



USAID
FROM THE AMERICAN PEOPLE



El Sistema guía para crecidas repentinas (FFGS)

Diseño, funciones y productos

Konstantine P. Georgakakos, Sc.D.

HYDROLOGIC RESEARCH CENTER

22 Mayo 2018

IMAGINE A UN PRONOSTICADOR DE PANAMÁ A LA 1:00PM LST 21 NOVEMBER 2015 (Sábado)

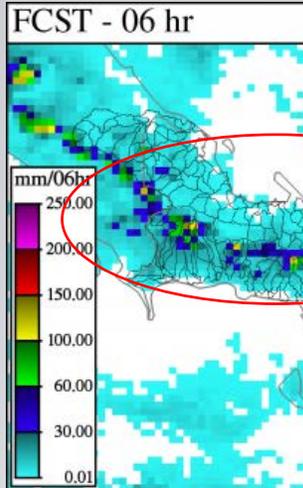
Hora en Panama = UTC – 5 horas

Ha estado lloviendo en el oeste de Panamá

¿Cuál es el pronóstico de lluvia?
El modelo WRF del FFGS muestra:

¿Cuál es la saturación actual del terreno?
Proporción de saturación de la capa superior del suelo del FFGS

¿Qué cuencas pequeñas están en riesgo?
El índice de amenaza por crecida repentina muestra:



Home » News » Panama » 12 homes affected in Boquete floods

12 homes affected in Boquete floods

Posted on November 22, 2015 in Panama

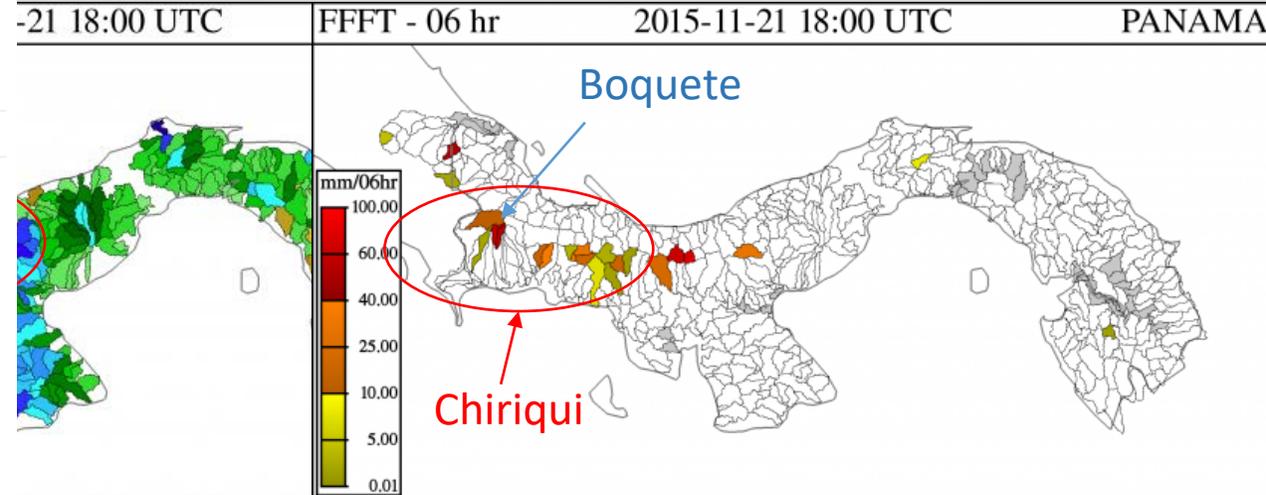
HEAVY DOWNPOURS throughout the weekend led to flooding and land slides in Chiriqui and Bocas Del Toro with at least 12 homes affected in the district of Boquete.



Share:    

Post Views: 562

The Joint Task Force (FTC), led by the National Civil Protection System (Sinaproc), said the torrential rain has wreaked havoc in several localities in western Panama, near the border with Costa Rica.



CAFFG - Central America Flash Flood Guidance System

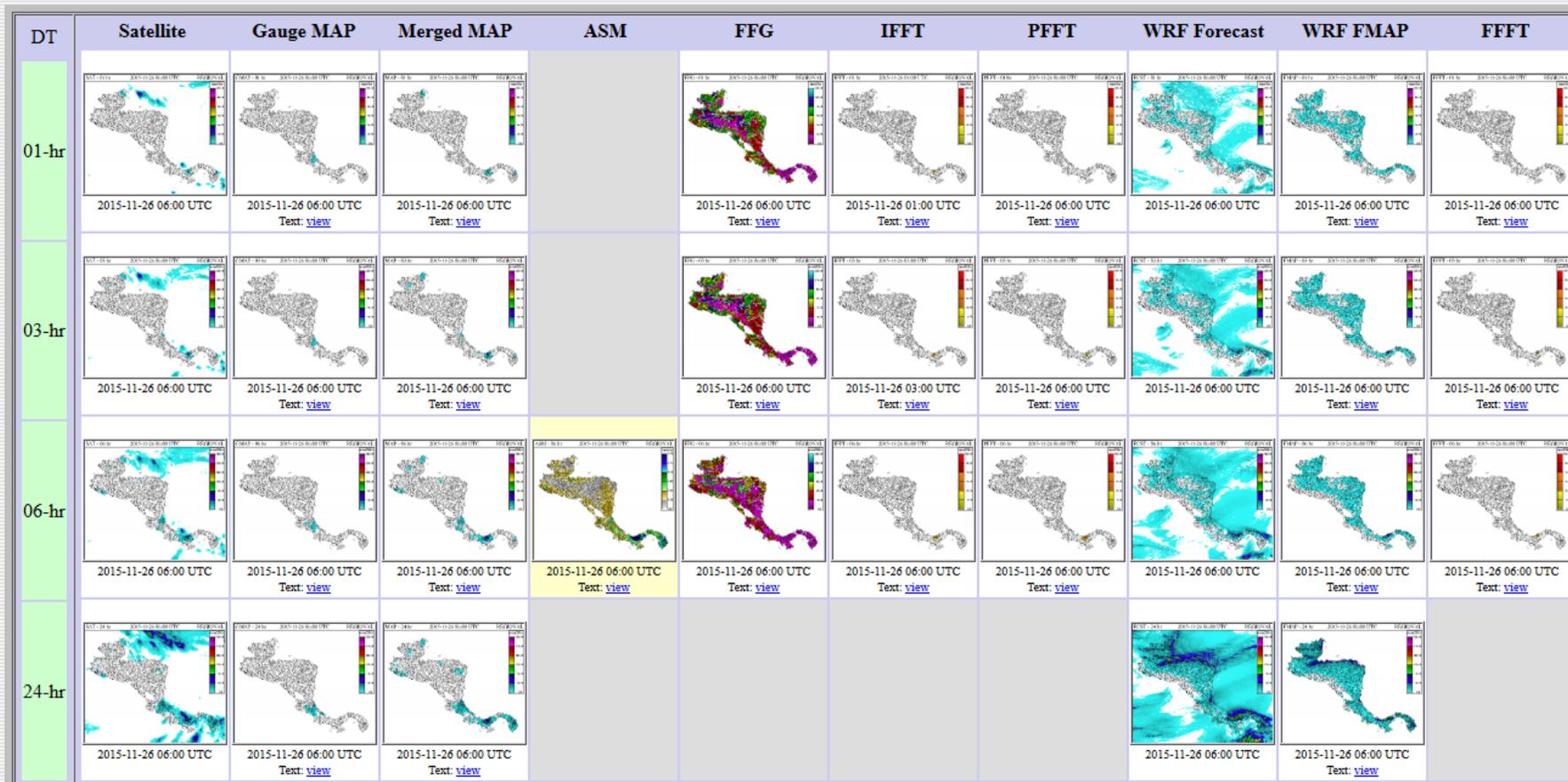
Current Date: 2016-02-01 06:12 UTC

Nav Date: 2015-11-26 06:00 UTC

Year: 2015 Month: 11 Day: 26 Hour: 06 REGION: REGIONAL OPTION: MEDIAN Submit

-1 Month -1 Day -6 Hours -1 Hour +1 Hour +6 Hours +1 Day +1 Month

Prev 6-hr Interval (00 UTC) Reset to Current Next 6-hr Interval (12 UTC)



Composite Product... [text](#), [DBF](#)

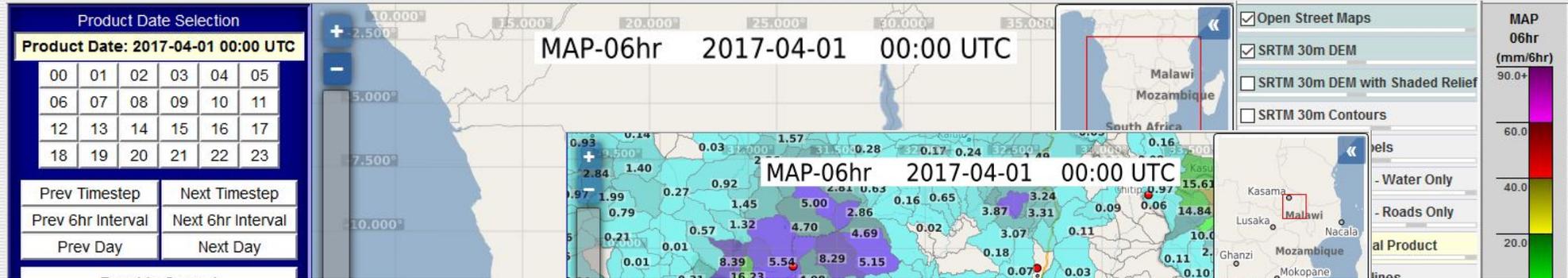
SFTP data transfer (requires SFTP Client): [EXPORTS/REGIONAL/2015/11/26](#)

Surfmet Gauge Observations at 2015-11-26 06:00 UTC

| Station Identifier | Station Name | 01-hr Accumulated Precipitation (mm) | 01-hr Average Temperature (C) | Region | Latitude | Longitude | Enable Precipitation Flag | Enable Temperature Flag |
|--------------------------|---------------------|--------------------------------------|-------------------------------|-----------|--------------|---------------|---------------------------|-------------------------|
| 0500072A | EL BOQUETE | No Report | No Report | NICARAGUA | 11.982222222 | -86.394722222 | Disabled | Disabled |
| 0500145C | EL ROSARIO | 0.00 | No Report | NICARAGUA | 11.846111111 | -86.166666667 | Enabled | Disabled |
| 050071BA | ALTAMIRA (ARROCERA) | No Report | No Report | NICARAGUA | 12.133055556 | -85.713611111 | Enabled | Disabled |
| 0500C234 | MATAGALPA | No Report | No Report | NICARAGUA | 12.947777778 | -85.871111111 | Disabled | Disabled |
| 0500E4D8 | SIUNA | 0.00 | No Report | NICARAGUA | 13.716111111 | -84.775 | Enabled | Disabled |
| 050146DA | SAN DIONISIO | No Report | No Report | NICARAGUA | 12.756388889 | -85.845833333 | Enabled | Disabled |

