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MILESTONE NAME: Bilateral communication with DANUBIUS and AQUACOSM partners to plan activities and explore synergies

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Involved Institution: HCMR, CNR, HZG, Deltares, Ifremer, COV, SYKE, CNRS, IRB

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- □ Report after a workshop or a meeting (TEMPLATE A)
- X Report after a specific action (TEMPLATE B) (test, diagnostic, implementation,…)
- □ Document (TEMPLATE B) (guidelines,...)
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JERICO-S3 MILESTONE

Joint European Research Infrastructure network for Coastal Observatory
Science, Services, Sustainability

Milestones title	Bilateral communication with DANUBIUS and AQUACOSM partners to plan activities and explore synergies
Work Package Title	WP2: Linking scales, communities and processes Task 2.2: Collaboration and interoperability with marine, river and terrestrial RIs.
Milestones number	MS 6
Description	This document summarises the JERICO-S3 – DANUBIUS and JERICO-S3 – AQUACOSM-plus communications and their outcomes. Contact occurred both at the level of project coordination, to foster a collaboration at European level and locally, within PSS and IRS, to start planning specific activities.
Lead beneficiary	CNR
Lead Authors	Carolina Cantoni, George Petihakis, Holger Brix
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1. Objectives and implementation process

Task 2.2 aims to develop collaborations with marine, river and terrestrial RIs, in order to foster interoperability and synergies for contributing to a comprehensive European RI service provision. Alignment of strategies achieved through a different set of case specific activities carried on both at regional and European level is a priority. General cooperation activities encompass sharing of technologies, best practices, by, for example, organising common workshops to contribute to the interoperability and standardisation of data across the European RI landscape, shared organisation of brokerage events with industry, stakeholders and policy makers and other events for the promotion of RIs.
As a first step and taking benefit of the co-location of RI's, as a proof of concept of mutual benefits, specific activities will be carried out in cooperation with DANUBIUS and AQUACOSM in selected Pilot Super Sites (PSS) and Integrated Regional Sites (IRS). The objective of these first months of activity, summarized in this milestone, is to establish contacts and communications with DANUBIUS and AQUACOSM to start the planning of specific collaborations and to lay the foundation for a plan for strategy alignment.

2. Main report

Contacts with AQUACOSM

An obvious area for cooperation is the Transnational Access (TA) offered. Towards this, Alan Berry, leader of the TA activity in JERICO-S3 was invited to attend the AQUACOSM-plus (AQ+) kick-off meeting that was carried online in April 2020. The possibility of organizing joint TA calls between JERICO-S3 and AQ+ within 2021 was discussed and possibilities are explored.
Moreover, a meeting between the two coordinators (Laurent Delauney & Jens Nejstgaard) in order to explore synergies beyond the TA and high level integration is considered as necessary and was proposed.

At the local-regional level, the areas which were identified suitable for carrying out specific activities are three PSS: the Gulf of Finland (GoF), the North Western Mediterranean (NW-MED) and the Cretan Sea (CS). Possible joint experiments were discussed for the first time during the AQ+ kick-off and are currently in a rather well-developed stage as explained below. The key AQ+ partners for these collaborations have been identified: Maiju Lehtiniemi, Pirjo Kuuppo, Timo Tamminen & Jukka Seppala from SYKE for GoF, Vivi Pitta from HCMR for CS and Behzad Mostajir from CNRS for NW-MED.

