



# **2<sup>nd</sup> International Workshop on Flood Monitoring and Modelling**

Delft, Netherlands, 19-21 March 2012

**Tom De Groeve, Joint Research Centre**

# Global Security and Crisis Management

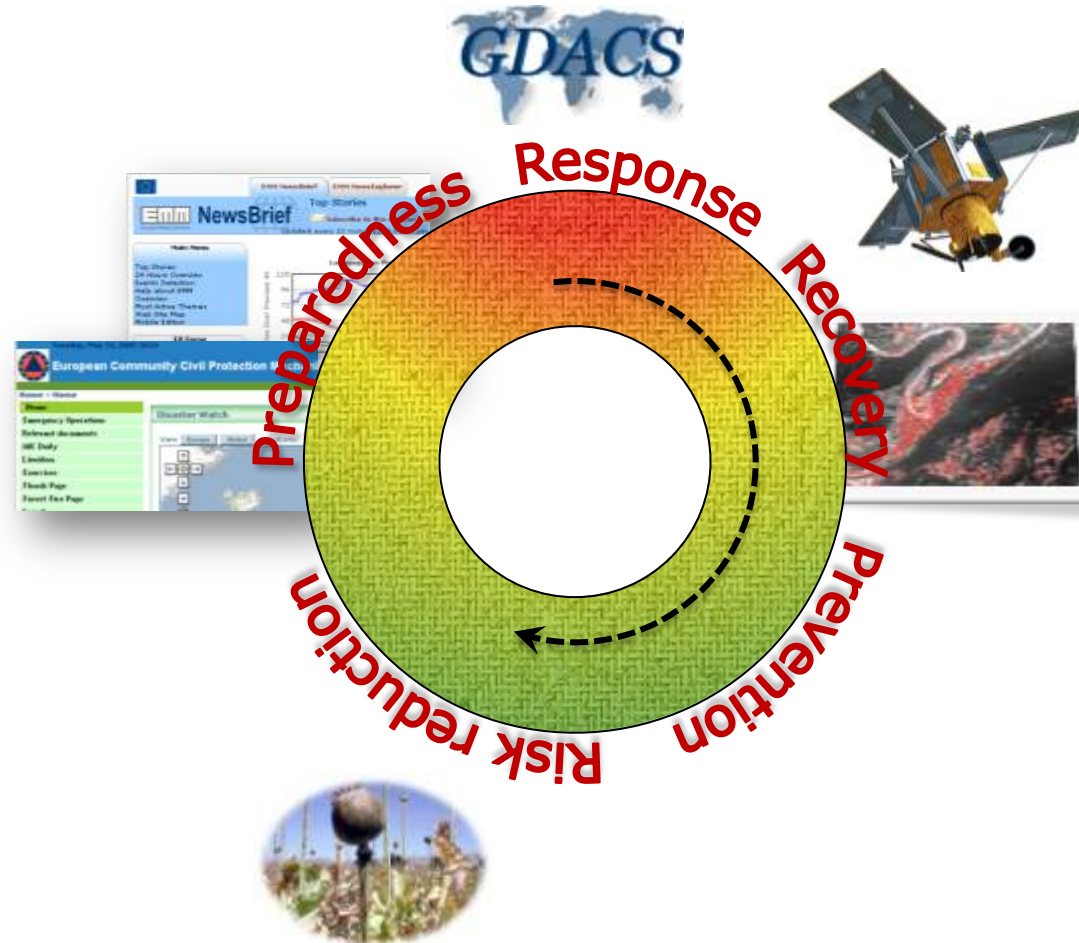


## Unit for Global Security and Crisis Management

- Preparedness
- **Response**
- Recovery
- Prevention and risk reduction

## Expertise

- Text mining
- Image mining
- Statistics mining
- **Physical and Risk Modelling**
- Crisis information management
  - Hazard impact modelling
  - Early warning and alert
  - Situation rooms





## *Global Disaster Alert and Coordination System (GDACS)*

- **multi-hazard**
- **real-time**
- **impact assessment**
- **and alerting system**

