ANNEX-3-1 04 Raape Dss Baseline

Tsunami Early Warning Process Baseline

Japanese German Coordination Meeting on IOTEWS
March 12-13, 2007

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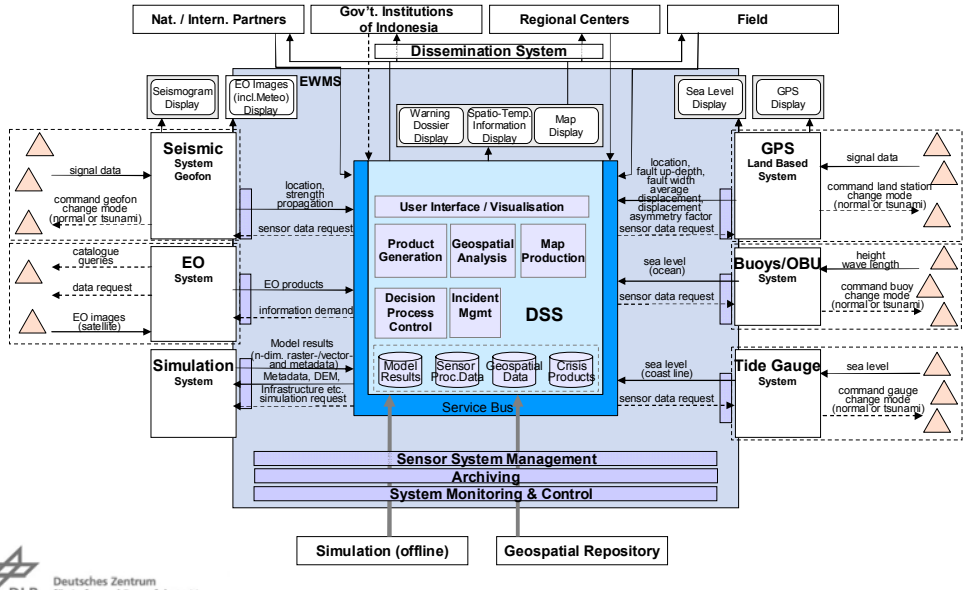
GITEWS Approach (DSS Perspective)

Several **Sensor Systems** provide essential input for **Decision Support System**



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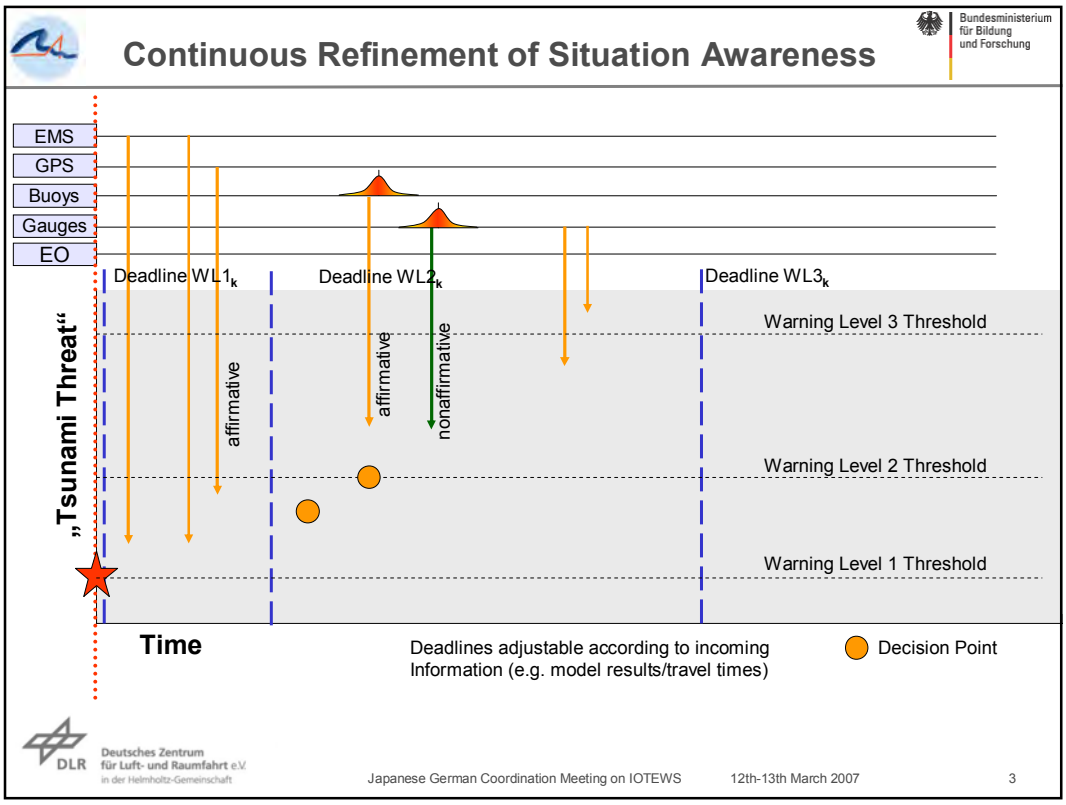

