SMASH

machine learning for science and humanities   postdoctoral program

UNIVERZA V LJUBLJANI

Jožef Stefan Institute

IZUM
Institute of Information Science Maribor

REPUBLIC OF SLOVENIA
MINISTRY OF THE ENVIRONMENT,
CLIMATE AND ENERGY
SLOVENIAN ENVIRONMENT AGENCY

Co-funded by
The European Union

HF-SCANNER

High frequency sea-level oscillations modeling in the Mediterranean using machine learning

Iva Međugorac, N. Metličić, M. Ličer
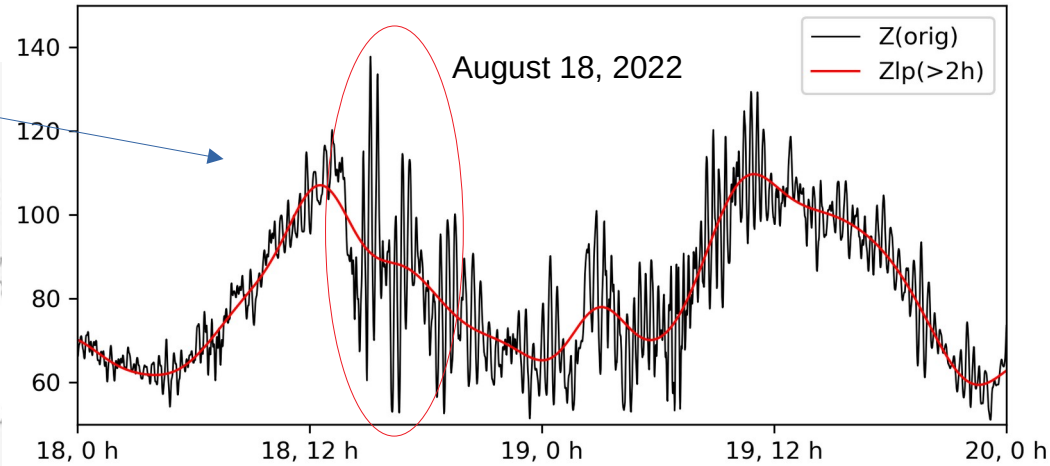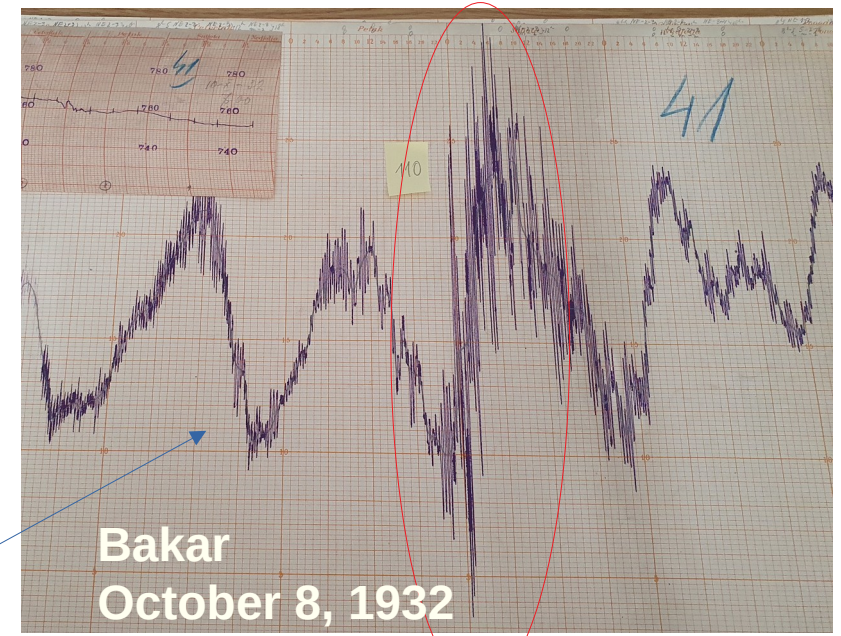
iva.medugorac@ung.si

