's) newest publication, "A Guide to Understanding the Real - Time Impact Forecasting System (RTFS)", which is designed as a collection of questions and answers. This publication is timely given the forecasts for the 2010 hurricane season, which generally indicate an above average season. The NOAA forecast estimates an 85% chance of an above-normal season, a 10% chance of a near-normal season and a 5% chance of a below-normal season. The information provided through the RTFS is useful in informing decision-making in anticipation of a hurricane by allowing access to real-time estimates of the expected hazard levels and impacts on population and infrastructure for all tropical cyclones, thereby contributing to public safety.

CCRIF provides the RTFS tool to its 16-member countries at the start of the Atlantic Hurricane Season on June 1 each year. This book has been designed as a reference resource to enable wider use of the RTFS and is intended for disaster and emergency managers and meteorological officers as well as other governmental and non-governmental agencies involved in hurricane risk management. The RTFS therefore supports users in their efforts in effective preparedness and response, evacuation decision making, planning for pre-positioning of equipment and supplies, activation of mutual assistance arrangements and asset management as well as in contingency planning to secure critical infrastructure and operations.



CCRIF is pleased to inform that the RTFS and the Facility's parametric hurricane policies are built on the same hazard and loss estimate modelling platform, which means that the hazard footprints from the final track of storms in the RTFS are the same as those used in the hazard loss estimate model which is used to underpin our policies.

We continue to work on this initiative with one of our key partners in the region - the Caribbean Institute of Meteorology and Hydrology, to whom we have granted a sub-licence to access the RTFS for training and support purposes. One of the key capacity building exercises undertaken by the CIMH is the organisation of training workshops for Caribbean meteorological officers and disaster management agencies prior to the start of the hurricane season.

As a novel idea nurtured by Caribbean governments into a successful and globally unique risk transfer solution, CCRIF will continue to work with its members to facilitate the implementation of comprehensive disaster management frameworks towards the sustainability of Caribbean nations.

A handwritten signature in blue ink, appearing to be 'A. P. ...', located in the lower right quadrant of the page.

# CCRIF - A Natural Catastrophe Risk Insurance Mechanism for the Caribbean

---



The Caribbean Catastrophe Risk Insurance Facility (CCRIF) is the first multi-country risk pool in the world, and is also the first insurance instrument to successfully develop parametric policies backed by both traditional and capital markets. It is a regional catastrophe fund for Caribbean governments designed to limit the financial impact of devastating hurricanes and earthquakes by quickly providing financial liquidity when a policy is triggered. 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. Sixteen governments are currently members of the fund: 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.

**Q. What is the TAOS Real-Time Impact Forecasting System (RTFS)?**

**A.** The Arbiter of Storms Real-Time Impact Forecasting System (TAOS RTFS) is a storm impact forecast tool which provides users with real-time hurricane hazard and impact information.

TAOS-RTFS is an integrated, 3D high-resolution modelling platform which is able to produce detailed



information on the expected hazard levels and their impacts from tropical cyclones for the entire Caribbean region. For the CCRIF, the RTFS simulates all storms in the CCRIF Analysis Area (as shown in map above), which encompasses all CCRIF countries.

The TAOS-RTFS therefore enables all active members of CCRIF to access real-time estimates of the expected hazard levels and impacts on population and infrastructure for all tropical cyclones during the hurricane season.

**Q. What are the benefits of the TAOS Real Time Forecasting System?  
What is the purpose of the TAOS RTFS?**

Advanced knowledge of a hurricane’s expected site-specific impacts can support effective preparedness and response, evacuation, decision making, planning for re-positioning of equipment and supplies, activation of mutual assistance arrangement and asset management in anticipation of a tropical storm or hurricane.

This real-time service provides enhanced value to participants through improving their understanding of hurricane risks and also through providing valuable real-time information to emergency and disaster managers, meteorological officers and finance/economy officials.

Some of the applications of the TAOS RTFS are outlined below:

Contingency Planning	Shelter Management	Emergency Interventions
<ul style="list-style-type: none"><li>• Use the TAOS 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</li><li>• Update country plans as needed with new information from latest forecast</li></ul>	<ul style="list-style-type: none"><li>• Identify impact areas and shelter locations to support shelter allocation decision</li><li>• Identify potential damage to shelters, and plan for alternatives</li></ul>	<ul style="list-style-type: none"><li>• Identify areas where population is at risk and issue warnings, plan for assistance</li></ul>

**Q. What is the history of TAOS RTFS?**

- A.** TAOS was originally developed as a land planning tool in the late 1980s, and was first applied in disaster planning for Hilton Head Island in South Carolina in the United States. Numerous studies were undertaken between 1992 and 2000 by the USAID/OAS Caribbean Disaster Mitigation Project on the use of the RTFS in disaster planning and management, with TAOS RTFS eventually being approved by the World Meteorological Organisation (WMO) Region IV Committee for storm surge, wind, and wave hazard modelling in 1995.

The tool has been used for hazard/loss studies in Florida, Hawaii, the Indian Ocean and also within the Caribbean as well as with commercial clients. An early version of the technology was used by the Caribbean Institute for Meteorology and Hydrology (CIMH) for production of storm surge envelopes.

More specifically, TAOS is a proprietary modelling technology developed by Kinetic Analysis Corporation (KAC) that seamlessly integrates advanced numerical modelling, global data collection, statistical analysis and geographic information system technology to address a wide variety of issues of concern to both government and the private sector agencies.

