DANUBIUS-RI
making River-Sea Systems work

International Centre for Advanced Studies on River-Sea Systems

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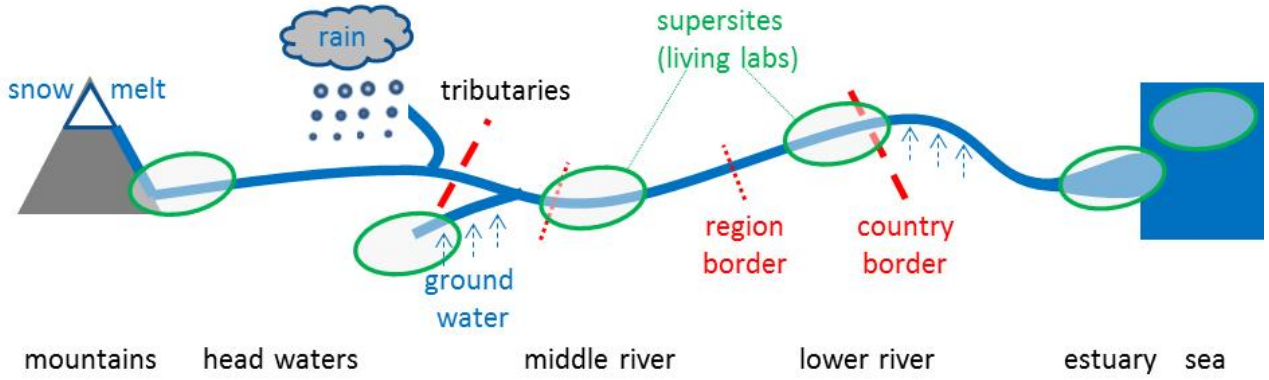
And the DANUBIUS-RI Consortium

GeoEcoMar

DANUBIUS-RI *making River-Sea Systems work*

- Interdisciplinary, distributed Research Infrastructure (RI)
- Supporting research addressing the conflicts between society's demands, environmental change and environmental protection in River–Sea Systems worldwide
- Hub/Headquarters in Romania
- Components across Europe
- Preparatory Phase funded by H2020 grant (December 2016 - November 2019)
- Submitted ERIC documentation at the EC in August 2020 = Implementation Phase
- Project led by GeoEcoMar (Romanian National Institute for Marine Geology and GeoEcology)

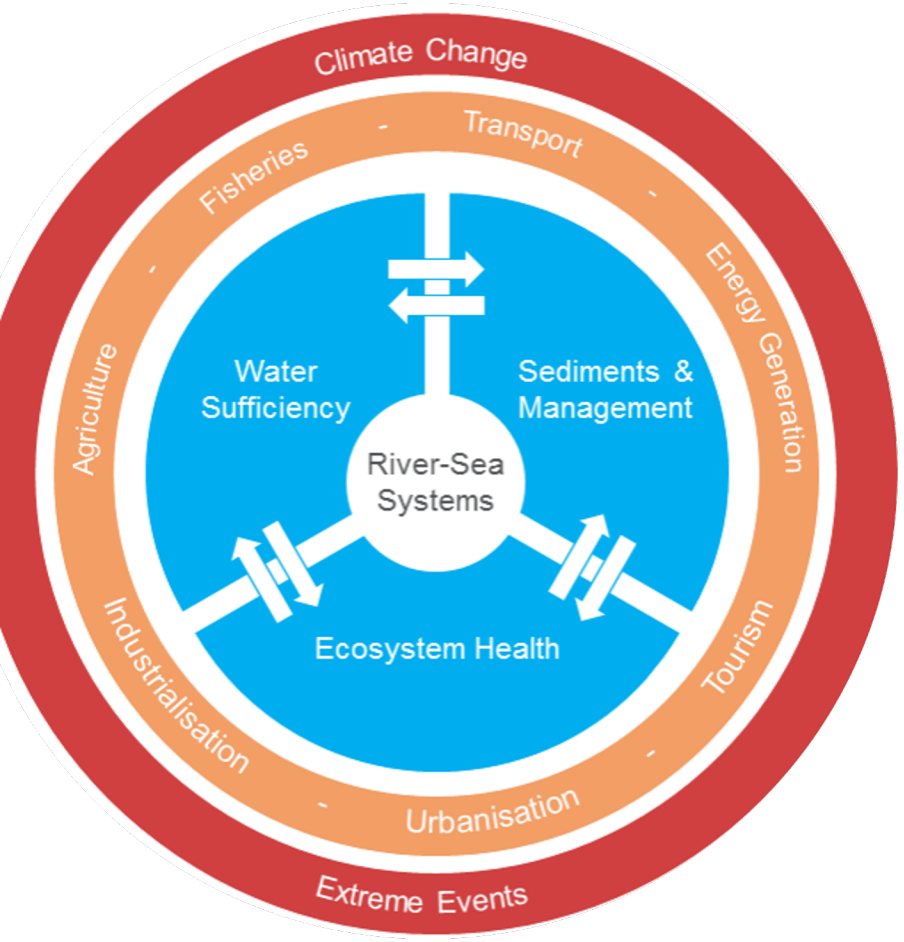
Driver for DANUBIUS-RI



Many societal challenges related to River-Sea Systems are multi-faceted and require new approaches to research, spanning traditional disciplines, with a RI that:

- spans the catchment from source to coastal sea
- provides innovative opportunities for boundary spanning
- facilitates knowledge exchange
- attracts young people to science
- maximises the impact of investments in environmental research,
- driving innovation

Global change and global megatrends affect River-Sea Systems at scales ranging from local to global



Guiding Questions for DANUBIUS-RI

- What constitutes a healthy River-Sea System in the Anthropocene?
- How are River-Sea Systems changing due to multiple and interacting pressures?
- How do processes and changes in parts of the River-Sea System propagate within the River-Sea continuum, both up and downstream?
- How are these changes affecting ecosystem health, its functioning and services?
- How can we sustainably balance use, protection and development of River-Sea Systems?
- How can we define and implement a management regime that can sustain the ecosystem services of a River-Sea System?