Vipava, 7–11/10/2024

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Outline

- Introduction to atmospherically induced HFOs

- HF-SCANNER

- → objectives

- → obstacles

- Design of the first model

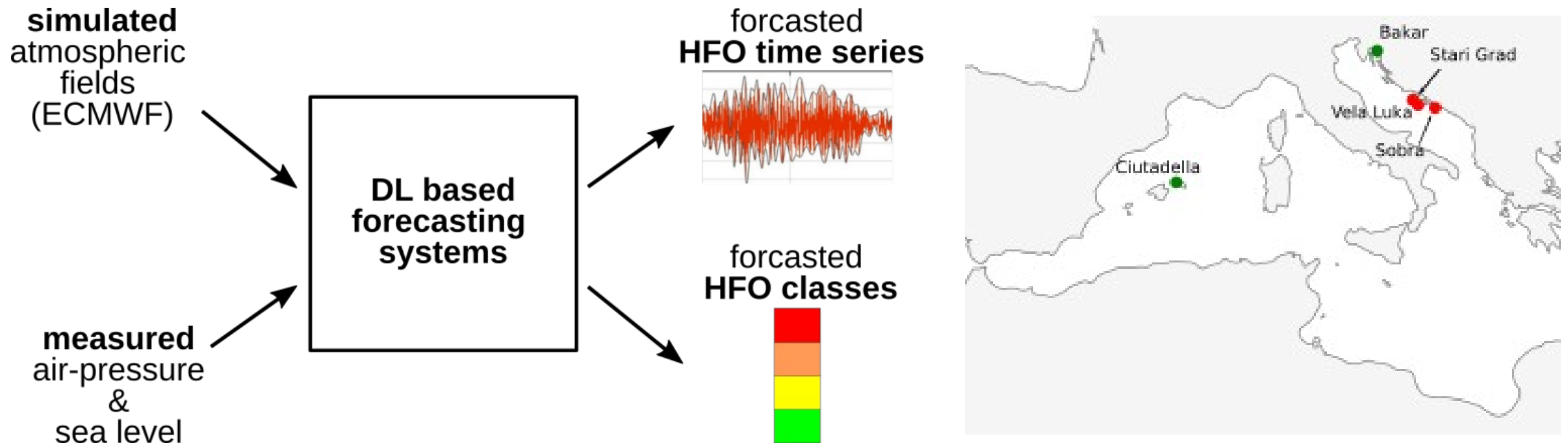- Results for TG Bakar

Atmospherically induced HFOs

Vela Luka
June 21, 1978

Bakar
October 8, 1932

Ciutadella
June 15, 2006

August 18, 2022

Z(orig)
Zlp(>2h)

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Spatial distribution of the Mediterranean HFOs

Pupić Vurilj et al. (2024). https://doi.org/10.15233/gfz.2023.40.8
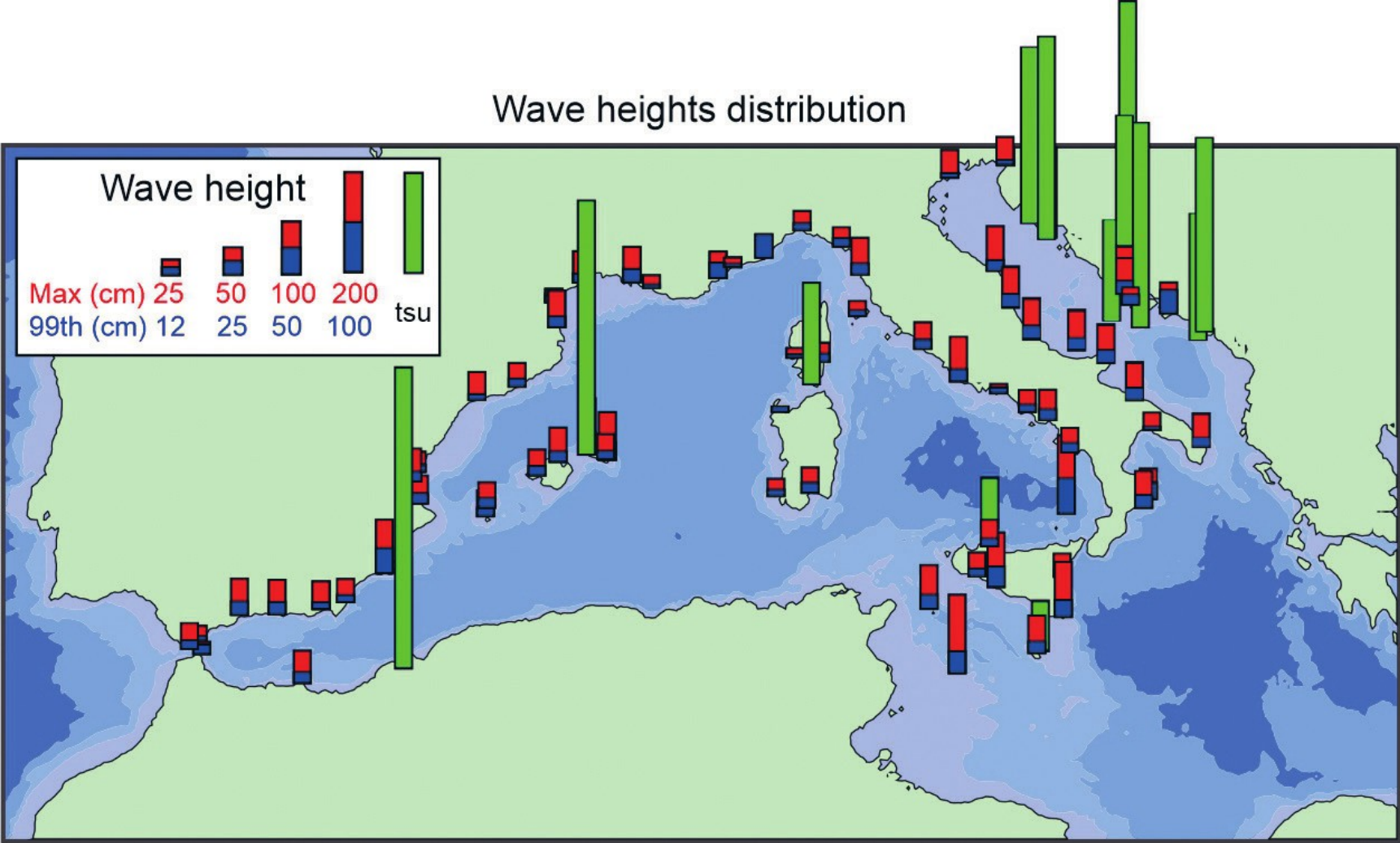
The **GOAL** of the HF-SCANNER