TAOS is used to produce all of the KAC tropical cyclone impact forecast products, including both a) real-time impact estimates and b) site-specific risk and loss assessments using all available historical storm information. The TAOS system incorporates wind, wave, surge and damage modelling



techniques that have been published in the scientific literature and have been widely tested (principal references available at [www.kinanco.com](http://www.kinanco.com)).

For modelling of current events, TAOS uses the full array of real-time weather data for the Automated Tropical Cyclone Forecast (ATCF) system, NOAAPORT and other sources. KAC also makes extensive use of remote sensing data from orbital platforms developed by NASA and other agencies for compiling up-to-date environmental and land use information. For socio-economic sector-specific impact assessments KAC uses primary source information from international agencies (including the World Bank and the International Monetary Fund), the US Government and national/regional organisations and agencies responsible for sectoral data.

**Q. What are the operational steps involved in producing detailed information on the expected hazard levels and their impacts from tropical storms?**

**A. To forecast hazard intensities and their impact for each active storm, the following processes are active on a 24/7 basis:**

- **Gathering and processing of the National Hurricane Centre (NHC) and ATCF data:** with each new storm advisory release, the current position, intensity data and forecast track are extracted. The storm model is then initiated with this information. If more than one storm is active at a time, separate job files are created and run for each new separate storm.
- **Detailed modelling of expected land impact:** the model simulates the active storm, producing forecasts for the intensity of wind, wave, storm surge and cumulative rainfall along the storm track, using global terrain models.
- **Graphic and GIS dataset generation:** upon completion of the model runs, the results are converted to graphical map form and datasets. The map images in Google Earth (kml) format will then be made available in the secure member area on the CCRIF website, where the GIS datasets can also be posted for download by members. Members will be alerted of the availability of the new maps and data by an automated email message.

**Q. What are the key features of the RTFS or what is the product description?**

**A.** For all active tropical storm systems, TAOS RTFS computes the intensities of the storm hazards along the forecasted track, and the potential impact of those hazards on affected territories. This information is updated with each storm advisory issued by the National Hurricane Center (NHC). The TAOS storm modelling platform to simulate the storm, uses as inputs the latest storm forecast information and other relevant weather data downloaded from the NOAAPORT satellite.

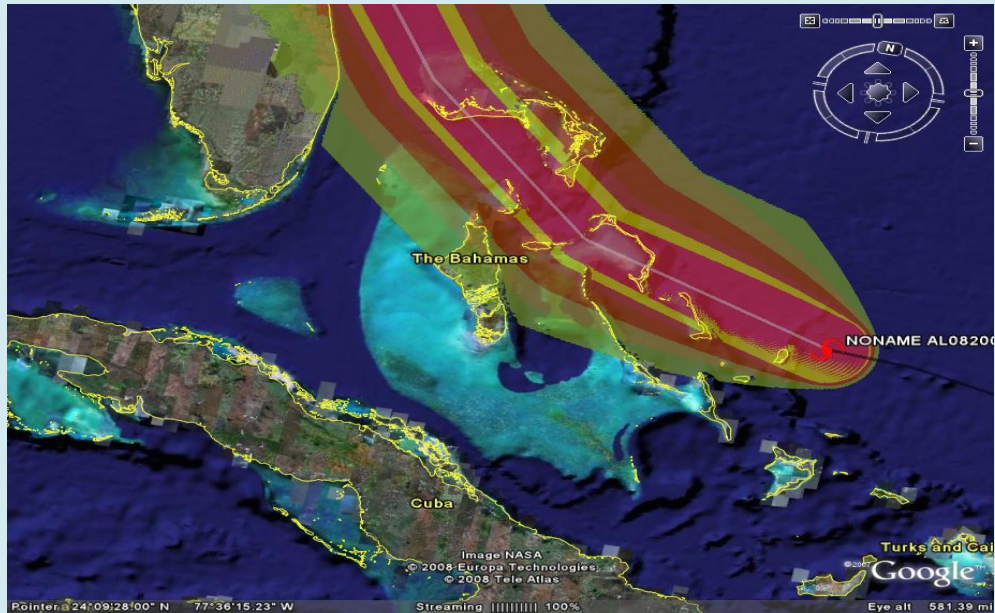
From the analysis described above, the following map and tabular information for use by CCRIF countries is provided:

- maximum expected hazard intensity for wind speed, wave and storm surge height, and cumulative rainfall across the entire impact area of the storm;
- estimates of the impact on the territory by varying hazard levels;
- estimates of the operational impact of the storm on major ports and airports, and
- maximum expected hazard values from the current storm as forecast, for up to five user-selected locations. For the maximum wind speed values, the time at which the maximum will occur is also provided.

CCRIF hazard and impact estimates are provided for areas between 55°W-91°W longitude and 8°N-34°N latitude.

