

# Coastal flooding and erosion



Samoa



Senegal



Colombia



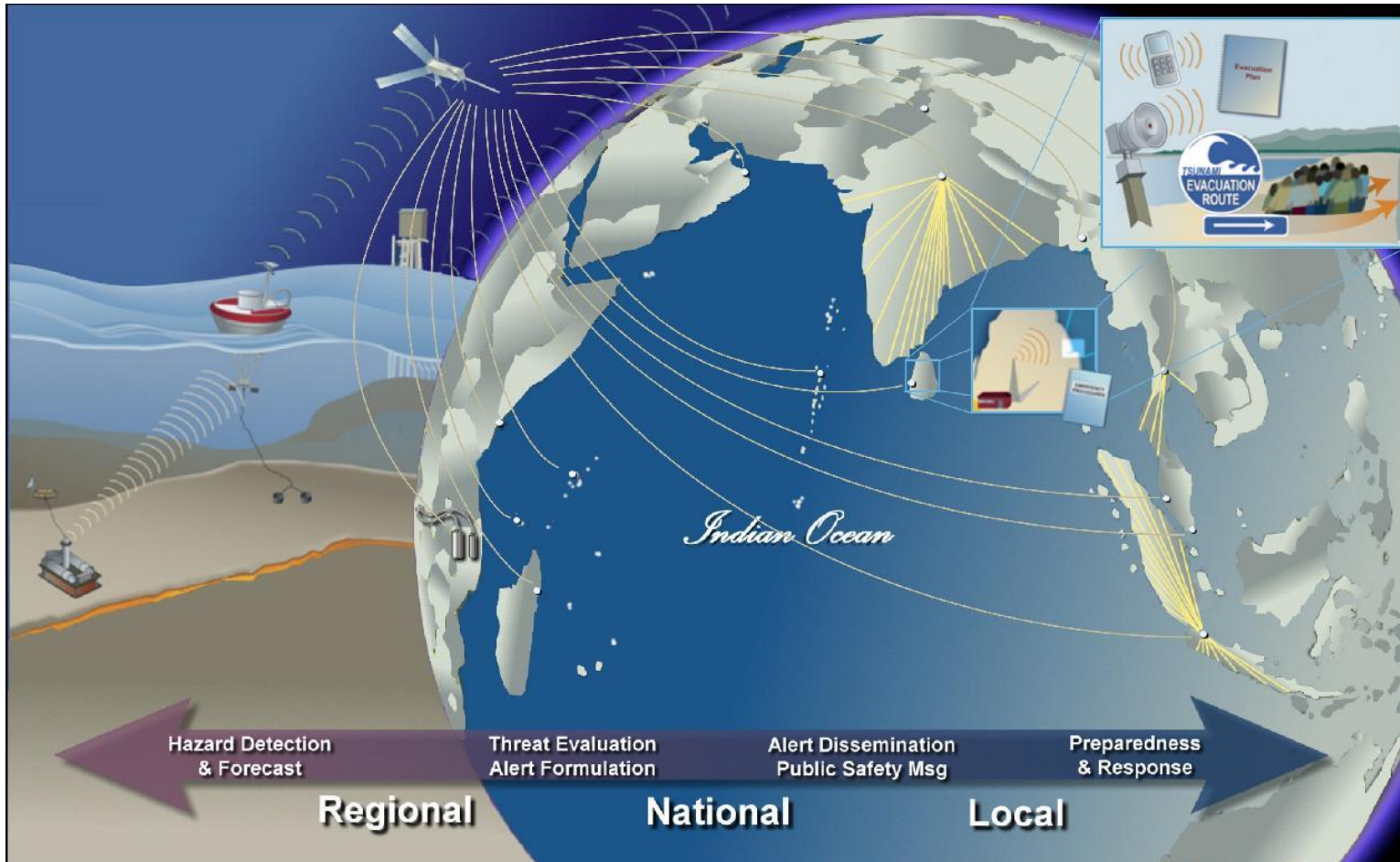
Ireland

# Coastal inundation hazards and IOC

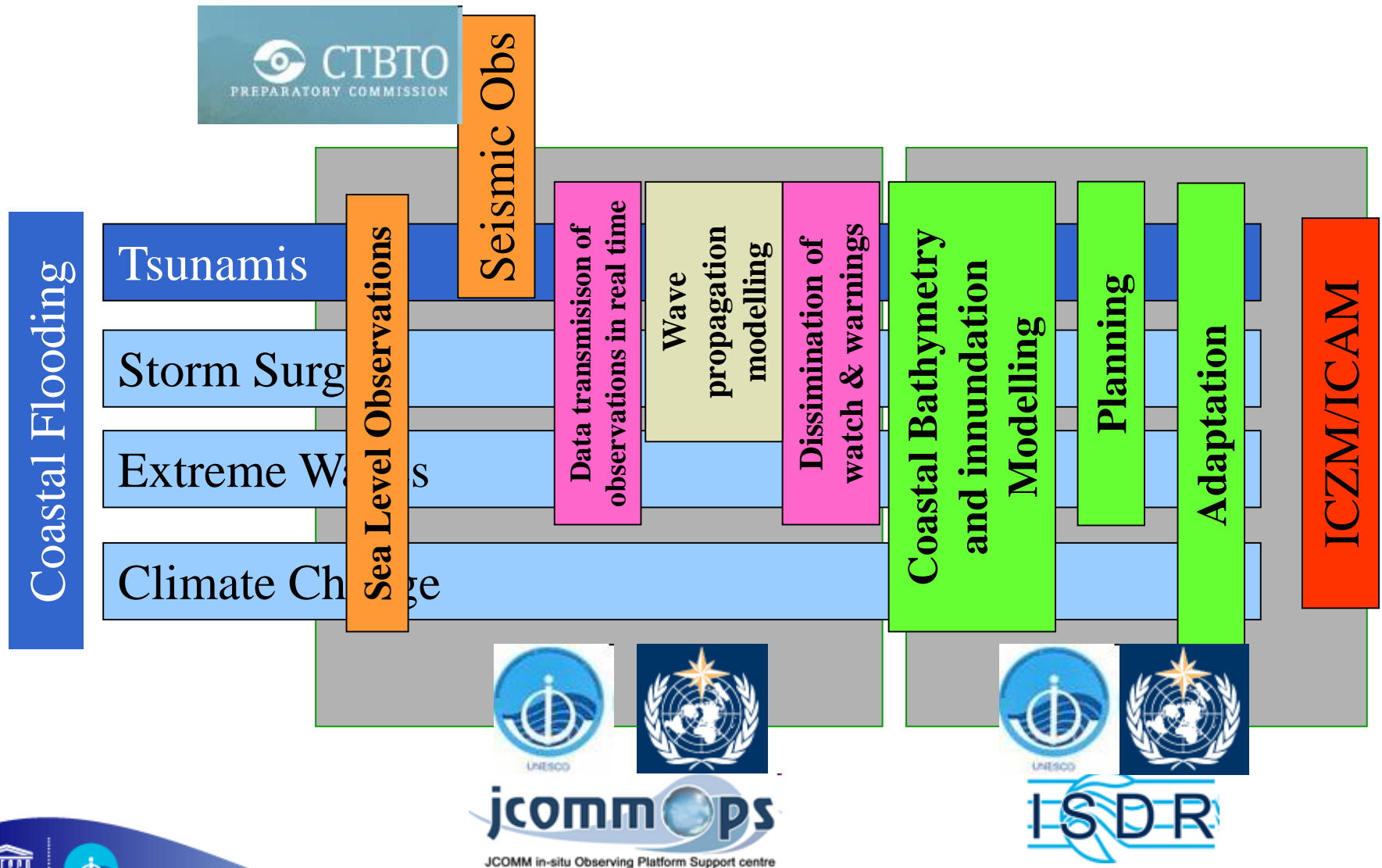
Hazard	Tsunami	Storm surge	Wind-driven waves	Sea level rise	Coastal erosion
Frequency	Decades to centuries	Annual to decadal	Annual to decadal	Ongoing but accelerating	Ongoing but accelerating
Magnitude (run-up)	From cm to meters	1-2 meters or more	1-2 meters or more	Average +0.5-1.7 cm	Several m/yr
Duration	Hours to 1 day	Few hours to few days	Hours to many days	Ongoing	Ongoing
Impact	Inundation and drainage surges	Single event inundation	Multiple localized inundations	Progressive sea level rise	Progressive
Area	Local run-up	Hydrological modelling	Terrain modelling	Terrain modelling	Long-term trends
Warning	Minutes to hours	12 hours to 2 days	1-3 days	Decades	Decades
IOC programme	TSU	JCOMM	JCOMM	GLOSS	ICAM