## *System of systems*

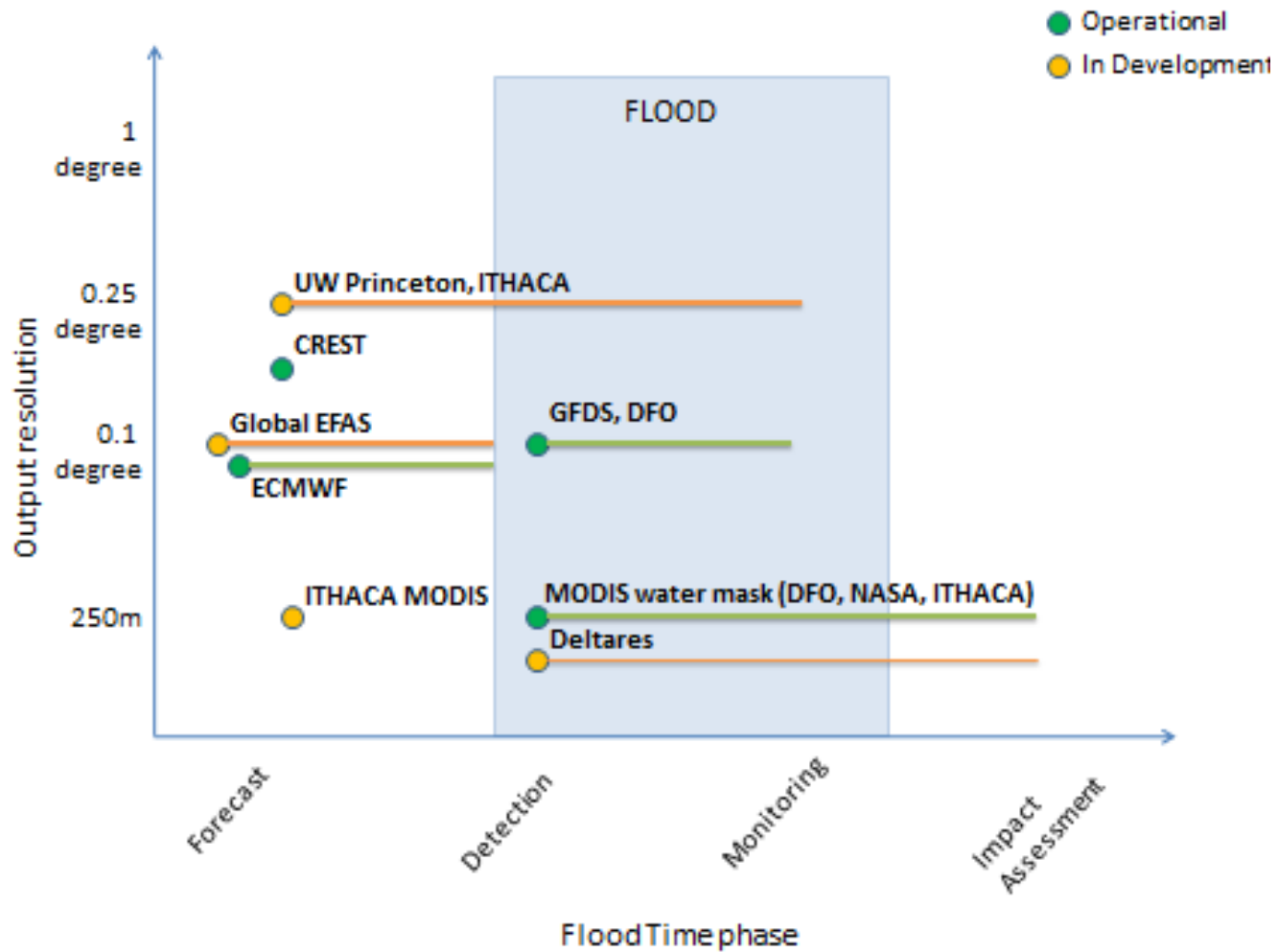
- **Scientific community**
- **Risk community**
- **Response community**

## *Why are floods challenging?*

- **Hazard**
  - Not monitored satisfactorily
- **Impact**
  - Not a single global model
  - Varies per country / society
  - Varies with flood type
- **Alert level**
  - Based on number of killed, as reported in media
  - To be improved: BEFORE flood disaster



# Systems map



# System matrix



1. Actors and responsibilities in global flood management										2. Flood disaster cycle and timing aspects					
Disaster cycle				Organisation type						Temporal scale			Time phase		
Risk reduction	Preparedness	Response	Recovery	Development agencies	Hydro-meteorological agencies	Civil protection agency	International humanitarian assistance	Post Disaster Needs Assessment	Rapid Mapping	Flash flood	Torrential flood	Seasonal flood	Early Warning	Flood detection	Flood monitoring
	X	X													

3. From proof of concept to global output					4. Local, national, international perspective			5. Interoperability			
Bottlenecks					Management level			GIS	Meteo	Satellite	
Methodological	Related	Technical	Operational	Policy related	Local: implementation	National: coordination and funding role	International: supporting role	OGC	GRIB	HDF	Web Service API
						X	X				

