Developing OGC Compliant Geoprocessing Services for Supporting Integrated Coastal Zone Management

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Overview

• Introduction

• Indicators for ICZM

• An OGC Compliant Platform for ICZM

• Conclusions
Setting the Frame

- The coastal zones are of strategic importance being home to a large percentage of European citizens
- Exposure of the coastal zones to the possible impacts of climate change
- The vulnerability of human and natural systems on the coasts has increased due to the continuing development and built-up in the immediate vicinity of the shoreline
Effects of climate change

Flooding

Coastal erosion

Soil erosion and leaching
Mitigation and adaptation

*Mitigation* is defined as the technological change and substitution that reduce resource inputs and emissions per unit of output.

*Adaptation* to climate change consists of initiatives and measures to reduce the vulnerability of natural and human systems against climate change effects.
Conceptual model for the Decision Support Tool

- **SRES**
  - Economic development
  - Technological development
  - Population development

- **DRIVERS**
- **PRESSURES**
  - Greenhouse gas emissions

- **STATES**
  - Climate change
  - LAND-SEA database
  - Sea level rise
  - Flooding
  - Coastal erosion
  - Groundwater level

- **IMPACTS**

- **RESPONSE**
  - ICZM
    - Coastal protection
    - Off-shore wind farms
    - Spatial planning

**Mitigation**
- Monitoring

**Adaptation**
- Modelling
- Acting
Indicator selection

- The selection of indicators is based on the following criteria
- The indicators selected should be based on existing indicator sets like the 27 indicators from the DEDUCE project
- The indicators selected should have relation to ICZM in a climate change perspective
Indicators - 1

- Demand for property on the coast (Indicator 1)
  - Size, density and proportion of the population living in the coastal zone (1.1)
  - Value of residential property (1.2)
- Area of built-up land (Indicator 2)
- Rate of development of previously undeveloped land (Indicator 3)
- Traffic in the coastal zone (Indicator 4)
- Intensity of tourism (14)
Indicators - 2

- Flooding (27)
  - Number of people living within ‘risk zone’
  - Area of protected sites within an ‘at risk’ zone
  - Value of economic assets within an ‘at risk’ zone

- Coastal erosion (26)
  - Geological stability
  - Potential for Renewable Energy
The software architecture

• General standards (ISO, OASIS)

• Web (W3C)

• Geospatial (OGC)
  – WMS, WFS, WPS, Spatial SQL

• Open source versus commercial software
OpenSource Components

- Operating system (Linux)
- Database (PostgreSQL / PostGIS)
- Tomcat – application server
- Apache – Web server
- Geoserver – Geospatial server
- MapFish – Print server
- GeoExt (Web client)
  - OpenLayers + extJS
Data

- Integrated Land-sea Database
- ENC data (S-57)
- National topographic maps
- Pan-European data sets from EEA
- Different access rights and data types
Client Interface

- Build using the GeoEXT system, based on Openlayers and ExtJS system
- System has standard GIS components in terms of layer tree and navigational functionalities
The WPS Processes

- The Web application creates an Execute command to Geoserver
- The PostGIS database receives the spatial query and creates the result view
- The database returns the view to GeoServer that renders the result back to the client as WMS
- For further processing a WFS is made
Geoprocessing dialog

• For geoprocessing execution, a process dialog has been created, with predefined options
Conclusions

• Coastal areas are perceived as particularly vulnerable to the impacts of climate change
• Knowledge based ICZM can contribute to as well climate change adaptation as adaptation
• High quality integrated land-sea data are imperative for reliable results
• An OGC compliant geoprocessing environment based on open source can facilitate the dissemination and use of the ICZM tools
THANK YOU FOR YOUR ATTENTION ! ! !

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