Obstacles:
short data series
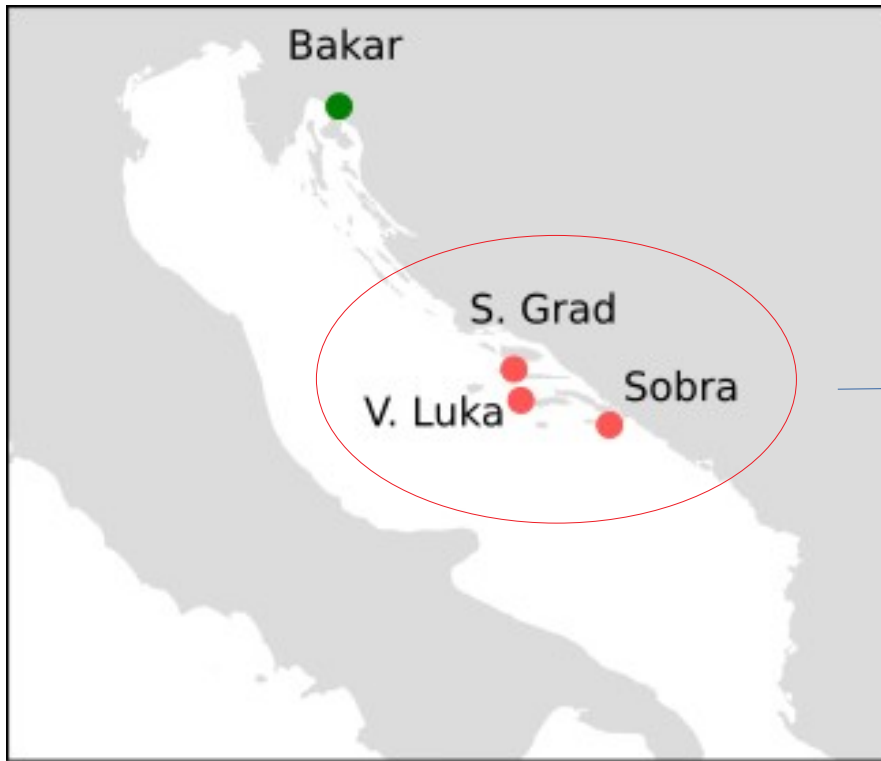
Transfer learning using:
1. foundation model
2. supervised model
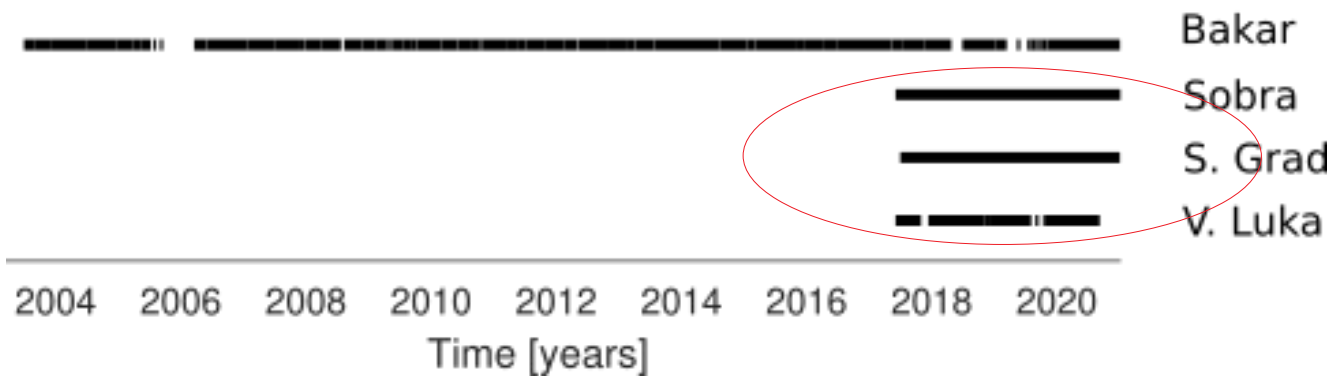
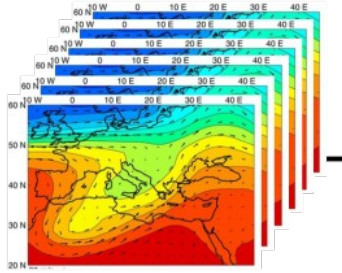Too short to train a stand-alone supervised model

