



# Modeling ecosystem service: risk-related analysis

Coastal flood risk

14/06/24

# Global Spatiotemporal Multicriteria and Data-Driven Analyses Identify Current and Future Coastal Risk Hot Spots and Clusters

*One Earth*

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## EXPOSURE

- ▶ Population count
- ▶ Urban area coverage
- ▶ Agricultural land cover
- ▶ Presence of UNESCO heritage sites
- ▶ GDP

## EXPOSURE

### Definition of indicators

For each of the variables

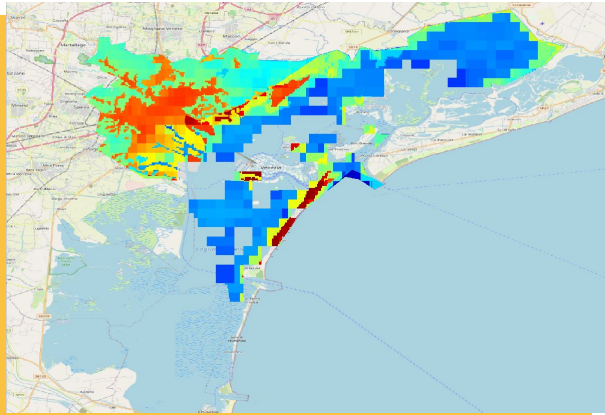


### WOWA

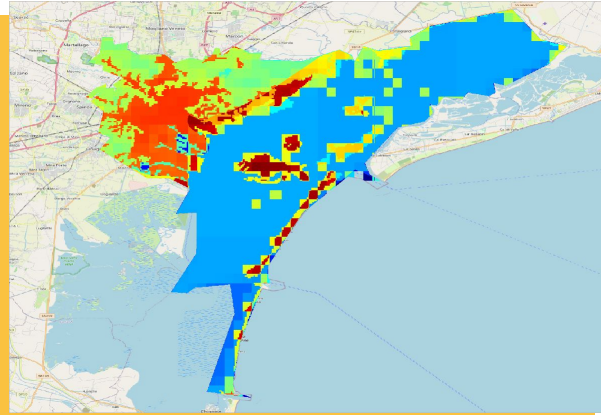
Ordered and weighted average

```
@parameter(label = 'Risk aversion', default=0.5, name = risk_profile)
@parameter(label = 'Risk neutral profile?', default=false, name = balanced_risk_prof)
@parameter(label = 'Ratio between median and extremes', default=1, name = ratio_balance)
number exposure_index
observing
    @criterion(relweight ?= 0.3) value of im:Gross_economics:DomesticProduct,
    @criterion(relweight ?= 0.35) value of count of demography:HumanIndividual,
    @criterion(relweight ?= 0.2) value of UrbanLand,
    @criterion(relweight ?= 0.05) value of AgriculturalLand,
    @criterion(relweight ?= 0.1) value of es.aesthetics:AestheticValuable conservation:ProtectedArea
using im.mca.owa(interpolate_weights = false);
```

