

## Water Recourses Management of the Danube with ISME-HYDRO



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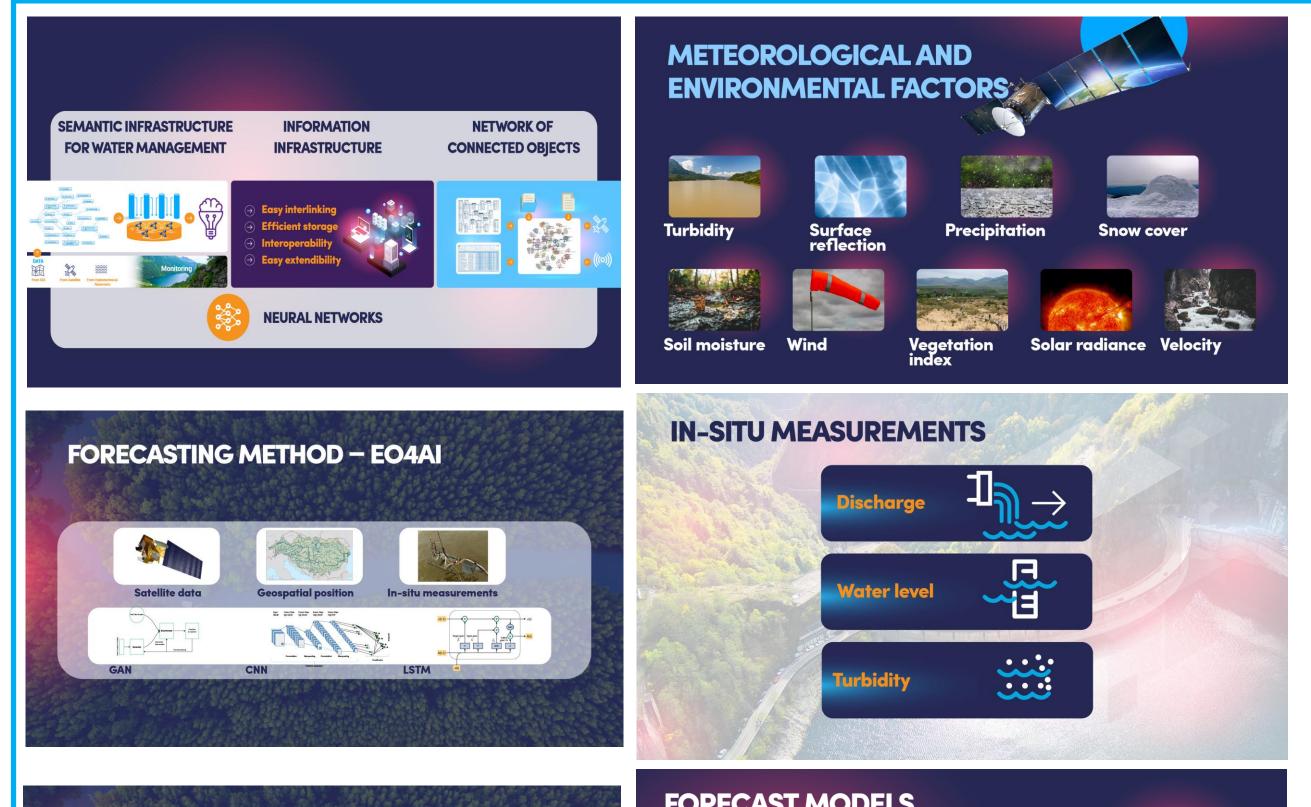
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## **INTRODUCTION**

The exploitation of rivers and hydropower reservoirs involves daily monitoring of the water resources, the meteorological conditions, the status of the coast, the flood areas, etc. •

- Providing with timely and easy to consume information, analytics and early warnings for current and upcoming statuses or events helps water resources managers and high level officials to adequately observe and plan operations for sustainable development of river areas.
- We present an intelligent web-based workflow ISME-HYDRO that combines different methods of AI, e.g. linked data, deep learning and reasoning, to provide an integrated information system that ensures interoperability between spatial information of GIS systems, remote sensing information, symbolic and numerical data like meteorological data and proprietary measurements and creates an actionable knowledge value chain for the needs of rivers and hydropower reservoirs exploitation.

