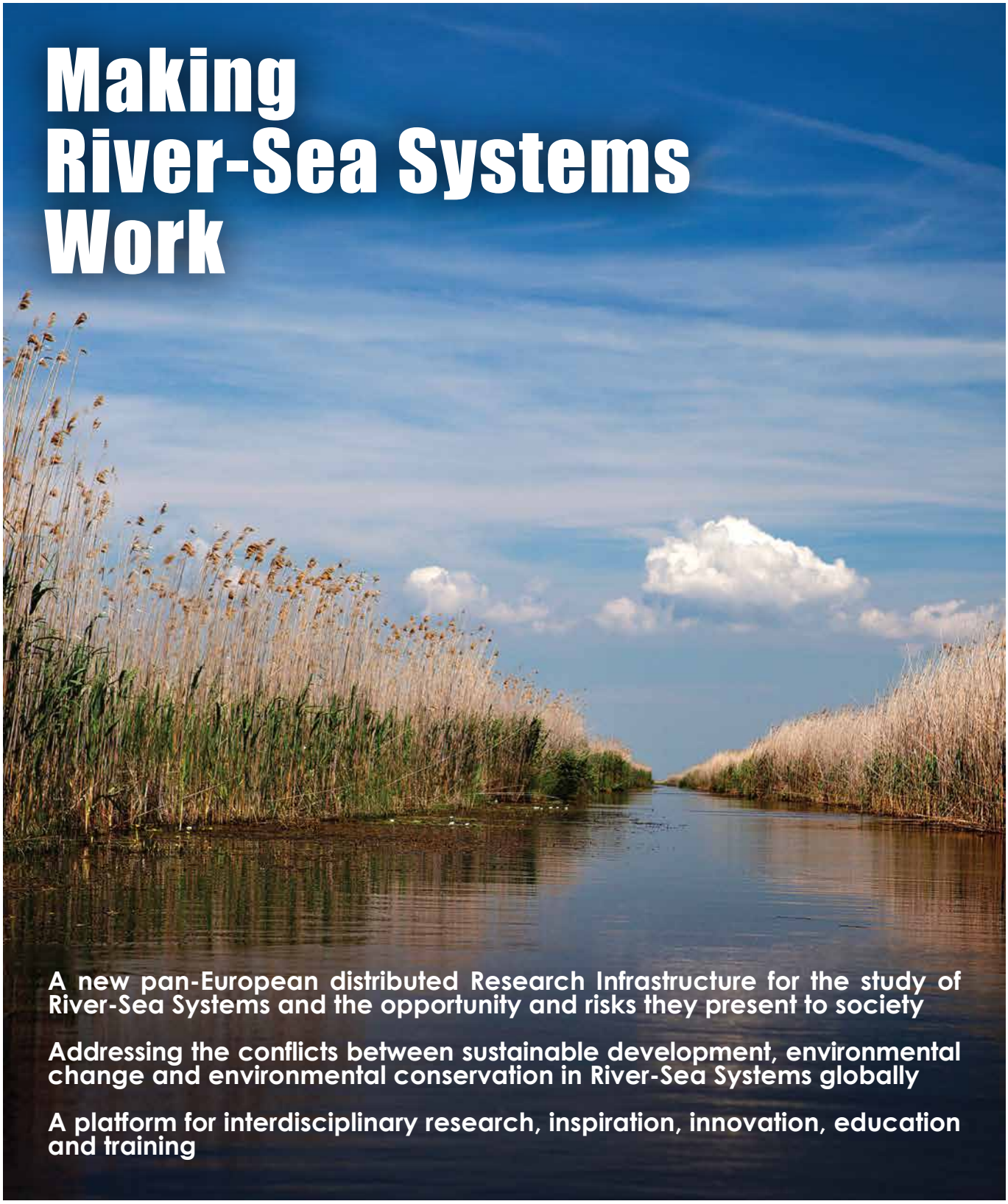
DANUBIUS-RI

International Centre for Advanced Studies on River-Sea Systems



Making River-Sea Systems Work

A new pan-European distributed Research Infrastructure for the study of River-Sea Systems and the opportunity and risks they present to society

Addressing the conflicts between sustainable development, environmental change and environmental conservation in River-Sea Systems globally

A platform for interdisciplinary research, inspiration, innovation, education and training

www.danubius-ri.eu

Introduction

River-Sea Systems (RSS), covering whole river basins and the coastal waters that they influence, are of major importance for food and energy production, transport, and societal wellbeing. Complex and dynamic, they are experiencing natural and anthropogenic pressures - at local, regional and global scales - through pollution, hydraulic engineering, water supply, energy, flood control and erosion. Improved understanding of their functioning is essential to avoid irreversible degradation and for restoration.