# End-to-End Concept exemplified with the Tsunami Warning System

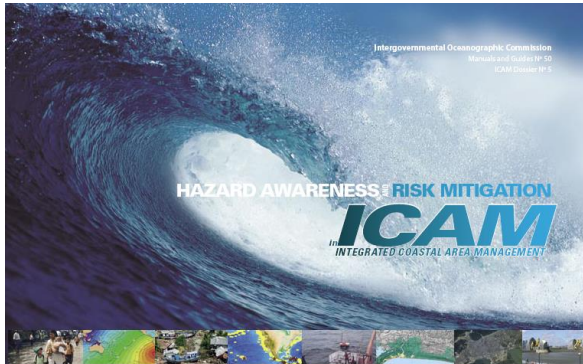


# Coastal inundation end-to-end systems

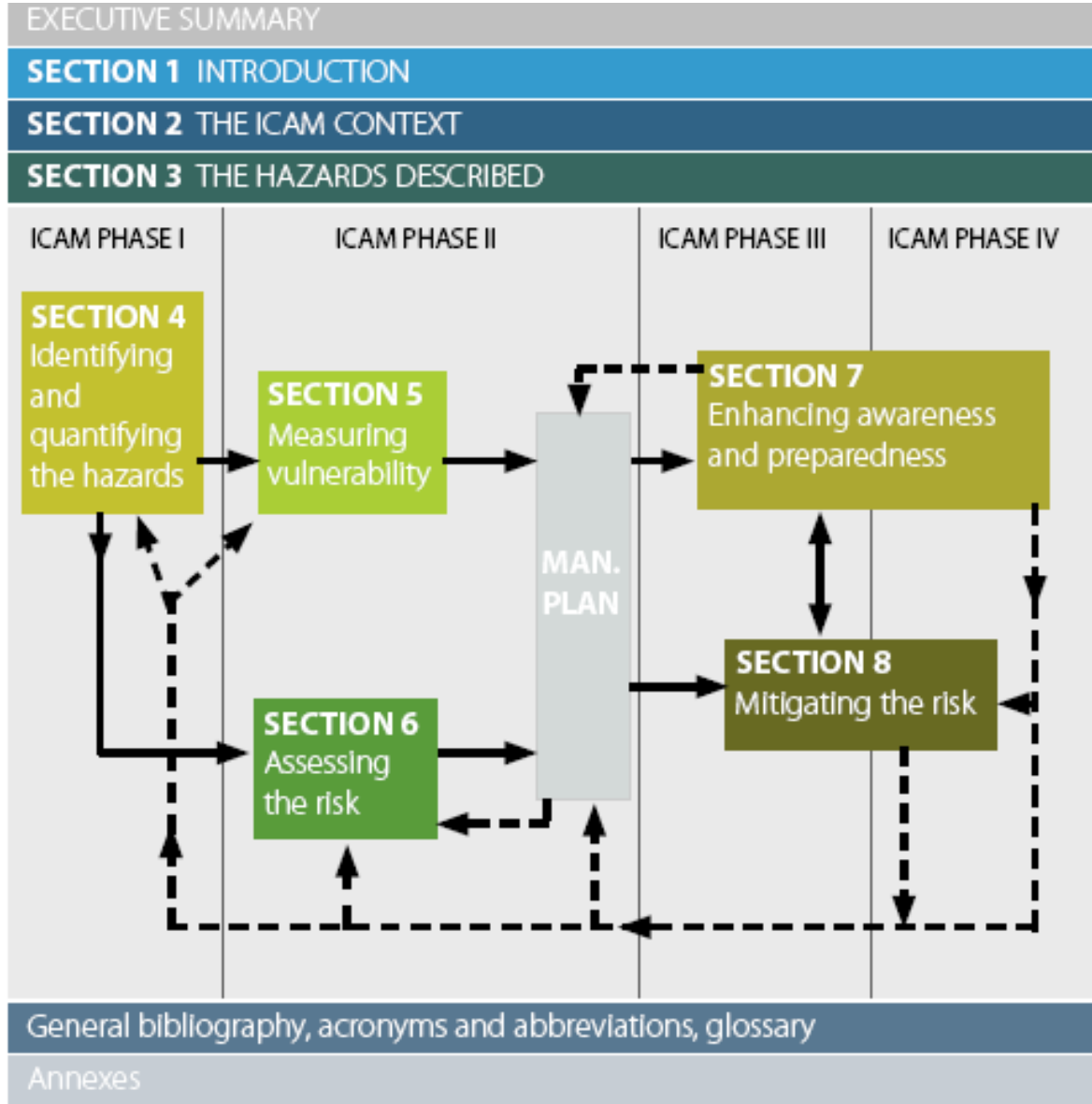
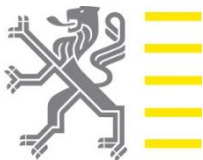




