

Disaster Risk Assessment Vision



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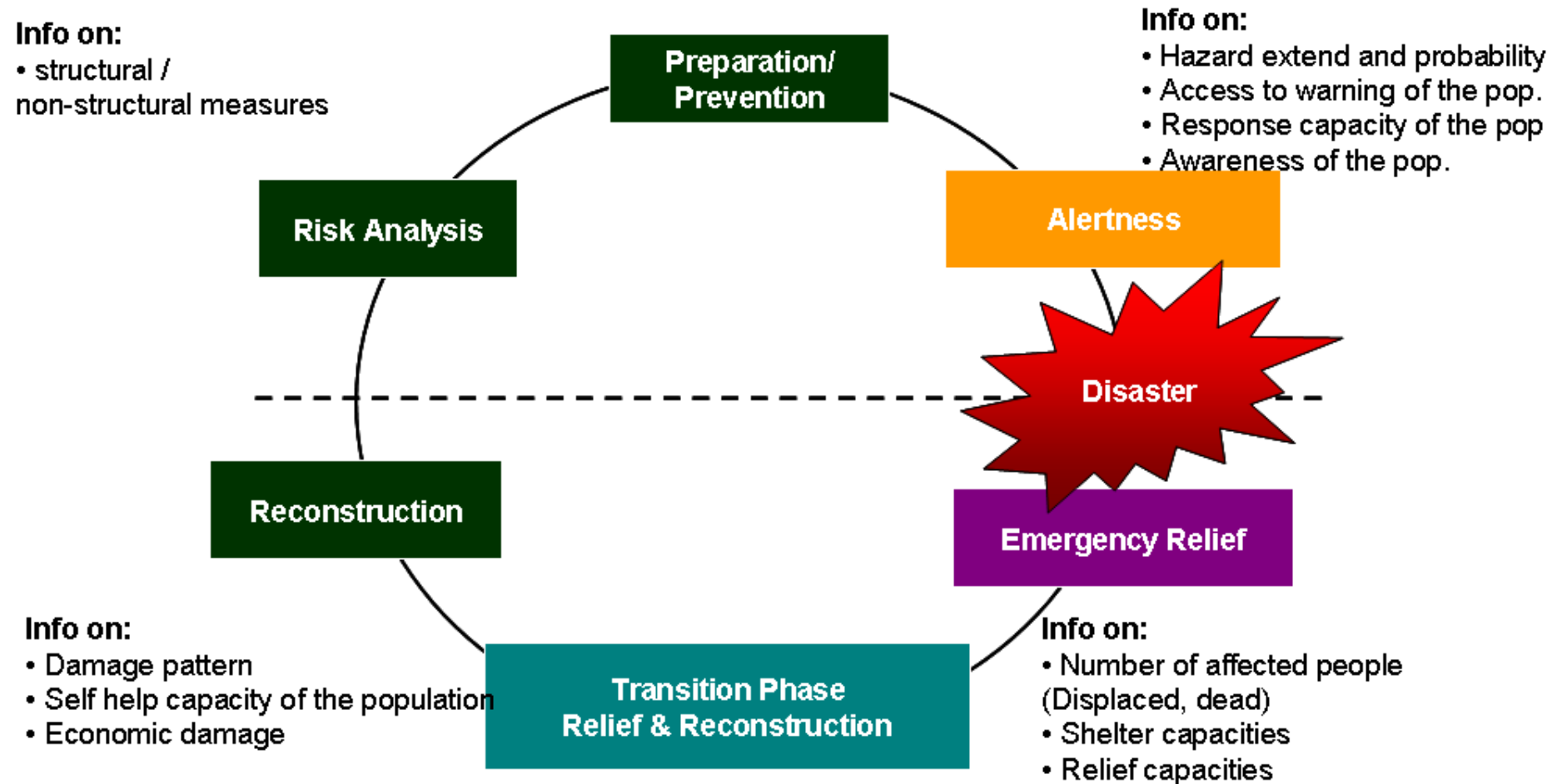
Space Research Institute NASU-NSAU

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General approach



....to support the full Disaster Management Cycle

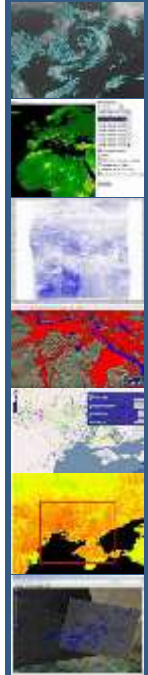


Measuring “flood risk”



$$\text{Risk} = F(\text{Hazard}, \text{Vulnerability})$$

- A popular approach
 - Risk = *the probability of each possible flood event per year x the consequences of that event*
 - Simple risk measures:
 - average annual economic damage (AAD)
 - average annual number of casualties (AAC)
 - Problems
 - **regular flooding** with **limited consequences** and **exceptional flooding with huge consequences** may have **the same AAD**, but in practice they differ significantly: it is possible to cope with the first type but not with the second one



Existing initiatives



- **EU Floods Directive**

- to **assess** if all water courses and coast lines are at **risk from flooding**,
- to **map the flood extent** and assets and humans at risk in these areas and
- to take adequate and coordinated measures to reduce this flood risk.

