EMODnet Stakeholder Conference & Sea-basin Workshops
14-15 February 2017

Geology theme

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Geology?

- **The EMODnet geology data available includes:**
  - sea-bed substrate
  - sediment accumulation rate
  - sea-floor geology
  - bedrock lithology
  - bedrock stratigraphy
  - coastline migration
  - mineral resources (oil and gas, aggregates, metallic minerals)
  - geological events (earthquakes, submarine landslides, volcanic centres)
- **The EMODnet Coastal mapping data will include:**
  - Coastline
  - Legal baseline
  - Intertidal area
  - High resolution underwater Digital Terrain Model

Wind Farm Siting

Marine Protected Areas

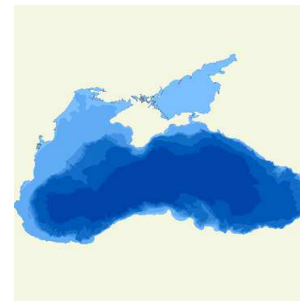Oil Platform Leaks

Climate

Coasts

Fishery Management

Fishery Impacts

Eutrophication

River Inputs

Bathymetry

Alien Species

◉ **Which Checkpoint challenges require geology data?**

- Windfarm siting

- Marine Protected Areas

- Coasts

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What are the requested Challenge products?

Wind Farm Siting

Determine the suitability of sites for development of a wind farm. All aspects should be considered - wind strength, seafloor geology, environmental impact, distance from grid, shipping lanes

Marine Protected Areas

Analyse the existing network of marine protected areas and determine whether the network constitute a representative and coherent network as described in article 13 in the Marine Strategy Framework Directive.
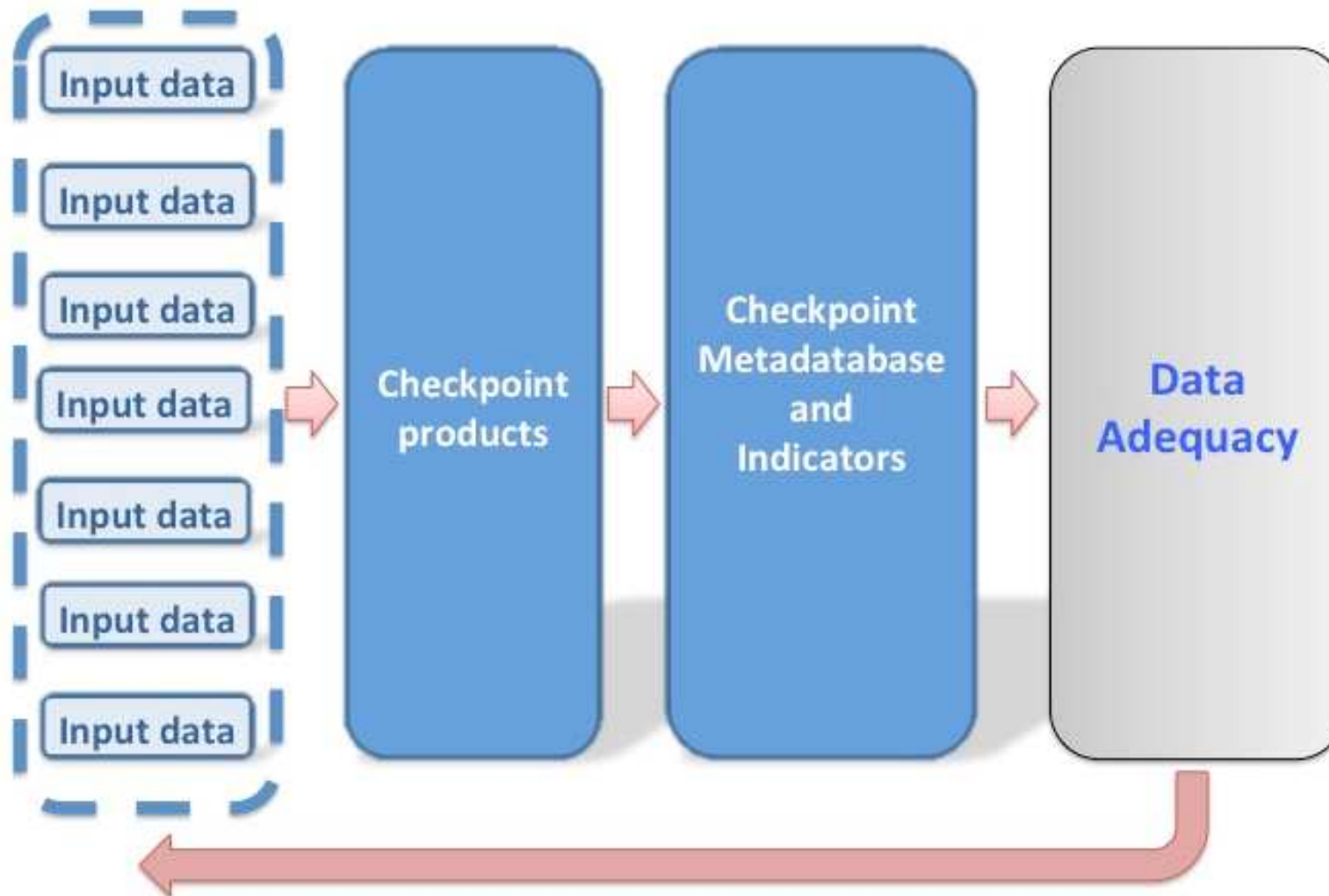
Coasts