# Hazard awareness and mitigation within ICAM cycle



The production of the guidelines has been facilitated with the generous support of the NOAA, the Government of Flanders and the WMO.



**Fig. 1.2.** The relationship of the Guidelines' sections to four phases of ICAM. Linkages (solid lines) and feedbacks (pecked lines) between Section topics; MAN. PLAN = Management Plan.

# Some examples of cooperation

Type of activity	Cooperation	Programmes
Monitoring	Development of GLOSS network crucial to TEWS's – recently especially to IOTWS and NEAMTWS	GLOSS, TSU
Capacity building	Training in inundation modelling (COAST-MAP-IO) contributing to prepare cadres for IOTWS operation	TSU, CD
Modelling, warning, hazard and risk mapping	NEAMTWS and JCOMM/SS collaborating to address storm surges in the North-eastern Atlantic as part of the TEWS (wave propagation, warning practices, hazard and risk mapping)	TSU, JCOMM/SS + WMO

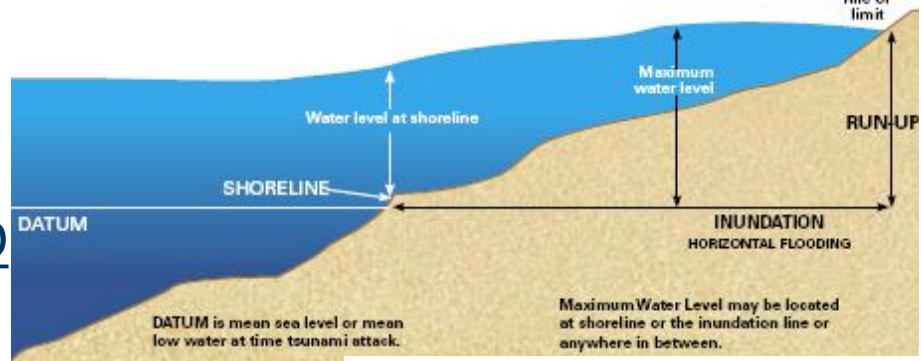
# Some potential for cooperation

Type of activity	Cooperation	Programmes
Coastal planning	ICAM promoting flooding risk mitigation and climate change adaptation through coastal planning (under preparation: South Atlantic and possibly Red Sea/Gulf of Aden)	ICAM, other programmes
Awareness	Potential role of Tsunami Information Centres (TICs) to disseminate information regarding different sea-level related hazards	TSU, other programmes + ISDR