SARFFG - Southern Africa Region Flash Flood Guidance System

2017-08-31 17:22:47 UTC



SARFFG - Southern Africa Region Flash Flood Guidance System

2017-08-31 19:52:00 UTC

FFG-Gram plot demo - 1-hr, 3-hr, and 6-hr durations - Basin: 2002702501

Start: 2017-03-20 18:00 UTC End: 2017-04-04 18:00 UTC

Product Date: 2017-04-04 18:00 UTC

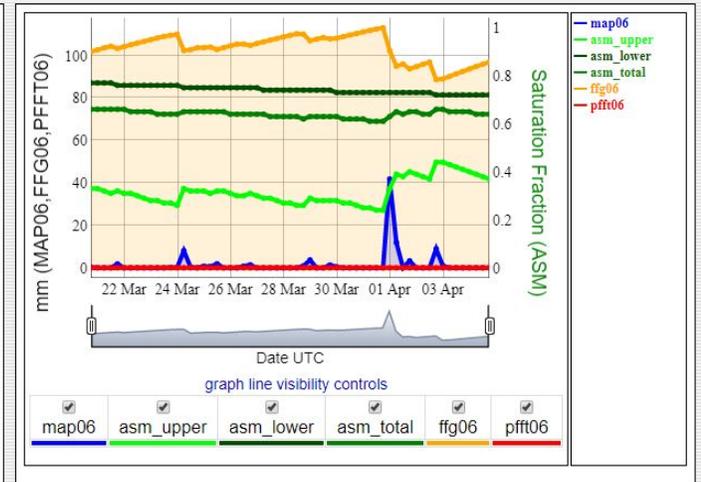
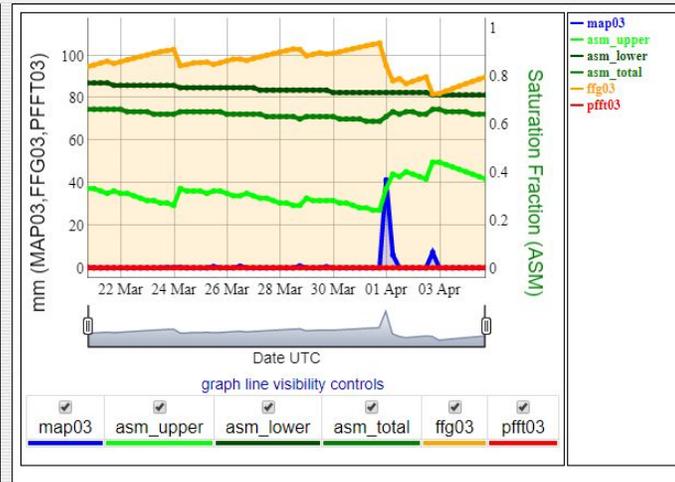
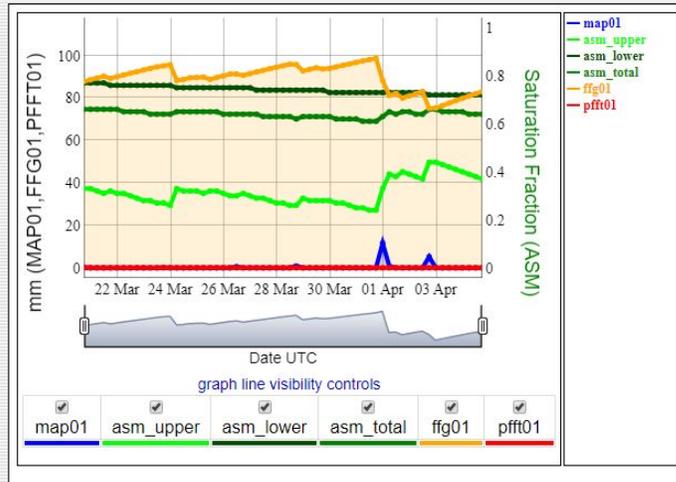
00 06 12 18

Prev 6hr Interval Next 6hr Interval

Prev Day Next Day

Reset to Current

Scope: 15 days

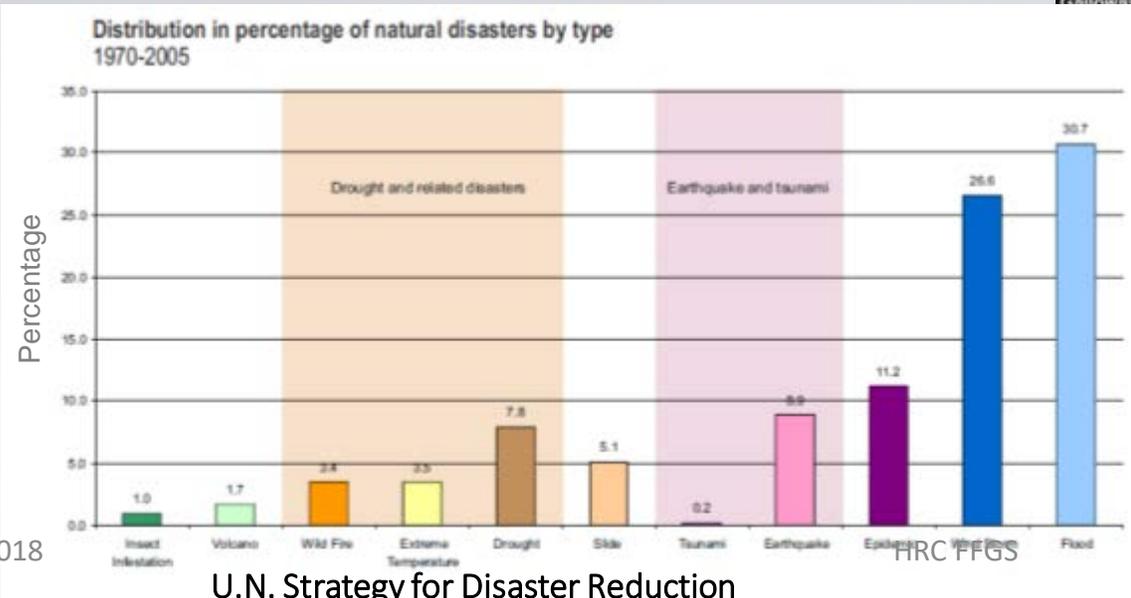


[Product Viewer](#) | [Product Comparison](#) | [Server Monitor Plots](#)

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Objetivo: Apoyar las alertas por crecidas repentinas

- Encuesta de la OMM (2008) en 139 países, 105 indicaron que las crecidas repentinas están dentro de las **dos** amenazas más importantes que requieren atención.
- 5,000 muertes alrededor del mundo a causa de crecidas repentinas
- 85% de las muertes relacionadas a inundaciones son por crecidas repentinas. Es la tasa de mortandad más alta (muertes/personas afectadas)



***No existe una
tendencia
discernible para la
reducción de
pérdidas!***

La necesidad

- No hay alertas por crecidas repentinas en áreas altamente pobladas del mundo
- Existe una falta de experticia local y de cooperación regional
- Poca información in-situ en regiones pequeñas
- Las estrategias para alertas por crecidas de grandes ríos no es efectiva para crecidas repentinas

Lytle Creek, CA
Octubre, 20, 2004
www.life.com



The Global Initiative for Flash Floods

The **Hydrologic Research Center (HRC)** has signed a joint Memorandum of Understanding to implement regional flash flood guidance systems worldwide with:

the United Nations – World Meteorological Organization (WMO)

the U.S. Agency for International Development/Office of U.S. Foreign Disaster Assistance (USAID/OFDA)

and the U.S. National Oceanic and Atmospheric Administration (NOAA).

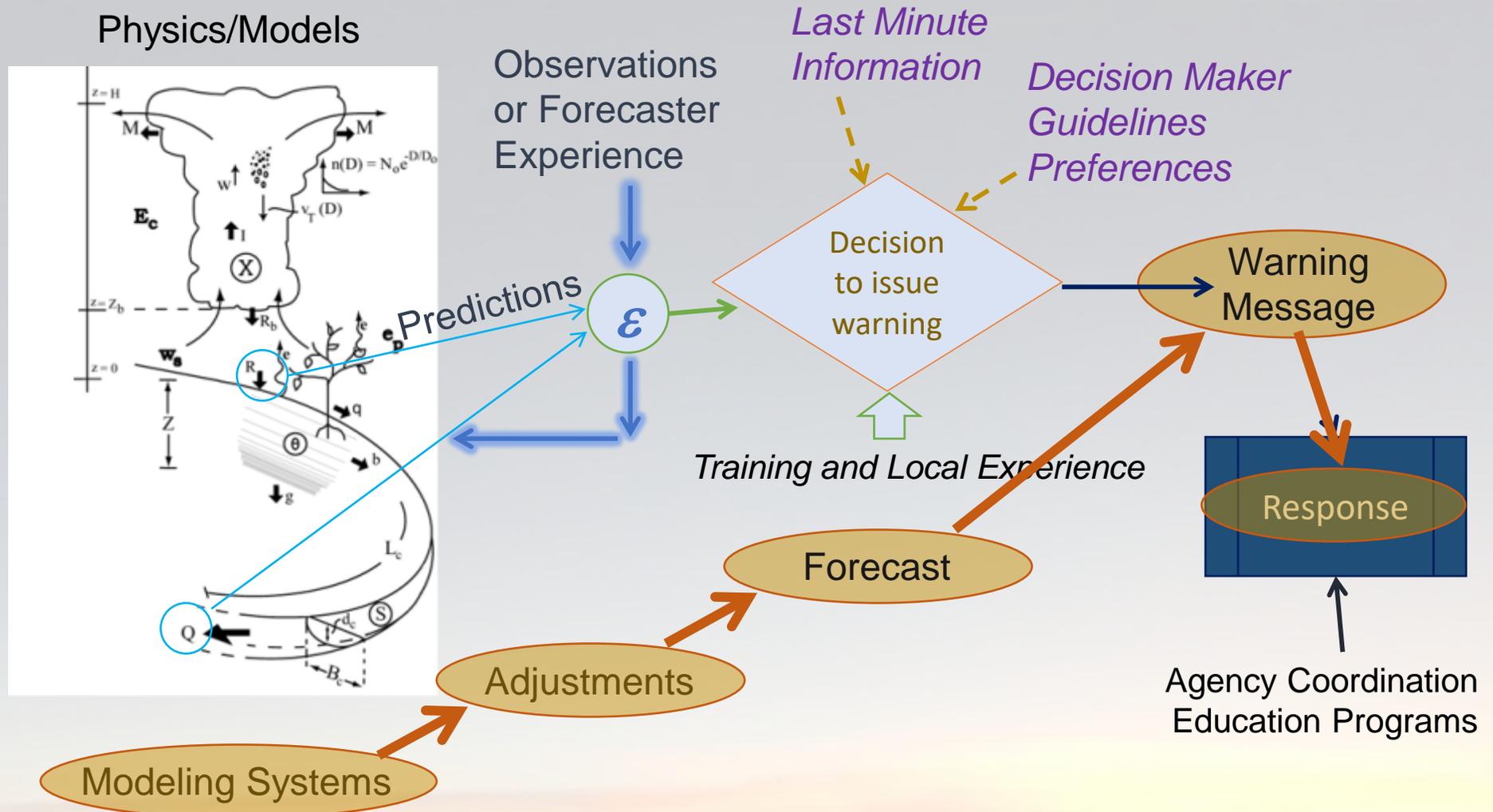
GOAL:

To support National Meteorological and Hydrological Services worldwide to:

1. provide reliable and effective flash-flood warnings and
2. improve disaster management efficiency

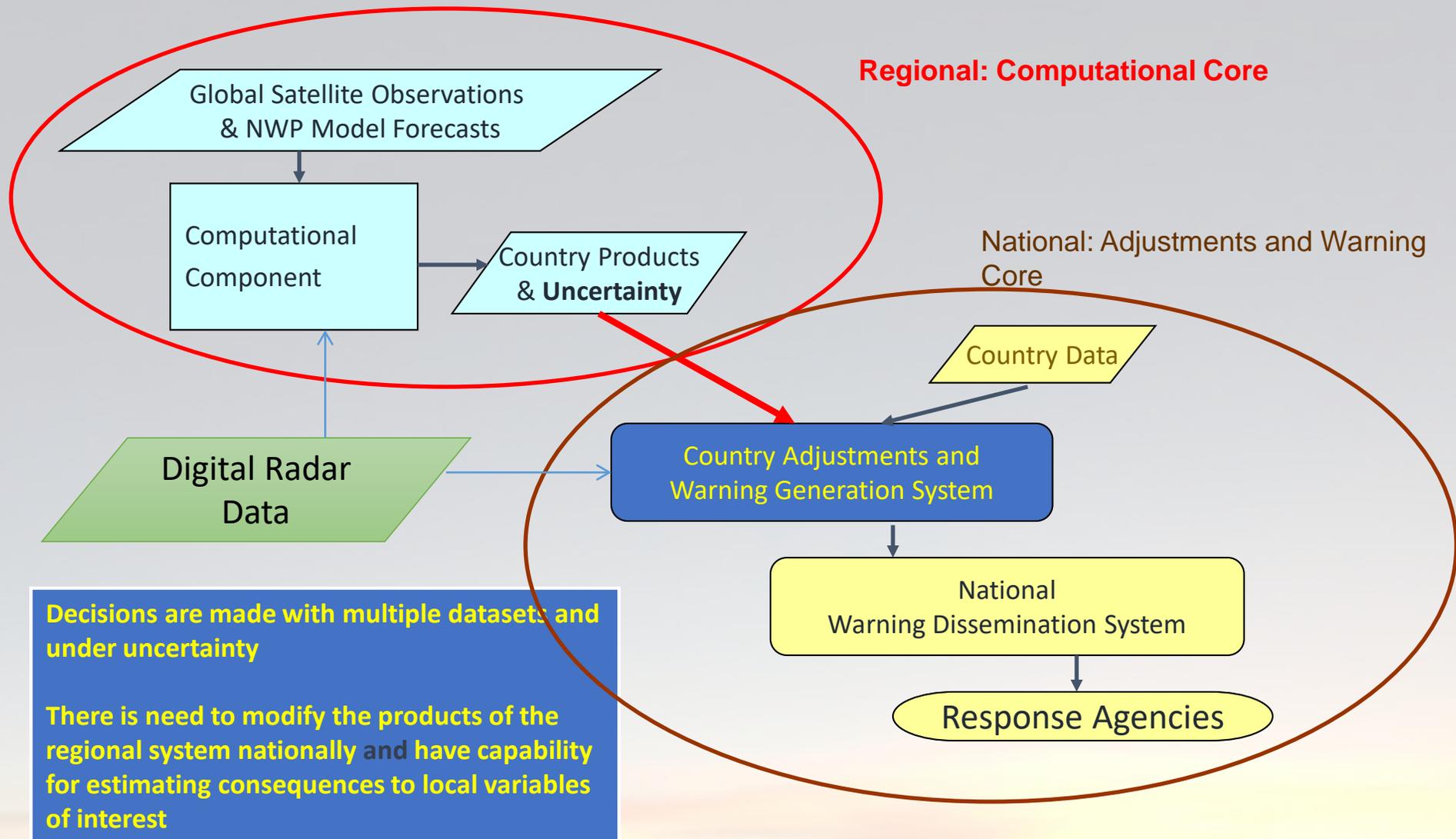


Integration of Data, Models and Human Experience Toward Saving Lives



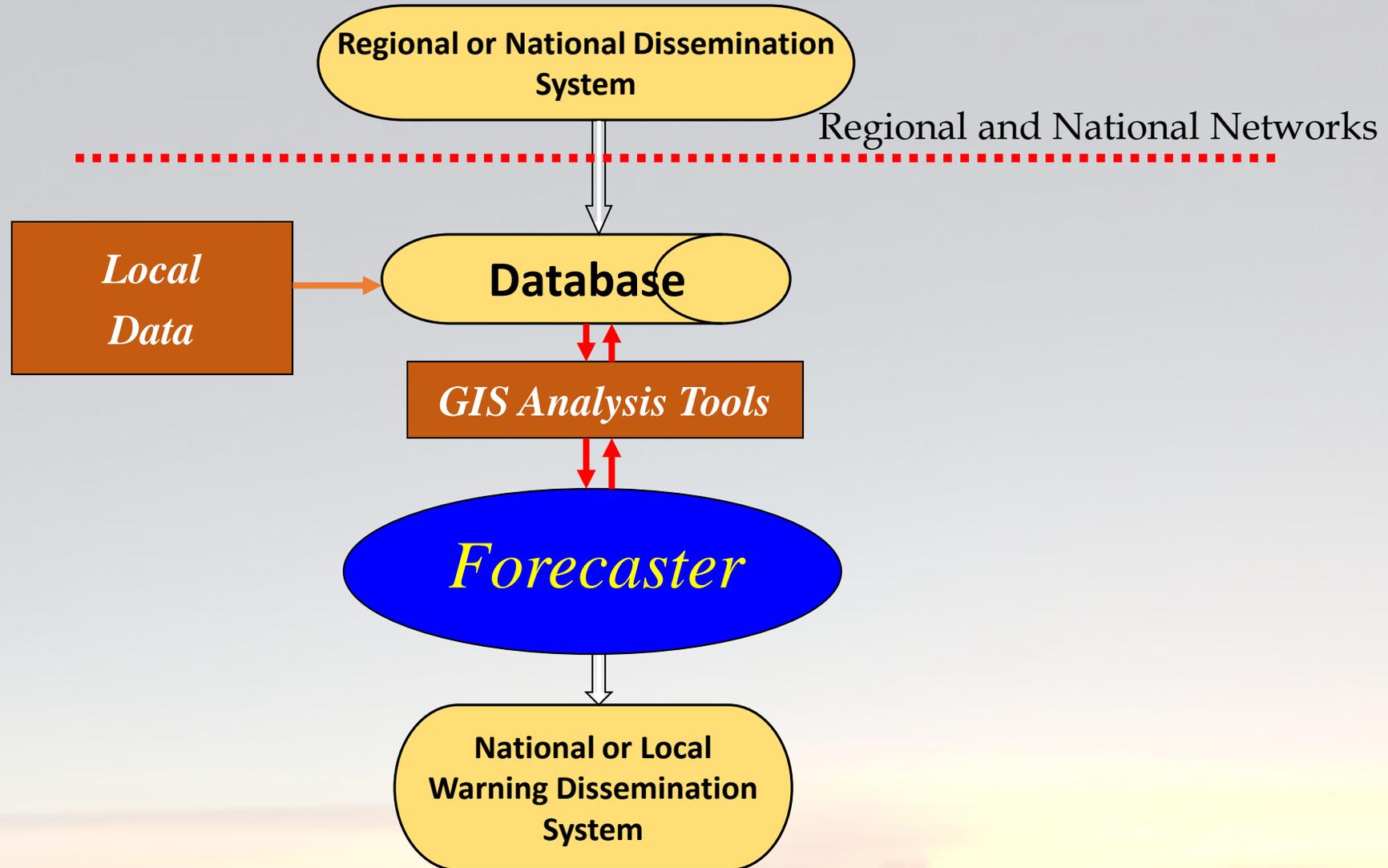
REGIONAL FFGS COMPONENTS

From Global Data and Regional Hydrometeorology to Country Data and Warnings

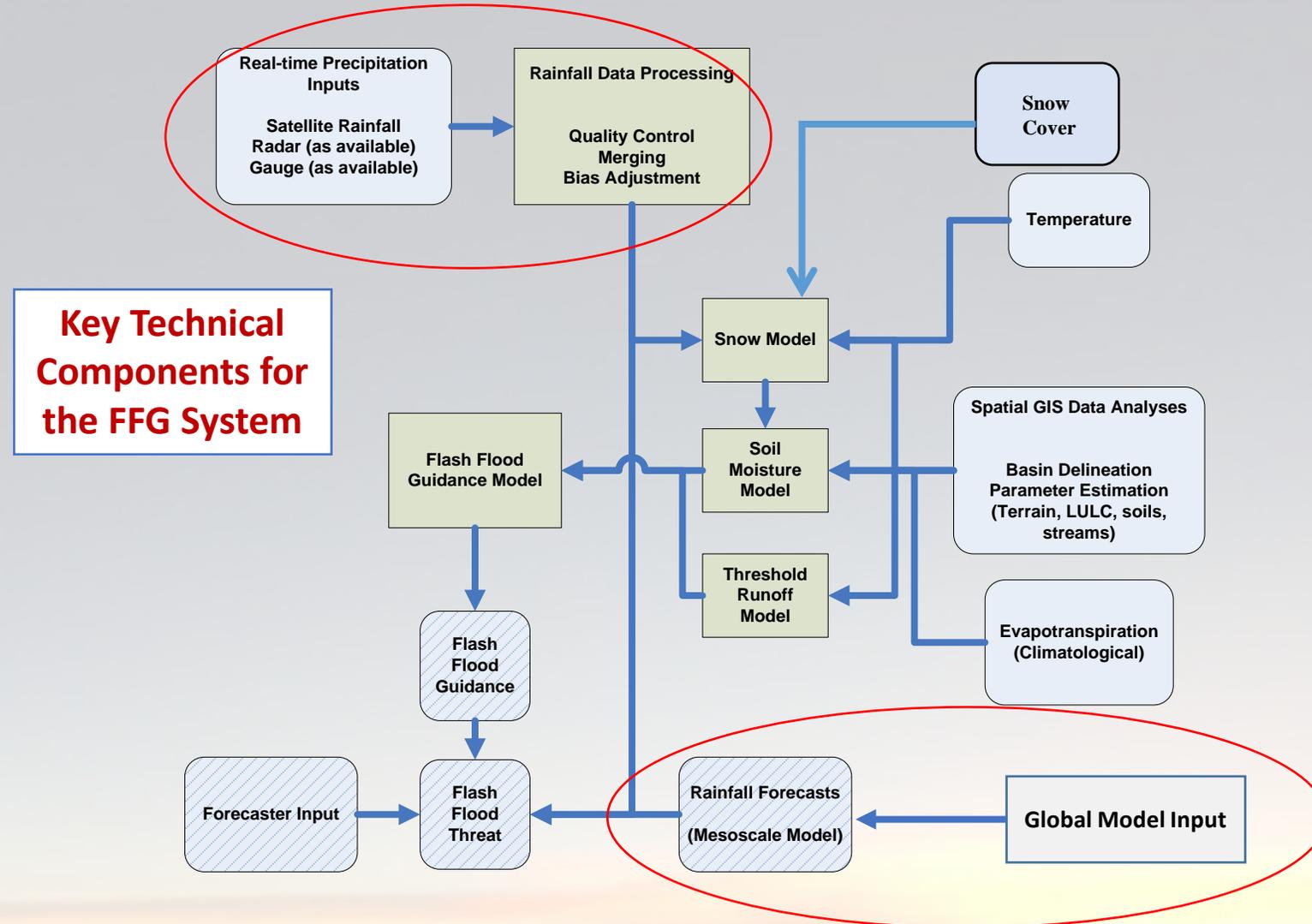


Serve more than 60 countries

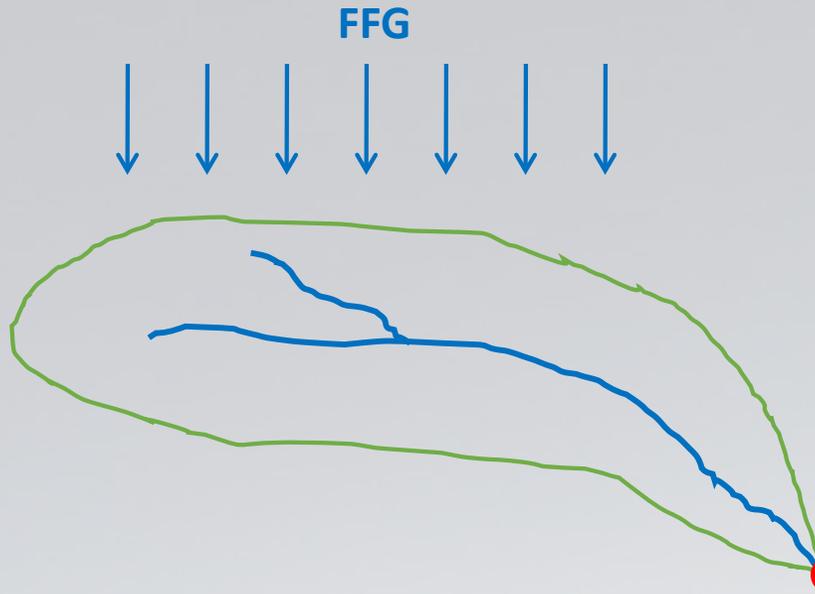
National System for Warnings