# **METHODS**



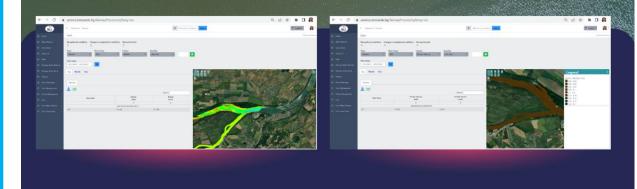


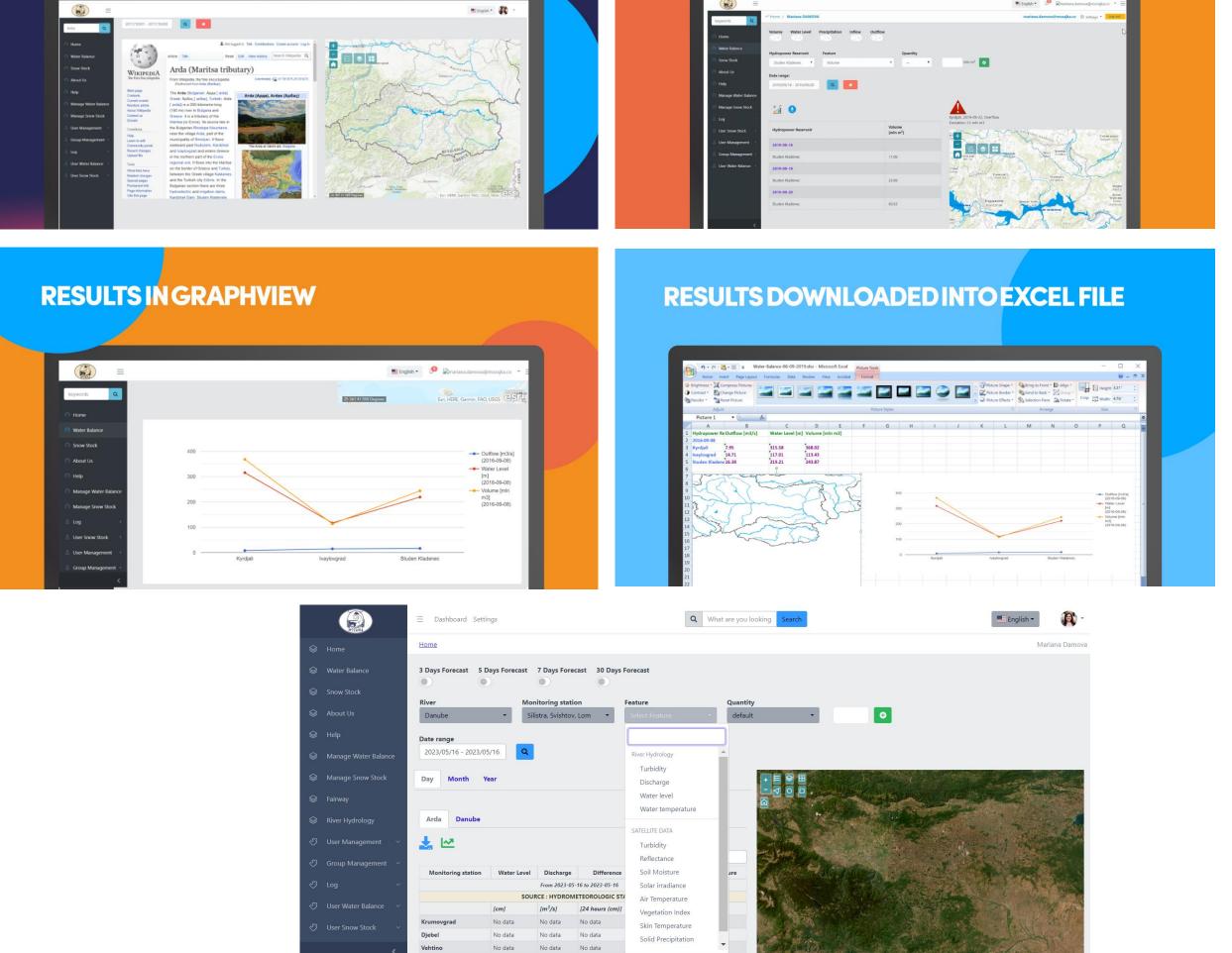
## DISCUSSION

# THE APPLICATION-ISME-HYDRO

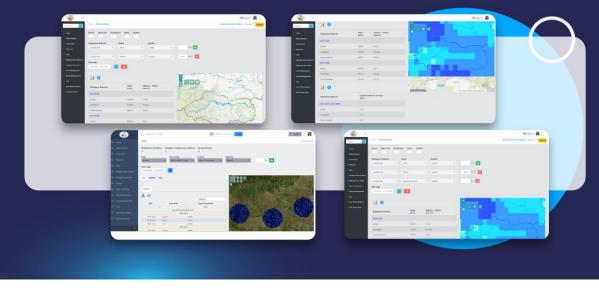
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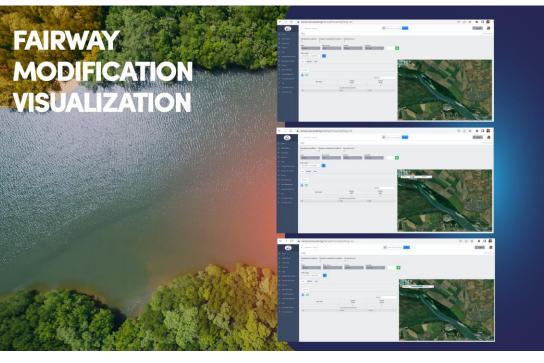
INTEGRATION OF THE FORECASTED HYDRODYNAMIC MODEL INTO A WEB-BASED WORKFLOW BASED ON LINKED **DATA E-INFRASTRUCTURE** 