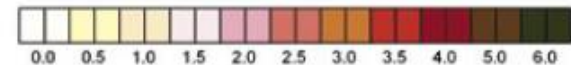
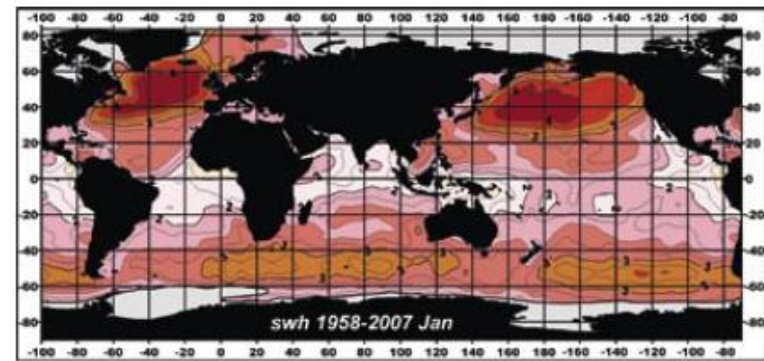
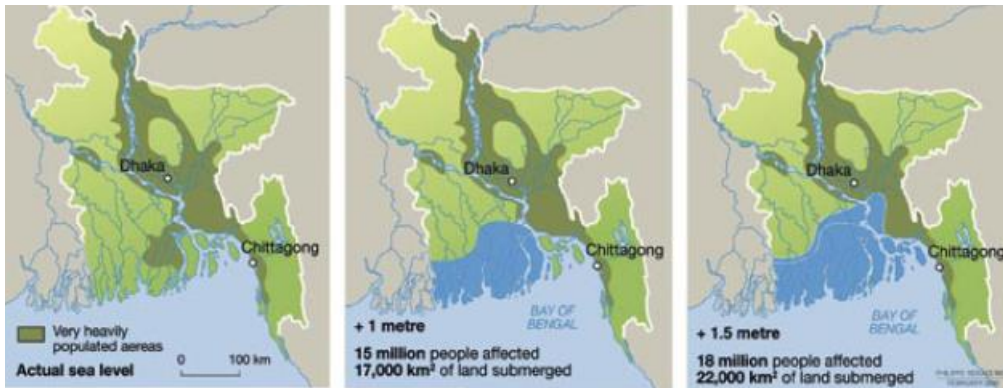
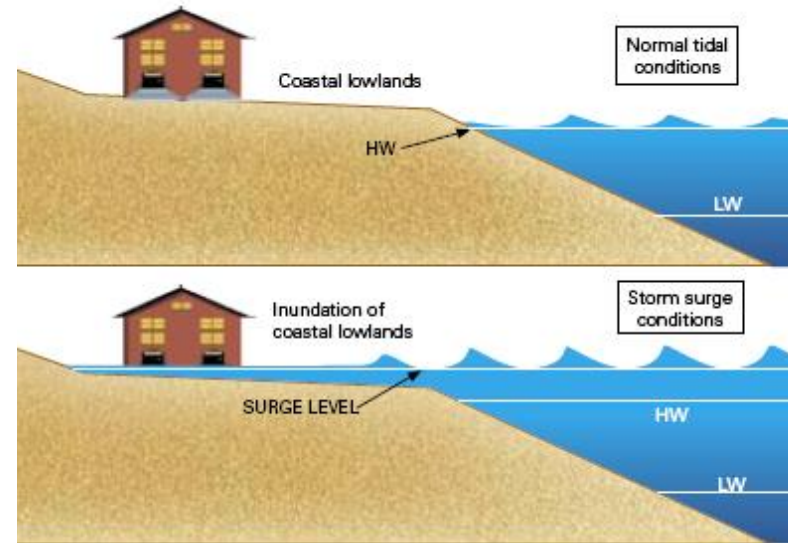
## Subsidiary Bodies

