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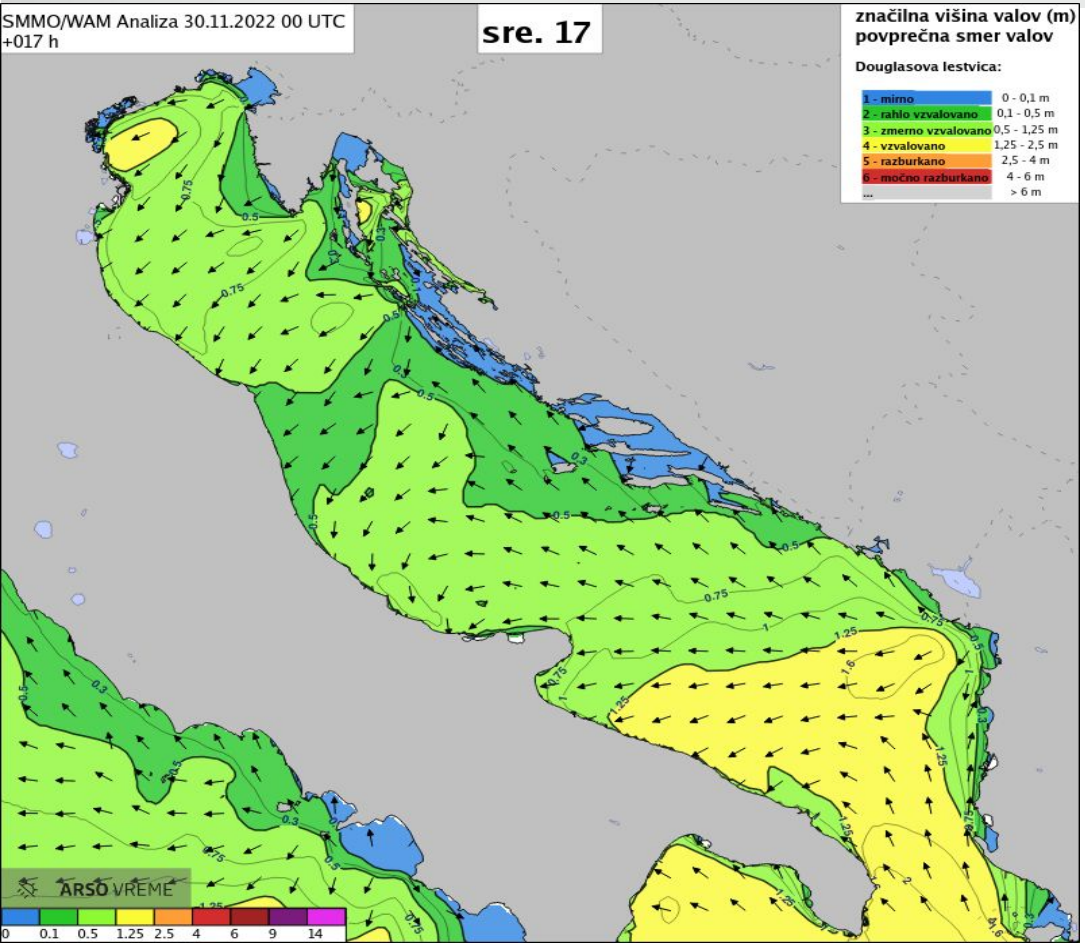
Operational Ocean Modeling at Slovenian Environment Agency



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Slovenian Environment Agency
Ljubljana, Slovenia