The planning of the PSS activities has started, including per site planning in collaboration with local AQ+ contacts, thought e-mail exchange and short virtual meetings and calls.
In the NW-MED a mesocosm experiment to simulate an "extreme event", is scheduled between April 19 and May 21 of 2021 (if COVID restrictions permit), in the framework of French ANR national project entitled: Microbial responses to terrestrial dissolved organic matter input in freshwater and marine ecosystems in a changing environment (RESTORE) on the MEDIMEER infrastructure[1]. To improve synergies between the JERICO-S3 observing community and the AQ+ mesocosm experimenting community, the experiment will be opened to the wider European scientific community (including JERICO-S3) through the AQ+ transnational access.
In GoF-PSS and CS-PSS, mesocosm experiments have been planned for spring and summer 2022, respectively. As well, these experiments study how extreme events affect the plankton ecosystem functioning, as detailed in deliverable D.4.1.
Observational data from JERICO-S3 will help to improve experimental mesocosm planning providing detailed information on the marine environmental state and thus contributing to more realistic treatments. The results of mesocosms experiments will help the JERICO-S3 community to parametrize specific processes in "controlled" conditions, processes otherwise difficult to observe and fully understand on the field (need to modify/adapt measurements frequency, additional variables, etc.). Combining experiments, observations and models, the results could provide insight into important processes, parameter estimation and important information on the trends and anomalies often recorded in the time series.

Contacts with DANUBIUS

Contacts have been established and strategy alignment with DANUBIUS have started through meetings between the scientific coordinator of JERICO-S3 (Ingrid Puillat) and DANUBIUS (Adrian Stanica), in June and July 2020.
At local level, the areas identified for collaboration are the North Sea Pilot Super Site (NSea-PSS), which also host the DANUBIUS's Tidal-Elbe SuperSite, and the Northern Adriatic Sea Integrated Regional Site (NA-IRS) that hosts the DANUBIUS's "Po-delta Venice lagoon" SuperSite.
A first outcome of the collaboration between marine and riverine institutions involved in JERICO-S3 and DANUBIUS in the NSea-PSS will be the joint establishment of a floating research platform that will be set up in Tesperhude at the Elbe about 8 km upstream of the weir in Geesthacht separating the Elbe River and its estuary. In combination with data from the JERICO-S3/COSYNA-station in Cuxhaven, the data from the research platform in Tesperhude will allow for example to quantify carbon and nutrient budgets for the Elbe estuary. This achievement involved the active cooperation of the DANUBIUS TidalElbe SuperSite coordinators (Friedrich, Bold) and the JERICO-S3 NSea-PSS coordinator (Holger Brix).
In the NA–IRS three meetings were organized with the coordinators of DANUBIUS Po-delta Venice lagoon SuperSite (Umgiesser, Bellafiore, De Pascalis from CNR) to identify possible areas of collaboration and initiate strategy alignment.

[1] https://www.aquacosm.eu/mesocosm/medimeer

The outcome of both NSea-PSS and NA-IRS activity, was a draft document that supported the dialogue between the scientific coordinators of JERICO-S3 and DANUBIUS (annex 1 to this report) during the meetings held in June and July.

3. Conclusions, Next-Steps

3.1. Synthesis of main conclusion

Contact between JERICO-S3 and AQUACOSM-plus and DANUBIUS has been established both at higher and local/regional level. A collaboration roadmap has been set which includes alignment of Access and common experiments.

3.2. Next steps

At a higher level, a meeting between the JERICO-S3 coordination and the AQ+ coordinator (Laurent Delauney, Ingrid Puillat & Jens Nejstgaard) in order to explore synergies beyond the TA and high level integration, is considered as necessary and proposed.
At local/regional level, the roadmap is set and once the details are finalised the common experiments and actions are expected to take place within 2021 (COVID-19 permitting).
The possibilities of other regional cooperation will be explored.

3.3. Annexes and references

1. Draft document to support meeting and collaboration with Danubius

Annex 1 to JERICO-S3-WP2-M6-301120-V1

Support material for discussion with Adrian - Ingrid 8 june 2020

JERICO-RI – scientific strategy

JERICO-RI is an essential component of the worldwide efforts to a better understanding of coastal marine systems. It also aims to be the future coastal component of the European ocean observing effort, as part of the Global Ocean Observing System. Through multidisciplinary pan European observations, JERICO-RI seeks to improve the knowledge on how coastal marine systems respond to global change. Since 2011, JERICO-RI has developed the conceptual and practical expertise aiming in providing high-quality coastal observations and