RSS in Europe are among the most impacted globally, after centuries of industrialisation, urbanisation and agricultural intensification. European researchers are pre-eminent in addressing these problems but research – including the transitional zone between freshwaters and the marine environment - has been largely discipline-specific, not addressing the system as a whole. Current Research Infrastructures (RI) are inadequate for urgently needed interdisciplinary research.

DANUBIUS-RI, named after the world's most international river, is a developing pan-European distributed RI supporting interdisciplinary studies of RSS, drawing on existing research excellence across Europe. It will enhance the impact of European research while maximizing investment efficiency. It will enable and support research addressing the conflicts between society's demands, environmental change and environmental protection in RSS. DANUBIUS-RI is on the ESFRI Roadmap (European Strategy Forum on Research Infrastructures) and is a Flagship Project of the EU Strategy for the Danube Region.

The lead in developing DANUBIUS-RI has been taken by Romania, which has committed land and resources, with the advice and support of scientists and stakeholders from institutions in more than 15 countries across Europe.

DANUBIUS-RI - a new European Research Infrastructure

- A fundamentally new approach to research on RSS, particularly at the freshwater-marine interface, spanning traditional disciplinary and geographic boundaries

- Building on existing expertise across Europe to support interdisciplinary research spanning the environmental, social and economic sciences

- Providing access to a range of sites, facilities and expertise, a 'one-stop shop' for knowledge exchange, access to harmonised data, and a platform for interdisciplinary research, education and training

- Supporting research on the interactions and transitional zones between coastal marine and freshwater areas

- Being developed by partners in 16 countries in Europe under the lead of Romania, with expressions of interest and support from the scientific community in many others in Europe and worldwide

- Aiming to attain ERIC status (European Research Infrastructure Consortium) and to become operational by 2023

The challenge of RSS requires world-leading science with immediate societal relevance and impact, and implemented in a consistent and quality assured framework.

DANUBIUS-RI – the science

The Science and Innovation Agenda for DANUBIUS-RI contains the following guiding questions:

- 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?

To achieve its purpose, DANUBIUS-RI will address the following research areas:

Global Change and Megatrends

- Climate Change and Extreme Events

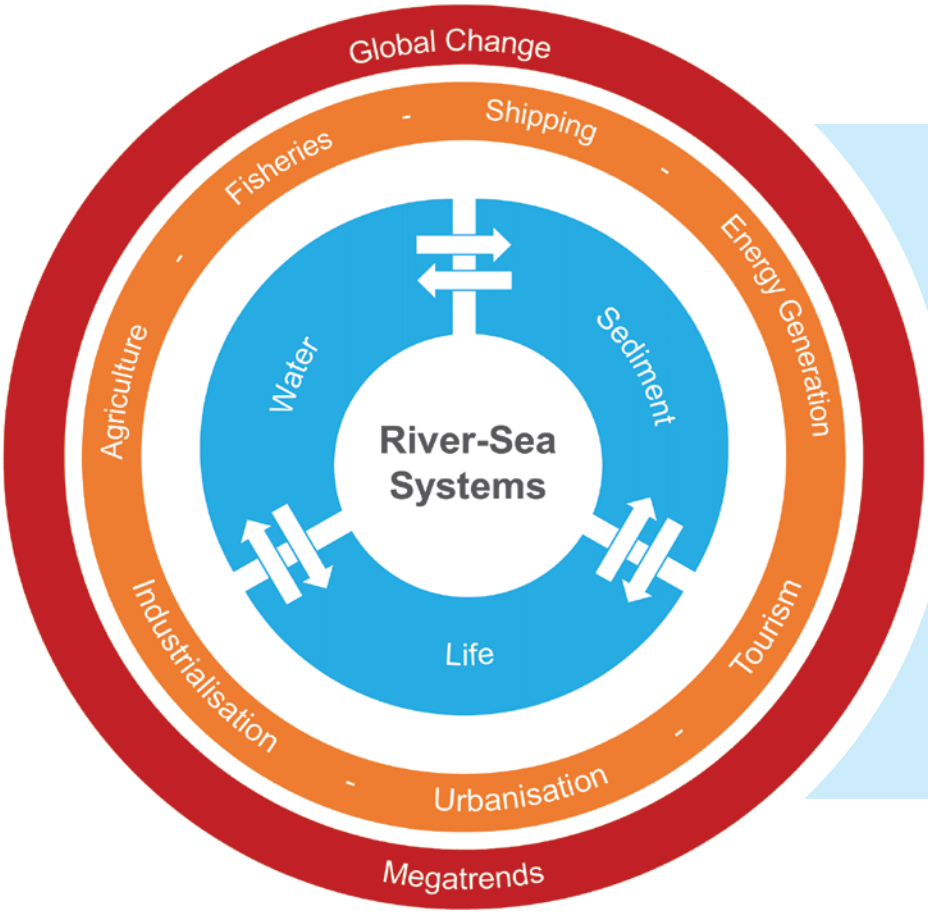
Water and Sediment

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

Biodiversity and Ecosystems

- Ecosystem Functioning
- Ecosystem Services

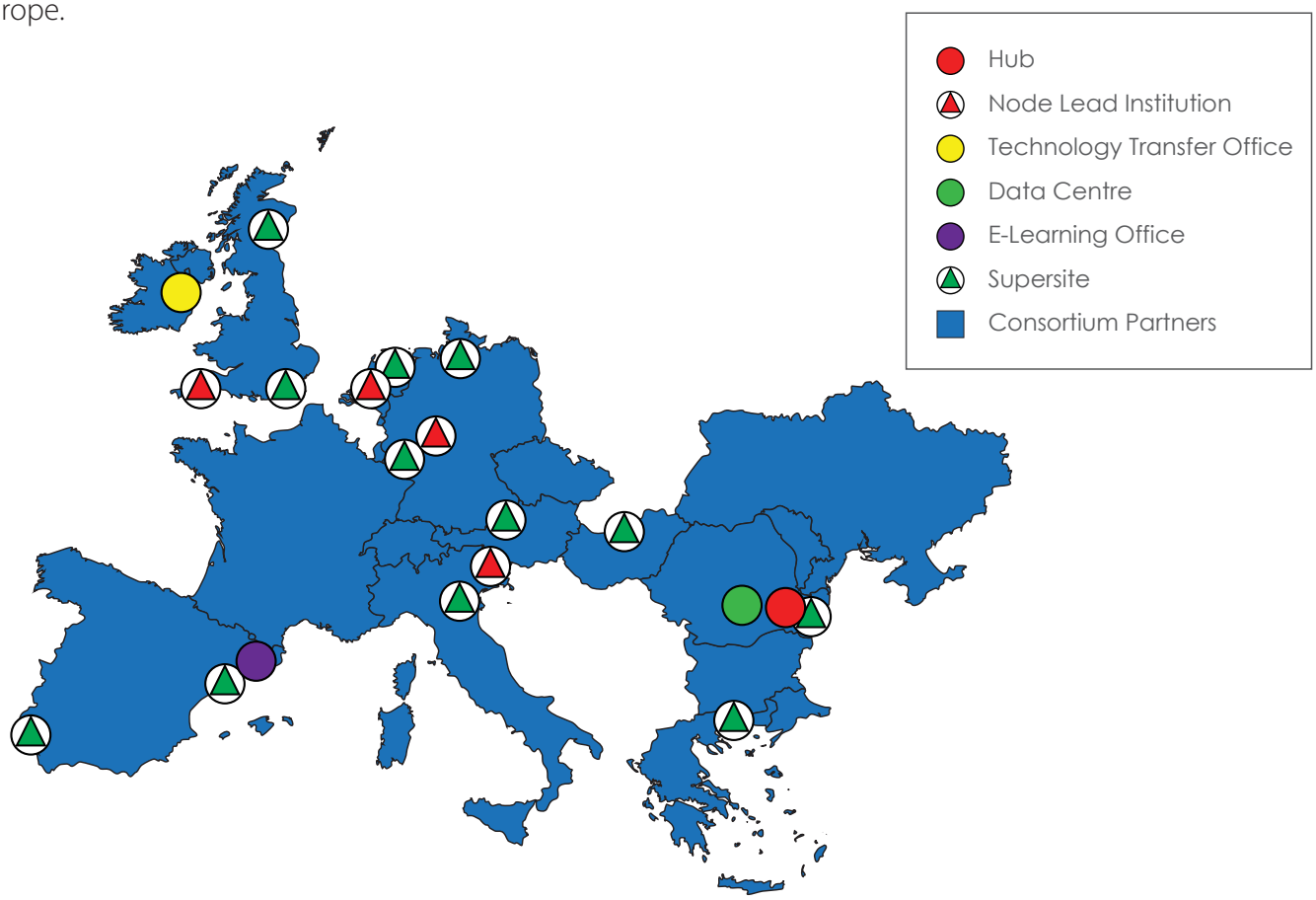
Multiple impacts on River- Sea Systems, taking into account the need to respond to complexity