Our Motivation and Challenge: Healthy River-Sea Systems

DANUBIUS-RI research areas to be addressed for achieving healthy River-Sea Systems:

Global Change and Megatrends

- Climate Change and Extreme Events

Water and Sediment

- Hydromorphology and Quantity: From Source to Sea
- Quality: Nutrients and Pollutants

Biodiversity and Ecosystems

- Ecosystem Functioning
- Ecosystem Services

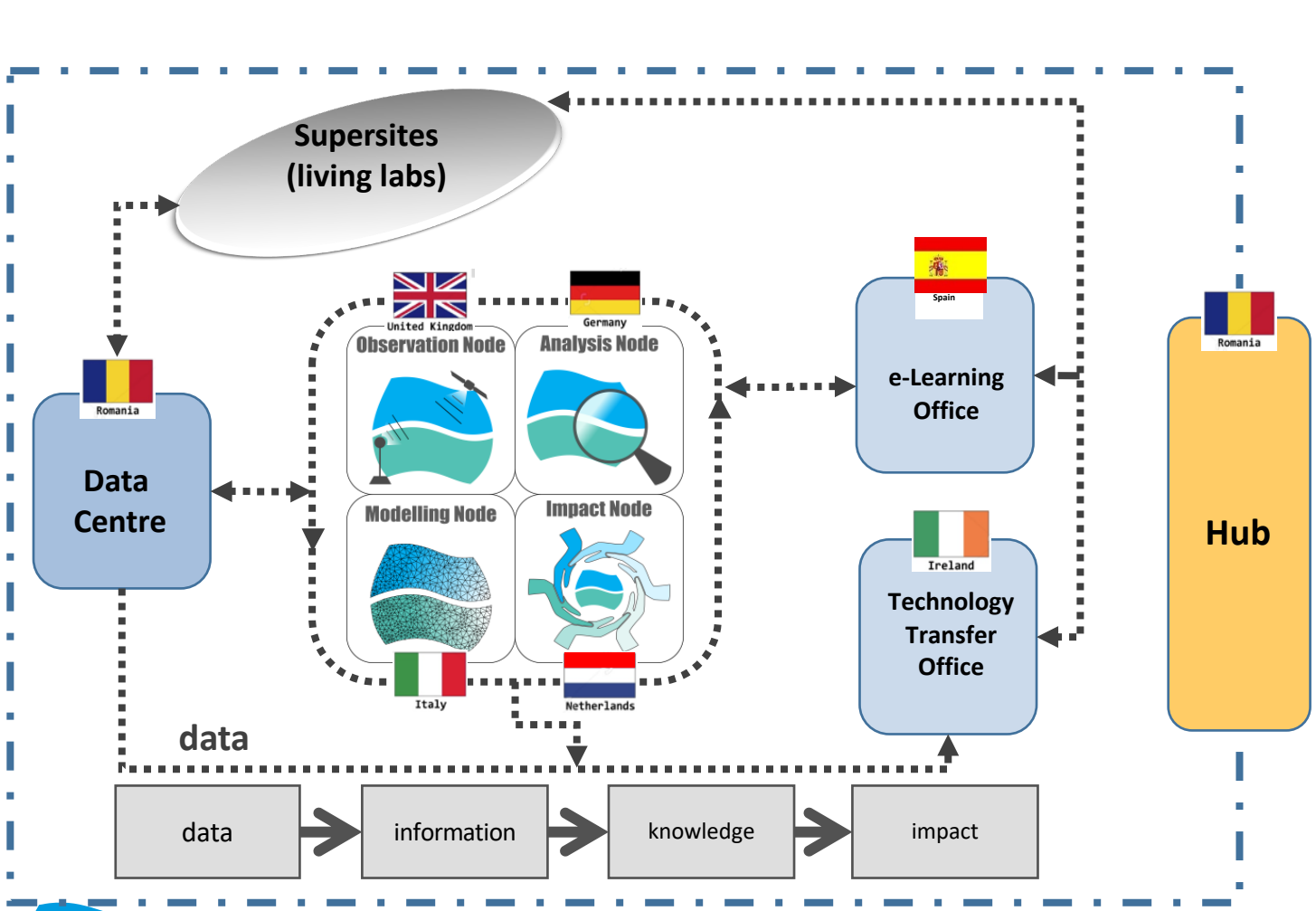
Multiple impacts on River- Sea Systems, taking into account the need to respond to complexity