- Inter-ICG Task Team on Sea Level will identify requirements for TWS sea level data involving GLOSS and JCOMM
- GEBCO expected to promote generation of high-resolution bathymetric charts and digital elevation models
- PICO to work on ecosystem observations to support coastal hazard, vulnerability and post-hazard studies

# THE HAZARDS DESCRIBED



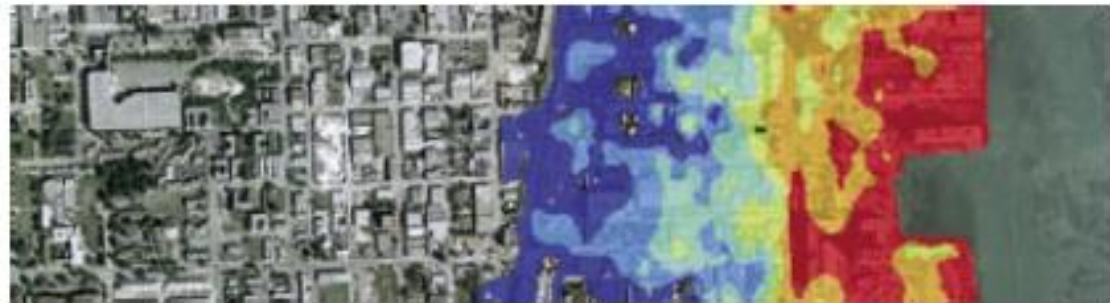
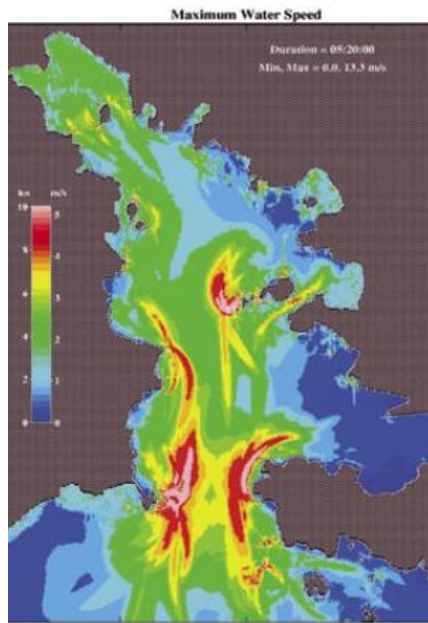
Rapid-onset hazards	Tsunami
	Storm surge
	Extreme wind-forced waves
Cumulative, progressive or "creeping" hazards	Long-term sea-level rise
	Coastal erosion