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Obstacles: rare and 'small' processes
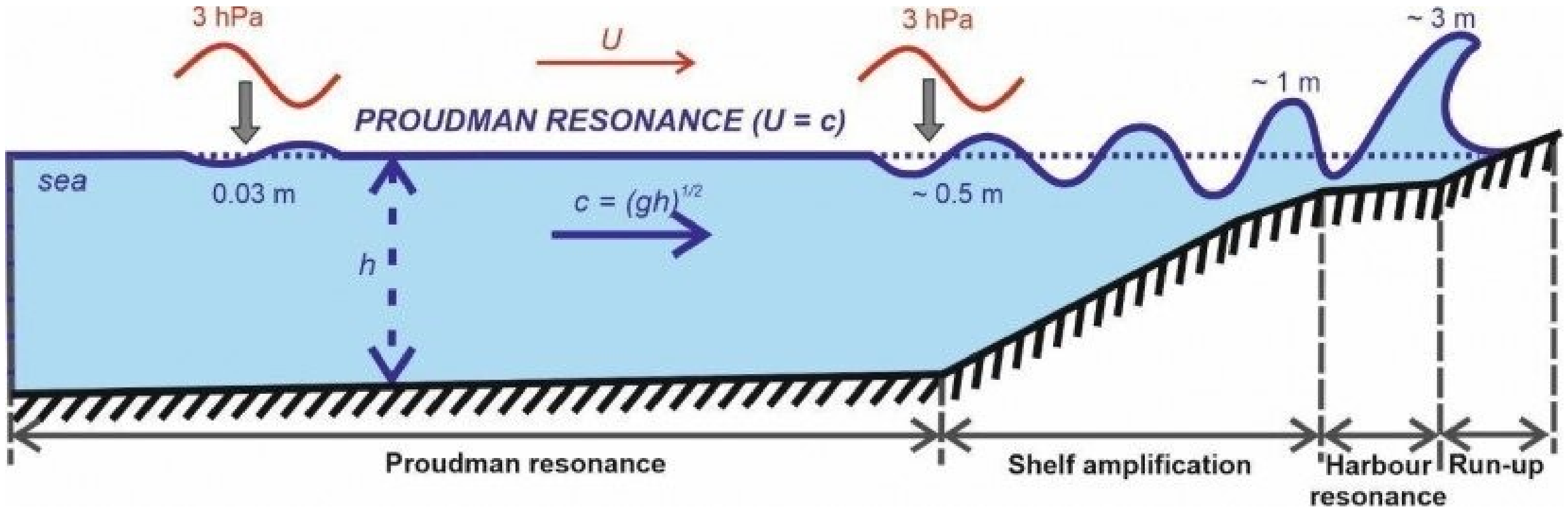
Adapted from Šepić et al. (2015): https://doi.org/10.1038/srep11682
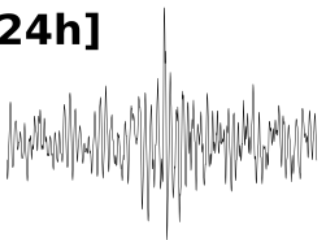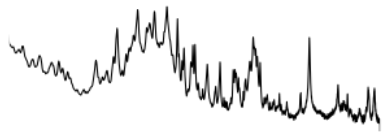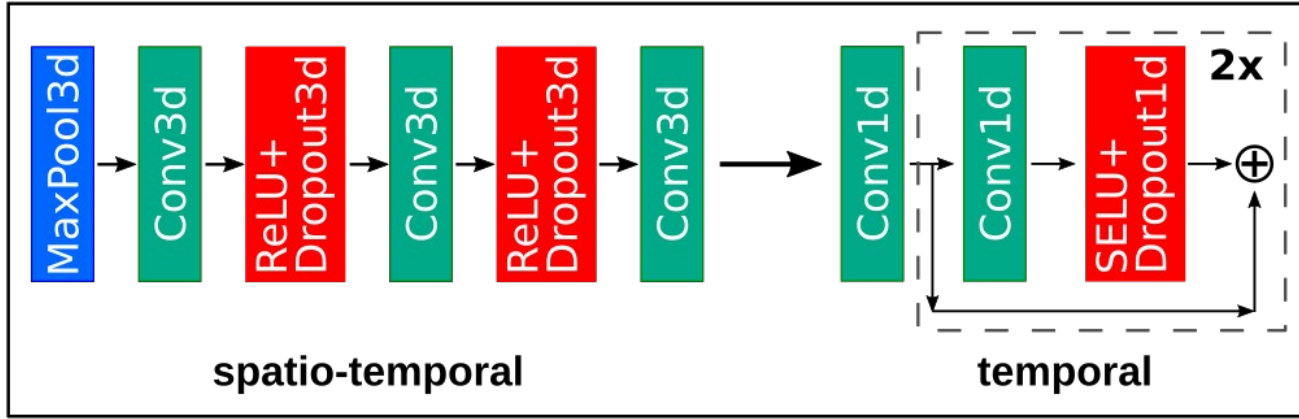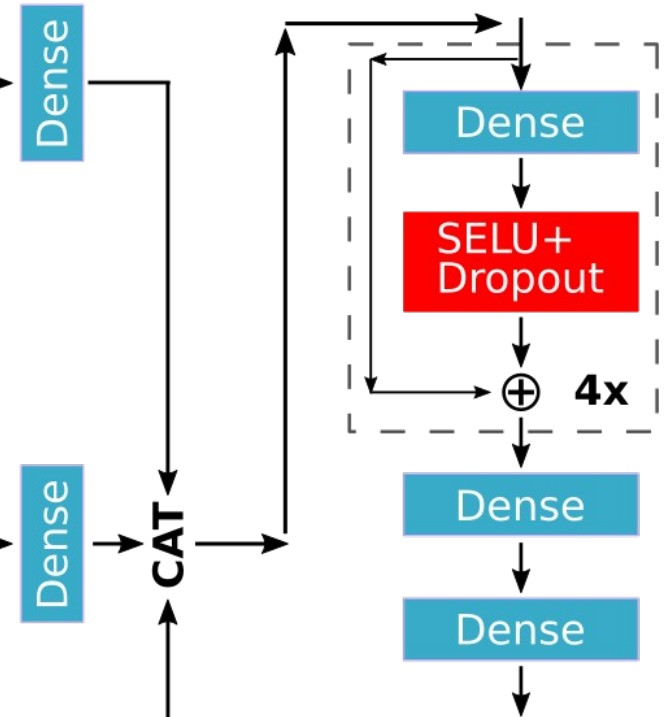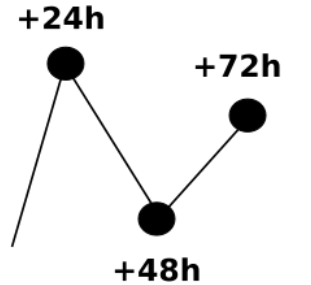
Model architecture (Bakar)