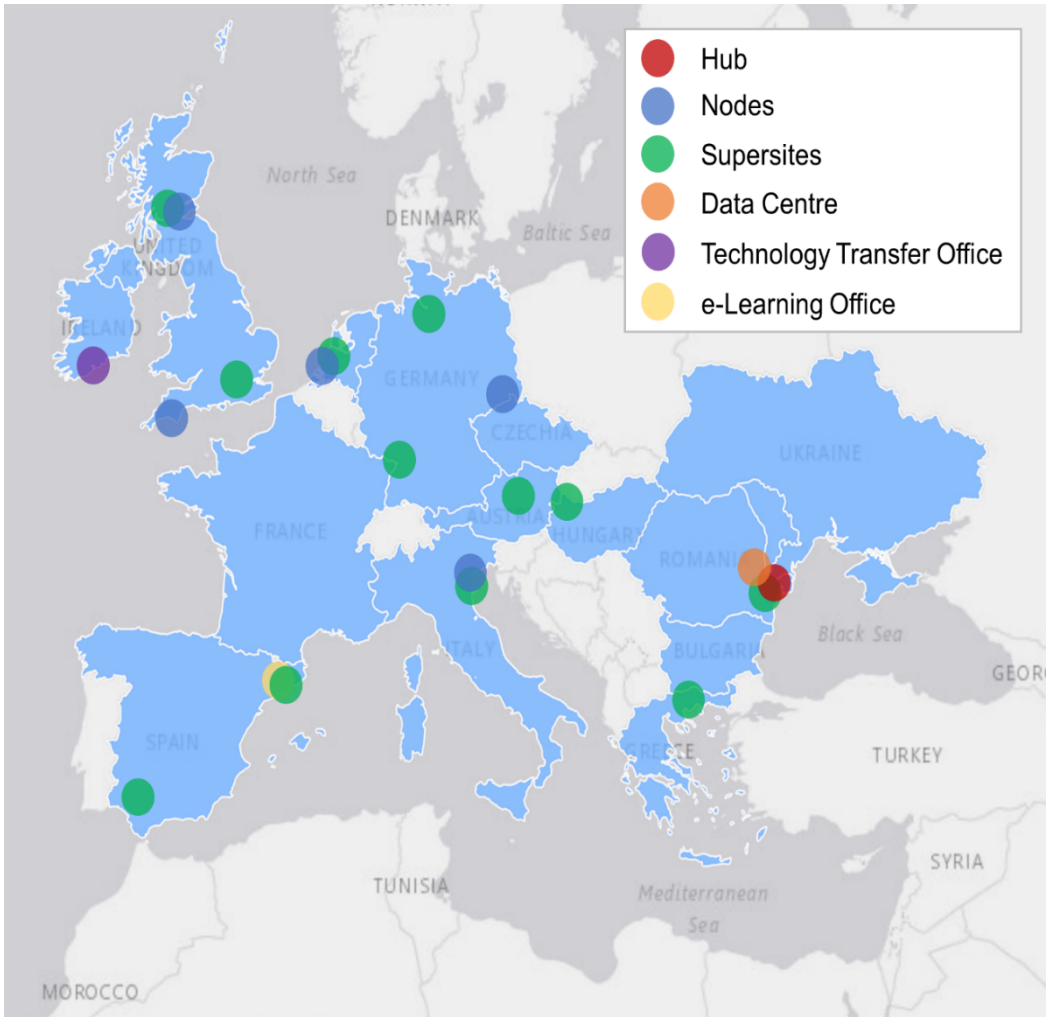
DANUBIUS-RI's contribution to SDG's

DANUBIUS-RI will:

- gather scientists from different disciplines instead of focussing on a single discipline
- address cross-disciplinary topics and issues related to sustainability of the River-Sea System, as a single, connected and highly dynamic system of high social and economic importance
- take interdisciplinarity and the socio-economic relevance and impact as important criteria for evaluating applications for access
- be a platform for collecting, analysing, modelling and retrieving River-Sea System data useful to all scientific disciplines
- create new knowledge through consistent state-of-the-art observation, analysis and modelling, across the science, social and economic disciplines
- enable stakeholder access to data, knowledge and concepts for more informed decision-making

DANUBIUS-RI – a distributed pan-European Research Infrastructure





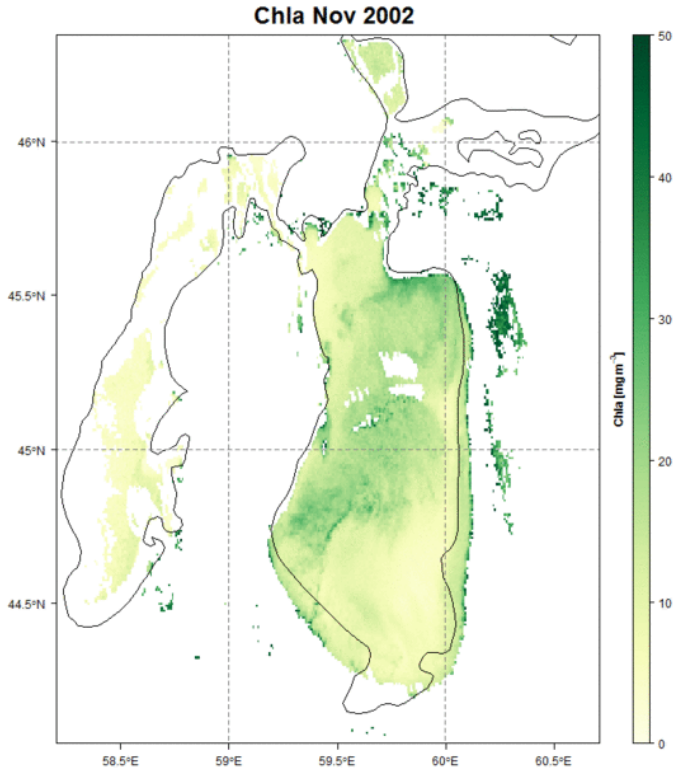
Observation Node

Plymouth Marine Laboratory (PML) & University of Stirling, UK

- In-situ measurements and satellite imagery integration
- *In situ* sensor networks
- Real-time observations
- Water quality
- Emergent pollutants
- Biogeochemical cycles
- Terrestrial coverage

Responsible for:

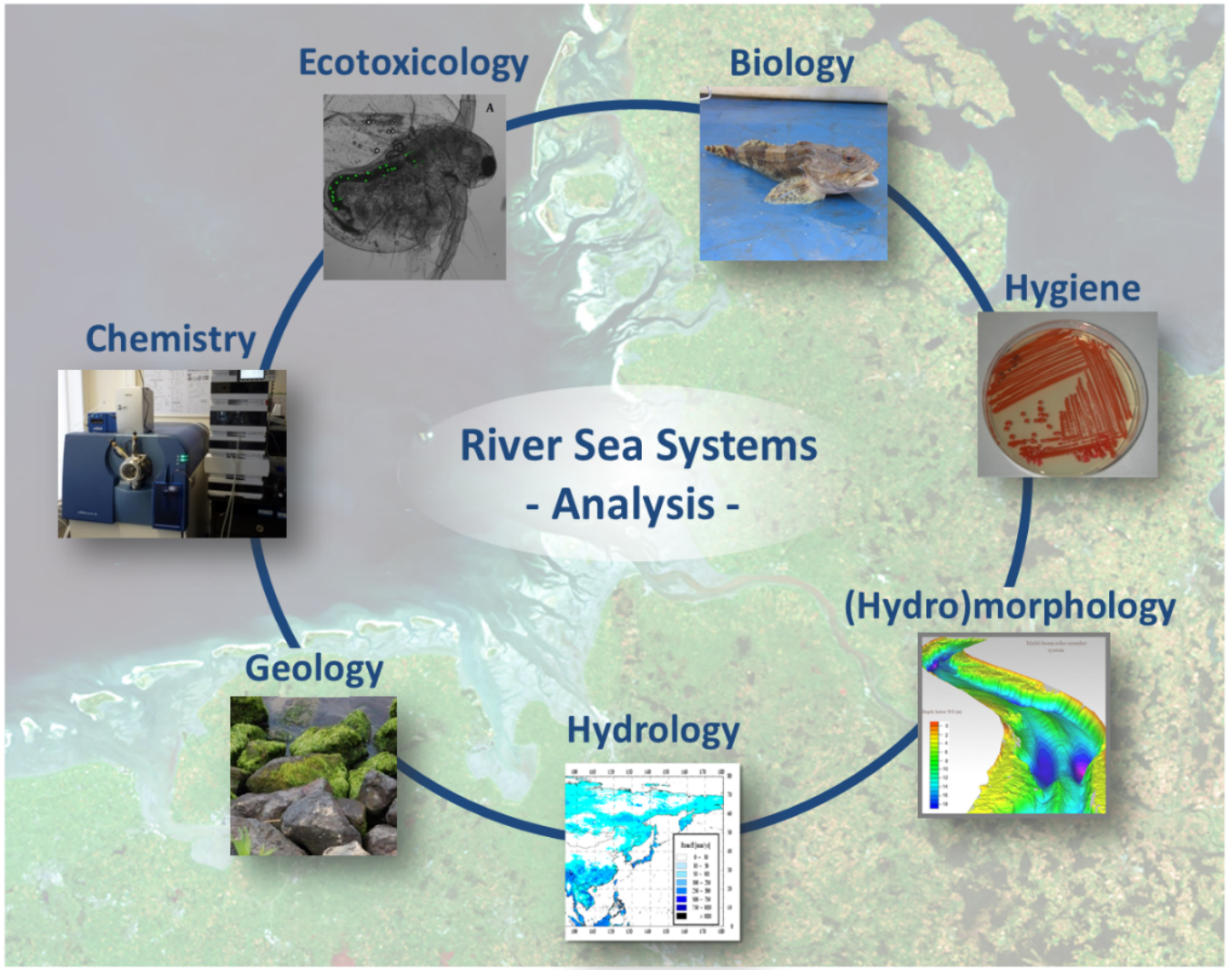
- Standardization of field measurement equipment (in situ stations) and sampling in supersites
- Calibration
- Training



Analysis Node

Dresden University of Technology, Germany

- Common standards and analytical techniques
- Offers scientific expertise, laboratories and instruments
- Innovative methods for biotic and abiotic conditions and interactions
- Integrates disciplines from Geology, Hydrogeology and Hydromorphology, Chemistry, Biology, Ecotoxicology and Hygiene
- Working framework for all labs working with DANUBIUS-RI