NAME	Organisation	Title	Triggering	Output
G. Robert Brakenridge	Colorado University	Measuring River Discharge (AMSR-E)	EO	% water
G. Robert Brakenridge	Colorado University	Mapping Surface Water Change (MODIS) in near real time	EO	water mask
Fritz Policelli	NASA/Goddard Space Flight Centre	Satellite measurements for water surface mapping	EO	water mask

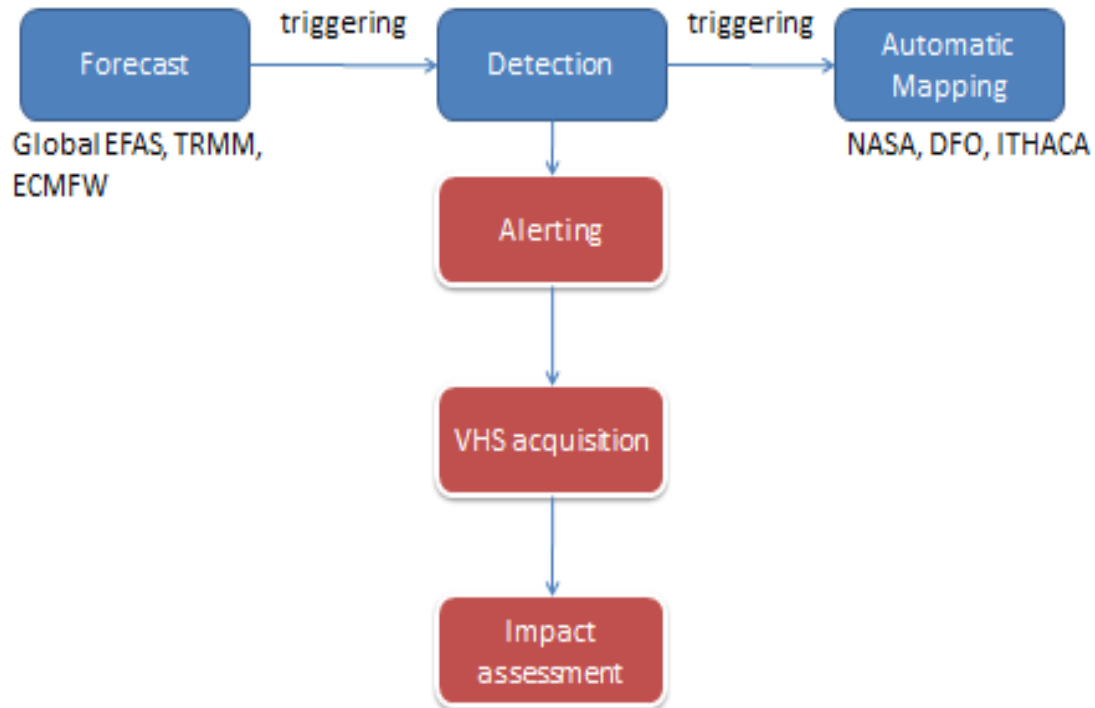
X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X

# Integrated map



Standards: **WMS, ArcGIS service, GeoRSS, KML, georeferenced images**

# Forecast to impact





# Agreed actions



## List of presentations

- **On ftp site and on web site**

## List of relevant publications

- **On web site**

## List of URLs to products; access to restricted products under certain conditions

- **Real-time products; real-time data**
- **Flood scenarios (Swiss Re)**
- **Seasonal and Hazards Calendar WFP**
- **Data archives: Dartmouth Flood Observatory**
- **Data archives: NASA**

## Map and grid of systems

- **Part of final outcome document (14 April 2010)**

## List of critical data sources

- **On web site**

## Publication in Journal of River Basin Management

- **Not achieved...**



## *Global Flood Monitoring and Forecasting Initiative*

- **Web portal: <http://portal.gdacs.org/?tabid=65>**
  - Username: global\_floods, Password: initiative
- **[global-floods@gdacs.org](mailto:global-floods@gdacs.org)**



### *Data agreements*

- **WFP – ECMWF** ✓
- DMIS access
- ...

### *Training*

- **JRC/GFDS: WFP, MIC, CEMADEN**
- ...

### *Bilateral collaboration agreements*

- **JRC/PDC (not only on floods)**
- ...

### *Joint projects and proposals*

- **NASA funding**
- ...



