



## **Towards DANUBIUS-RI's Science & Innovation Agenda: Enhancing Understanding of Changing River-Sea Systems**

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Rivers and coastal seas are continuously changing over different spatial (regional, national and global) and temporal (seasons to centuries) scales due to various natural and human pressures originating from climate change, agriculture and fisheries, urbanisation and industrialisation, water-borne transport and energy generation. Consequently, the quantity and quality of water and sediment transported along the river-sea continuum as well as the structure and functioning of associated ecosystems are changing fundamentally with implications that extend throughout the river-sea continuum. However, our ability to respond to these changes is limited by fragmented research facilities, research and data, and thus a lack of understanding in transboundary rivers and coastal seas.

This is why DANUBIUS-RI, the International Centre for Advanced Studies of River-Sea Systems, is currently being developed with around 30 partners from over 15 countries coordinated by the research institute GeoEcoMar in Romania. DANUBIUS-RI is a long-term, distributed and interdisciplinary research infrastructure (RI) seeking to integrate rivers and their catchments, transitional waters, such as estuaries and deltas, and their adjacent coastal seas (i.e. River-Sea Systems). The overall aim is to support interdisciplinary research and to enhance process and system understanding, thereby enabling us to respond and address current and future challenges related to River-Sea Systems. In 2016, the European Strategy Forum for Research Infrastructures (ESFRI) included DANUBIUS-RI in its Roadmap. The three-year Horizon 2020 project DANUBIUS-PP (Preparatory Phase) is building the scientific, legal and financial foundation to implement and operate DANUBIUS-RI ([www.danubius-pp.eu](http://www.danubius-pp.eu)).

The DANUBIUS-PP consortium is presently developing DANUBIUS-RI's Science & Innovation Agenda (SIA), which is guiding DANUBIUS-RI's evolution from preparation through implementation to operation based on selected research priorities. This contribution introduces the state of the art of DANUBIUS-RI's SIA. The SIA first describes our vision and mission as well as our approach to research and innovation, which is mission-oriented, integrated, interdisciplinary and participatory. Second, the SIA provides an overview of DANUBIUS-RI's research priorities, which correspond to key challenges within River-Sea Systems, and include examples of research needs and questions. DANUBIUS-RI has five interrelated research priorities: Climate Change, Water Sufficiency, Sediments & their Management, Ecosystem Health and Living with Change in River-Sea Systems. Cross-cutting issues include changes in hydro- and morphodynamics, eutrophication and pollution. Third, the SIA illustrates how these research priorities will be addressed by DANUBIUS-RI through its unique architecture and services. In total, the SIA highlights DANUBIUS-RI's potential and perspectives for interested researchers, stakeholders and the public. The SIA will be published in November 2019 and will thereafter be regularly updated in order to respond to changing and emerging challenges and respective research needs in River-Sea Systems.