Results: predictions 2022

training: 2003-2020
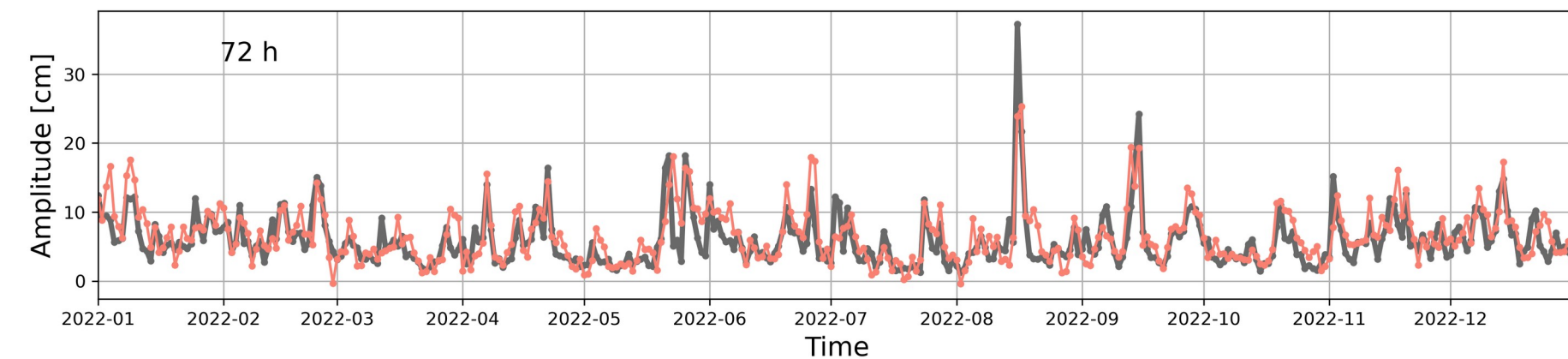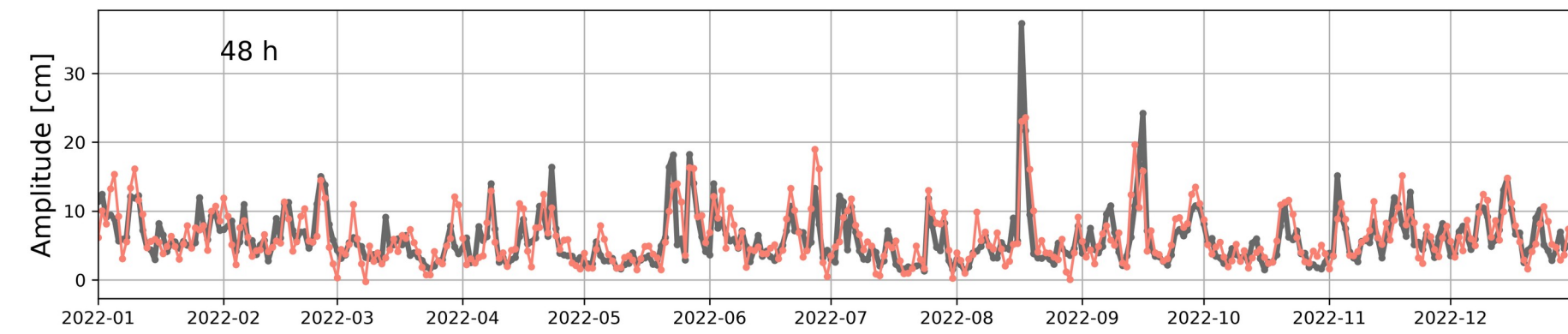