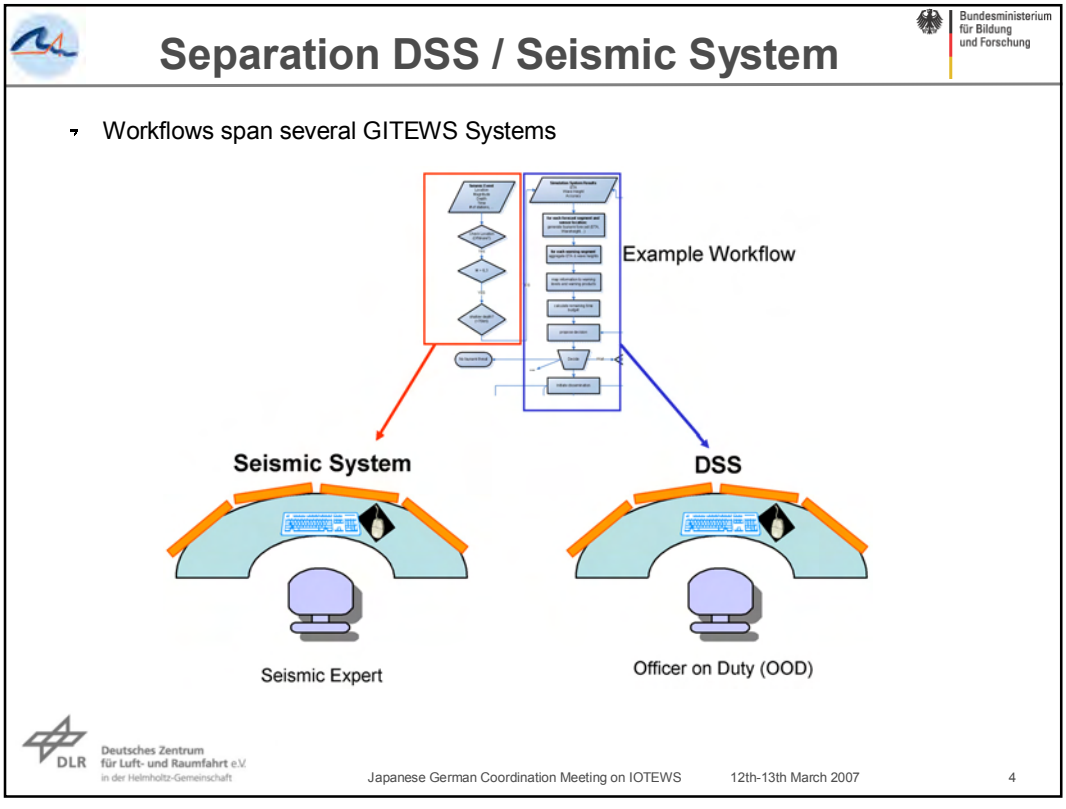

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Officer on Duty (OOD)

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- Disaster management decision maker
  - monitor and assess the situation
  - initiate and supervise the situation awareness process
  - decide autonomously or with support from the EWMS when and how to trigger what actions (e.g. issue a warning)
  - with regard to tsunami threats within the area of responsibility
- Not included:
  - in-depth evaluation and analysis of incoming sensor information (this is covered by the sensor system expert roles)
- But:
  - OOD is free to visualize incoming sensor information if the OOD assumes this to be helpful to improve situation awareness
    - (e.g. sea level diagrams)

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Baseline Workflow based on Seismic Information

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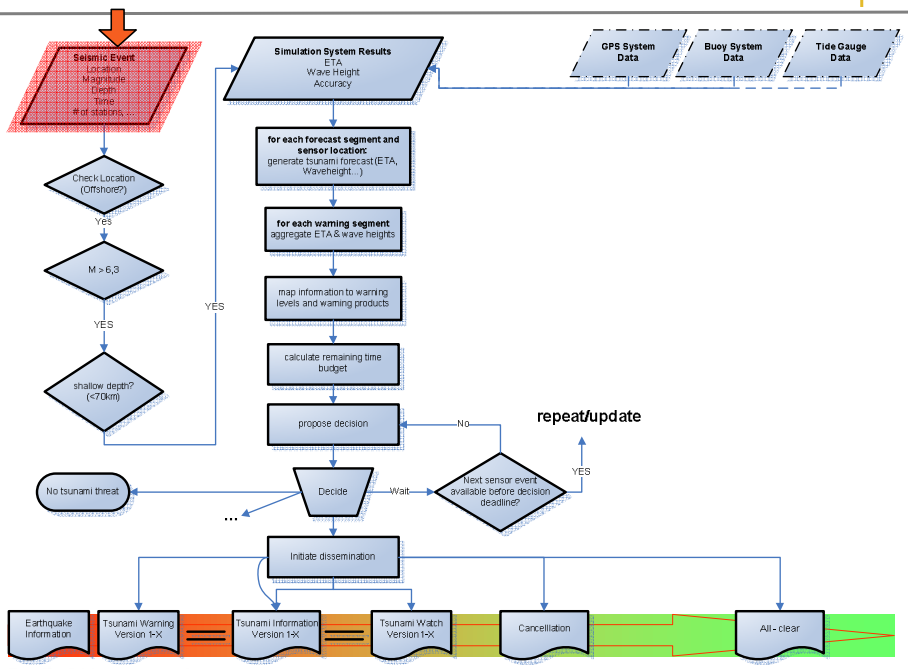