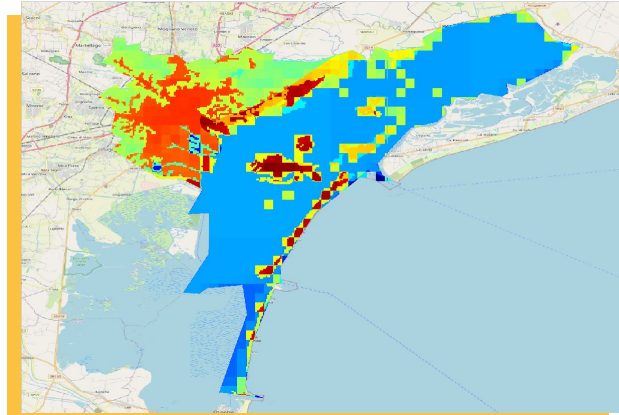
## EXPOSURE in Venice



Current situation

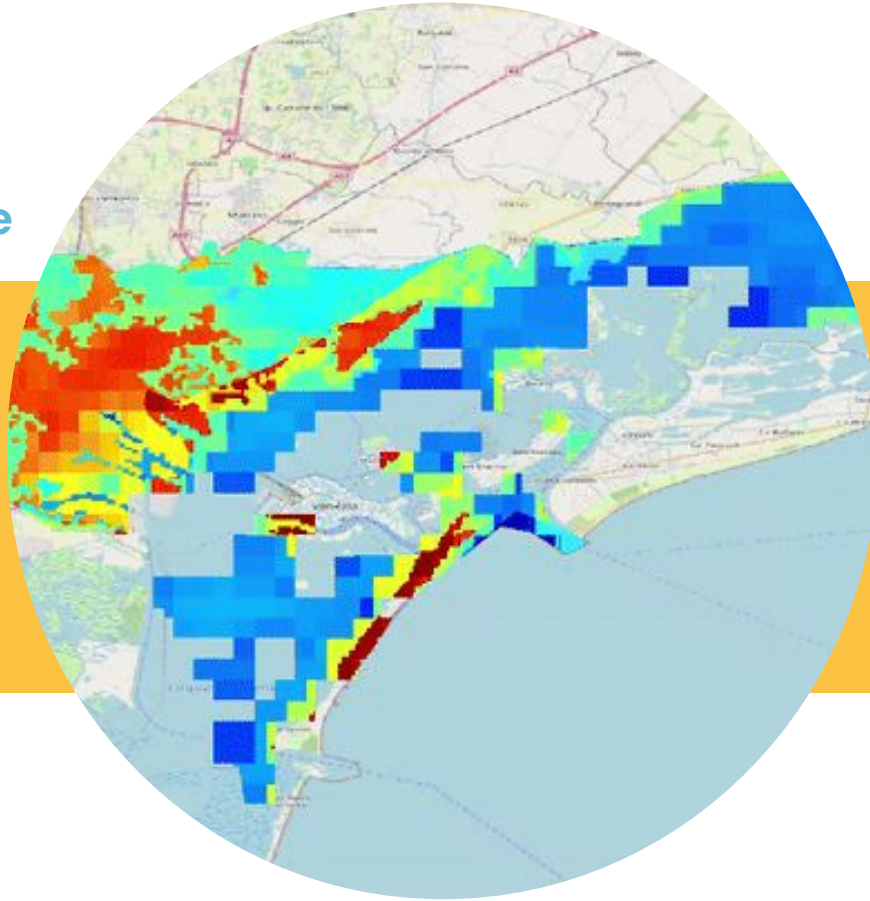


End of the century  
Under SSP 4.5 scenario



End of the century  
Under SSP 8.5 scenario

## EXPOSURE in Venice



# HAZARD

- ➔ Levels that could be reached because of a marine ESL event with a return time equal to 1 in 100 years