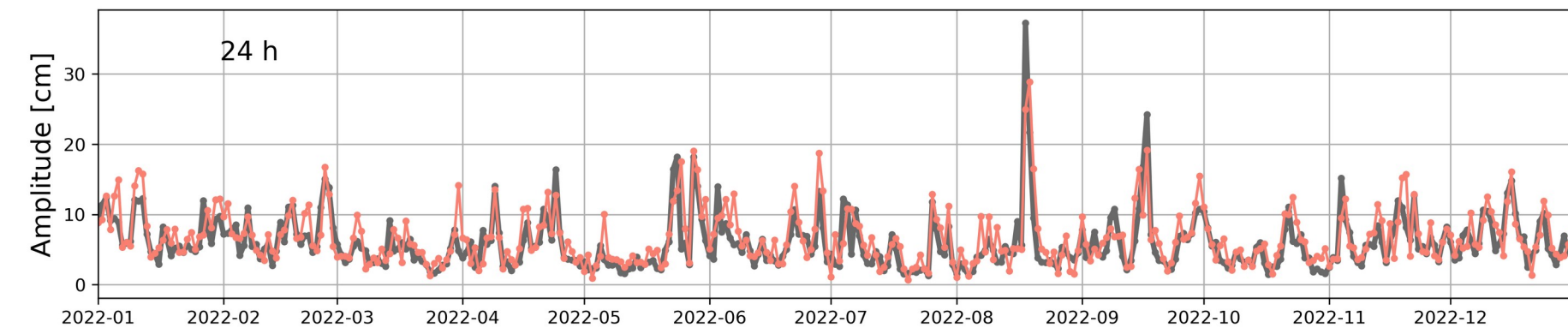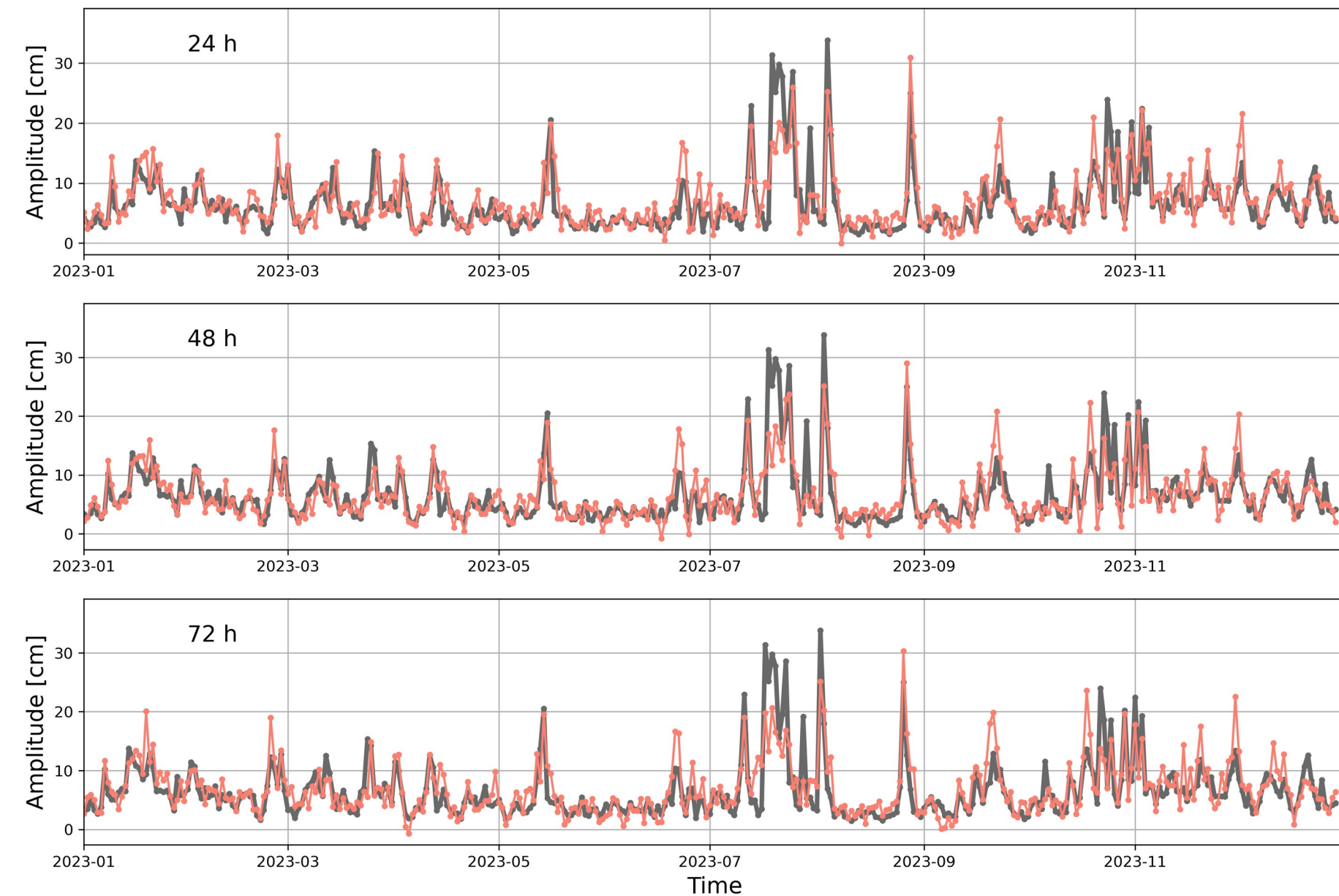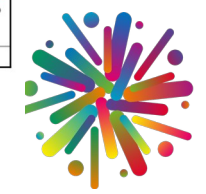
validation: 2021