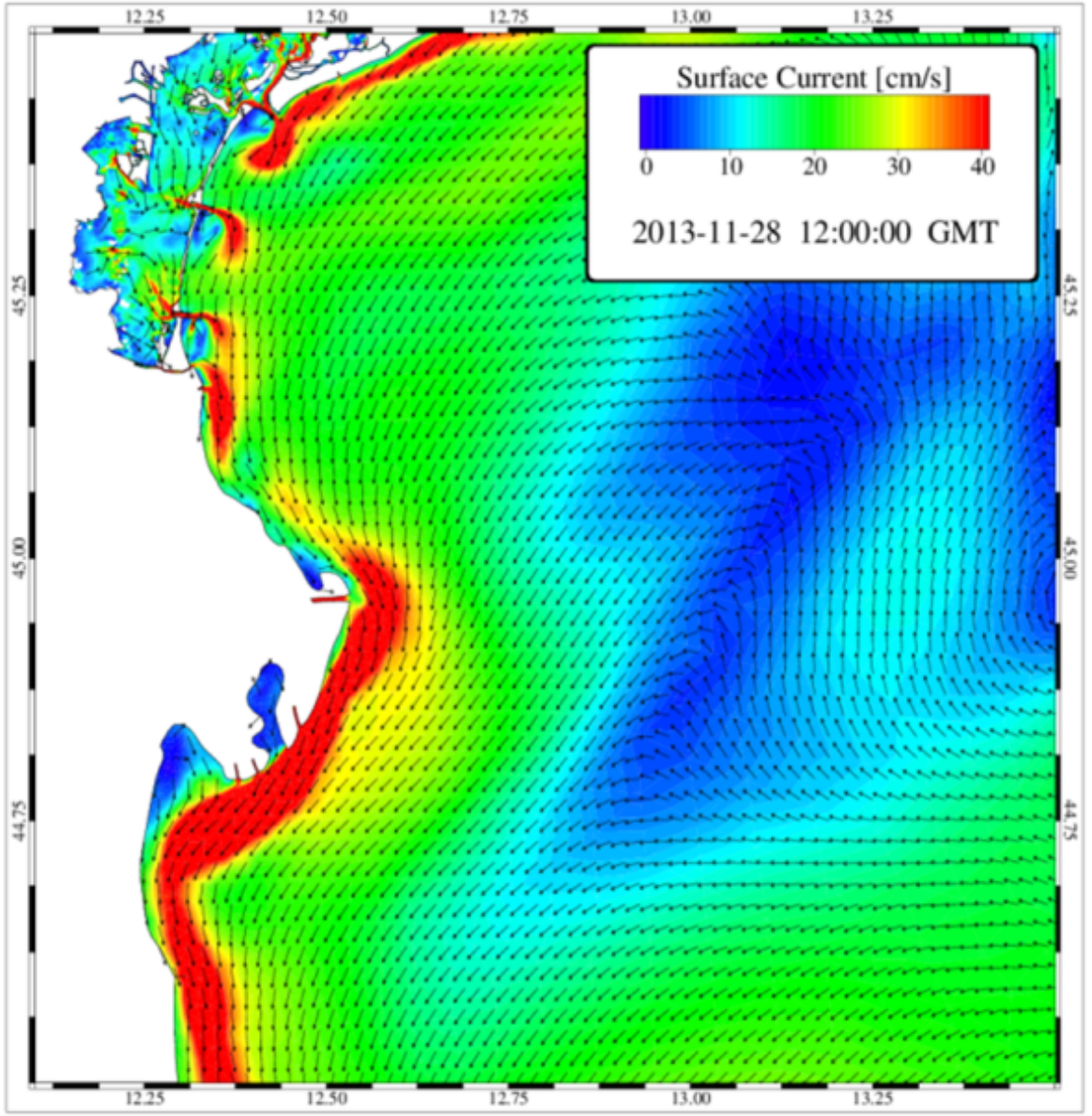
Modelling Node

ISMAR-CNR , Venice, Italy

Data from the Observation and Analysis Nodes and Supersites on morphology, process type and interaction between different large-scale (basin) or small-scale hydro-morphological processes integrated into models that:

- simulate the processes
- interpolate the measurements
- elaborate forecasts and scenarios

Provides methods and appropriate techniques that can be applied effectively in different Supersites and other locations

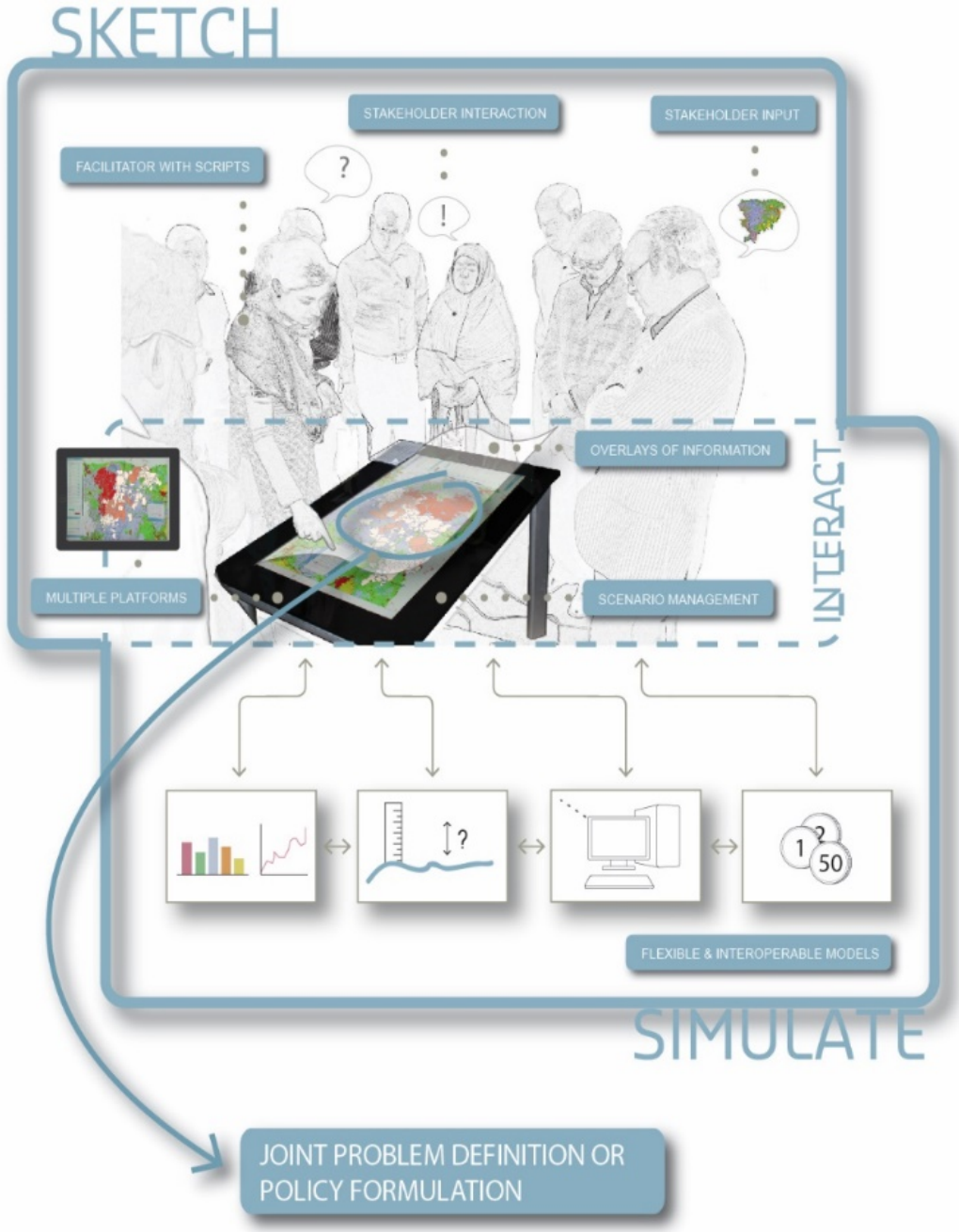


Impact Node

Deltares, Netherlands

Integrates technical knowledge with governance and policy-making to solve problems in complex River-Sea Systems:

- resolving problems
- confronting uncertainties in making decisions
- involving stakeholders
- bringing together different disciplines from different fields
- elaborating management scenarios

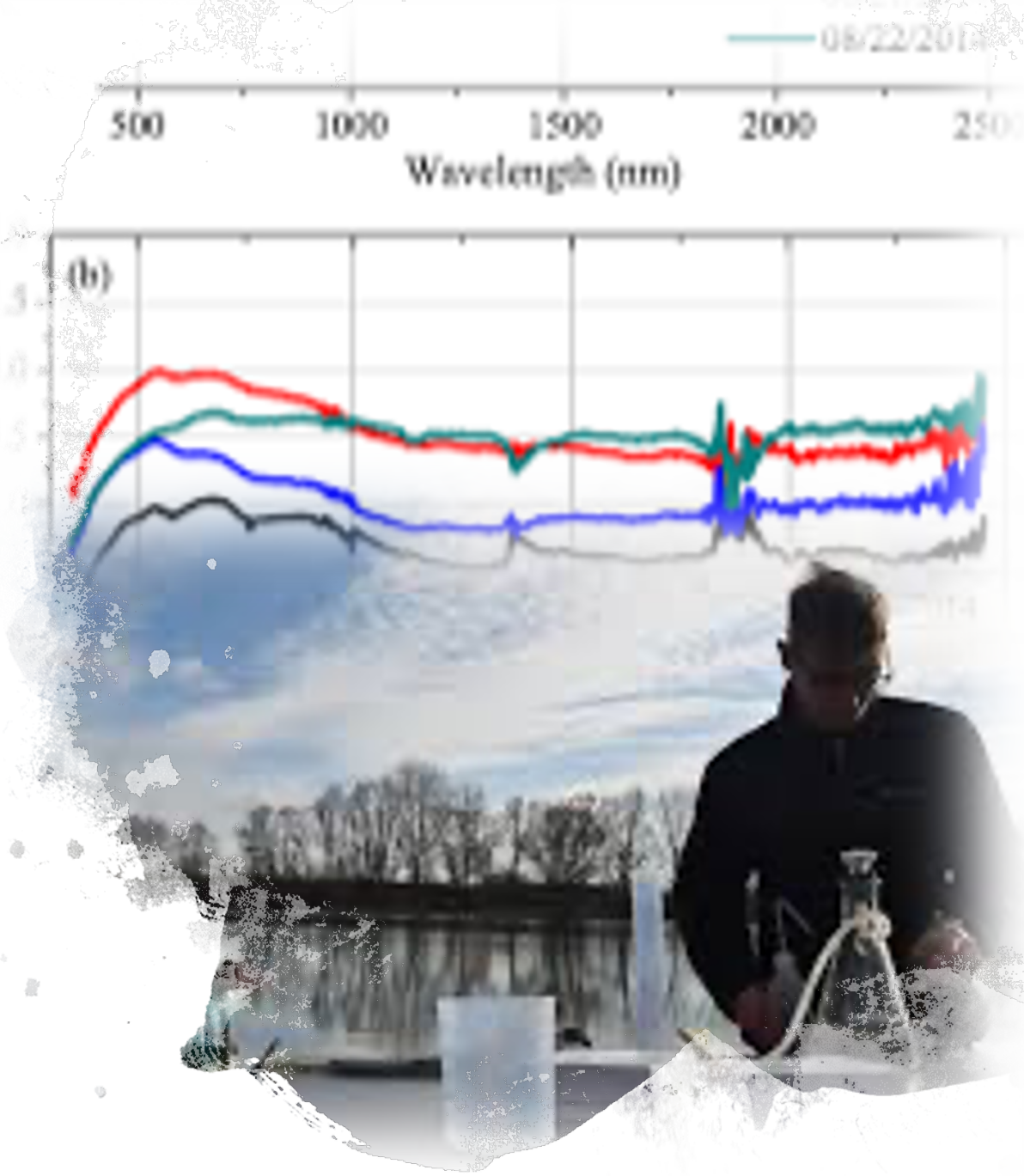


Supersites

- Natural laboratories for observation, research, modelling and innovation at locations of high scientific importance and opportunity
- Covering River-Sea Systems from river source to transitional waters and coastal seas
- Ranging from the near pristine (e.g. Danube Delta) to the heavily impacted (e.g. Thames Estuary)
- Identifying, modelling and defining system states and conditions for naturally and anthropogenically triggered transitions in the physical, biogeochemical and biological states
- DANUBIUS-RI will also support research at other locations

DANUBIUS Commons

- Set of harmonised:
  - methods
  - protocols
  - instruments
  - data acquisition
  - management
- Implemented across DANUBIUS-RI to guarantee the quality and consistency of scientific output
- Kept under continual review
- Avoidance of ‘over definition’