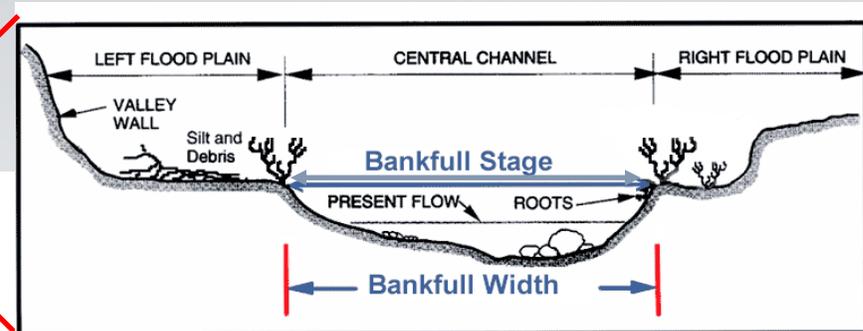
SOURCES OF INFORMATION FOR THE FFGS



El concepto de guía para crecidas repentinas

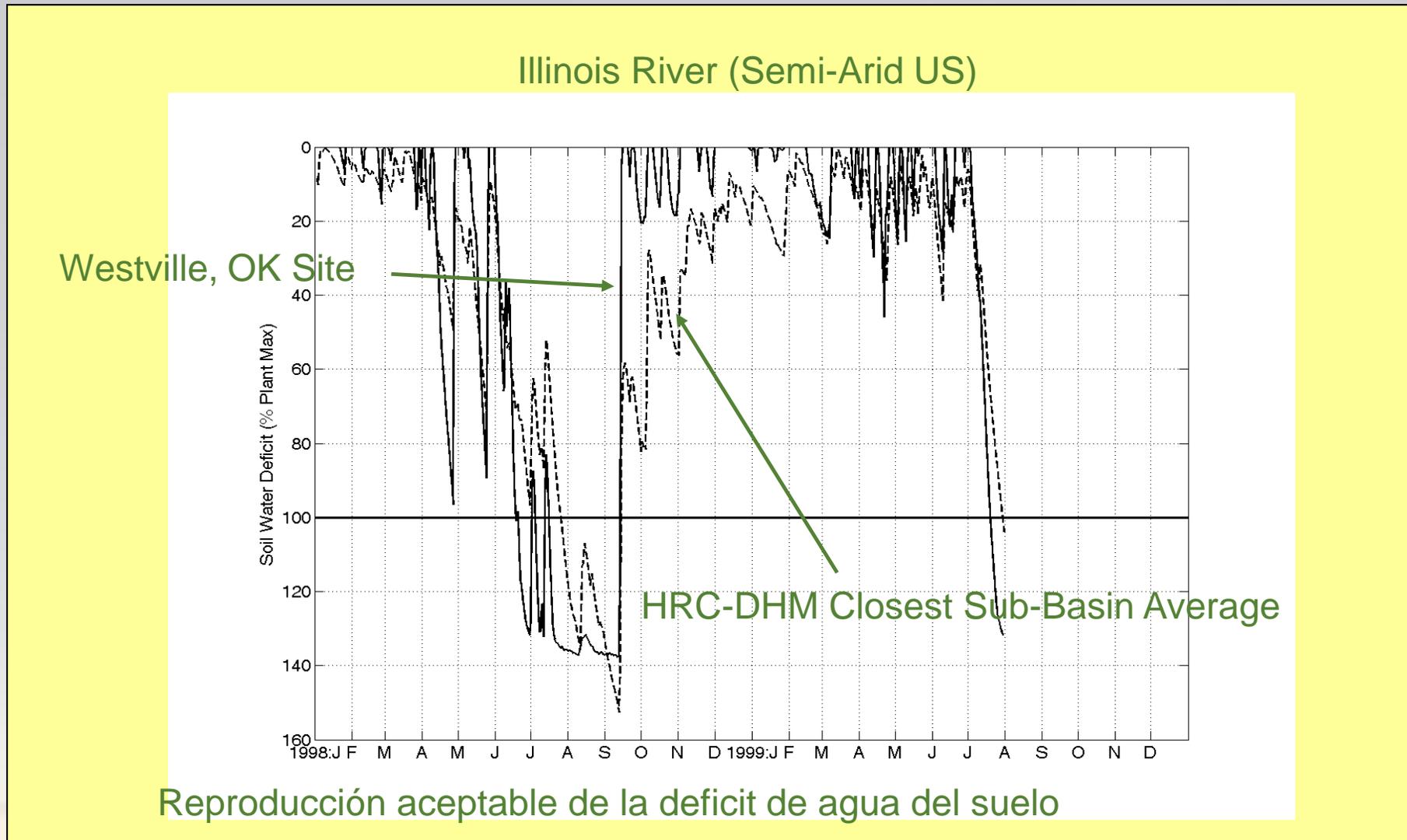


La preocupación principal es la predicción de la **ocurrencia** de crecida repentina, particularmente en regiones con datos escasos.



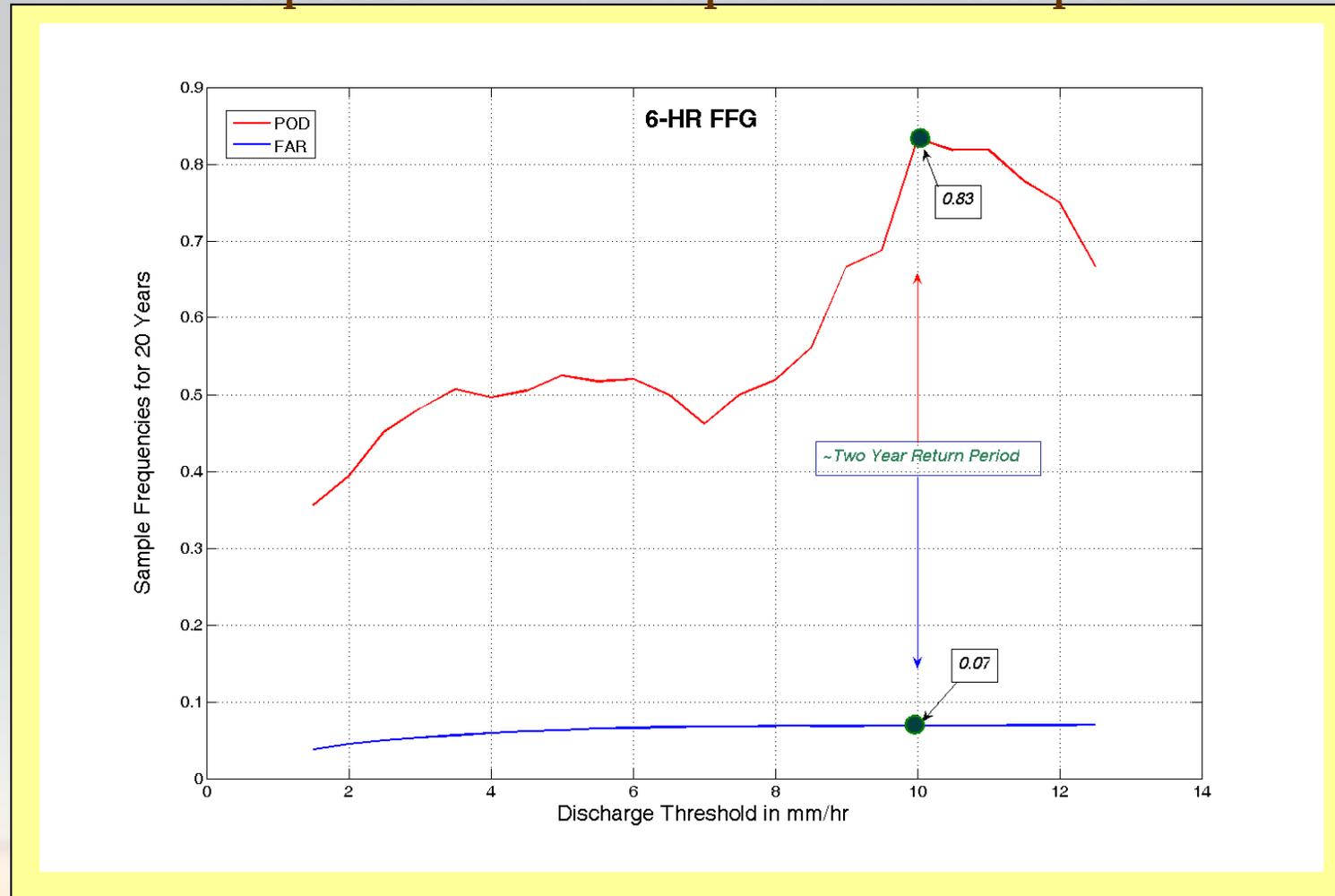
FFG: el volumen de **precipitación** distribuida uniformemente en el espacio, de una duración determinada (de 1 a 6 horas), sobre una determinada pequeña cuenca, **necesario para causar una inundación mínima** en la desembocadura de la cuenca.