testing: 2022-2023

black – observation

red - prediction

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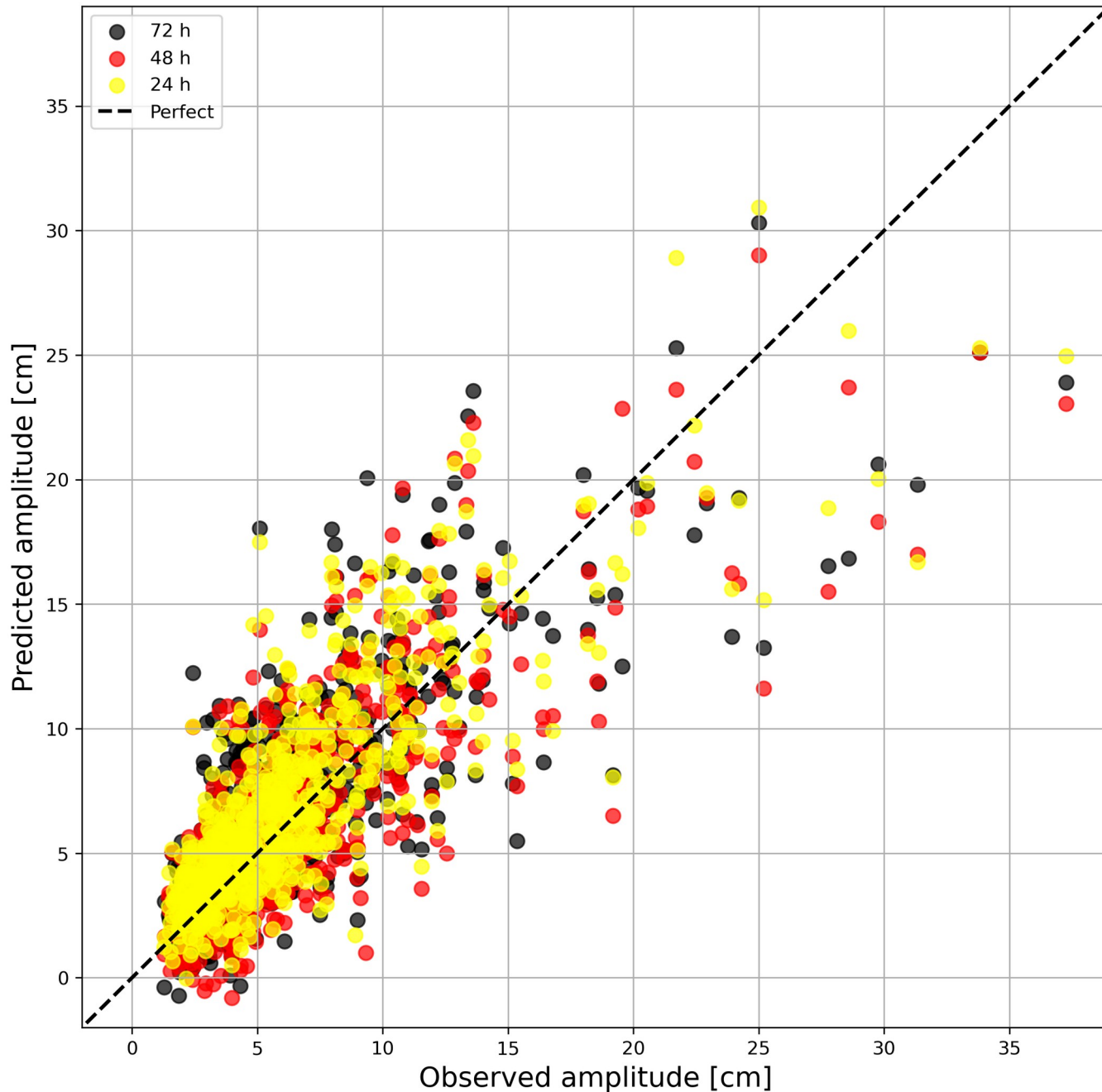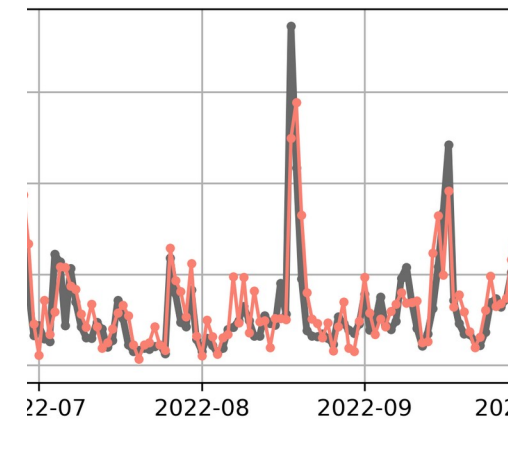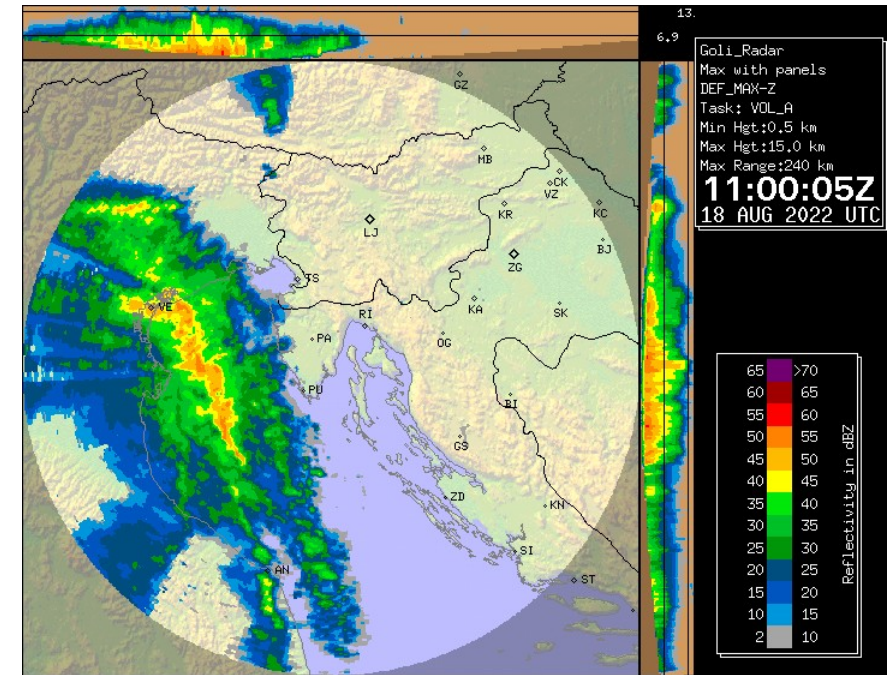# Results: predictions 2023

