Decision-making tools in support of ICAM – the case of marine-related hazards

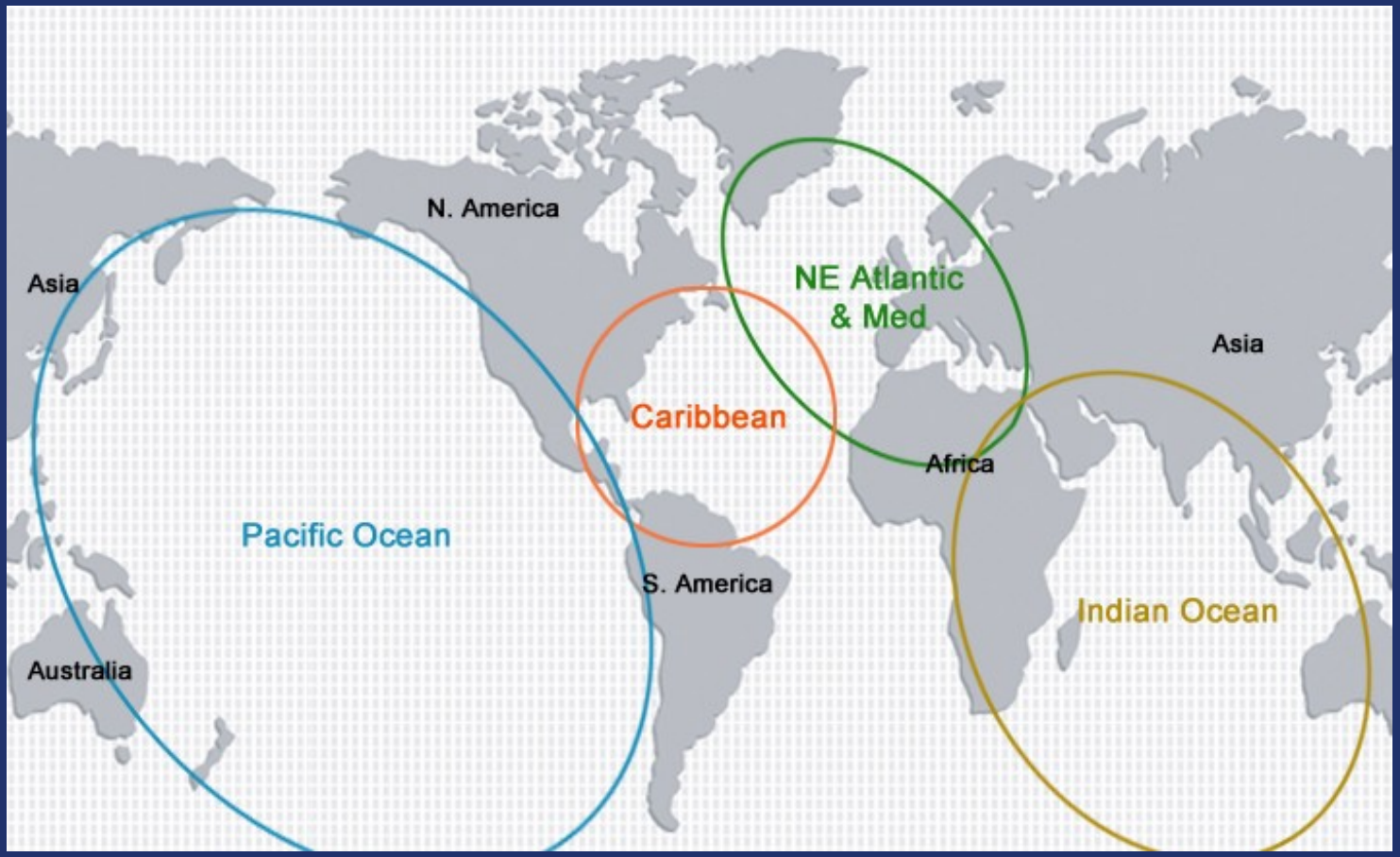
Presented by

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on behalf of IOC - UNESCO

GEOSS Support for Decision-Making in the Coastal Zone:
First Regional Workshop: NAO Athens 9-13 June 2008

The IOC-coordinated regional warning systems



Since 1965 – successful operation of PTWS (Pacific)