Validación in-situ del deficit de agua de suelo



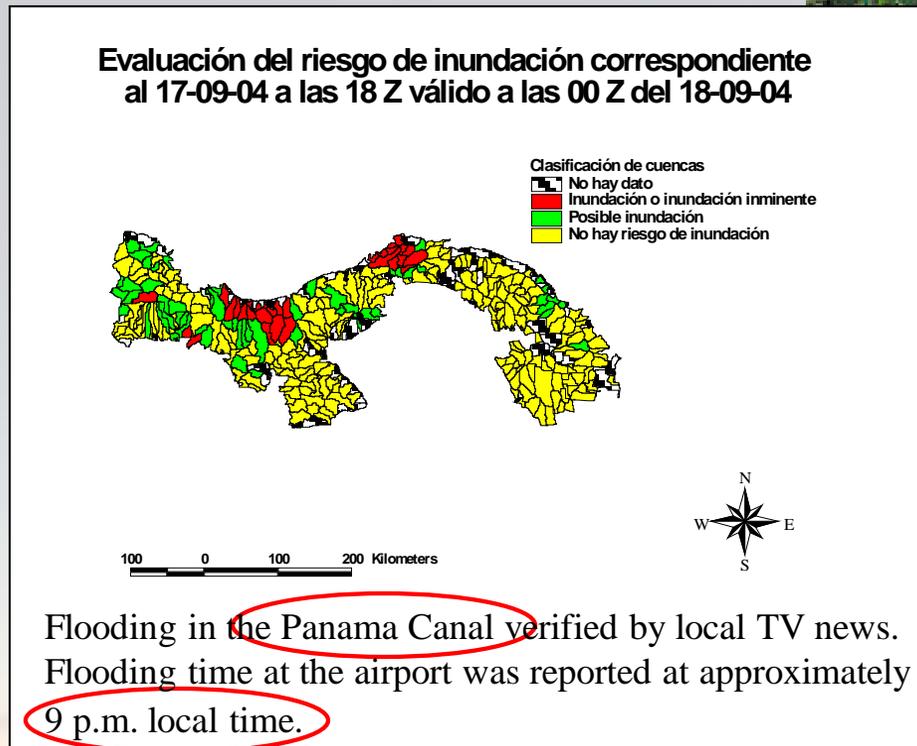
Validación de cuencas individuales: Rio Chagres, Panamá

Precipitación medida interpolada - límite superior



Validación del CAFFG

Los operadores del sistema de Costa Rica y El Salvador estuvieron en comunicación diaria con las agencias nacionales para recibir información de las comunidades referente a las inundaciones locales



Amenaza de crecida repentina (cada 3-Horas) (*ajustada*):
Acertada: 57% (63 – 100%)
Falsa: 30% (0 - 21%)
Fallada: 13% (0 - 16%)

Utilidad operacional de los sistemas con ajustes de los pronosticadores

- Los ajustes de pronosticadores capacitados han tenido un efecto benéfico en la confiabilidad de las alertas, especialmente en situaciones de sesgo local
(El uso de información en tiempo real del campo es muy útil; la cooperación en tiempo real entre hidrólogos y meteorólogos es muy útil para hacer ajustes efectivos)
- Una formación exhaustiva para los pronosticadores, respecto al comportamiento del modelo del sistema, es necesaria para su sustentabilidad
(en muchos casos, se requiere de varios meses de esfuerzo)
- Coordinación a priori y en tiempo real entre los pronosticadores y las agencias de respuesta es necesaria para tener una utilidad alta
- La experiencia local de los pronosticadores es invaluable para las alertas contra fenómenos hidrometeorológicos rápidos– Validación/bases de datos
(sesgos de modelos de mesoescala; sesgos de modelos hidrológicos; comportamiento local del suelo y condiciones de crecida)

Pasos para la implementación

Elección de representantes nacionales y sus técnicos designados

Obtención de datos (históricos y en tiempo real)

Inicio del programa de formación (cursos en línea)

Desarrollo de delineaciones (de cuenca) en alta resolución y revisión/corrección

Desarrollo del control de calidad de los datos de entrada y comprobación con datos históricos

Adaptación de los componentes del sistema regional (o nacional) y nacional (o local) de acuerdo al país de interés (basada en el establecimiento de protocolos operativos)

Sistema operativo en el HRC con una transmisión de datos segura y generación de productos para los países involucrados

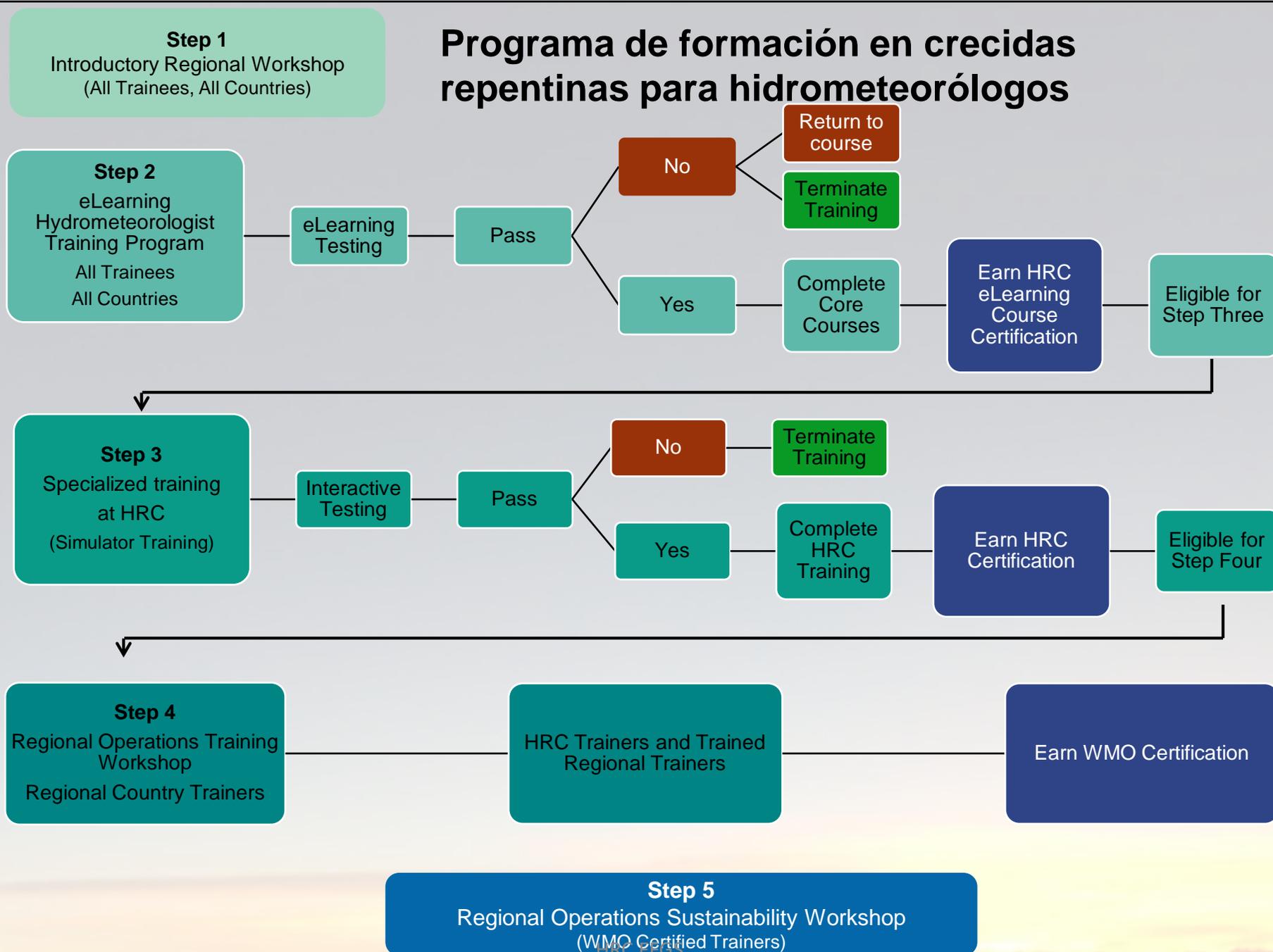
Formación práctica en el HRC (4 – 6 semanas) (simulador y estudio de casos en tiempo real)

Validación inicial y ajustes de pre-instalación

Implementación in-situ y formación en operaciones en TI (Certificación OMM)

Soporte para el mantenimiento anual y formación para asegurar la sustentabilidad del sistema

Programa de formación en crecidas repentinas para hidrometeorólogos



CURSOS EN LÍNEA

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Bases del SIG,
Productos de modelos de guía para
crecidas repentinas,
Telemetría y sistemas de alerta
temprana.

ELEMENTS OF METEOROLOGY

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+ Add

Edit

Delete

Courses

Course Material

Examination

Actions

Overview

Add | View

Add

FLASH FLOOD GUIDANCE PRODUCTS

Forum

+ Add

Edit

Delete

Courses

Course Material

Examination

Actions

ELEMENTS OF HYDROLOGY

Forum

+ Add

Edit

Delete

Simulador de entrenamiento

Product navigation date is now set to the event Begin Date.

