



Digital Twin Application for Monitoring the Impact of Climate Change on the Eutrophication and Biofiltration of the Danube River Waters in the St. George Branch

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Danube Delta is one of the most vulnerable European regions to climate changes. Risks related to the decrease of the available water on the Danube River side and the slow increase of the level of the sea is expected to change fundamentally, hydrological situation of the Delta in terms of concentrations of pollutants inflowing from the river side and the salt concentration from the sea side. The situation may possibly lead to fundamental changes of basic processes including the biofiltration.

Several communities are already suffering on fresh water sufficiency and the region has the highest vulnerability and least adaptive capacity to climate change impacts. Urgent masterplan actions need to be applied and reinforced with knowledge-based solution.

The proposed paper is presenting the results of research activities carried-out as part of the ARSINOE project aiming to contribute to improve and facilitate the nutrients removal or use of nature-based solutions such as selective symbiotic relationships of microorganisms and aquatic biomass. Thus, controlled biomass production can be obtained by using the nutrients from water and ensuring the proper condition for trophic chain equilibrium or restoring in functionally affected ecosystems.

The paper include the results of the following activities:

- Evaluation of existing datasets and data sources and digital twin approaches within the borders of Biosphere Reserve;
- Evaluation of different Multiscale and Multiphysics models for hierarchical and complex phenomena in the river-sea Deltaic Ecosystem;
- Evaluation of the climate risk analysis methods and methodologies for resilience building in river-sea Deltaic Ecosystem.