services to the marine scientific community at large and to a range of local, regional and European end-users. Also, several European countries have recently restructured their national effort to better address their coastal priorities into dedicated national research infrastructures. JERICO-RI benefits from both these national and European initiatives. However, Europe still lacks an integrated Research Infrastructure addressing the complexity of marine coastal systems. The JERICO-RI aims to close this critical gap. As a result, it will enable cutting-edge European coastal research to reach a sound understanding of changes and adaptations of marine coastal systems. By doing so, it will strengthen interactions between observations, experimentations, and numerical modelling.

JERICO-RI will adopt a systemic approach to monitor, observe, explore and analyze the coastal marine systems in order to reach a sound understanding of their structuration and functioning in the context of global change. It will encompass the whole range of environmental sciences, technologies and data sciences. It will also foster integration of social sciences. JERICO-RI will be the only Research Infrastructure holistically embracing coastal marine systems. It will therefore fill a crucial gap in the European RI landscape. Cooperation with existing environmental RIs either focusing on deep ocean (EuroArgo and EMSO) or on inland and transitional environments (DANUBIUS and eLTER) will help reach JERICO-RI's goals. Therefore, the JERICO-RI community intends to establish collaborative agreements with relevant environmental RIs as expressed in JERICO-RI projects recently accepted for H2020 funding.

Collaboration between JERICO and DANUBIUS.

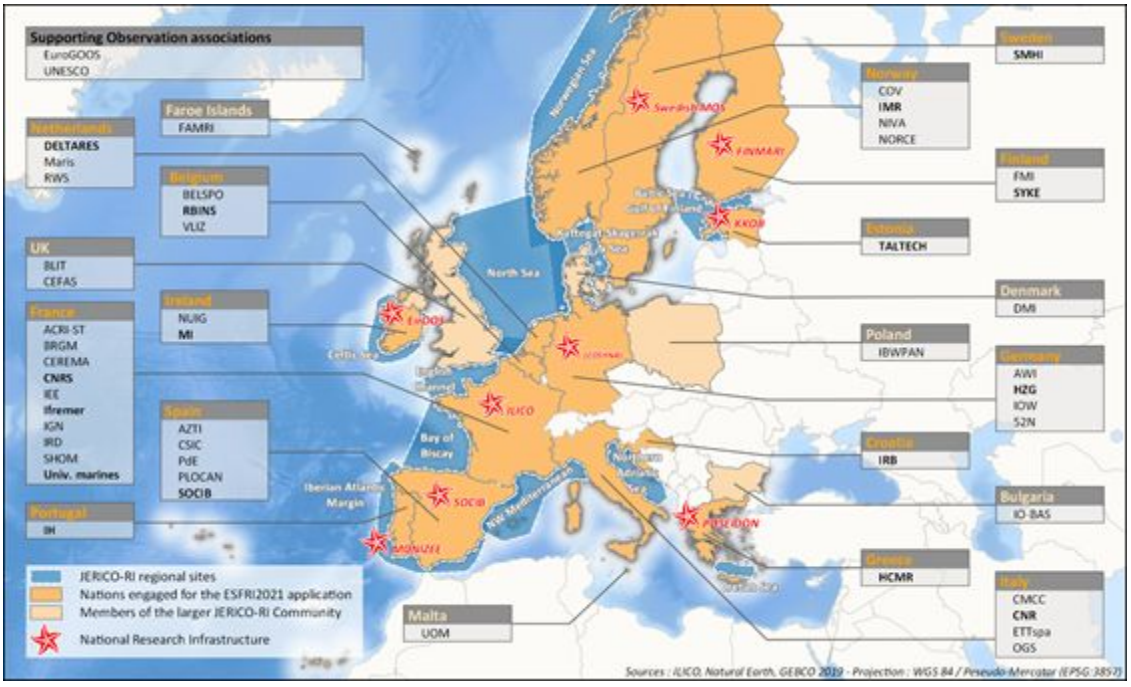
As part of JERICO-S3, WP2 (Linking scales and communities) intends to foster cooperation and coordination with existing RIs at different regional, national and transnational levels. One important partner that is present in many regions where JERICO-RI has also been active is DANUBIUS-RI. To foster collaboration at high level, the JERICO RIs-Board (J-RIB) plans to involve RI's representatives in specific yearly workshops to channel communication and collaboration with an ultimate aim of signing MoUs. Alignment of strategies achieved through a different set of case specific activities carried on both at regional and European level is a priority. Indicative activities encompass sharing of technologies, best practices, by, for example, organizing common workshops to contribute to the interoperability and standardization of data across the European RI landscape, shared organization of brokerage events with industry, stakeholders and policy makers and other events for the promotion of RIs. At local/regional level, joined collaborations are explored within the JERICO's Pilot Super Sites (PSSs) and selected Integrated Regional Sites (IRSs). As a proof of concept of mutual benefits, we plan to carry out specific activities in cooperation with DANUBIUS (North Sea-PSS, Adriatic-IRS).