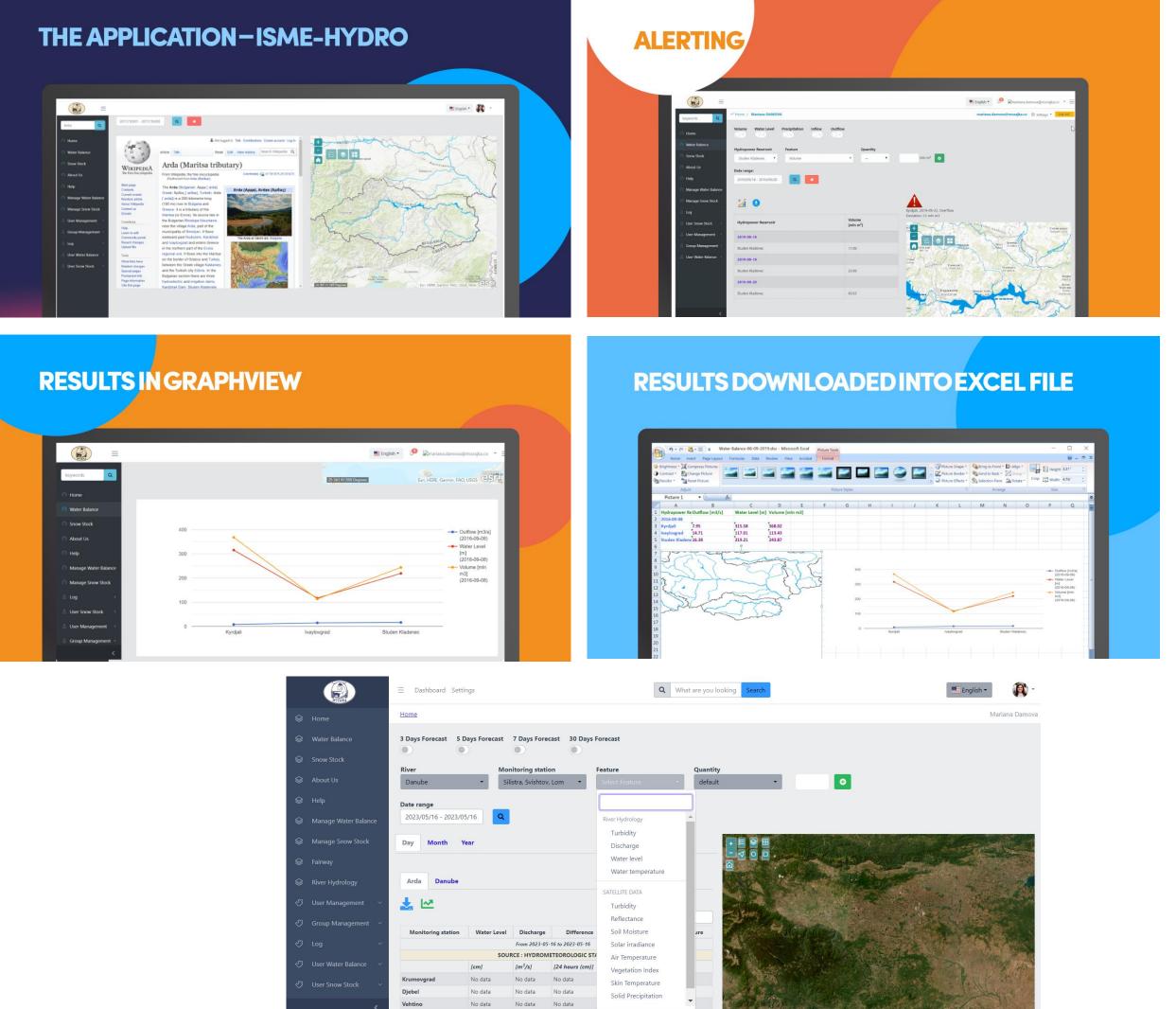




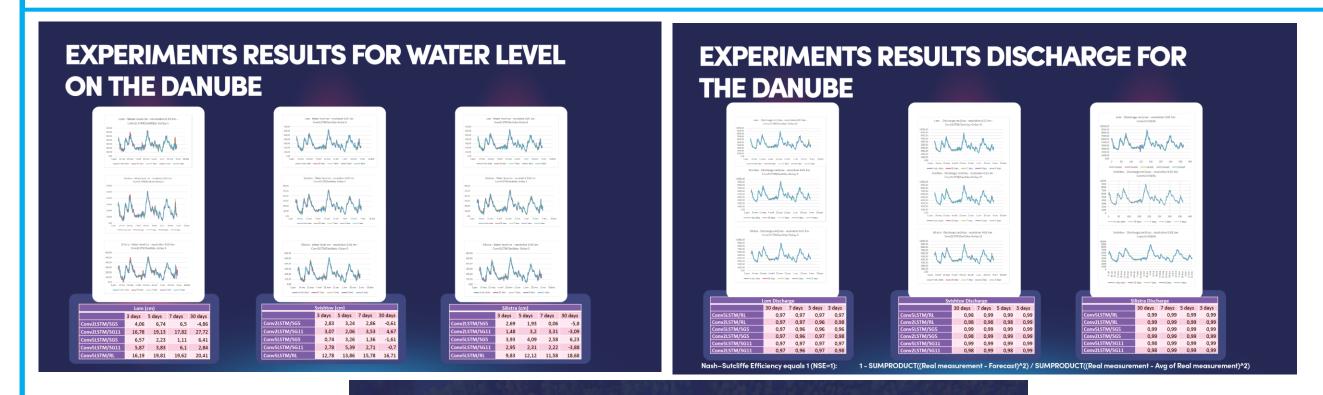
### **THE APPLICATION – ISME-HYDRO**







## RESULTS

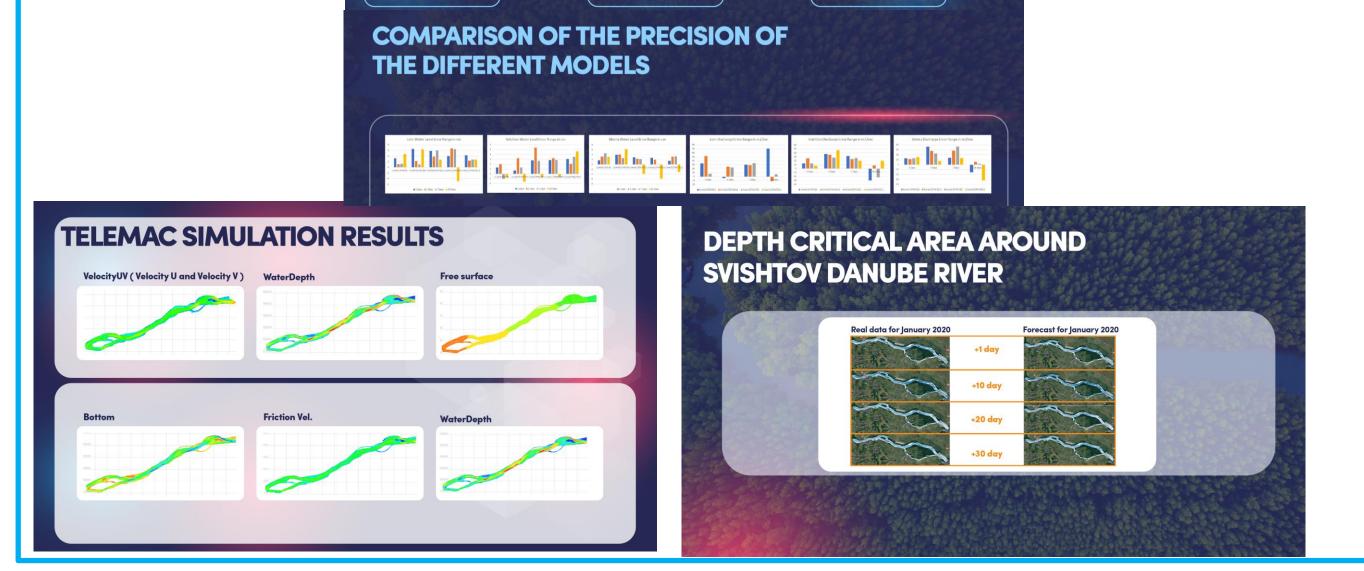


## **COMPARISON OF THE RESULTS FROM OUR MODELS WITH** THE OFFICIAL RESULTS FOR WATER LEVEL ON THE DANUBE

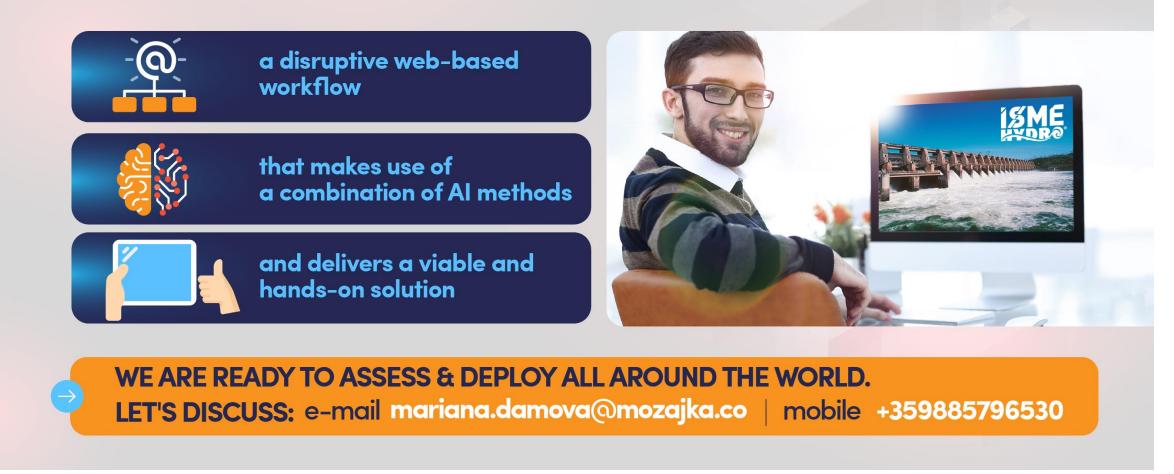


## CONCLUSIONS

**ISME-HYDRO** – AN INTEGRATED INFORMATION SYSTEM







References:

Mottech Water Management (2021) https://mottech.com/%e2%80%8eirrigation-control-systems/

Advantech Water Management Systems. (2021) https://www2.advantech.com/EDM/9FB6F0A9-3BDD-4518-B26C-81FA4948E329/water.html