From 2005 – development of three more regional systems

From “tsunami” to “multi-hazard” warning systems

- *Physical coastal hazards*
  - *Tsunamis*
  - *Storm surges*
  - *Extreme wind-forced waves*
  - *Sea-level rise*
  - *Coastal erosion*

Scope of the warning systems

- *Assessing*
  - *Hazard probability*
  - *Community vulnerability and risk in respect of hazard*
- *Preparing*
  - *Social and institutional awareness and readiness*
- *Warning*
  - *End-to-end systems in place for detection, alert and warning*
- *All in the ICAM context*
  - *Systems developed within framework of Integrated Coastal Area Management*

External drivers of risk awareness and mitigation

- *The new European Floods Directive*
  - *Preliminary Flood Risk Assessments (by 2011)*
    - *Territory-wide – inland and coastal*
    - *All types of flooding*
  - *Flood Hazard Maps*
    - *Handbook on Flood Mapping - EXCIMAP*
  - *Flood Risk Maps (by 2013)*
  - *Flood Risk Management Plans (by 2015)*
- *The Barcelona Convention*
  - *ICZM in the Mediterranean*

Assessing the hazards

- *What is the likelihood of a hazard event?*
  - *Location*
  - *Magnitude*
  - *Return period, rate of erosion*
  - *Joint probabilities:*
    - *storm surge – extreme waves,*
    - *river flood – storm surge events*
  - *Information conveyed by regional hazard mapping*

- *What is the local impact of a regional hazard?*
  - *Pathways for hazard impact – bathymetry, coastal topography, existing defences*
  - *Limits conveyed by modelling and hazard mapping (erosion, inundation)*

Assessing the vulnerability of coastal communities

- *Dimensions of vulnerability*
  - *Social, economic, environmental, institutional*
- *Quantifying vulnerability, consequences*
  - *Aggregated vulnerability*
- *Dynamic*
  - *Temporal changes in all dimensions*
  - *Uncertain scenarios*
  - *Feedback from mitigation*
- *Vulnerability mapping*
  - *Multilayered information, zones, hotspots, aggregated vulnerability*

The risks to coastal communities

- *Risk – the product of hazard probability and community vulnerability in respect of the hazard*
  - *Different hazards, different risks*
  - *Different dimensions of vulnerability, different risks*
  - *Risk levels*
  - *Risk mapping – delineation of risk zones, hotspots*

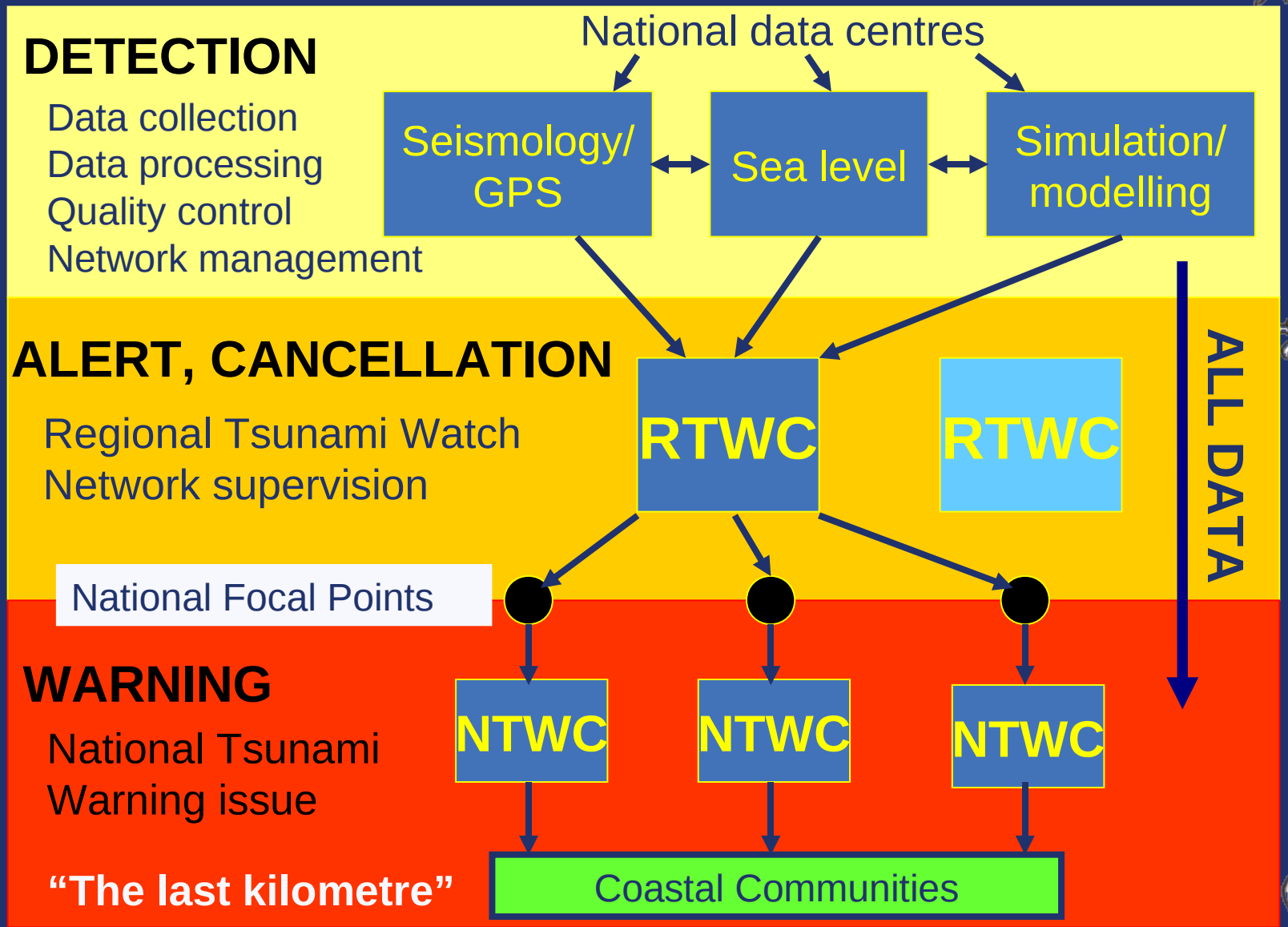
- *Risks changing with time*
  - *Changes in hazard frequency, magnitude*
  - *Social and economic changes*
  - *Changes in the coastal environment*
  - *Feedbacks from mitigation actions*