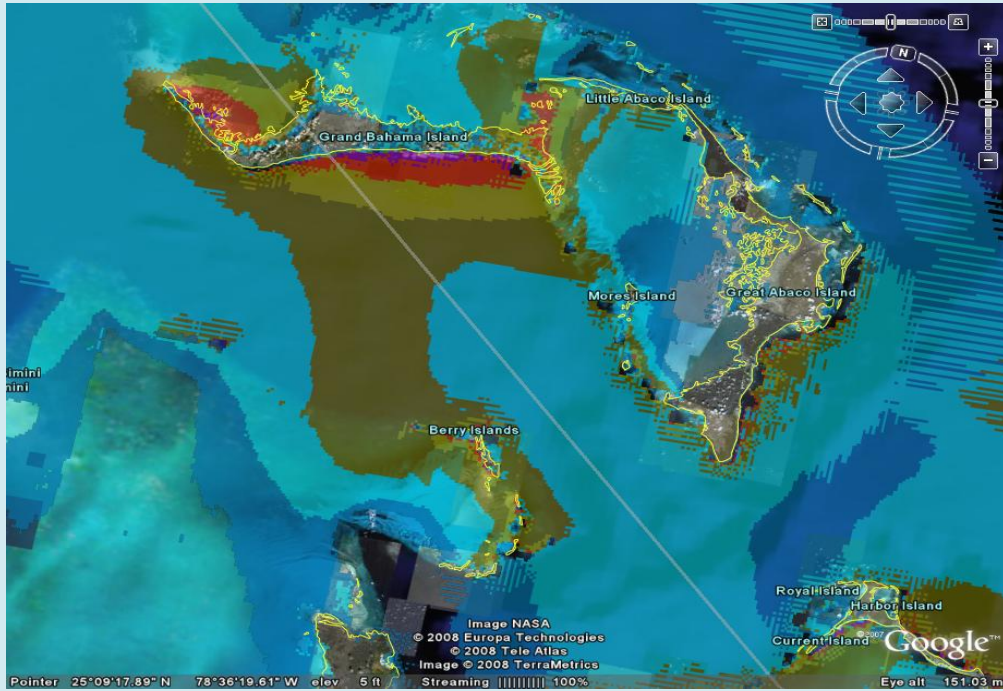
Figures 1, 2 and 3 below are footprint maps of wind speed, storm surge height (peak) and wave height (peak) for various storms.

**Figure 1: Wind Speeds (Maximum)**



- taos\_ccrif\_hazards\_kml
- [al082008\\_ofcl\\_windcats](#)
- Weak Tropical Storm
- Strong Tropical Storm
- Category 1 (74-95mph)
- Category 2 (95-110mph)
- Category 3 (110-130mph)
- Category 4 (130-155mph)
- Category 5 (over 155mph)

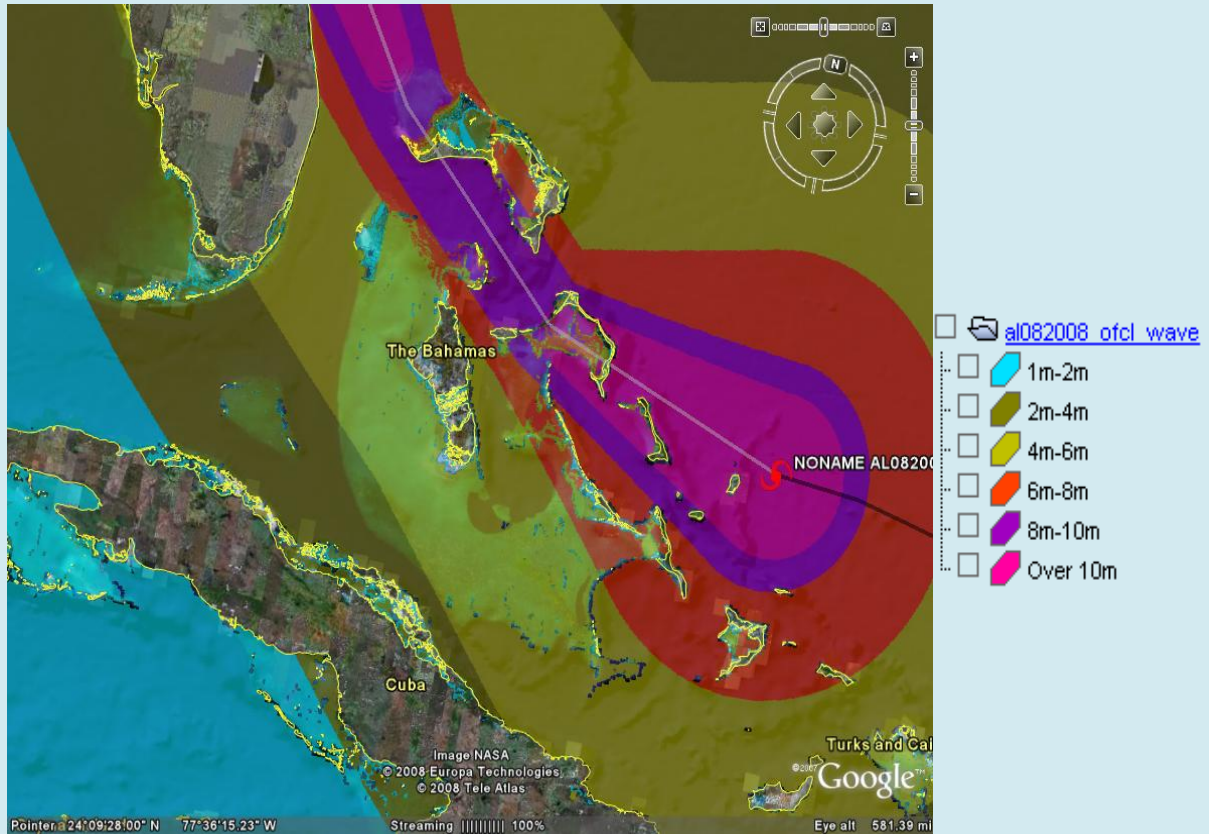
Figure 2: Storm Surge Heights (Peak)



- al082008\_ofcl\_water
-  Less than 1m
  -  1m - 2m
  -  2m-3m
  -  3m-4m
  -  4m-5m
  -  5m-6m
  -  Over 7m