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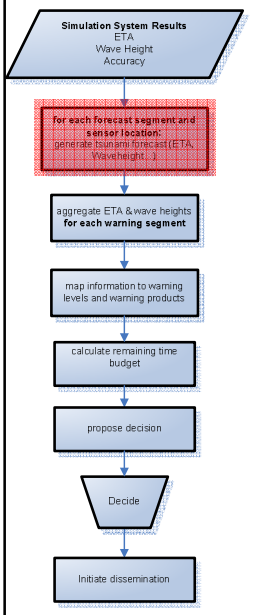
Forecast Segments



- A **Forecast Segment** is a well-defined segment of the shoreline which is treated as homogeneous unit by the EWMS with respect to the **Tsunami forecast process**.
- Each Forecast Segment contains **Forecast Points** where parameters are calculated
  - Estimated Time of Arrival (ETA)
  - Estimated Wave Height (EWH)
  - …
- A **Forecast Segment** is considered to have more or less **homogeneous** properties regarding tsunami arrival patterns, vulnerability structures, etc., but should also consider administrational boundaries.
- Once defined, Forecast Segments are considered static but might be modified, split up or aggregated to different administrative *Warning Segments* *(see next slide)*.

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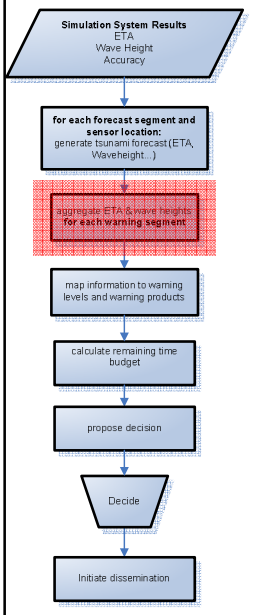
Warning Segments



- A **Warning Segment** is a well-defined segment of the shoreline which is treated as homogeneous unit by the EWMS with respect to the **Tsunami warning process**.
- A **Warning Segment** is defined according to administrational boundaries.
- A **Warning Segment** is used as smallest warnable unit for which tsunami threat information is aggregated and to which crisis products may be addressed.

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Administrative Level of Warning Segments

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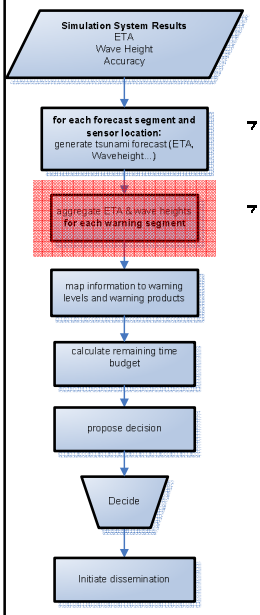

- **How should Warning Segments be defined?**
- **Proposal**: considered on administrational levels
  - Propinsi (Provice) 14
  - Kabupaten (County / Regency) approx. 90
  - Kecamatan (Subdistrict) approx. 500

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Warning Segments on Kabupaten Level

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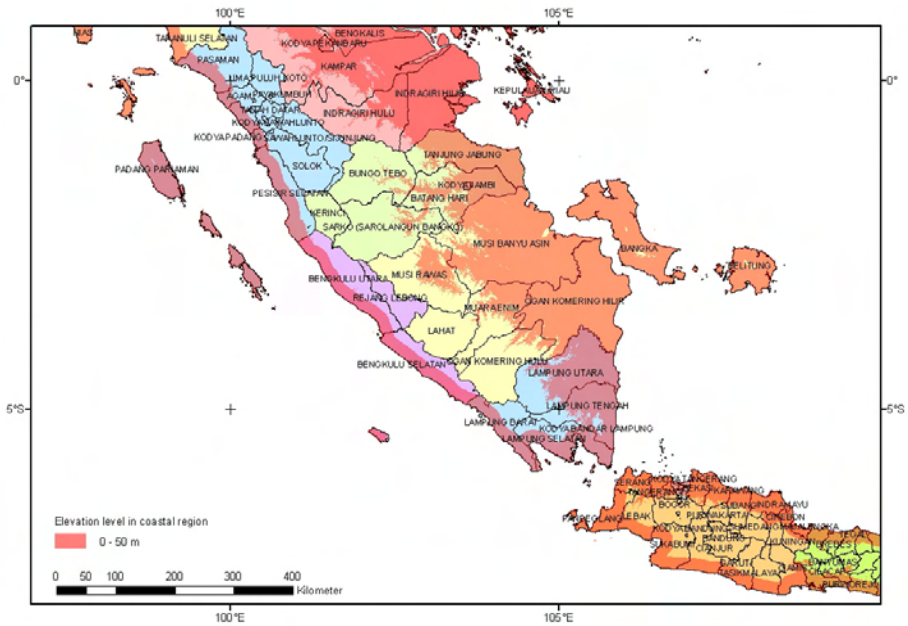