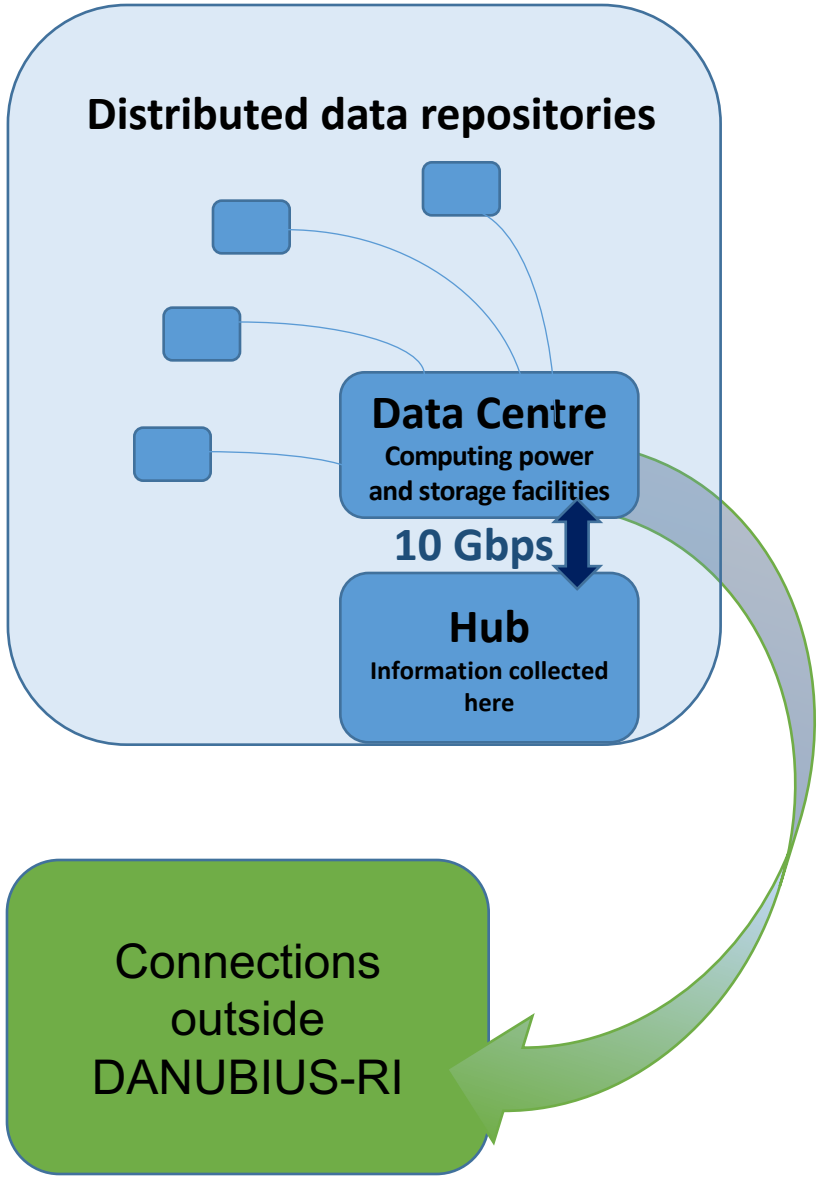
Data sources

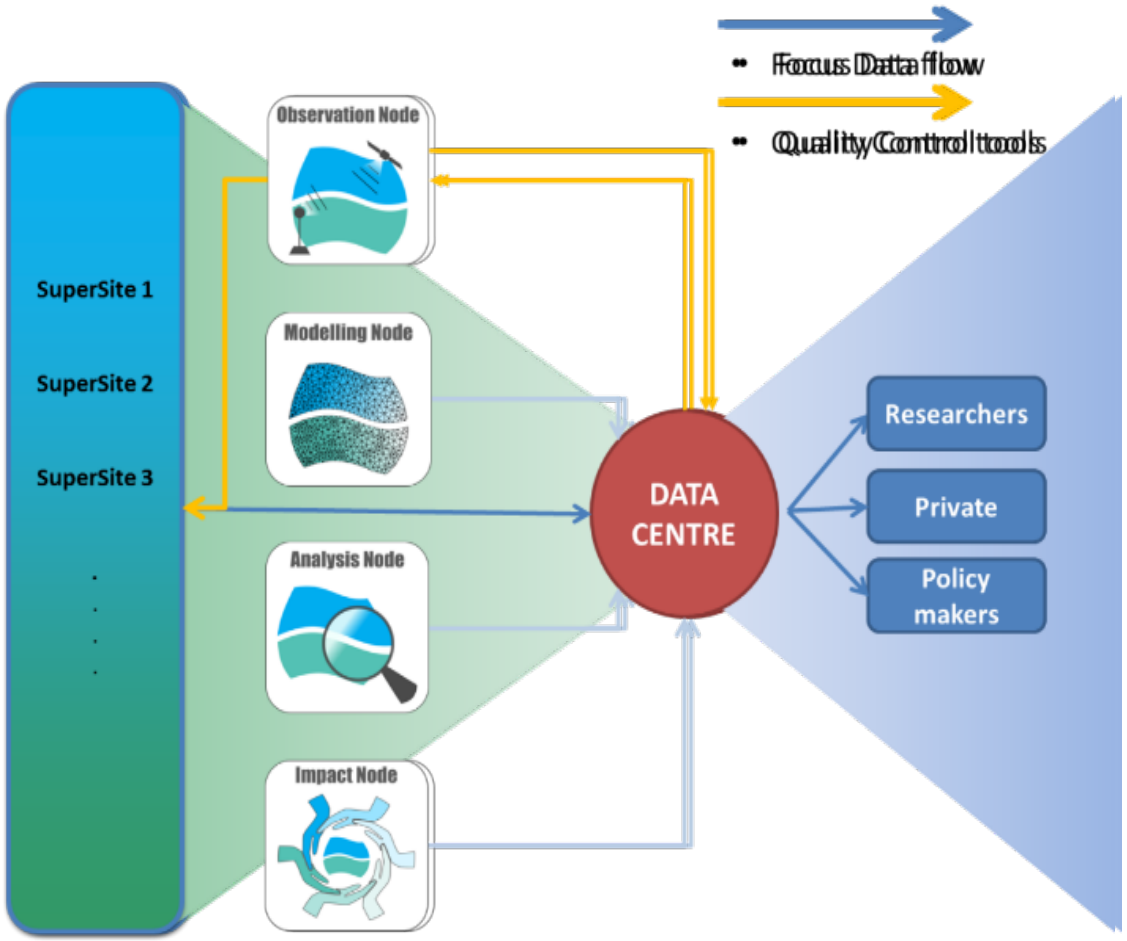
- Digital data from:
  - remote sensing
  - automatic stations (real time and periodic downloading)
  - cruises
  - computer models
  - physical, sedimentological, chemical, biological and ecotoxicological analyses