Calculate average annual sea-level rise per stretch of coast And average annual sediment balance (mass gained or lost per stretch of coast) for 10, 50 and 100 years.

The Checkpoint methodology in general

Checkpoints Results – General (1)

◉ **Mediterranean Sea**

- ■ The input data sets used in this theme are several: coastal geomorphology, concentration of suspended particulate material in the water column, depositional environment, lithology, sedimentary structure.

- ■ **The quality elements indicators (coverage, resolution, accuracy, validity) for input data sets are dominantly "not adequate" and "partly adequate"**

◉ **A sediment mass balance product cannot be developed for any part of the basin mainly because the sediment mass flux from rivers is not known. Data are available only in scientific literature or very locally in a myriad of scattered non-homogeneous data sets.**

Checkpoints Results – General (2)

- ◉ **Black Sea**
  - ■ General geological maps exist but the resolution should be improved.
  - ■ There is a general lack of the sediment sea bed data.
- ◉ **Atlantic**
  - ■ Only 7 data entries related to geology datasets were recorded, which hampers reliable statistics. Most of them concern the coastline and two are about seabed sediments. The literature survey stressed insufficient resolution of the seabed substrate data.
  - ■ A wealth of sediment samples in analogue form are still unexploited.
  - ■ There is a lack of information on vertical land motion (see point on GPS measurements in physics/sea level section)
  - ■ (…) models will need to use finer grid resolutions to account for local effects, such as coastal evolution and sediment transport.

Checkpoints Results – General (3)

◉ **Baltic**

- ■ Finer seabed slope products are needed, especially for Wind farm siting

- ■ **There is a lack of sediment concentration observations in river discharge;**

- ■ Existing seabed sediment and substrate type data are useful in general wind farm siting assessment but not in refined wind farm siting design.

◉ **North Sea**

- ■ On the scale of the North Sea basin, **no sediment data was discovered that could enable calculation of annual sediment mass balance at the coast** for each NUTS3 region. Indeed, any usable data for non-experts is rare, since those datasets that are available require expert processing. For example, geology data from EMODnet, OneGeology or the European Atlas of the Seas provided only a rough indication of sediments near the coast.

General conclusion for "geology"

- **In the Mediterranean and North Sea basins, a sediment mass balance estimation is not possible. Thus a monitoring gap exists for suspended material inputs from rivers, sediments quality distribution, geomorphology and lithology of the river/seabed and the coastal transport**

- **Critical actions are required to be undertaken in order to:**

  - **1) collect and assemble the scattered existing data sets on sediment quantity and quality at the coasts**

  - **2) develop new schemes for the sediment mass balance monitoring on the basis of satellite altimetry, multi- or hyper-spectral sensors, hydrological and sedimentological in situ monitoring integrated with coastal morphodynamics modelling and predictions.**