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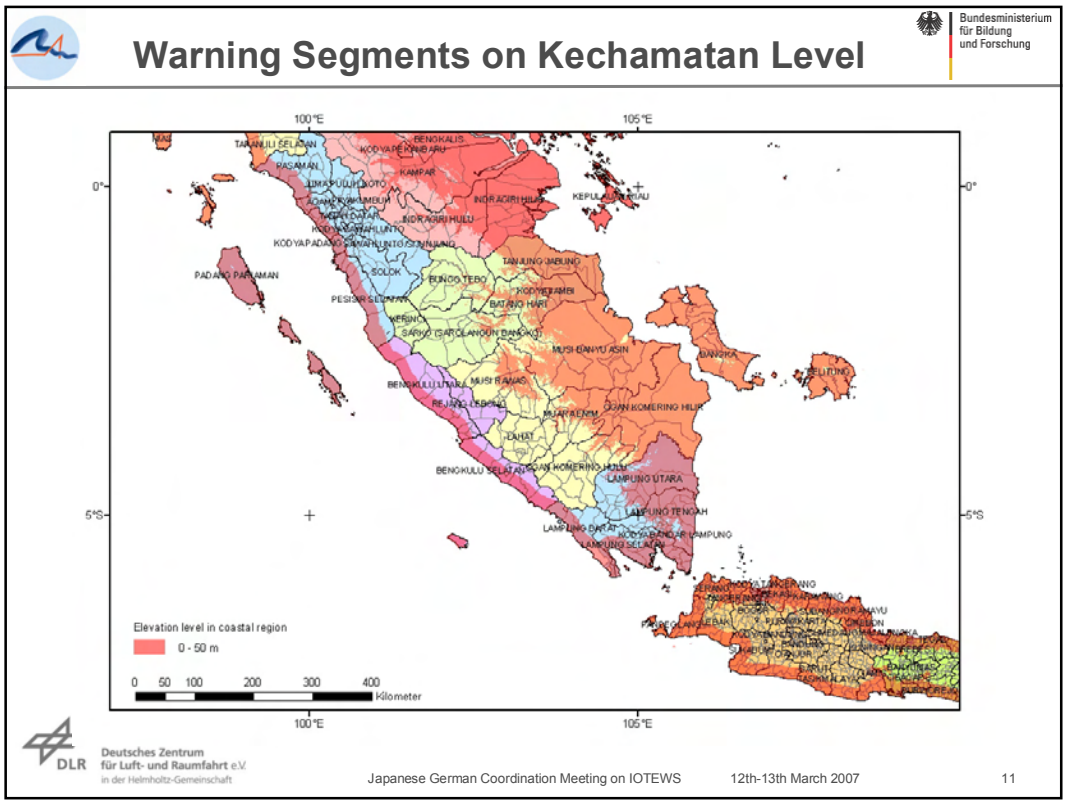