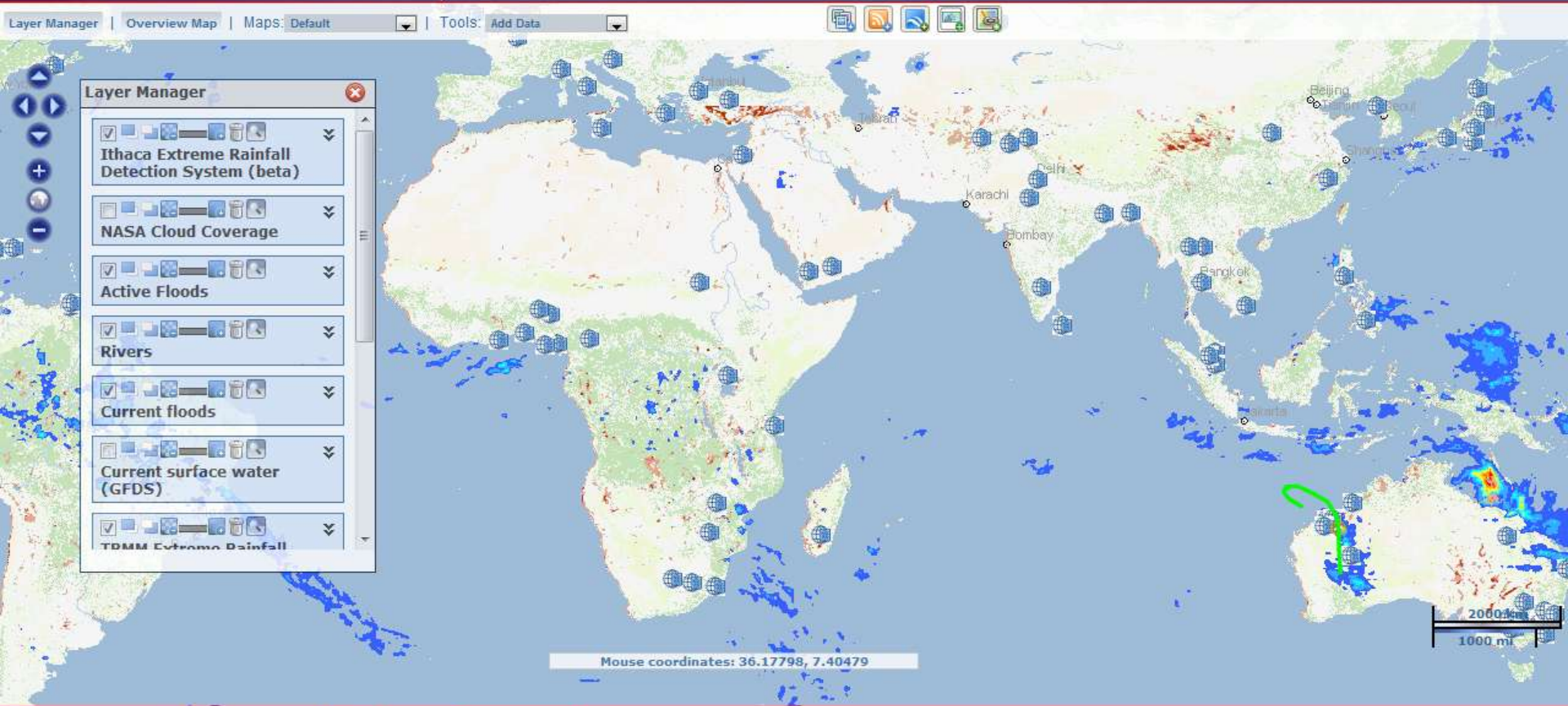
### *Joint validation exercises*

- **Bangladesh, September 2011**
  - GFDS, Glofas, ECMWF, MODIS
  - Not completed → no ground truth, difficulty in interpretation

### *Operational support*

- **Namibia (NASA, JRC → ECHO)**
- **Thailand, Cambodia (JRC → ECHO)**
- **Mozambique (DFO → WFP)**

# Progress in 2011 Common data platform







## ***Day 1: Review of 2011 studies and Global flood modeling & forecasting***

*09:00 Opening & welcome*

*09:30 Review of 2011 studies*

*10:30 Coffee Break*

## ***11:00 Session 1: global flood forecasting***

- Jutta Thielen (JRC-IES)
- Fredrik Wetterhall (ECMWF)
- **DISCUSSION: Timing and uncertainty**

*Lunch 12:30-14:00*

## ***14:00 Session 2: global flood forecasting & modelling***

- Bart Nijssen
- Tim Fewtrell (Willis), Albrecht Weerts (Deltares)
- **DISCUSSION: International initiatives and forums.**

*15:30 Coffee break*

## ***16:00 Session 3: global flood nowcasting***

- Adriana Albanese et al. (Ithaca)
- Bob Adler (U. Maryland)
- **DISCUSSION: Flood locations.**

***19:00 Workshop dinner, sponsored by Deltares***



## ***Day 2 (March 20): Global flood monitoring using satellite techniques***

*08:30 Leave hotel (by foot)*

### ***09:00 Session 4: Near real-time observation***

- Tom De Groeve (JRC)
- Kevin Dobbs (U. Kansas)
- **DISCUSSION:** When is a flood a flood?