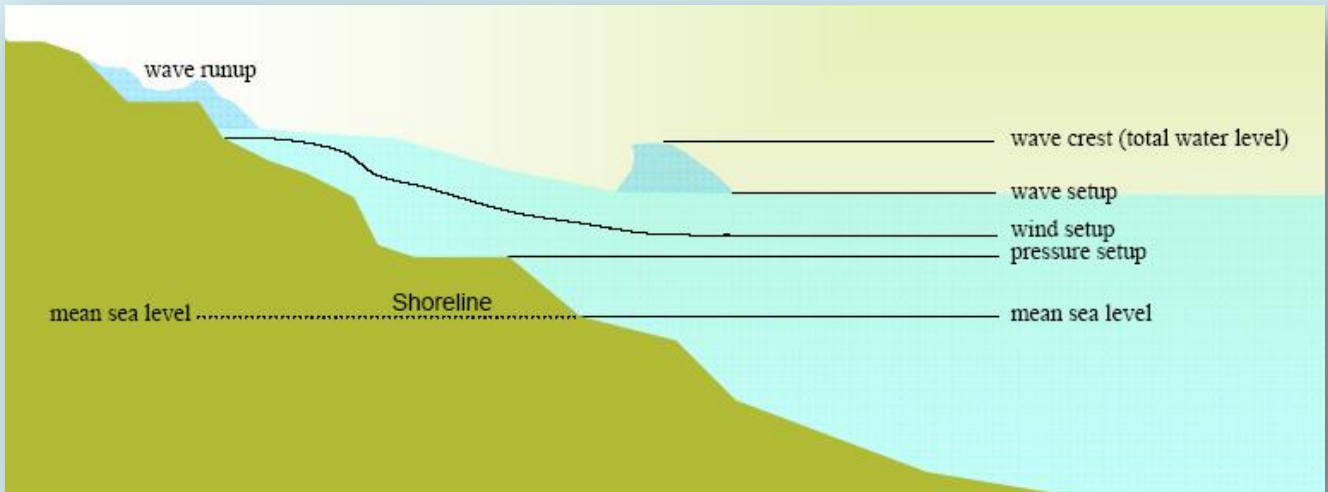
Figure 3: Wave Heights (Peak)



**Q. What are the definitions of the various TAOS-RTFS hazards?**

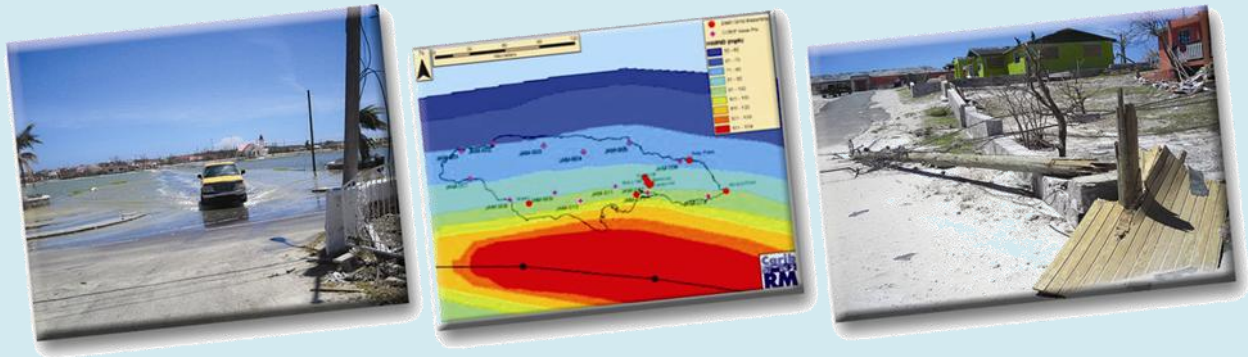
**A. The TAOS RTFS definitions include the following:**

- **Wind speed:** two-minute average wind speed at 10m above terrain. These wind speed estimates are compatible with the Automated Surface Observing System (ASOS).
- **Wave height:** measured from crest to trough.
- **Storm surge:** elevation above mean sea level or terrain height. Surge height includes astronomical tides, wind setup, pressure setup and wave setup, but not wave runup (see diagram below).



**Q. Is the RTFS relevant to earthquakes?**

**A.** No. The RTFS is only relevant to tropical cyclones as it uses internationally-accepted forecast products from NHC. No such forecasts are possible for earthquakes as there are no proven, reliable pre-cursor signals for earthquakes.



**Q. When is the RTFS made available?**

**A.** The RTFS is made available at the beginning of every Atlantic Hurricane Season which starts on 1 June or when a storm becomes active within the designated CCRIF monitoring region.

**Q. How often is the RTFS feed updated?**

- A. As soon as the latest storm fix (data on location, track, intensity) is received, KAC starts modelling the storm to produce hazard footprints and impact estimates. The RTFS feed is then updated by KAC with each storm advisory issued by the National Hurricane Center (NHC), which is generally every 6 hours. Modelling results are available within 30 minutes of latest NHC forecast.

**Q. How are the TAOS RTFS data made available?**

- A. The RTFS data or results are provided in kml format, which can be displayed in Google Earth. This allows the user to display the map layers over the Google Earth background, which puts the hazard and impact data layers in an easy to visualise local geographic context.

For best performance, users should install the latest version of Google Earth. Google Earth and tutorials on its use are available for free at [earth.google.com](http://earth.google.com).