- **UN Global Risk Data Platform**

(<http://preview.grid.unep.ch/>)

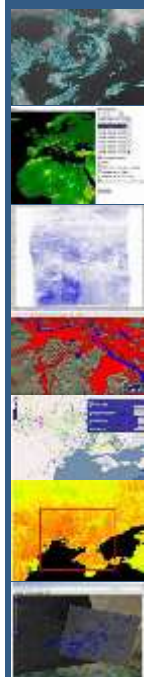
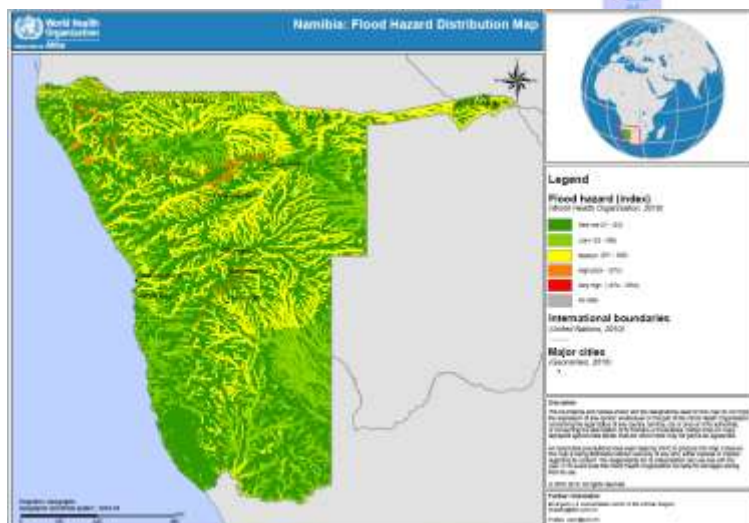
- "a multiple agencies effort to share **spatial data information on global risk from natural hazards**. Users can **visualise, download or extract** data on **past hazardous events, human & economical** hazard exposure and **risk** from natural hazards".
- Registered as GEOSS service in GEOSS Registry



Existing initiatives



- Global Flood and Landslide Monitoring provided by NASA
- Dartmouth Flood Observatory
- World Health Organization



Existing initiatives



- **Global Disaster Alert and Coordination System (GDACS)**
 - a cooperation framework between the United Nations, the European Commission and disaster managers worldwide to improve **alerts**, **information exchange** and **coordination** in the first phase after major sudden-onset disasters

GDACS Global Flood Detection System - Version 2

An experimental system to detect and map in near-real time major river floods based on daily passive microwave satellite observations. The purpose is to identify and measure floods with potential humanitarian consequences after they occur.

Home | Current floods | Global map | Search areas | Custom areas | Regions | Animations | Download | About

The Global Flood Detection System monitors floods worldwide using near-real time satellite data. Surface water extent is observed using passive microwave remote sensing (AMSR-E and TRMM sensors). When surface water increases significantly (anomalies with probability of less than 99.5%), the system flags it as a flood. Time series are calculated in more than 10000 monitoring areas, along with small scale flood maps and animations.

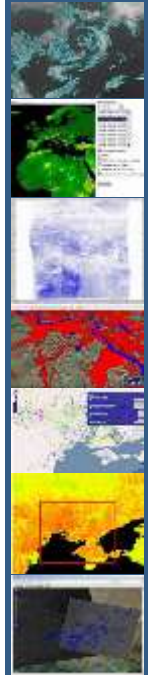
GDACS currently monitors around 10000 areas, defined in collaboration with partners. For these areas, the flood signal is further processed to generate time series, flood maps and flood animations. See a full list of [current floods](#) or [search for areas](#) by river, country or name.

Site	Location	Coordinates	Magdalen Island
Site 15105	in Kenya (on river)	0 7024330000000	Magdalen Island; Nyando
Site 1490	in Uganda (on river White Nile)	0 3011070000000	Magdalen Island; Site 1507

EO and Insurance Workshop 2012



- Co-organised by
 - ESA, the European Association of Remote Sensing Companies, reinsurer Swiss Re and
 - insurance brokers Willis and Lloyds
- Requirement for catastrophe risk management
 - the need for **daily updated flood extent information** during a major plain flood event
 - Examples:
 - Mid-res: MODIS (optical) and Envisat WSM (radar) -> 100%
 - High-res: RADARSAT & COSMOSkyMed (SARs) and SPOT & RapidEye (Optical) ->100% [*P.Bally*]
 - Newly available missions [*P.Bally*]:
 - » Sentinel-1 mission alone -> requirement met at 84% (all weather)
 - » Radarsat Constellation -> requirement met at 100% (all weather)



General approach



- Natural disaster risk assessment
 - To map **globally** regions with **high risk** of disaster
 - **Scaled** (layered) approach
 - global (low-resolution) observations and models to assess risks (detect possible hazards) everywhere;
 - higher-res observations in known high-risk areas;
 - highest resolutions where disaster response is currently needed or underway
 - **Maps** of regions with high risk of disasters to be available **in advance**
 - past disasters, infrastructure objects, roads, distribution of population, shelter capacities etc.
 - **Service-oriented approach**
 - As in GEOSS
 - **Crowd source mapping**