- *Dealing with uncertainty*
  - *Long, irregular return periods (especially tsunamis)*
  - *Unpredictable magnitudes*
  - *Unknown scenarios*

Managing the risk

- *Bridging the knowledge-practice interface*
  - *Stakeholder/public involvement in research agenda and management planning*
  - *acceptance of the assessment at all levels*
- *Warning systems*
  - *Tried and tested*
- *Emergency procedures*
  - *Tried and tested*
- *Strategic mitigation, adaptation*
  - *Strategic management to reduce risk*
  - *Structural and non-structural measures*
  - *Protection; Accommodation; Retreat*

Levels of functions for the architecture of NEAMTWS



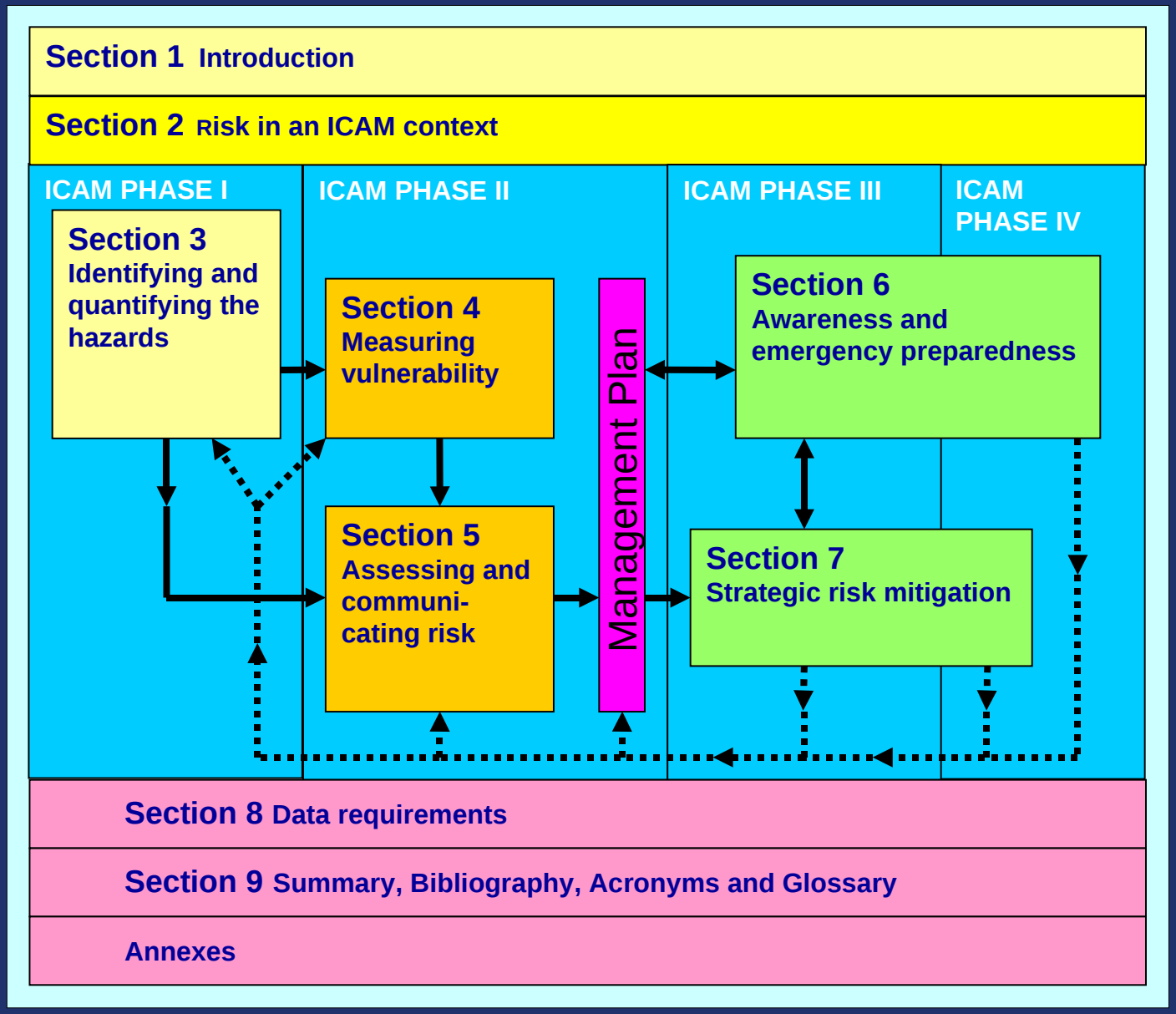
IOC-coordinated warning systems

- *Operated by IOC Member States*
- *Integration of oceanographic and meteorological data (IOC, WMO, JCOMM)*
- *Common observational platforms, databases, alerting protocols, response mechanisms*
- *Scope for application of GEO/GMES marine services*
- *European Earth Observation System*
- *Scope for synergies*

Key objectives of IOC-coordinated multi-hazard warning systems

- *Effective in risk reduction*
- *Compatible with Regional aims/directives*
- *Synergetic with other warning systems*
- *Taking account of research developments*
- *Affordable*
- *Sustainable*
- *Credible – appropriate to the risk*
- *Responsive to changing conditions*

ICAM Guidelines: Hazard awareness and mitigation



Thank you

Sea-level related hazards in the ICAM process

PHASE I – PRELIMINARY IDENTIFICATION

1. Identify an existing ICAM or other applicable framework where coastal hazard management goals and objectives could be incorporated

2. Identify background data on coastal hazards and drivers that can be used to promote effective coastal hazard management

PHASE II – PREPARATION OF PLANS IN ICAM

1. Carry out social and environmental assessments through analysis and forecasting

2. Define goals, strategies, and development of desirable and possible scenarios; identify institutional, social and environmental conditions, resources and data available

3. Prepare the Management Plan based on ICAM principles, goals and objectives

Sea-level related hazards in the ICAM process

PHASE III – IMPLEMENTATION

1. Set up the necessary institutional mechanisms for incorporating interests potentially affected by sea-level related hazards into the ICAM process

2. Implement the ICAM plan (or any comparable instrument), including through specific measures and tools to protect life and property from sea-level related hazards

3. Evaluate the measures implemented and their effectiveness in reducing the risks

PHASE IV – CONSOLIDATION/ REPLICATION/ EXPANSION

1. Consolidate the ICAM plan in a long time-scale, by replicating the plan implementation with the incorporation of learned good practices and correction of detected mistakes

2. Incorporate new knowledge and technology relevant to sea-level related hazards

3. Adapt the plan to new situations in a continually changing scenario