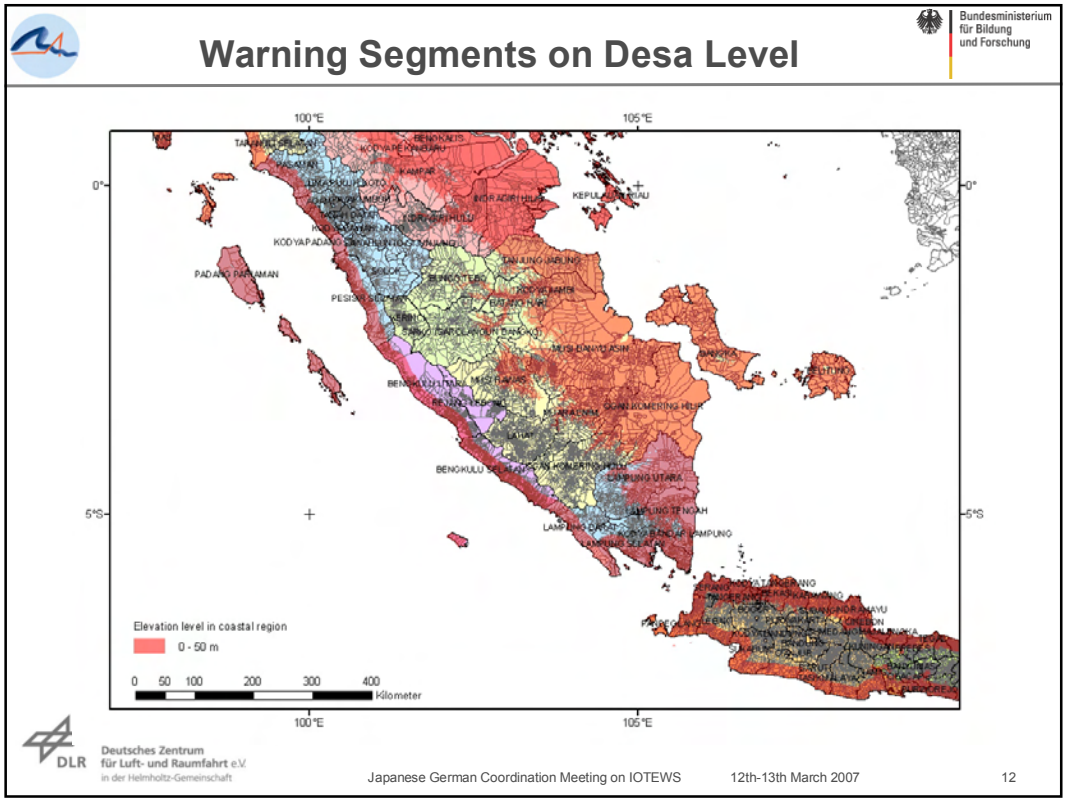

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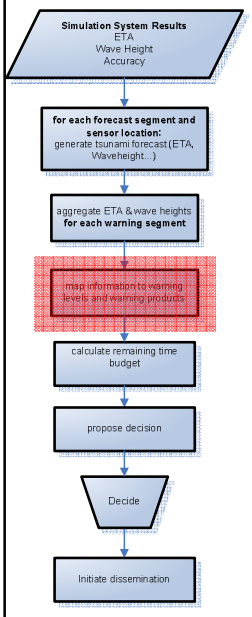
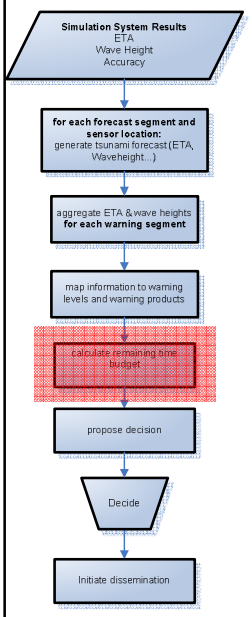
Warning Levels and Warning Products



- Situation Assessment information will be mapped to Warning Levels and suggested Warning Products

Additional Decision Support Information



- Calculate remaining time budget
- Supports the decision if there is time to wait for next sensor events before the 5-minute-deadline
- This step may include other calculations that may support the decision maker

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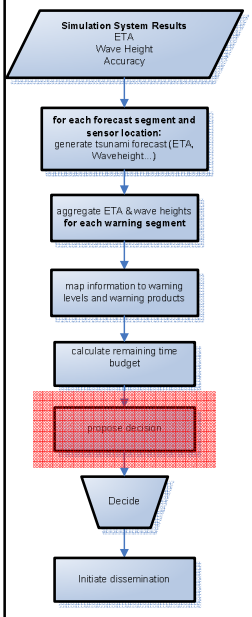
Generate Decision Proposals



- The EWMS DSS will generate decision proposals to the Officer on Duty (OOD)
- Decisions may include
  - Activation/deactivation of sensors
  - The dissemination of specific warning products to specific warning segments
    - All at once, step-by-step, … (not decided yet)
  - The proposal to wait for next sensor events that will help to improve situational awareness (in case of sufficient time budget)
  - …

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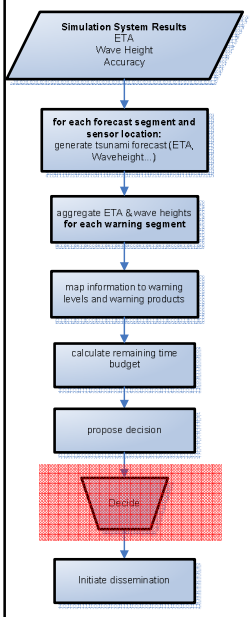
Officer on Duty decides



- The decision proposals generated by the DSS are presented appropriately to the OOD
- The OOD decides on what to do

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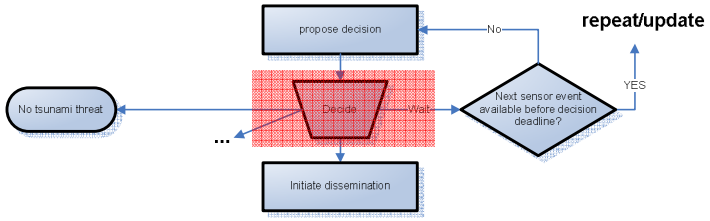
Decide



- The OOD decides mainly
  - To initiate (or update) the warning process
  - To de-escalate (no tsunami threat)
  - To wait for next sensor events
- The DSS will support the OOD
  - to stay within available time budgets (remainder of upcoming decision deadlines)
  - In activation/deactivation of sensors
  - the dissemination of specific warning products to specific warning segments
  - …

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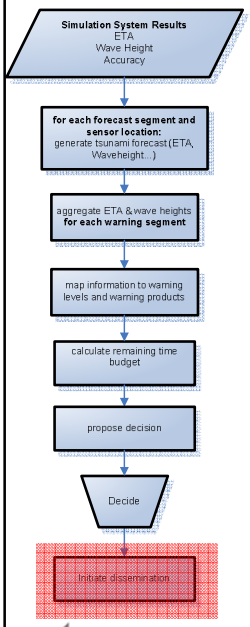
Dissemination