GFFGS-SIM - Global Flash Flood Guidance System Simulator

[Return to Product Console](#)

Select Simulation Event Parameters:

Event Number: 1

| Soil Type | Initial Conditions | Antecedent Precip | Event Precip | Forecast Precip |
|--|--|--|--|--|
| <input checked="" type="radio"/> Nominal | <input type="radio"/> +30% | <input type="radio"/> +30% | <input type="radio"/> +30% | <input type="radio"/> +30% |
| <input type="radio"/> Sandy | <input checked="" type="radio"/> Nominal |
| <input type="radio"/> Clay | <input type="radio"/> -30% | <input type="radio"/> -30% | <input type="radio"/> -30% | <input type="radio"/> -30% |

[Activate New Parameter Selections](#)

Event Product Preview

MAP - 06hr 2013-01-08 00:00 UTC Event 1 | ASM - 06hr 2013-01-08 00:00 UTC Event 1 | FFG - 06hr 2013-01-08 00:00 UTC Event 1

[Open Preview Animation \(Pop-Up Window\)](#)

Currently Selected Simulation Event Parameters:

| Event # | Soil Type | Initial Condition | Antecedent Precip | Event Precip | Forecast Precip | Begin Date | End Date | Event Code |
|---------|-----------|-------------------|-------------------|--------------|-----------------|----------------------|----------------------|-------------------------------------|
| 1 | Nominal | Nominal | Nominal | Nominal | Nominal | 2013-01-08 00:00 UTC | 2013-01-13 18:00 UTC | E001-strom-scni00-pau00-pen00-pri00 |

[HOME](#) | [About GFFGS-SIM](#) | [Product Descriptions](#) | [Static Resources](#) | [Event Parameters](#)

GFFGS-SIM v.1.0. Official Release Date: Apr 2014
 Copyright © 2014 [Hydrologic Research Center](#) (HRC)

FLASH FLOOD GUIDANCE GAZETTE

Welcome to the first issue of the Flash Flood Guidance (FFG) Gazette, a semi-annual newsletter bringing users of FFG products all the latest news – operational information, technical advances, case studies and soon introducing the new e-learning environment for the flash flood community.

Hydrologic Research Center ~ Linking Science and Society

Flash floods are a world-wide hazard. Unlike other weather related events with specific geographic locations, every location where rain falls is vulnerable, from the tropics to the sub-polar regions. With flash floods being among the most devastating of natural disasters it is essential that flash flood warnings be formulated in a short time with as much specificity in timing and location as possible. As significant rainfall events may cover large areas, this information may be needed for multiple basins at once. This is a very challenging situation for forecasters and some type of guidance is necessary to organize the real-time data and information from multiple sources into easily usable and interpretable products, which are amenable to operational modification in a timely manner.

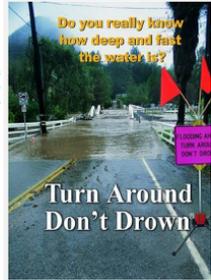
The HRC flash flood guidance systems aim to provide just that and to assist the forecasters in their effort to provide reliable and timely flash flood watches and warnings. They integrate observed data from remote sensing platforms, on-site automated sensors, and modeled data from atmospheric and land-surface models in an automated FFG software system. Although the use and interpretation of the FFG products requires minimal training, quantifying the uncertainty associated with these products in real time and for specific events requires substantial training of the forecasters.

In an effort to provide a means of communication that will provide forecasters with information on case studies suitable for training, valuable pointers from the field in the use and interpretation of the products, and a forum for the continuing validation of the FFG products and associated warnings, HRC is initiating the publication of a newsletter, the **FFG Gazette**. We would be glad to receive commentary pertinent to the use of the FFG systems from the field for inclusion in the **FFG Gazette**, as well as summaries of interesting FFG applications, validation results and suggestions for system improvements.

On behalf of HRC, I would like to take this opportunity to express our gratitude to those men and women that serve faithfully as forecasters during all hours of day and night in a vigilant effort to reduce life loss from natural disasters throughout the world. To them this effort is dedicated.

Konstantine P. Georgakakos, Sc.D.
Director - Hydrologic Research Center
San Diego, California, USA

We would like to ask you to share your suggestions, stories, pictures, experiences relating to flash floods and flash flood guidance systems. Please send your information to R. Graham (editor) at rgraham@hrc-lab.org.



In this issue:

Welcome Note from Dr. Konstantine Georgakakos

Flash Flood Guidance systems around the World

Haiti and Tropical Storm Tomas

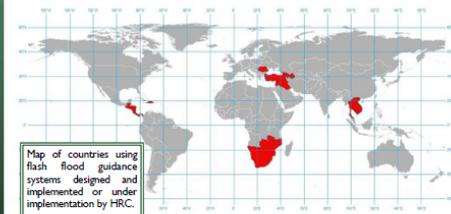
Operational Solutions-Sharing Knowledge: Case study Haiti

Special points of interest:

- HRC Global Initiative on FF Floods
- The NEW Southern Africa Regional Flash Flood Guidance System

FLASH FLOOD GUIDANCE GAZETTE

Flash Flood Guidance systems around the World



Map of countries using flash flood guidance systems designed and implemented or under implementation by HRC.

Since 1993 the Hydrologic Research Center (HRC) has led the technical development and application of flash flood guidance systems in thirty different countries.

In collaboration with the national meteorological and hydrological services, HRC Flash Flood Guidance systems will serve more than half a billion people worldwide by the end of 2011.

The South Africa Regional Flash Flood Guidance System

The South Africa Regional Flash Flood Guidance (SARFFG) system will be the first fully automated real-time regional flash flood guidance system in the Southern Africa region, in operation in seven countries - South Africa, Botswana, Namibia, Malawi, Mozambique, Zambia and Zimbabwe in 2011.

The SARFFG system is a diagnostic tool for analyzing weather-related events that can initiate flash floods and is designed to allow the forecaster to add his/her experience with local conditions, incorporate information and any last-minute local observations, to assess the threat of a local flash flood.



Haiti and Hurricane Tomas



Map illustrating the track of Tomas (October 30 to November 7, 2010). Source: U.S. National Weather Service/National Hurricane Center.

On 4th and 5th of November 2010, Haiti was impacted by Hurricane Tomas, with heavy rains and winds over various areas of the country. Tomas developed from a tropical wave east of the Windward Islands on 29th October and quickly intensified into a hurricane passing near Santa Lucia on 31st October.

During its closest passage to Haiti, Tomas was a Category 1 Hurricane per the U.S. National Weather Service, National Hurricane Center. See the following discussion to learn how the FFG system was used in Haiti.

For more information on the HDRFFG system see - http://www.hrc-lab.org/right_nav_widgets/realtime_hdrffg/index.php

H FLOOD GUIDANCE GAZETTE

Solutions-Sharing

Flash Flood Guidance System (HDRFFG)

with Météo-France, has implemented a Flash Flood Guidance system for Haiti and the HDRFFG. The HDRFFG became operational on 1st July, 2010 and was implemented in Haiti to the Centre National to develop flash flood warnings, a January 2010 earthquake.

for Haiti

Hurricane Tomas, the U.N. Development Programme (UNDP) asked HRC to assess the potential flooding impacts in this, HRC provided UNDP and the Centre National with forecasts of Flash Flood Threat and the impact of Tomas making landfall.

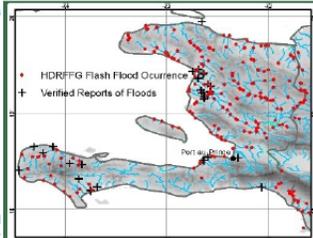


Figure illustrates the HDRFFG Flash Flood Threat Occurrences based on a 36-hour precipitation forecast (for the 36-hour period ending 7 November 2010, 0300 UTC) and compared to locations of verified reports of flash floods.

Assessment

In addition to the information, HRC assessed the HDRFFG system with respect to the areas impacted by flash floods from the storm.

Operational data were available for this system to identify impacted basins.

HRC only evaluated the systems accuracy, including the application of rainfall inputs and whether or not warnings were issued and appropriate responses taken, which is the ultimate test of the system.

Operational storm Tomas, the use of rainfall forecasts to derive flash flood threat the HDRFFG system) provided valuable results in the identification of areas at risk. This provided useful information to disaster relief agencies on potential flooding. For a copy of the report please contact HRC at admin@hrc-lab.org

Value on Flash Floods:

Operational vulnerability and preserve resiliency in basic human needs: livelihoods, agriculture, water resources, and natural resources.

HRC in partnership with U.S. National Weather Service (NWS), U.N. World Meteorological Organization (WMO) and U.S. Agency for International Development/Office of U.S. Foreign Disaster Assistance (USAID/OFDA) is involved in an initiative to develop and implement a Global Flash Flood Guidance (GFFG) system designed to be used by weather services and disaster management agencies around the world to develop localized warnings for deadly flash floods. (For more information on the GFFG system see - www.hrc-lab.org/publicbenefit/index.html).

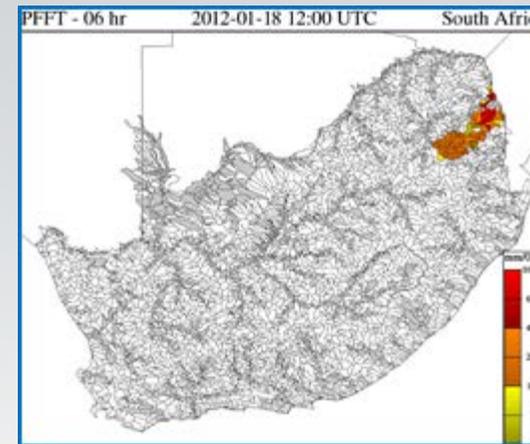
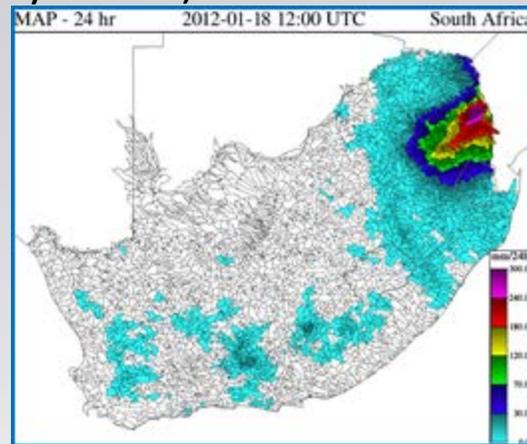
CONGRATULATIONS TO DR THERESA CARPENTER UPON HER COMPLETION AND SUCCESSFUL DEFENSE OF THE DOCTORAL DISSERTATION - 'An Interdisciplinary Approach to Characterize Flash Flood Occurrence Frequency for Mountainous Southern California'.