GEOGLOWS. Global River Forecasting Applications. (2021) https://www.arcgis.com/apps/Cascade/index.html?appid=414730116a3c4c119b80ec9d1727ab74

SCADA. (2021) https://www.dpstele.com/scada/how-systems-work.php GIS. (2021) https://www.esri.com/en-us/what-is-gis/overview Linked Data. (2021) https://www.w3.org/standards/semanticweb/data

Goodfellow et al. (2014) Ian J. Goodfellow, Jean Pouget-Abadie, Mehdi Mirza, Bing Xu, David Warde-Farley, Sherjil Ozair, Aaron Courville, Yoshua Bengio. Generative Adversarial networks. In: Stat.ML,

arXiv:1406.2661v1, Cornell University. 2014 https://arxiv.org/abs/1406.2661

Saha S (2018) A Comprehensive Guide to Convolutional Neural Networks. https://towardsdatascience.com/a-comprehensive-guide-to-convolutional-neural-networks-the-eli5-way-3bd2b1164a53

Long-Term Short-Term Memory. (2020) https://www.sciencedirect.com/topics/engineering/long-short-term-memory

INSPIRE Data specification on Hydrography – Technical Guidelines, INSPIRE Thematic Working Group Hydrography. (2014) https://inspire.ec.europa.eu/id/document/tg/hy

TELEMAC 2D. (2021) http://www.opentelemac.org/index.php/presentation?id=17 ISME-HYDRO (2021) http://isme-hydro.com ADAM. (2021) http://adamplatform.eu ISMoSeDe (2021) http://ismosede.bg

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