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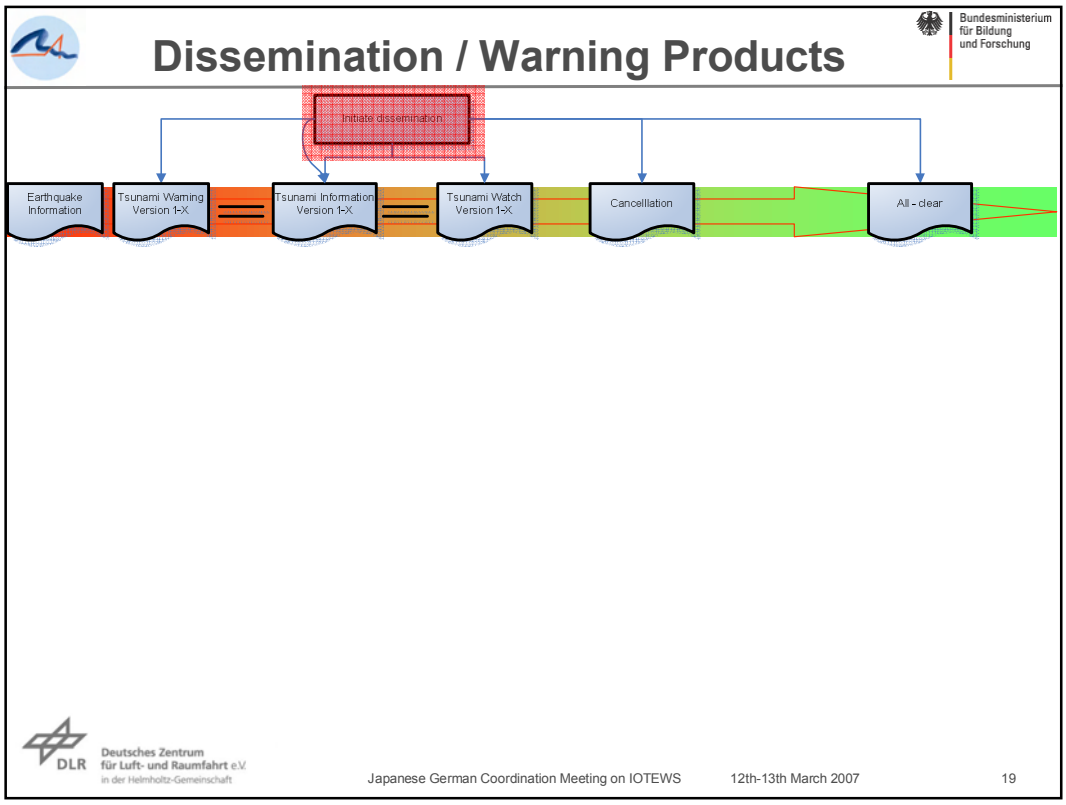