**Q. How are the storm hazard and basic impact data provided?**

**A.** Results are provided in a kml format which can be displayed in Google Earth, which allows for easy visualisation within a local geographic context. The map layers containing the hazard and impact data are made available in hazard and impact forecast files which are organised within three folders, each of which contains multiple map layers showing:

- Storm current position [folder name: taos\_carib\_ofcl\_storms\_kml] – this folder contains three subfolders for each storm. These are:
  1. Official track — the storm track as forecasted by the NHC. Storm information, such as the storm name, date and time, wind speed and central pressure are made available;
  2. Past positions — locations occupied by the storm centre for each of the past forecast times; and
  3. Forecast positions — future positions as forecasted. For each position forecast details include the date and time of the forecast, the expected storm wind speed, and the hours out from current location.
  
- Storm hazard estimates [folder name: taos\_carib\_ofcl\_hazards\_kml] – this folder contains five subfolders for each active storm. These are:



1. Wind speed — maximum wind speed, grouped by Saffir-Simpson category;
2. Storm surge — maximum storm surge height; over water, this height is measured above Mean Sea Level and over land it is measured above the terrain height;
3. Wave height — maximum wave height, measured crest-to-trough;
4. Total rainfall — cumulative rainfall over the duration of the storm forecast, since the first forecast for this storm; and
5. Impact of wind forces — qualitative wind effects, based on the Beaufort scale.

It is important to note that the maximum hazard intensities shown in one map layer do not occur simultaneously; they are attained at different times during the progress of the storm along the track.

- Territory impact estimates [folder name: taos\_carib\_ofcl\_impacts\_kml] - this folder contains two subfolders for each active storm. These are
  1. Impact on port and airport facilities — operations downtime in number of days, and potential damage level; and
  2. Impact on population — tabular estimates of the population affected by the different levels of wind hazard, and by flooding. A sample population impact report is shown below.

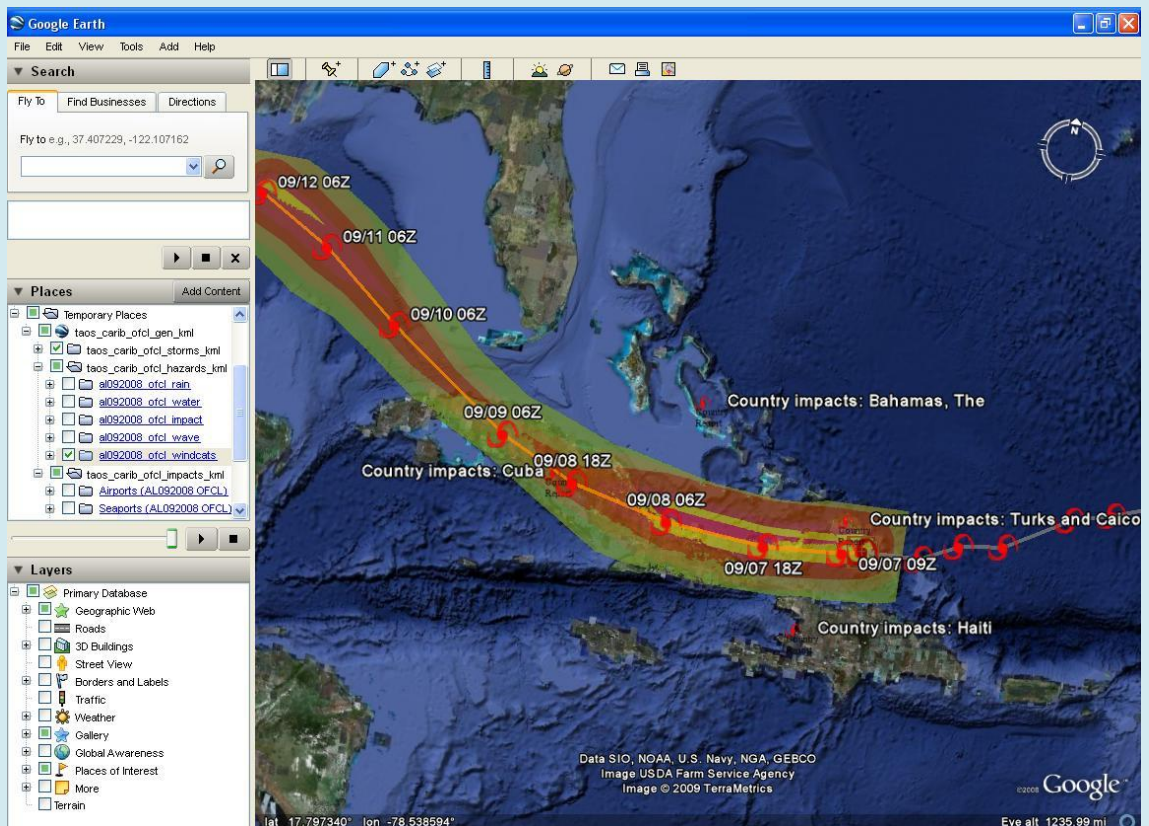


Hazard and impact information is provided for all active storms in the Caribbean for which official forecasts are disseminated by the NHC. Names for individual map layers and folders within these three primary folders identify the map feature and the storm responsible for the hazards and impacts shown.

KAC uses the unique ID assigned through the Automated Tropical Cyclone Forecasting (ATCF) system to identify each storm. The ATCFID is in the form 'ALxyyyy', where 'AL' denotes the Atlantic basin, 'xx' is the sequential number of the storm in the season, and yyyy the current year.

Should more than one storm be active in the Caribbean at one time, the separate storm-specific layers allow hazard and impact information for each storm to be displayed separately or simultaneously in Google Earth.

The image below shows selected results from a sample storm, including the qualitative wind impacts and the current and forecast positions of the storm.