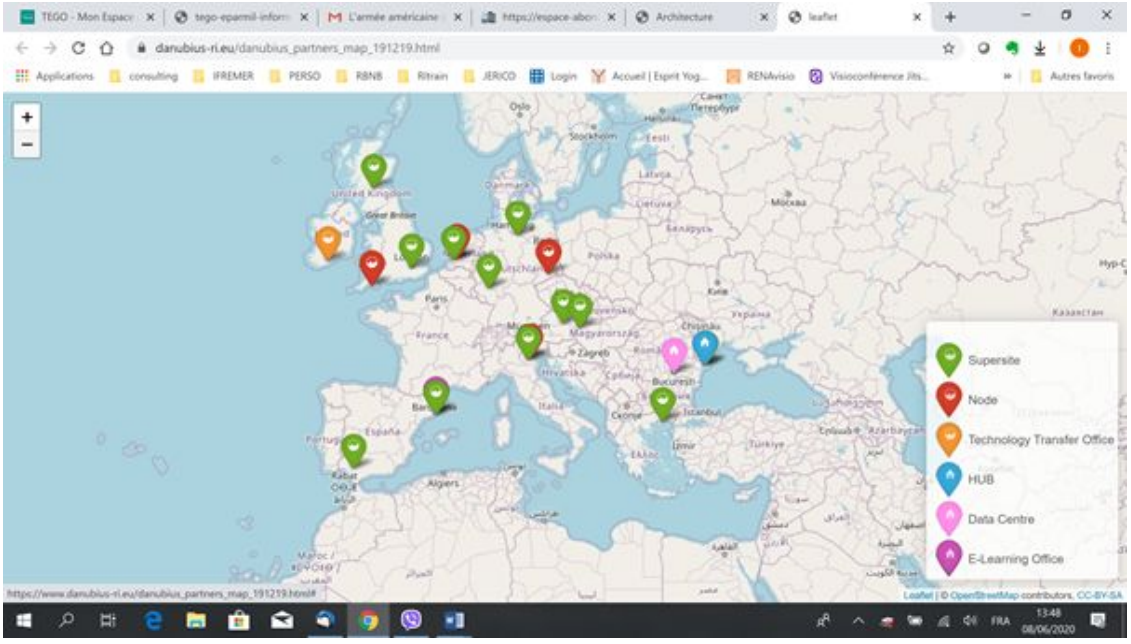
The North Sea-PSS is coordinated by HZG, which also hosts DANUBIUS's Tidal-Elbe SuperSite. As part of an initial effort meetings have been organized between representatives of COSYNA (Coastal Observing System for Northern and Arctic Seas, JERICO's representative in the German Bight), MOSES (Modular

Observation Solutions for Earth Systems, an initiative to foster observational capabilities for extreme events sponsored by the Helmholtz Association), DANUBIUS-RI/PP and various stakeholders for the Tidal Elbe. This cooperation is motivated be a keen shared interest in investigating the transition zone from land to sea with a focus on estuaries, where riverine and marine influences interact and determine matter fluxes from land to sea.