*10:30 Coffee Break*

### ***11:00 Session 5: Near real-time flood mapping***

- John David (SSAI/NASA-GFSC)
- Stuart Fry (NASA-GFSC)
- **DISCUSSION:** Flood mapping.

### ***14:00 Session 5: Near real-time flood mapping (cont'd)***

- Rogier Westerhoff (Deltares)
- Bob Brakenridge (Univ. Colorado/DFO)
- **DISCUSSION:** combining systems

*15:30 Coffee Break*

### ***16:00 Session 6: on demand very high resolution flood mapping***

- Christina Corbane (JRC/GEMMA)
- Wendi Pedersen (UNOSAT)
- **DISCUSSION:** Triggering mechanism.





***Day 3 (March 21): Towards an integrated flood monitoring information system***

*08:30 Leave hotel (by foot)*

***09:00 Part 1: User points of view and information needs***

- Marion Cezard, Lara Prades (WFP)
- Caspar Honegger (Swiss Re)
- André Silveira, Demerval Gonçalves (CEMADEN, Brazil):
- Cristina Brailescu (EU DG ECHO/MIC):

***Part 2: Data archiving and sharing***

***10:30 Coffee break & snack***

***11:00 Part 3: System integration (Discussion)***

***14:00 Close of Workshop***

***Bagged lunch prepared***



# Discussions



## ***Session 1: global flood forecasting***

*DISCUSSION: Timing and uncertainty of forecasts.*

- **What are operational parameters for flood preparedness and response?**
  - Lead time required?
  - Certainty required?
- **Parameters required?**
  - Location, Duration, Depth
- **Perspectives**
  - Intl. response → prepositioning, team preparation
  - Local response → alerting, evacuation
  - Insurance → damage claims
  - Triggering systems → VHR, crowd-sourcing...



## ***Session 2: global flood forecasting & modelling***

*DISCUSSION: International initiatives and forums.*

- **Are there groups with a similar scope as this one, i.e. integration of semi-operational systems?**
- **Latest developments in**
  - US
  - EU
  - WMO
  - UN IASC



## ***Session 3: global flood nowcasting***

### ***DISCUSSION: Flood locations.***

- **What is a flood event?**
  - From response point of view
  - From hydrological point of view
- **Should floods be reported by pixel, by river, by basin or by administrative unit?**
- **Methods for spatio-temporal aggregation**
  - Raster to vector: contour lines, observation sites
  - Duration: linking events in time



## ***Session 4: Near real-time observation***

### ***DISCUSSION: Flood detection.***

- **When is a flood a flood?**
  - When is triggering needed?
  - When is a flood a humanitarian disaster?
  - Response capacity of country?
  - Flood protection and management capabilities?
- **Hydrological versus response criteria.**
  - Number of people affected
  - Extreme event: 10 year, 50 year?



## ***Session 5: Near real-time flood mapping***

### ***DISCUSSION: Flood mapping.***

- **Classification schemes**
  - Is a flood red or blue?
  - Temporal evolution of a flood (maximum extent, current extent)
- **Mapping standards**
  - Reference water layer
  - Seasonal reference water
  - Reference country borders
- **Map metadata**
  - Current practice at DFO, GMES, SAFER, UNOSAT
  - Icons for purpose and use



## ***Session 5b: Near real-time flood mapping***

### ***DISCUSSION: Global flood mapping,***

- **possibilities for combining systems**
  - Example: see <http://dma.jrc.it/map?application=flood>
  - Utility?
- **mechanisms for sharing data and products**
  - WMS: map service
  - KML: data + symbology
  - Shapefile: data
  - HDF, Tiff: data
- **constraints in sharing data and products**
  - License and copyright
  - Acknowledgements





## ***Session 6: on demand very high resolution flood mapping***

*DISCUSSION: Triggering mechanism.*

- **What are exact parameters needed for accurate and timely triggering?**
  - AOI
  - Timing
  - Cloud cover estimate
- **What systems are currently best suited?**
- **What data exchange format?**
  - GeoRSS?