**Q. How can countries use Google Earth to view TAOS RTFS outputs?**

**A. The Google Earth platform enables users to display hazard and impact map layers over the Google Earth platform in an easy-to-visualise local geographic context which optimises the viewing of the TAOS RTFS results.**

Tutorials and reference information for Google Earth are available on the Google Earth online site. For best performance users should install the latest version of Google Earth available at [earth.google.com](http://earth.google.com).

**Q. What are Google Earth System Requirements that are required to enable optimal viewing and use of the RTFS?**

A. The table below lists the minimum and recommended system configurations for running Google Earth [ver 4.3] for computer systems running MS Windows. Information on system requirements for other operating systems and video card support is available on [earth.google.com](http://earth.google.com)

	Minimum	Recommended
Operating system	Windows 2000, Windows XP, or Windows Vista	Windows XP or Windows Vista
CPU	Pentium 3, 500Mhz	Pentium 4 2.4GHz+ or AMD 2400xp+
System memory (RAM)	256MB	512MB
Hard disk	400MB free space	2GB free space
Network speed	128 Kbits/sec	768 Kbits/sec
Graphics card	3D-capable with 16MB of VRAM	3D-capable with 32MB of VRAM
Screen	1024x768, "16-bit High Color" - DirectX 9 (to run in Direct X mode)	1280x1024, "32-bit True Color"

[Source: Google Earth ver. 4.3 release notes, as of 15 Aug 2008]



## Q. How can users enable optimal viewing and use of the RTFS?

A. For optimal viewing of the TAOS RTFS outputs in Google Earth, the following recommendations should be observed. Users are strongly encouraged to practice these recommendations to become fluent in maneuvering in Google Earth.

- **Start with a clean slate.** When ready to view the storm file produced for the latest NHC forecast, make sure that you delete all old storm files that may still reside under “Temporary Places.” In case you want to keep information on a prior storm, save the original downloaded file in an appropriate directory on your hard drive or other storage medium.
- **Recognise the hierarchy in folders and subfolders, and proceed systematically.** Develop a routine for viewing the contents of a storm file, and follow that routine.
- **Only display one layer at a time.** While it is possible to view multiple polygon map layers covering the same area simultaneously, it can be difficult to interpret the results. Instead, we recommend viewing layers individually. To do this, select the ‘+’ sign next to the folder to view the folder contents, then select the check box next to the layer that you wish to view (with other layers turned off).
- **Complete viewing of one folder at a time.** When finished viewing the contents of a folder turn off the layers in the folder and close it by selecting the ‘+’ sign next to it, before proceeding to the next folder.

- **Select the “zoom” level that is most appropriate for viewing the selected layer.** Start by viewing wind fields, wave heights, and cumulative rainfall at the regional level, which allows one to view the entire hazard footprint. Zoom in as required to view more country-specific detail. The storm surge is more concentrated around the coastlines, and may require more zooming-in to observe the different surge height levels.
- **Look at all levels closely.** When the area affected by certain hazard level is not easily visible toggle the particular level within the layer on and off by checking the box next to it, to discover where that level applies.
- **Capture what is seen on the screen.** A user may want to capture a particular hazard or impact view for wider dissemination to government agencies, news media, or populations at risk. This can be in the form of a briefing paper, an attachment to an email, or a simple hand-out. There are two ways to capture what is shown on the screen:
  1. Use “Printscreen” to save an image of the entire screen (including the legend in the left hand column). This can then be pasted in a document and printed, or inserted in an email.
  2. Use “File – Save – Save Image” on the Google Earth menu to save the screen as an image in jpeg format (this only saves the map view, not the legend).

**Q. Are there any training and other capacity building exercises that are available to enhance the understanding and use of the RTFS?**

**A.** CCRIF provides a sub-licence to the Caribbean Institute for Meteorology and Hydrology (CIMH) to access the TAOS RTFS and use it for training and support purposes. One of the goals of this initiative is to enhance the understanding and use of the RTFS within the region and this is supported by a number of activities undertaken by CIMH as follows:

1. Briefing the CDEMA country preparedness team(s) each time a storm is approaching one or more of the CDEMA member states;
2. Using TAOS RTFS as training material in its teaching programme for meteorology students;
3. Organising familiarisation and training workshops for Caribbean meteorological officers and disaster management agencies prior to the start of the hurricane season; and
4. Providing technical support to TAOS RTFS users upon request.

Persons who are interested in any of these initiatives can contact the CIMH directly ([www.cimh.edu.bb](http://www.cimh.edu.bb)) or CCRIF ([www.ccrif.org](http://www.ccrif.org)) for further details.

**Q. What support is provided to countries who subscribe to the RTFS?**

**A.** Apart from encouraging countries to participate in the training workshops which are held by the CIMH on the use of the RTFS, countries are also provided with a User's Manual which can be found on the CCRIF website at [www.ccrif.org](http://www.ccrif.org). CIMH also provides technical advice on interpretation of hazard information from TAOS RTFS as well as conducting the activities mentioned above.



**Q. How will users be able to access the RTFS product?**

**A.** Each year, prior to the start of the Atlantic Hurricane Season on June 1, CCRIF invites each of its member countries to designate a number of national agencies to receive TAOS RTFS outputs. CCRIF encourages the inclusion of personnel from the national meteorological organisations and national disaster management agencies for access to the RTFS. Each designated agency contact is issued with a username and password for access to the secure section of the CCRIF website ([www.ccrif.org](http://www.ccrif.org)) by which the RTFS can be accessed. Automated emails are also sent by CCRIF to designated contacts each time new output is available for their country. Output files are available as attachment to email, and/or for download from the CCRIF secure website. In addition to this, the TAOS RTFS is made available to CDEMA through the CIMH on behalf of CCRIF. The five steps required to access the RTFS on the CCRIF website are presented in the figures below.