We are very excited and proud to share this great news! Dr Carpenter, an HRC colleague has defended her Ph.D. dissertation on the 5th of January, 2011 at Scripps Institution of Oceanography, UCSD. (For a copy of her thesis contact Dr Carpenter at tcarpenter@hrc-lab.org).

Estudio de caso de Sudáfrica

Enero 2012, Tormenta tropical Dando, Parque nacional Kruger

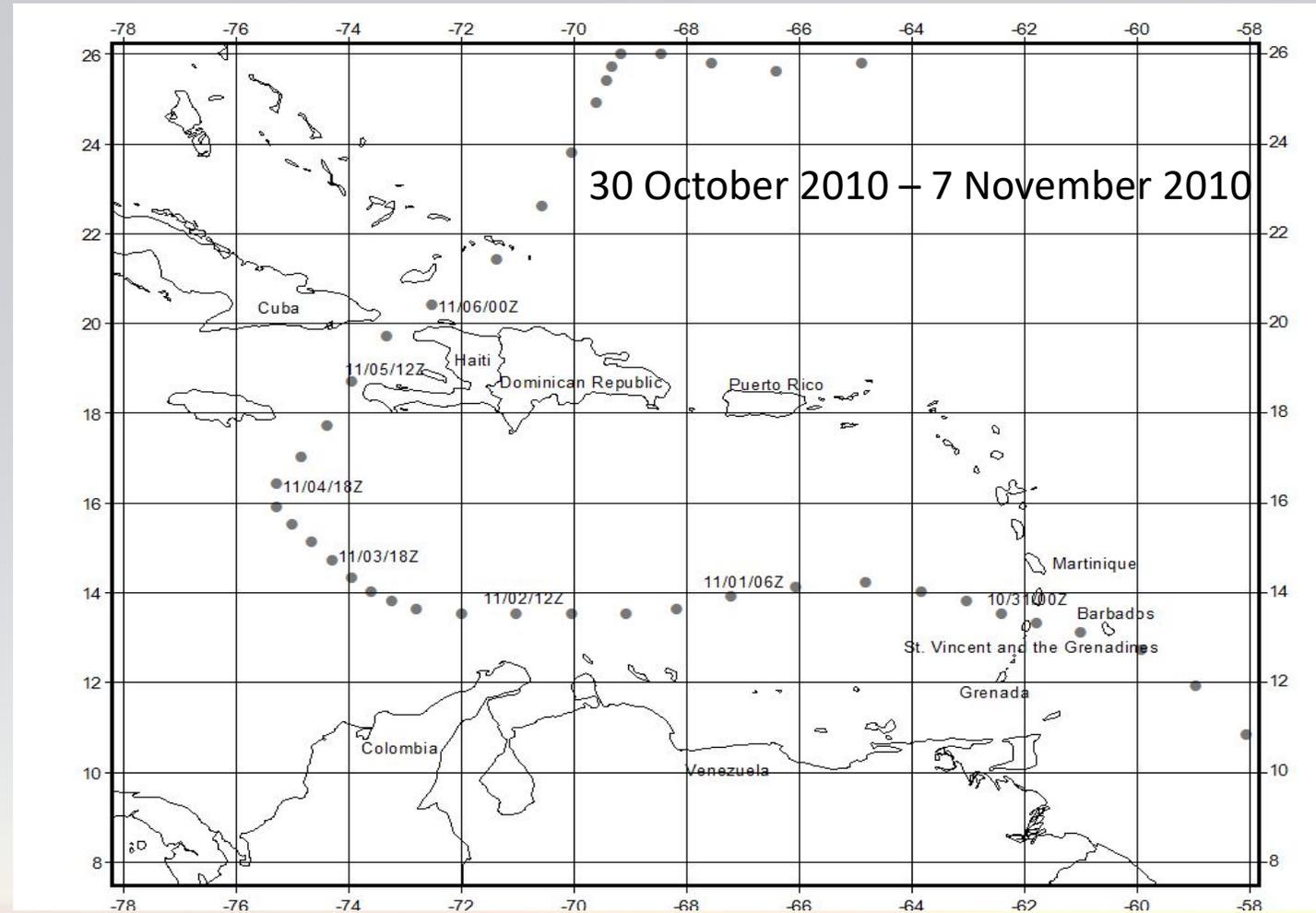
“Un análisis de la tormenta realizado por el Servicio Meteorológico de Sudáfrica (SAWS) mostró que el sistema FFG de África meridional funcionaba muy bien, indicando las áreas de fuertes lluvias (figura izquierda) y amenaza de crecida repentina (figura derecha) que estaban de acuerdo con los datos observados.” (de la Flash Flood Gazette, Mayo 2012)



“Las discusiones entre el Servicio Meteorológico de Sudáfrica, el Departamento de Asuntos Hídricos de Sudáfrica y los funcionarios del Parque Nacional Kruger indicaron que la información y los datos disponibles a través del sistema FFG pueden ser muy útiles en situaciones como esta.”