## HAZARD

### ESL dataset

To find locations and their level



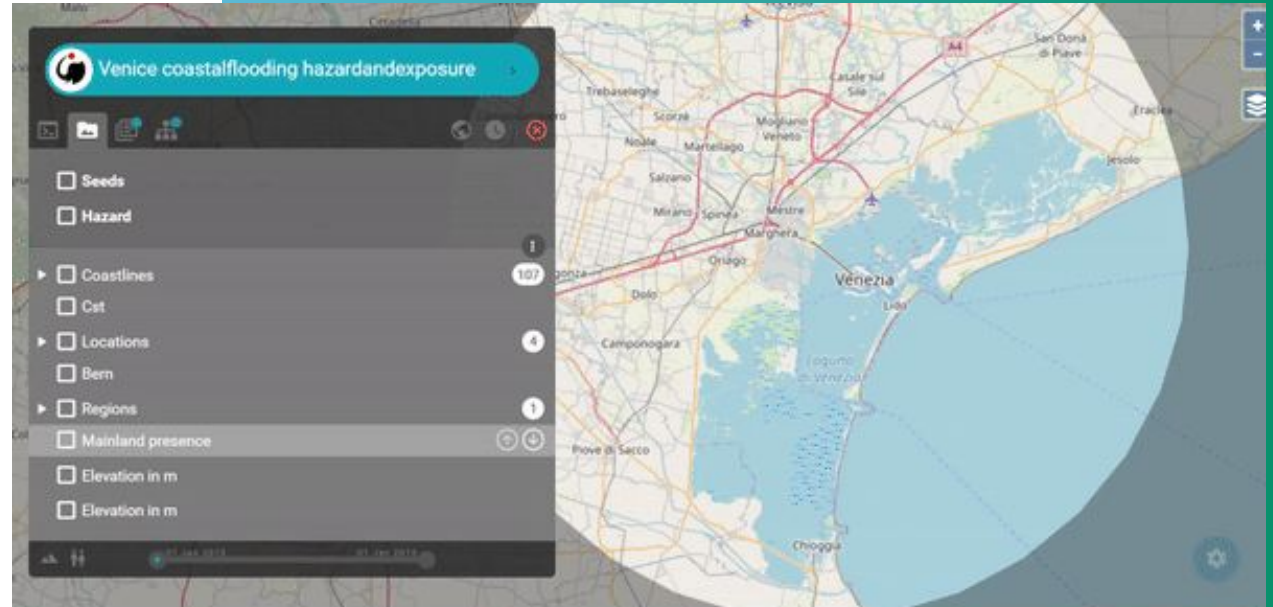
### Bern

Interpolation of flood level

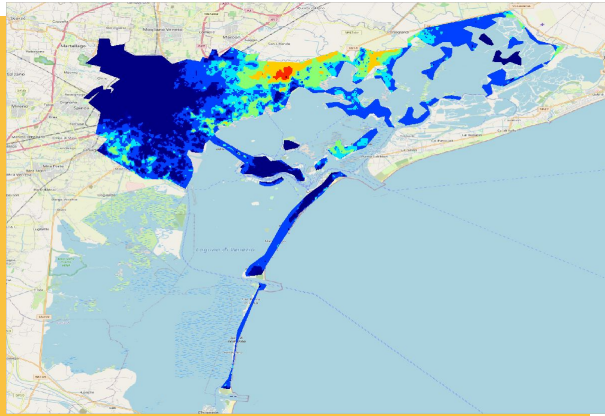


### Seeds

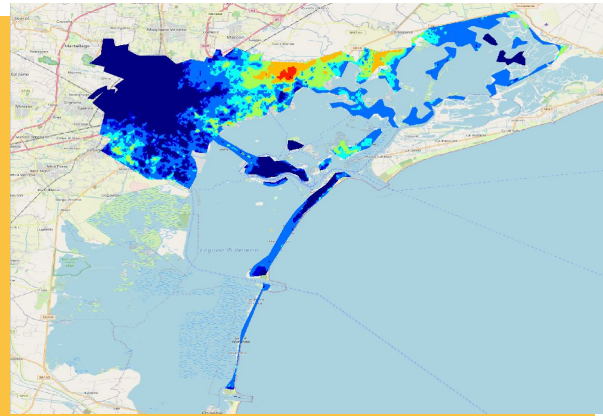
Flood level in coastline



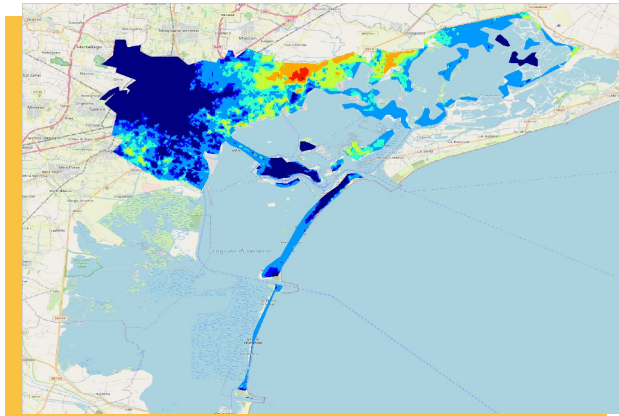
## HAZARD in Venice



Current situation



End of the century  
Under SSP 4.5 scenario



End of the century  
Under SSP 8.5 scenario

## HAZARD in Venice

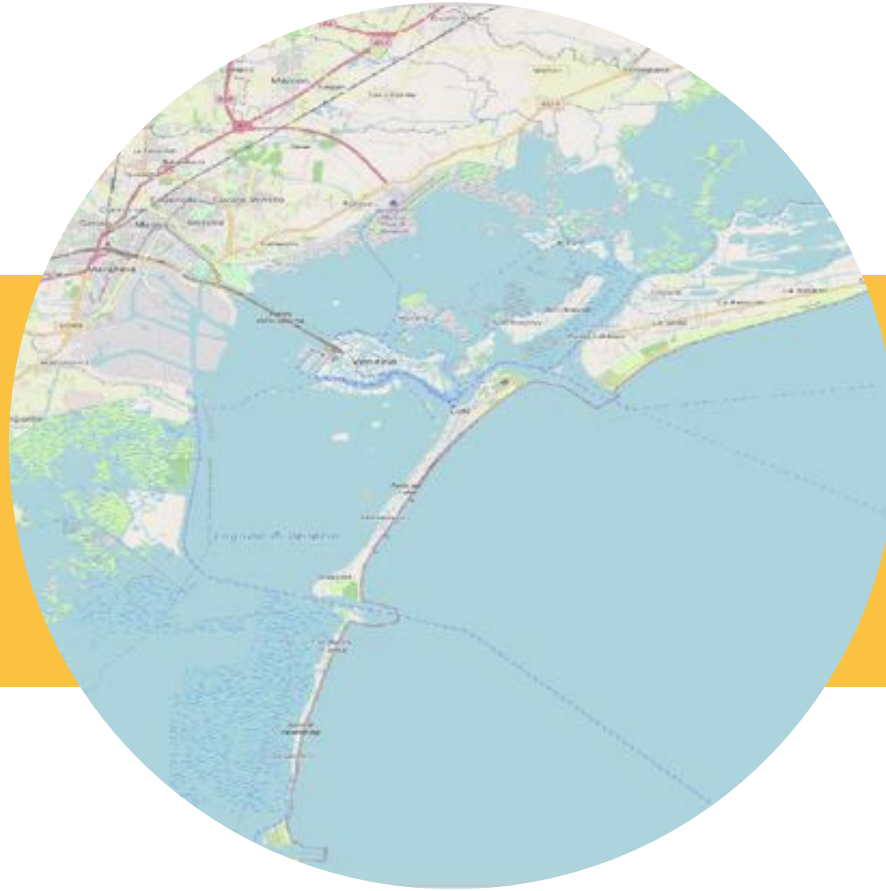


Current situation



End of the century  
Under SSP 8.5 scenario

## HAZARD in Venice



- > 🗄️ endofcentury.baseline
- > 🗄️ endofcentury.sspfive
- > 🗄️ endofcentury.ssptwo



**Thank you!**



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[www.aries.integratedmodelling.org](http://www.aries.integratedmodelling.org)