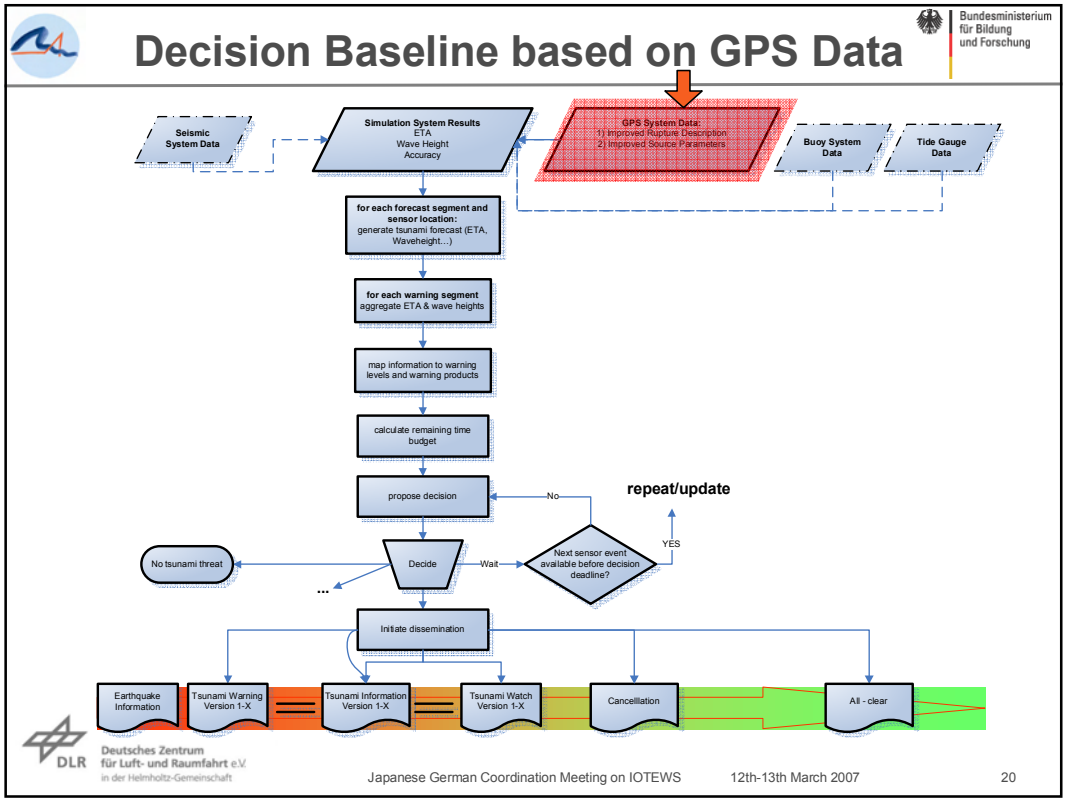

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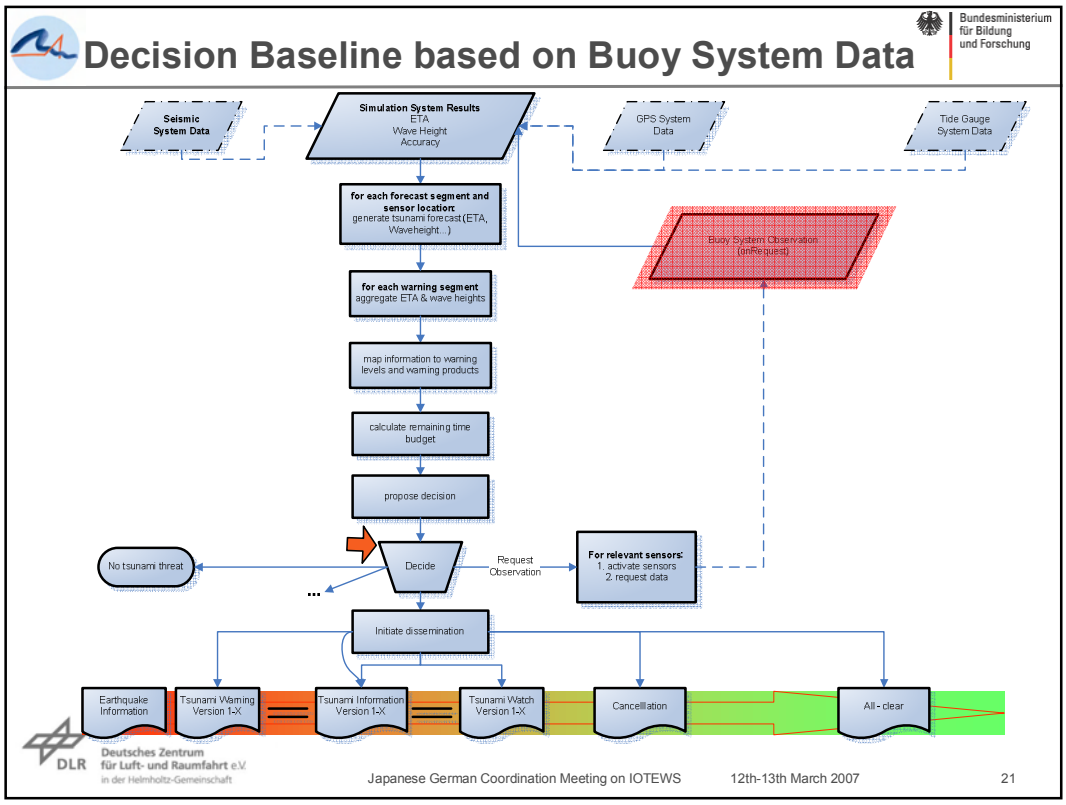