## IDENTIFYING AND QUANTIFYING THE HAZARDS

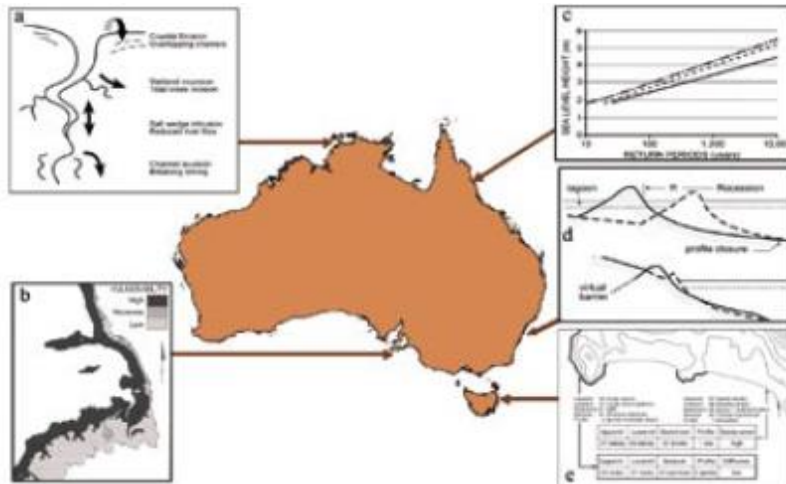
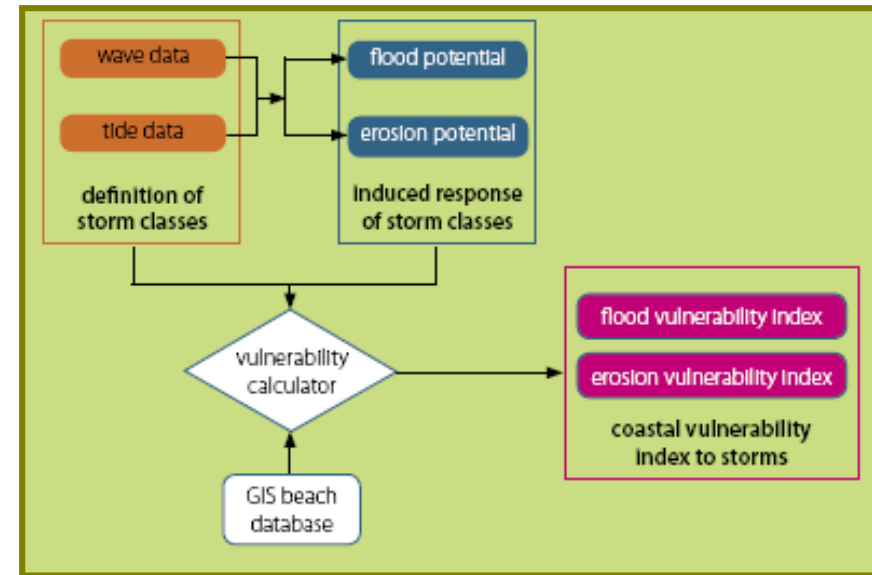
- Define the **geographical limits** of the coastal management area.
- Examine the **historical records** of coastal hazard impact events and shoreline change, also the regional and ocean-wide seismic records.
- Access information on **hazard origins and propagation patterns**, local, regional and far-field.
  - Acquire and **compile data** on nearshore bathymetry and coastal topography.
  - Determine the spatial **parameters of hazard impact** – the exposure (e.g., by modelling or post-impact observation).
  - Determine **probabilities** for hazard scenarios.
  - Display exposure and probability results as **hazard maps**.
  - Convey results of hazard assessment to **risk and emergency managers**.



*Fig. 4.6* Inundation modelling of a storm surge impact.

## MEASURING VULNERABILITY

This section aims to guide the determination of the **social, physical, economic and environmental vulnerabilities** of coastal communities who may be affected by the possible impacts of inundation. It identifies the **data requirements** that are appropriate to the scale the management unit and the specific thematic dimension of vulnerability. It describes how these data may be gathered then processed to provide **vulnerability levels** for defined **inundation scenarios**.



Procedures for vulnerability assessment in respect of natural hazards are documented in publications such as those of ISDR. While many aspects of the vulnerability of coastal communities to coastal hazards are common to community vulnerability to natural hazards in general, the section highlights **consequences of hazard impacts** of particular relevance to coastal areas.

## ENHANCING AWARENESS AND PREPAREDNESS



- Identify an appropriate **early warning framework**.
- Raise **awareness of the risk** at all levels in the community.
- Establish the **key operational requirements** of the early warning system.
- Prepare all levels of the community for **emergency responses**.

## • MITIGATING THE RISK

Procedures and information that policy makers should consider within ICAM when developing a risk mitigation strategy for the coastal hazards.