**Step 1**

Use the login page to log in with the username and password you were given.

The screenshot shows the 'USER ACCOUNT' login page. At the top, there is a navigation menu with links: Home, About Us, News, FAQ, Publications, Programmes, Partnerships & Projects, Calendar, Member Countries, Multimedia, Member Zone, and Contact Us. Below the menu, the page title is 'Home » User account'. The main heading is 'USER ACCOUNT'. There are two buttons: 'Log in' and 'Request new password'. A search box with a 'Search' button is located on the right. The 'Username: \*' field is followed by the instruction 'Enter your The Caribbean Catastrophe Risk Insurance Facility username.' The 'Password: \*' field is followed by the instruction 'Enter the password that accompanies your username.' A 'Log in' button is at the bottom left. The footer contains contact information for Caribbean Risk Managers Limited and copyright information for CCRIF.

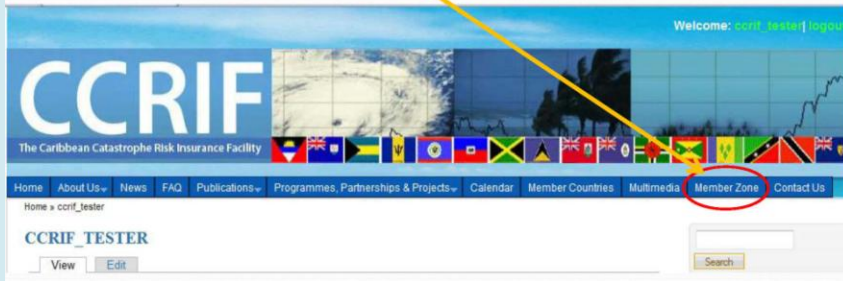
Step 2

The user profile page will appear as shown on the left.

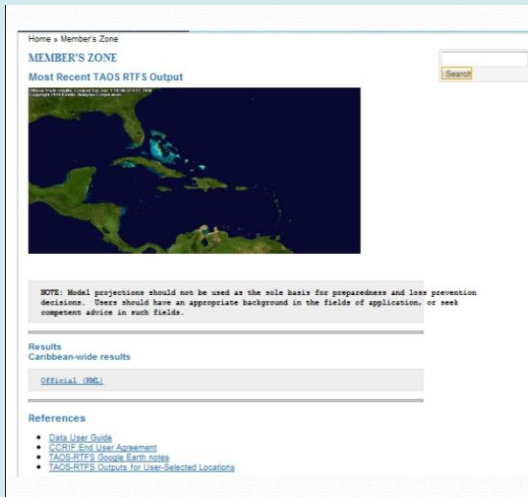
The screenshot shows the user profile page for 'CCRIF\_TESTER'. The navigation menu is the same as in the previous screenshot. The page title is 'Home » ccrif\_tester'. The main heading is 'CCRIF\_TESTER'. There are two buttons: 'View' and 'Edit'. Below this, there is a 'Newsletters' section with a 'Manage my subscriptions' link. The 'Current subscriptions' are listed as 'None'. The 'Personal Information' section shows 'Country: Jamaica', 'First Name: CCRIF', and 'Last Name: Testing Account'. The 'History' section shows 'Member for: 20 hours 28 min'. The 'Blog' section has a link to 'View recent blog entries'.

Step 3

Click the **Member Zone** menu option to access the RTFS content.



**Step 4**



The page shows the “Official Forecast” and the “Caribbean Wide results” kml file.

The Reference materials are also available.

**Step 5**



**Q. Is my access to the RTFS automatic from year to year?**

CCRIF member countries are provided with the TAOS RTFS at no cost. Each year members are asked to reapply for access to the RTFS, after which they are provided with user names and passwords. The provision of this tool to member countries is part of the CCRIF's contribution to enhanced disaster management within member states. Countries which are non-members of the CCRIF may contact KAC ([www.kinanco.com](http://www.kinanco.com)) for further details regarding access to the tool.

**Q. Who are the main users of the RTFS product?**

**A.** The main users of the RTFS product include disaster and emergency managers and meteorological officers. Essentially, the TAOS RTFS outputs are for the exclusive use by governmental and non-governmental agencies involved in hurricane risk management. Outputs can be used to produce reports, maps, and other guidance documents in support of emergency management. TAOS RTFS files cannot be commercialised by the users.

*Emergency managers can use the RTFS information as triggers for preparedness and alert procedures.*

*For example, shelter management can be informed of when the maximum wind speed is expected at that location. The decision to evacuate a low-lying area can be informed by the maximum storm surge height expected just off the coast at that location.*

**Q. How does the RTFS support countries in emergency preparedness and evacuation decisions?**

**A.** By providing advance knowledge of a hurricane's expected site-specific impacts, the RTFS can assist meteorological officers and disaster management coordinators to support effective preparedness and response, evacuation decision making, planning for pre-positioning of equipment and supplies, activation of mutual assistance arrangements and asset management as well as for contingency planning to secure critical infrastructure and operations.



**Q. Can policy makers and cabinet ministers make use of the RTFS and what kinds of information can they use?**

**A. Yes. In fact the RTFS information can:**

- Assist with contingency planning by providing a preview of what might happen if a given storm continues along a projected path, and activate appropriate contingency plans based on this insight;
- Assist with shelter management by identifying impact areas and shelter locations to support shelter allocation decisions;
- Identify potential damage to shelters, thereby aiding decision makers to plan for alternatives; and
- Assist with determining emergency interventions by identifying areas where populations are at risk so that decision makers can issue warnings and plan for assistance.