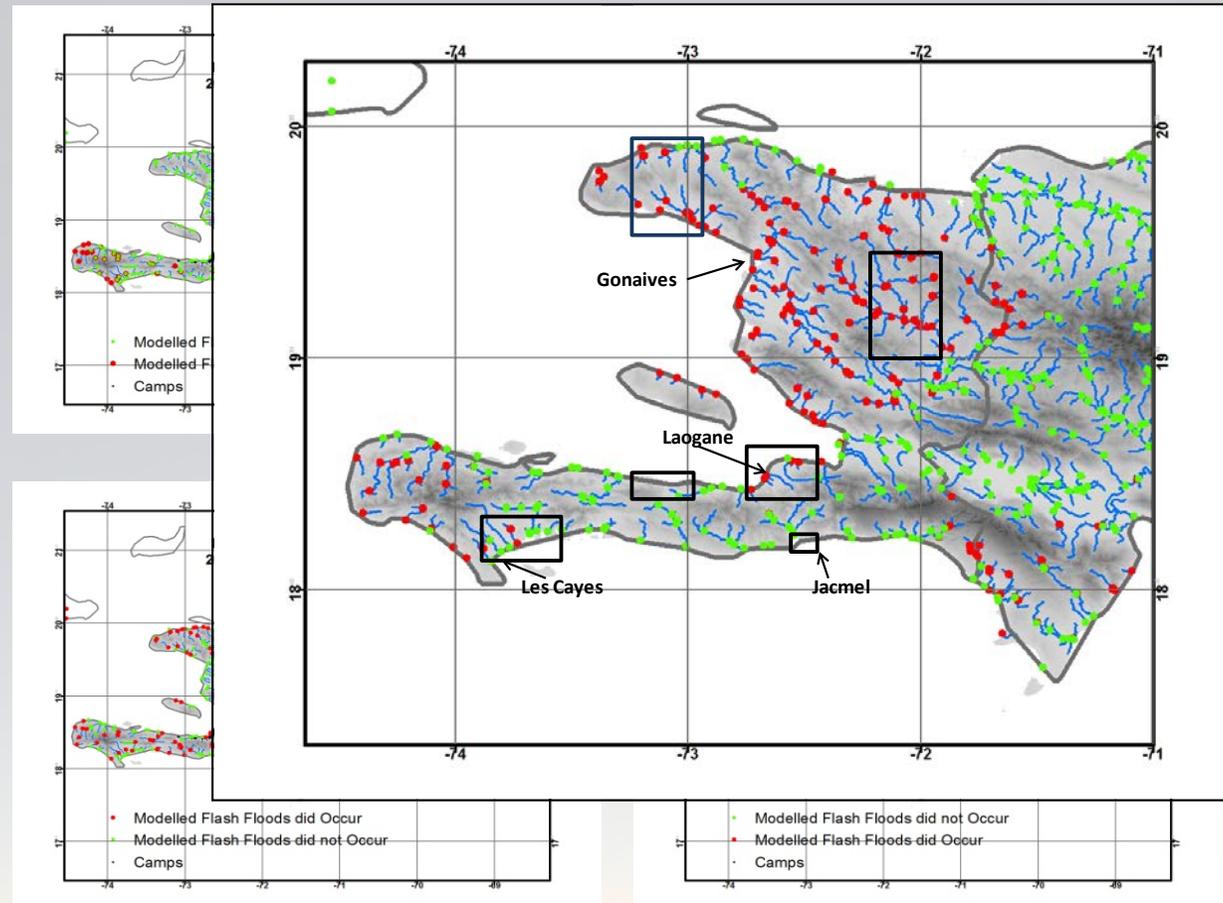
Estudio de caso de Haiti N°1

Paso del huracán Tomás



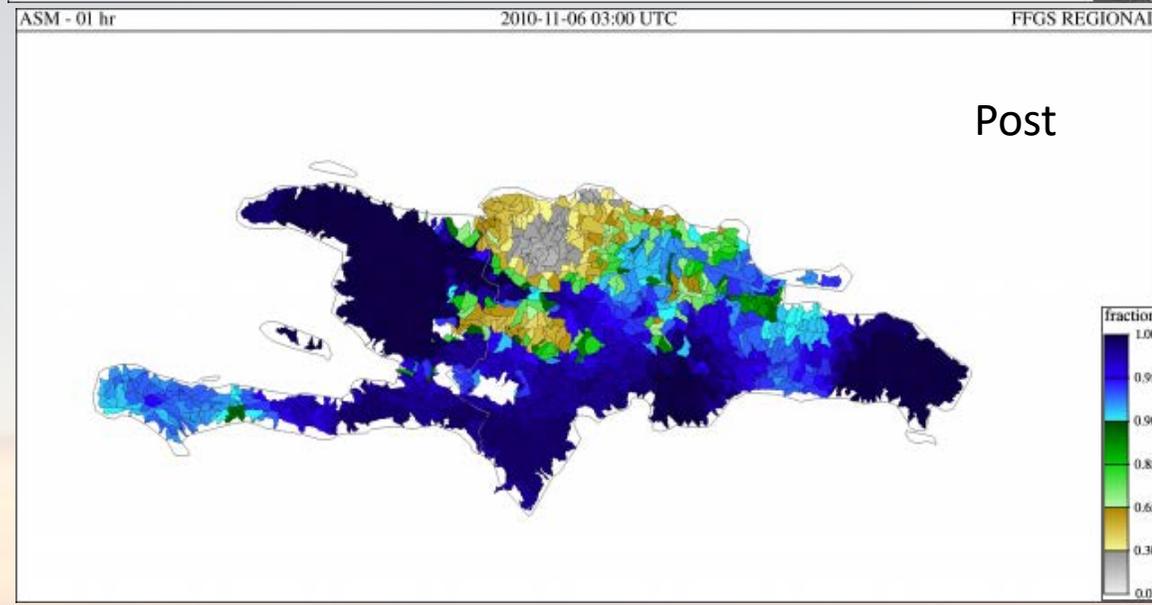
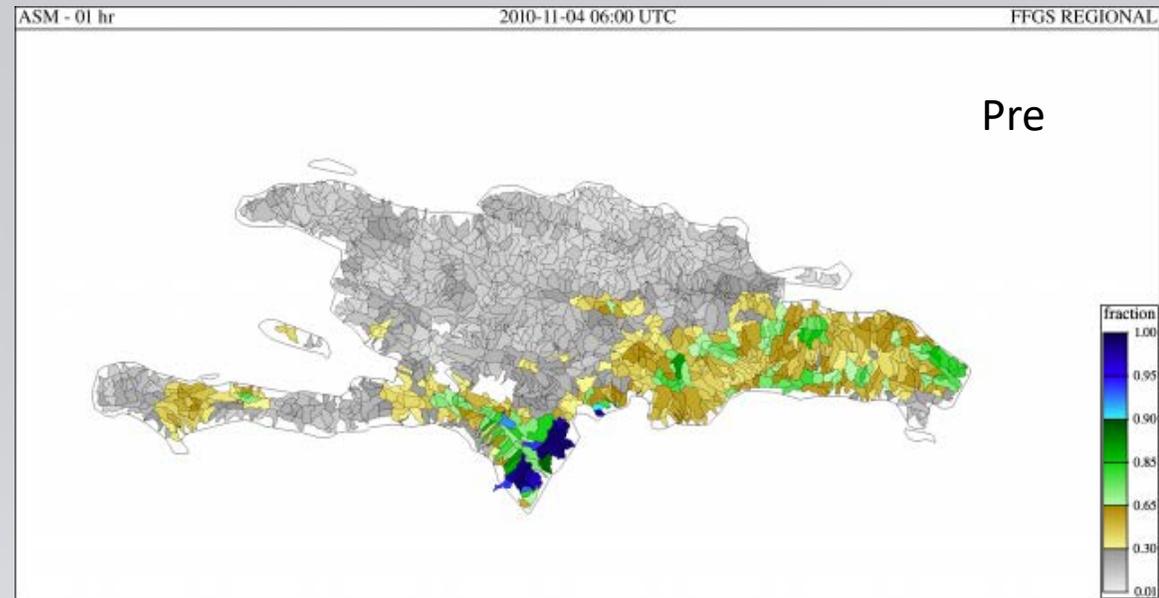
Estudio de caso de Haiti N°1

Paso del huracán Tomás



Estudio de caso de Haiti N°1

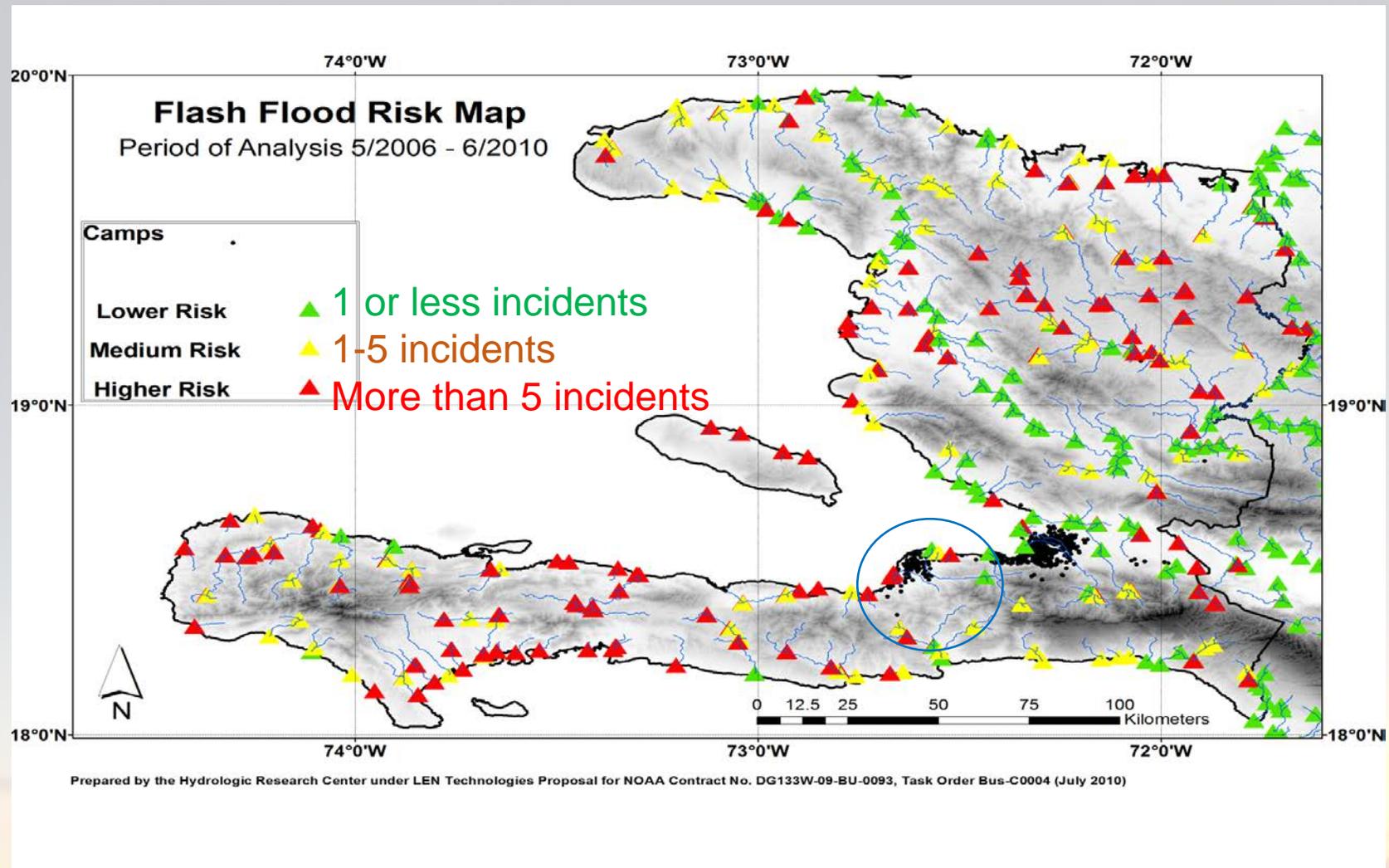
Paso del huracán Tomás



Estudio de caso de Haiti N°2

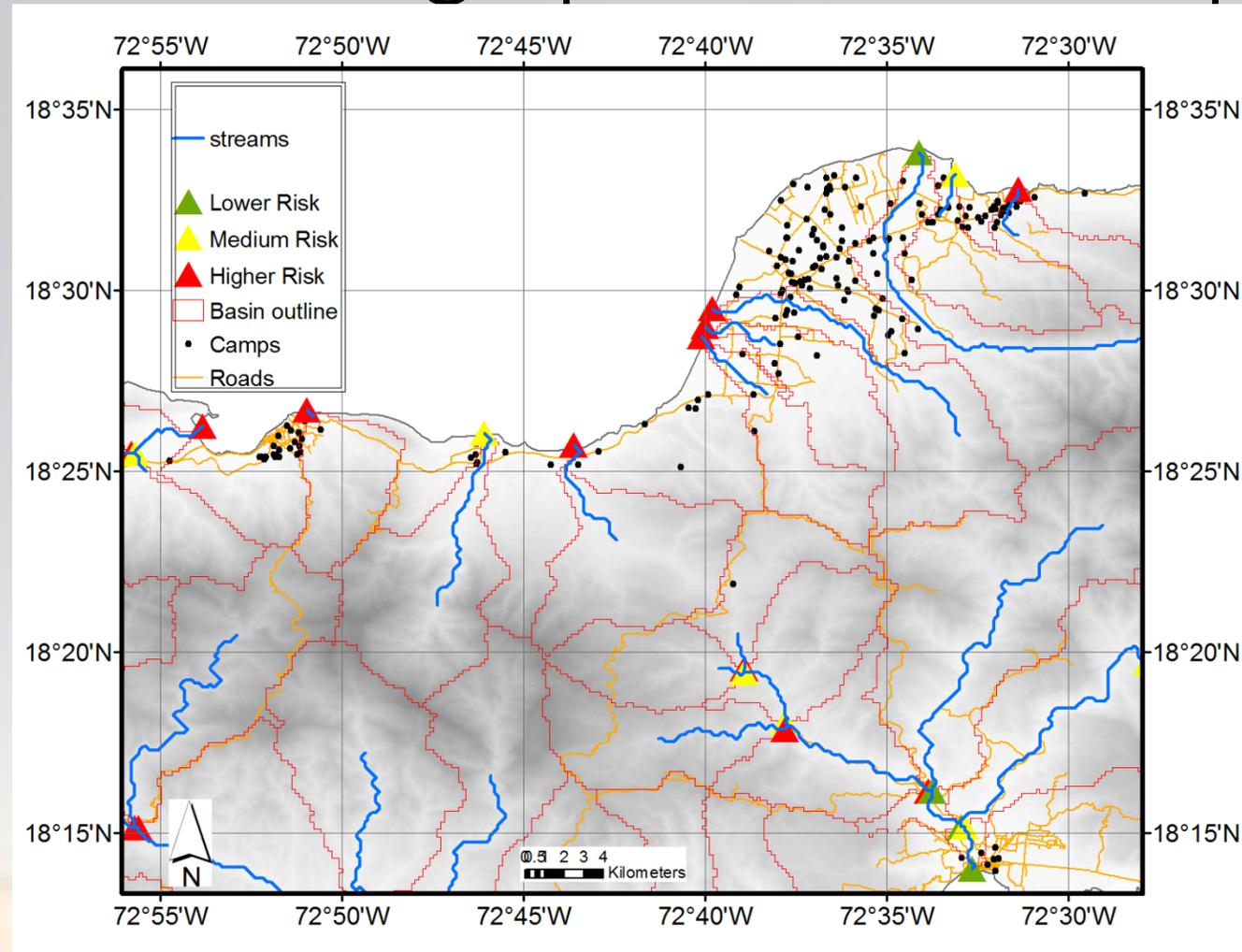
Evaluación del riesgo por crecidas repentinas

Toda Haiti (Area promedio de cuenca: 72 km²)



Estudio de caso de Haiti N°2

Evaluación del riesgo por crecidas repentinas



Equipo de desarrollo e implementación del FFGS en el HRC

Randall Banks

Zhengyang Cheng

Konstantine Georgakakos

Rochelle Graham

Robert Jubach

Theresa Modrick

Eylon Shamir

Cris Spencer

Jason Sperflage



Gracias

El fuerte apoyo de los Servicios Nacionales Meteorológicos, Hidrológicos y de Gestión de desastres ha sido vital para el uso operativo útil de los sistemas regionales de guía para crecidas repentinas.