A first tangible outcome of this cooperation has been the establishment of a floating research platform that will be set up in Tesperhude at the Elbe about 8 km upstream of the weir in Geesthacht separating the Elbe River and its estuary. The research platform consists of a ponton with a container housing diverse state-of-the-art observation systems providing continuous, high resolution and near-real-time water quality data. These include a Ferry-Box system (e.g. temperature, chlorophyll, turbidity, pH, O2), nutrient analyzers (NH4, NOx, NO3, PO4, Si(OH)4), gas analyzers (N2O, CO2, CH4, Rn), a mobile ICP-MS for element analysis, a weather station and a radiometer, as well as ADCPs. In addition, the research platform contains an automated water sampler, a continuous flow centrifuge and a sedimentation box for suspended matter collection. In combination with data from the JERICO/COSYNA-station in Cuxhaven, the data from the research platform in Tesperhude allows for example to quantify carbon and nutrient budgets for the Elbe estuary. Funds for this project are provided by the Helmholtz Association (through MOSES and COSYNA) and the state of Schleswig-Holstein for DANUBIUS through the European Fund for Regional Development.

The northern Adriatic represents one of the JERICO "Integrated Regional Sites" (IRS) and involves two nations and three institutions: CNR-ISMAR – Institute of marine Sciences and OGS – Istituto Nazionale di Oceanografia e Geofisica Sperimentale from Italy and IRB - Ruđer Bošković, Centre for Marine Research from Croatia.
Italian partners are part of the JERICO consortium since the beginning and several research projects have benefited from the transnational access offered by two stations located in the area: the Acqua Alta oceanographic tower (8 nm off Venice lagoon) and the S1-GB elastic beacon (located off the Po delta). Croatia is a new partner to this community hence the planning of the North Adriatic IRS is moving now towards the first steps.
Italy and Croatia have both fixed stations and valuable time series of oceanographic and biological data from repeated samplings at fixed points and along a marine transect spanning from the Po river delta to the Istrian peninsula, on the other side of the Adriatic. One of the main goals of the North Adriatic IRS is to provide the basis for a permanent infrastructure to organize, harmonize and integrate existing coastal observing networks and activities including in situ data and modelling.
The Po delta together with the lagoons of Venice and Grado-Marano represents a DANUBIUS supersite, designed to study the interactions between riverine loads, lagoons and the Italian coastal area of the North Adriatic. Both the Italian institutes involved in JERICO are also partners in DANUBIUS and this will facilitate a future collaboration between these two consortiums.





Site web: https://www.danubius-ri.eu/architecture.html

THE HUB WILL ALSO INCLUDE THE FACILITIES FOR COLLABORATION WITH OTHER ESFRI PROJECTS AND LANDMARKS WITH WHICH THERE IS AN AGREEMENT FOR USE OF THE DANUBE DELTA SUPERSITE

- greenhouse gas measurement towers – as common point with ICOS,
- areas for experimental sites – for reeds and other aquatic / wetland plants – possible contribution for AnaEE,

- deployment facilities for ARGO floats (proposed by DANUBIUS-RI - if needed for Euro Argo to test equipment dedicated to shallow waters at river-sea interaction zones),
- dedicated platform in the river-sea interaction as contribution to EMSO (as agreed in the initial support letter and contacts with EMSO),
- facilities for biota collection and storage – as possible contribution to EMBRC,
- network of sensors for the measurement of geodynamics (from profound to superficial subsidence) –contribution to EPOS,
- other types of facilities that may be requested by other ESFRI Research Infrastructures.

The Hub will have the competence to plan and facilitate the access to users to exploit the full potential of the DANUBIUS-RI distributed RI.