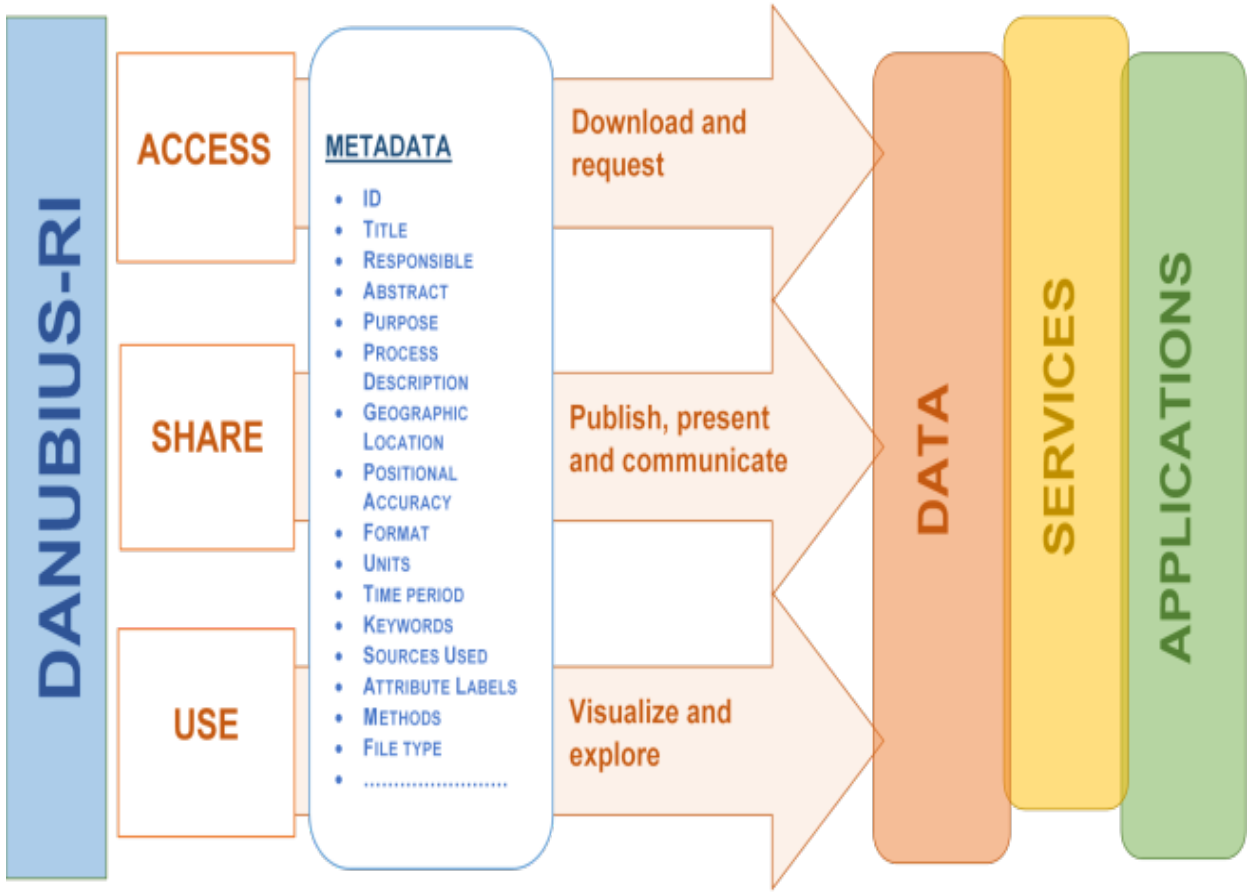
- Non digital data (e.g. biota samples, sediments, DNA)

- Research data stored, processed and made available (open access) to participants and public

- Digital and non-digital data at distributed data repositories but data information collected by Data Centre




Focus Data flow
Quality Control tools
SuperSite 1
SuperSite 2
SuperSite 3
Observation Node
Modelling Node
Analysis Node
Impact Node
DATA CENTRE
Researchers
Private
Policy makers


DANUBIUS-RI
ACCESS
SHARE
USE
METADATA
ID
TITLE
RESPONSIBLE
ABSTRACT
PURPOSE
PROCESS DESCRIPTION
GEOGRAPHIC LOCATION
POSITIONAL ACCURACY
FORMAT
UNITS
TIME PERIOD
KEYWORDS
SOURCES USED
ATTRIBUTE LABELS
METHODS
FILE TYPE
Download and request
Publish, present and communicate
Visualize and explore
DATA
SERVICES
APPLICATIONS

Access and data use

- DANUBIUS-RI will apply an '***open access***' policy based on competition and selection of proposals evaluated on their scientific excellence and social and economic relevance
- Aim to develop *common standards* and *open access* to data and the *harmonisation of data requirements* in particular related to European Strategies
- Data for research purposes will be free, while organisations using data for commercial uses will be charged
- Measures of the success of DANUBIUS-RI will be its impact and the extent to which the data and information developed are both accessible and used by society (at social, economic and policy level)
- Abide by FAIR Principles

DANUBIUS-RI timeline

Date	Phase
March 2016	selected for ESFRI (European Strategy Forum on Research Infrastructures) 2016 Roadmap
December 2016 – August 2020	Preparatory Phase
August 2020 - 2023	Implementation Phase
2021 - 2022	Establishment of ERIC
ca. 2023	Operational Phase

Consortium

- Consortium for Preparatory Phase comprised partners from 17 countries, including three international organisations/programmes

- coordinated by GeoEcoMar (Romanian National Institute of Marine Geology and Geoecology)

- ERIC Submitted to the EC,
- Implementation Phase gathers partners from countries involved in the ERIC creation

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Thank you!

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