External forces are climate change, climate variability and extreme events, and internal forces resulting from human use have cumulative effects on the River-Sea continuum.

DANUBIUS-RI – the components

DANUBIUS-RI is being developed as a distributed RI, with an envisaged lifetime of at least 30 years. It will comprise: a Hub, Data Centre, Technology Transfer Office, an e-Learning Office, Nodes and Supersites across Europe.



The Hub, located at the Danube Delta in Romania, will include the headquarters of DANUBIUS-RI housing the Directorate and administration. The Data Centre will also be in Romania, the Technology Transfer Office in Ireland, and the e-Learning Office in Spain.

The four Nodes (Observation, Analysis, Modelling, and Impact) will provide expertise and services, data-storage and provision, experimental and in-situ facilities. The respective Lead Institutions of the Nodes will be in the UK, Germany, Italy and Netherlands.

The Supersites – defined areas of water/land for research and observation activities open to all researchers – are at locations of high scientific importance and opportunity. They are the components of DANUBIUS-RI where ideas and developed concepts will be tested, refined and verified. Supersites under development are: Elbe-North Sea (Germany), Thames Estuary (UK), Nestos (Greece), Po Delta and North Adriatic Lagoons (Italy), Ebro-Llobregat Deltaic System (Spain), Upper Danube (Austria), Middle Danube – Szigetköz (Hungary), Danube Delta (Romania), Middle Rhine (Germany), Rhine-Meuse Delta (Netherlands), Guadalquivir Estuary (Spain) and Tay Catchment (UK).

DANUBIUS-RI will provide support for research not only at Supersites but also at other locations across Europe.

The DANUBIUS Commons

At the heart of DANUBIUS-RI, the DANUBIUS Commons will be an overall set of common standards, protocols and rules. Building on best internationally accepted standards, the DANUBIUS Commons will ensure harmonisation of methods, protocols, instruments, data acquisition and management implemented across the RI, to ensure the consistency and quality of scientific the output. Many of the services and facilities required to address the research challenges (e.g. to undertake physical, biological and chemical analyses) are available at laboratories across Europe. However, they may lack the quality control and comparability that DANUBIUS-RI requires to achieve its aims. Adherence to the DANUBIUS Commons will be a requirement for all components of DANUBIUS-RI.

This will be a critical tool for the building of an integrated RI with standardised, high quality procedures and products. It will be an important contribution to raising the quality of research facilities and services across Europe and thus support a step change in understanding of the evolution and dynamics of RSS.

DANUBIUS-PP

The development of DANUBIUS-RI is now in its Preparatory Phase. DANUBIUS-PP is a three-year project, started in December 2016, funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 739562 aiming to raise DANUBIUS-RI to the legal, financial and technical maturity required for successful implementation and development.

DANUBIUS-PP brings together key stakeholders through a process of wide engagement. The Consortium is led by Romania and is currently composed of 30 partners from 16 countries, with expressions of interest and support from the scientific community in many other countries in Europe and worldwide. The Consortium provides a well balanced mix of competencies required to build DANUBIUS-RI, in terms of both scientific and administrative domains, as well as geographical coverage.

DANUBIUS-PP is developing the structures and processes to ensure that the RI strengthens scientific performance by providing a sustainable basis for future operation, delivering key services to the different user communities

Contact us

For further information, please visit our websites at www.danubius-ri.eu and www.danubius-pp.eu (Preparatory Phase) or email us at danubius.research@geoecomar.ro

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Consortium

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