The information provided through the RTFS is therefore useful in informing decision making at such critical times to ensure public safety.

**Q. Can member countries select locations to be incorporated in the product based on their own needs?**

**A. Yes. Member countries have the option to choose up to five locations for which they would want to receive the maximum hazard values.**

**Q. How frequently could the RTFS be used during the course of a storm?**

**A. As soon as the latest storm fix (data on location, track, intensity) is received, KAC starts modelling the storm to produce hazard footprints and impact estimates. The RTFS feed is then updated by KAC with each storm advisory issued by the National Hurricane Center (NHC), which is generally every 6 hours. Modelling results are available within 30 minutes of the latest NHC forecast.**

**Users can then access this information as frequently as they wish to.**



**Q. What is the relationship between the RTFS and CCRIF hurricane policies?**

**A. There is no direct relationship between the RTFS and CCRIF hurricane policies, apart from the fact that they are both built on the same modelling platform.**

A benefit provided through this shared platform is the fact that the hazard footprints from the post-event storm run (an RTFS run using the FINAL track after a storm has run its course) will provide a good illustration of the hazard levels that were used in the Hazard Loss Estimation Model which underpins policies and estimates parametric losses. It is important to note that in the RTFS forecast mode there will always be some differences between the forecast track and the FINAL track used in the loss estimation and the post-event storm run.

**Q. Can the use of the RTFS provide countries with information on whether their CCRIF policy is triggered during the passage of a storm?**

**A.** To some extent the RTFS can provide countries with an idea of whether their CCRIF policies have been triggered or not triggered, as the outputs utilised in the Hazard and Loss Estimation Model underpinning policies is consistent with the hazard outputs of the RTFS. It is however important to point out that the triggering of a policy is not only dependent on hazard information (such as shown through the RTFS) but is also contingent on the attachment point of the policy, which is a value of dollar loss, for which there is not direct representation in the RTFS.

**Q. Is there a relationship between the RTFS and CCRIF's second generation loss model?**

**A.** Both the RTFS and CCRIF's second generation loss model are built on the same Hazard Loss Modelling Platform. The CCRIF second generation model utilises the hazard outputs visualised through the RTFS and turns them into losses (once the final storm track is established), which are then used to inform the CCRIF policies.



**Q. Will the RTFS be linked to CCRIF's new Excess Rainfall Product?**

**A.** The RTFS will not be linked to the CCRIF's new excess rainfall product for the 2010-2011 policy year. CCRIF is currently working on making rainfall maps in kml format available all year round. It is anticipated that the CIMH will undertake the underlying hazard modelling for the excess rainfall product which will be linked to the recently launched regional rainfall model.

The Hazard Loss Estimation Model used to underpin the RTFS and the CCRIF second generation model is a stand-alone system.



**Q. What is the role of the Caribbean Institute for Meteorology and Hydrology in the use of the RTFS?**

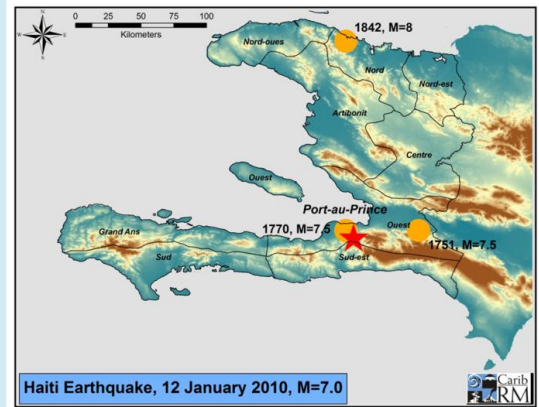
**A. CCRIF has granted the Caribbean Institute for Meteorology and Hydrology (CIMH) a sub-licence to access TAOS RTFS and use it for training and support purposes. The terms of this sub-licence include:**

- Briefing the CDEMA country preparedness team(s) each time a storm is approaching one or more of the CDEMA member states;
- Using TAOS RTFS as training material in its teaching programme for meteorology students;
- Organising familiarisation and training workshops for Caribbean meteorological officers and disaster management agencies prior to the start of the hurricane season; and
- Providing technical support to TAOS RTFS users upon request

KAC provides the necessary support to CIMH officers involved in the above activities, and maintains a website with online reference and technical support materials, accessible to the license holder and all sub-license holders. Matters related to the technical aspects of product transmission and display will be handled via direct communication between KAC and the license/sub-licence holders.

**Q. Is there a special RTFS product for Haiti, given its current situation?**

**A.** As a result of the earthquake which occurred in Haiti on 12 January 2010, the vulnerabilities of the Haitian population to natural hazards have been especially heightened as a significant amount of the population remains displaced and without shelter. In light of these heightened exposures and risks, CCRIF has enhanced the site-specific features of the RTFS for Haiti in order to support the ongoing management of displaced populations.



CCRIF is currently working with the Civil Protection Directorate in the Ministry of the Interior and the Meteorological Centre in Haiti along with international relief agencies to provide them with relevant and actionable information for management of refugee tent-camps, safekeeping of their occupants, and for general displaced population planning purposes. For critical locations, such as aid operation centers, refugee camps and transportation hubs, TAOS RTFS will produce site-specific estimates of expected wind speed and coastal flooding heights during the approach of a storm. Information will be made available in various formats optimised for the required applications.

# Notes on My Use of the RTFS

---