training: 2003-2020

validation: 2021

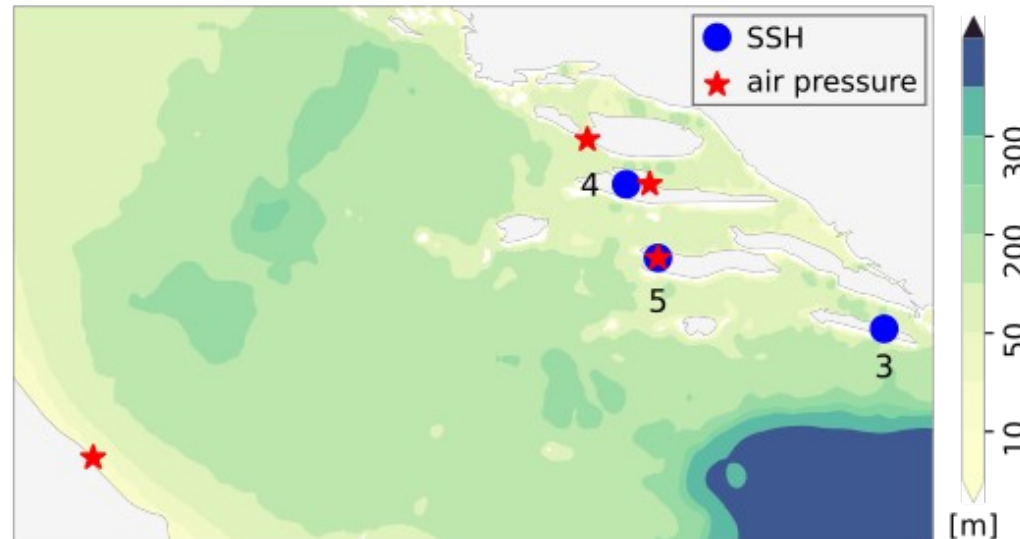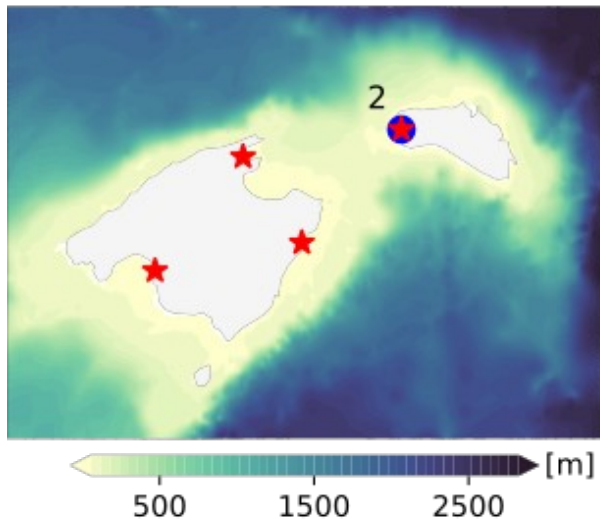testing: 2022-2023

black – observation

red - prediction

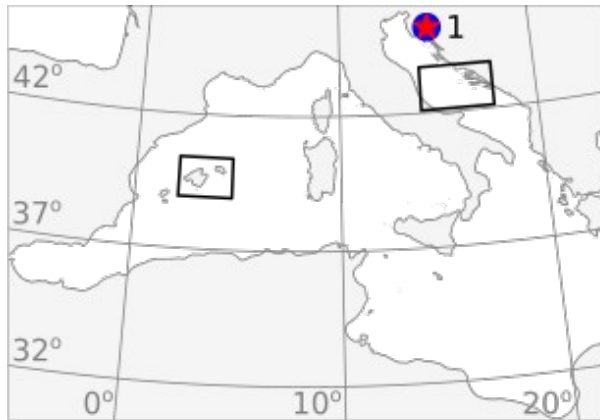# Results: predictions 2022–2023

- training: 2020-2020

- validation: 2021

- testing: 2022-2023

Next actions

(1) modify the model; (2) reduce the forecast horizon

(3) include additional data

Thank you for your attention

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