DCC Meeting, January 2023

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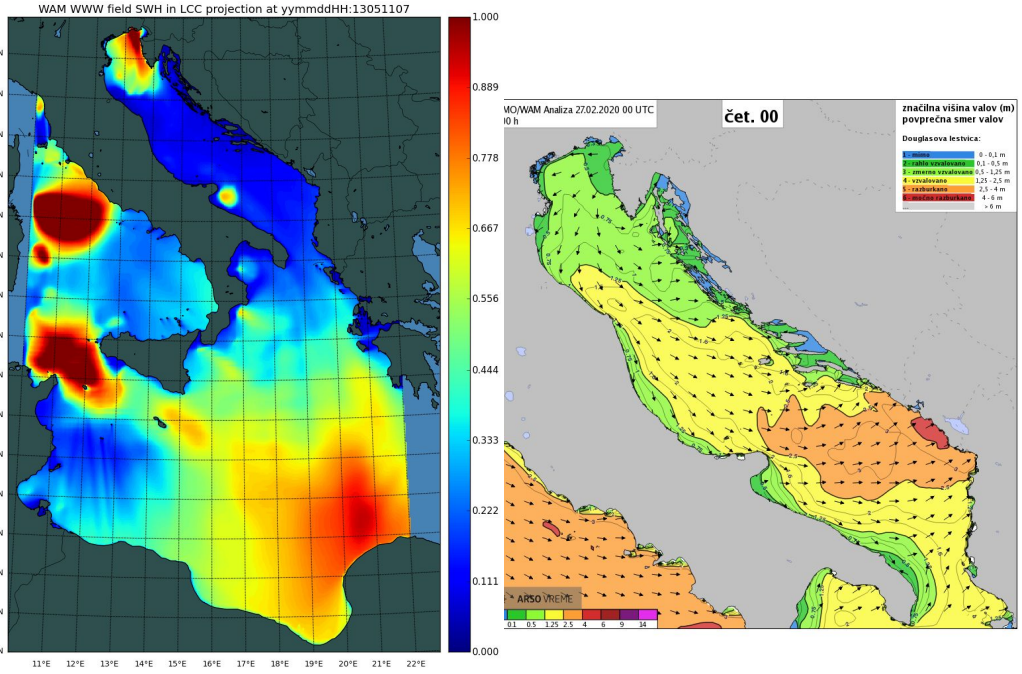
Slovenian Environment Agency

Wave modeling



WAM SURFACE GRAVITY WAVE MODEL (ECMWF cy46r1)

Adriatic and Central Med domain: [10°, 24°] E and [30°,45.986°] N. Extend south to African coast to capture the swell entering at Otranto

High resolution: 961 x 841 cells, 1.6 km

Prediction Horizon: 72h

IC: Hotstart

SBC: 10m winds from **ALADIN SI** (Trieste - Sicily) + **ECMWF** (Sicily - Africa)

Daily run: 3:15 UTC, available at 4:15 UTC.

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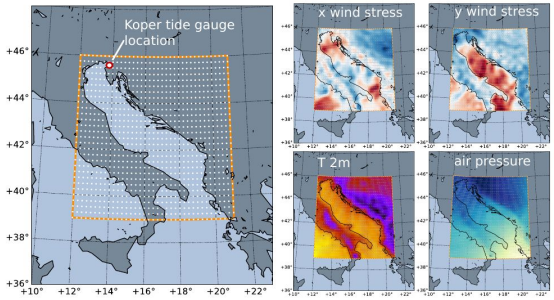
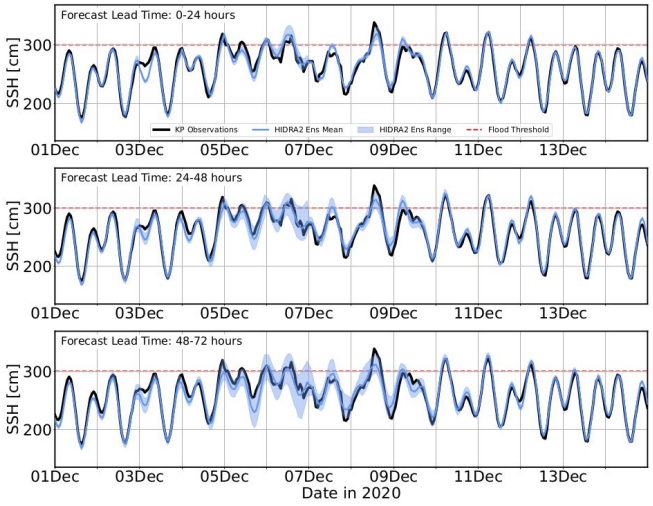
Storm surge modeling





Sea Level Ensemble Forecast: probabilistic approach

GCM approach:

NEMO Ocean Model + ECMWF ensemble forcing (high computational cost)

Machine Learning Approach (with **Marko Rus, Lojze Žust and Matej Kristan**, **FCIS UL, Visual Cognitive Systems Lab**):

HIDRA (Deep Residual CNN) + ECMWF ensemble + KP tide gauge

HIDRA frequently outperforms available GCM setups.

HIDRA has learned to mimic Adriatic basin oscillations.