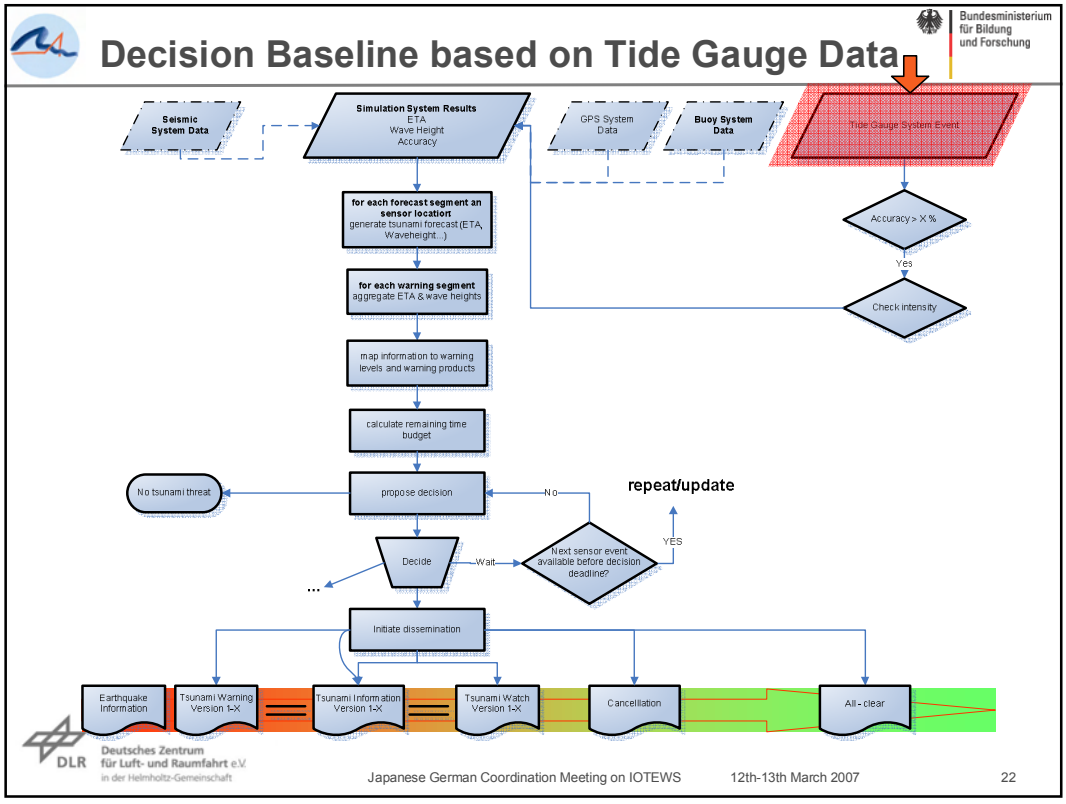

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Core Decision Support Loop

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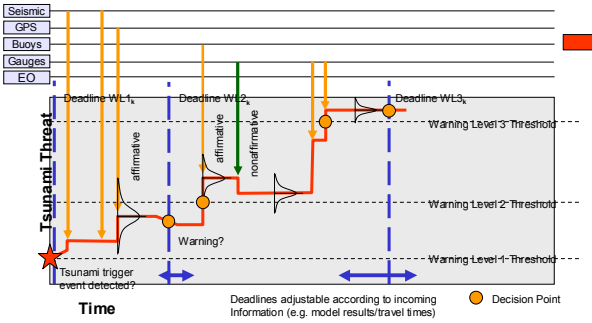
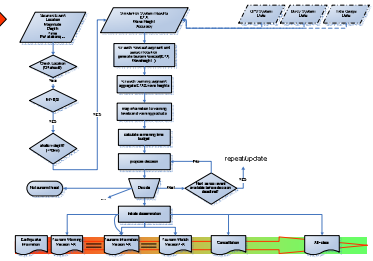
Workflows are triggered each time new information comes in or deadlines are reached





Open Standards for Spatial Data

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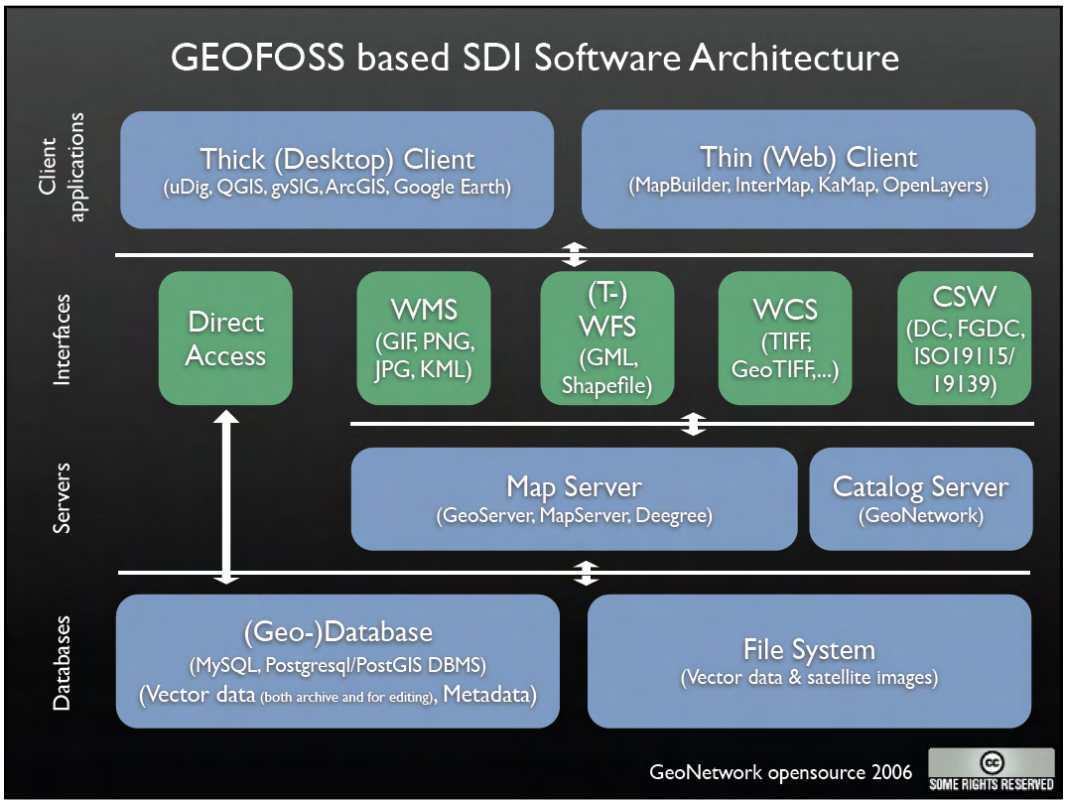
- State-of-the-art: Open Geospatial Consortium (OGC)
- “Static” Services
  - Web Map Service – request map (i.e. image)
  - Web Coverage Service – request binary gridded or aggregated data
  - Web Feature Service – request feature data
  - …
- Sensor Web Enablement Framework
  - Schemas
    - SensorML – models and schema for describing sensor characteristics (geolocation, response)
    - Observation & Measurement – models and schema for encoding sensor observations
  - Services
    - Sensor Observation Service – access sensor information (SensorML) and sensor observations (O&M)
    - Sensor Planning Service – task sensors or sensor systems
    - Web Alert Service – asynchronous notification of sensor events (tasks, observation of phenomena)
    - Sensor Registries – discovery of sensors and sensor data

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