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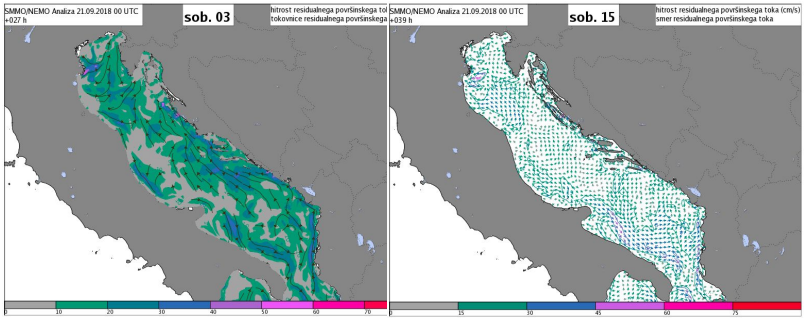
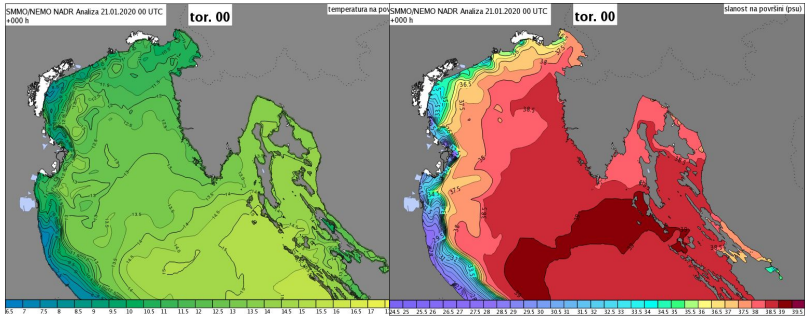
Circulation modeling





NEMO OCEAN MODEL v3.6

Adriatic domain: [12.0°,21.0°] and [39.0°,45.986°]

High resolution: 999 x 777 x 33, 1/216 degree
(N ADR and TS Gulf Domains also implemented via 1-way nesting)

Forecast range: 72h

IC, LBC: CMEMS MFS

RR: 42 rivers - mostly climatological discharges,
However: Soča, Dragonja, Rižana (hydrological model forecasts), Po (ARPA gauge)

SBC: ALADIN SI atmospheric model (Strajnar et al. 2018, Ličer et al. 2016)

Daily run: 3:15 UTC, available at 4:15 UTC.

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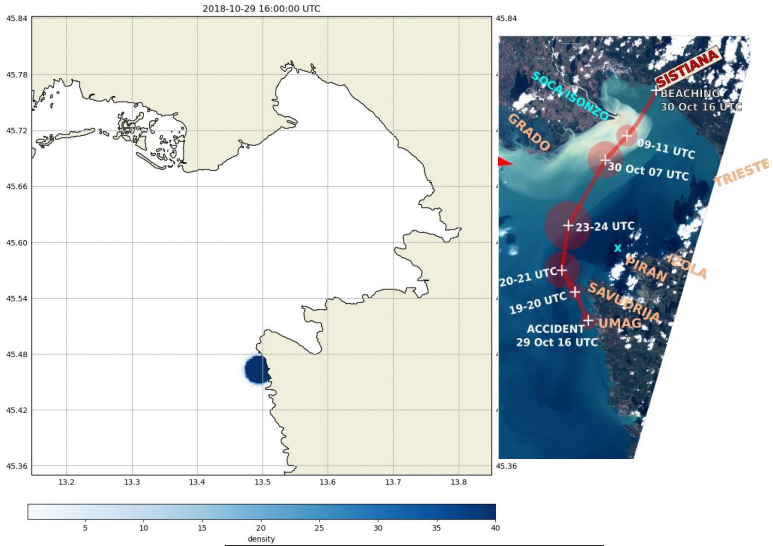
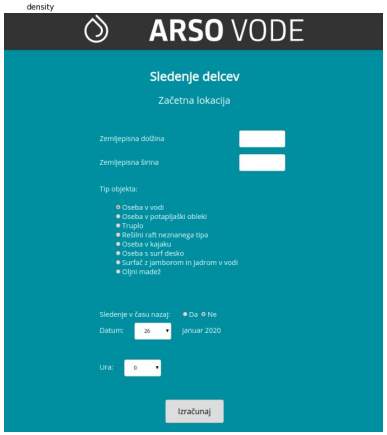
Lagrangian modeling



(Details in Ličer et al., NHESS 2020)



Lagrangian Search and Rescue Model: OpenDrift

Domain: Adriatic NEMO domain

Ocean Currents: Adriatic NEMO

Surface Winds: ALADIN SI

Surface Waves: Included in OpenDrift through parametrization from observations

This product is available to ARSO forecasting service as a web browser application. It covers entire Adriatic sea and allows Oil spill, SAR, and other applications.