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Human and natural processes both induce changes along rivers

The cases of Mura (Slovenia) and Vjosa (Albania)

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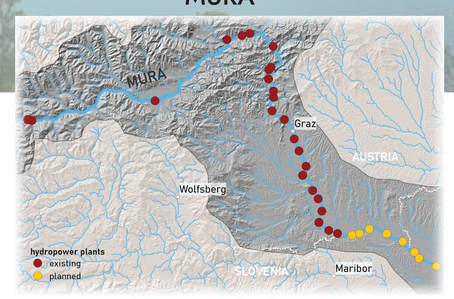
MOTIVATION

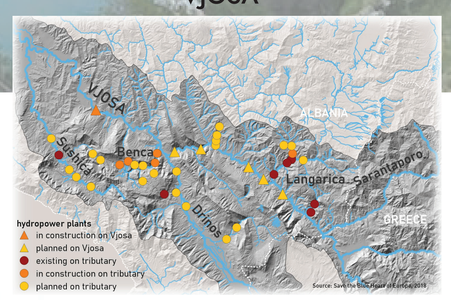
Both rivers Mura and Vjosa share a common **historical**, **geomorphological**, and **economic background**, except that the Mura is heavily dammed in its upper part and regulated in some sections. Vjosa, in counterpart, is known as one of the last wild rivers in Europe, but many hydropower plants are planned on its course in the future.

Based on interdisciplinary approach combining **remote sensing, anthropological,** and **geographical research**, we try to understand how human actions have modified the river course. We were also interested in how building HPPs on theriver Mura can predict what can potentially happen on the Vjosa river in the future.

MURA



VJOSA

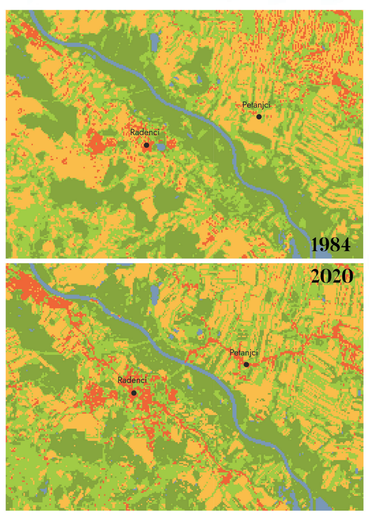


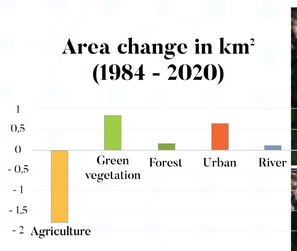
DATA

- Landsat data (from 1984 on)
- Sentinel-2 data (from 2015 on)
- in-situ data (e.g. hydrological)
- fieldwork anthropological data

METHODS

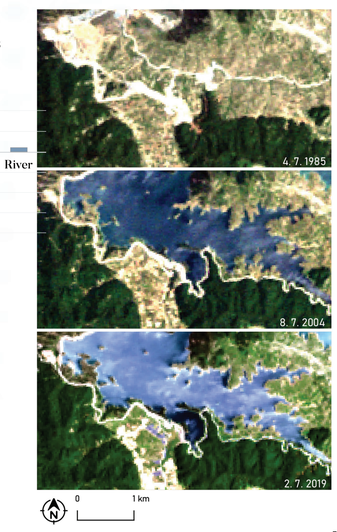
- Land use/land cover change detection using SVM and RF approach + time series approach (twDtw)

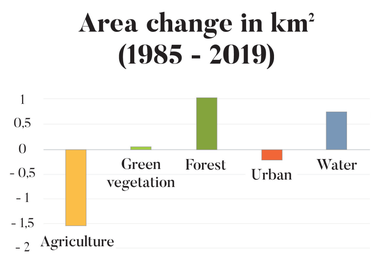




1984 image is Landsat 5
SVM classification
Kappa = 0.95, Overall Accuracy = 77 %

2020 image is Landsat 8
SVM classification
Kappa = 0.95, Overall Accuracy = 80 %

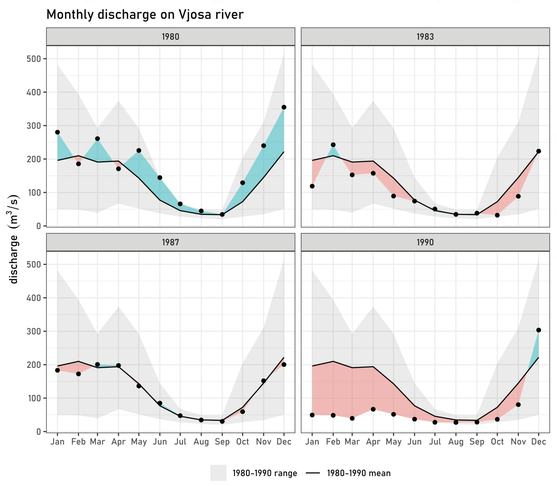


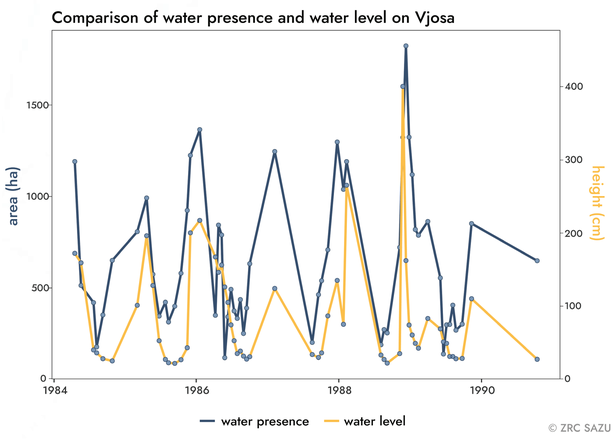


MURA

VJOSA

- Relation and comparison of the results obtained with RS methods to the data collected in the field





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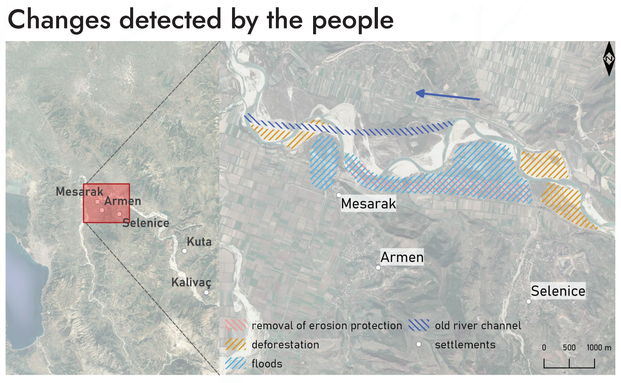
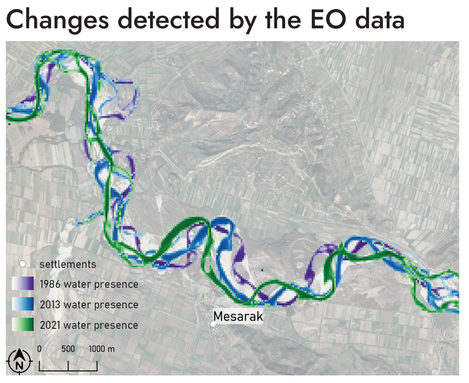
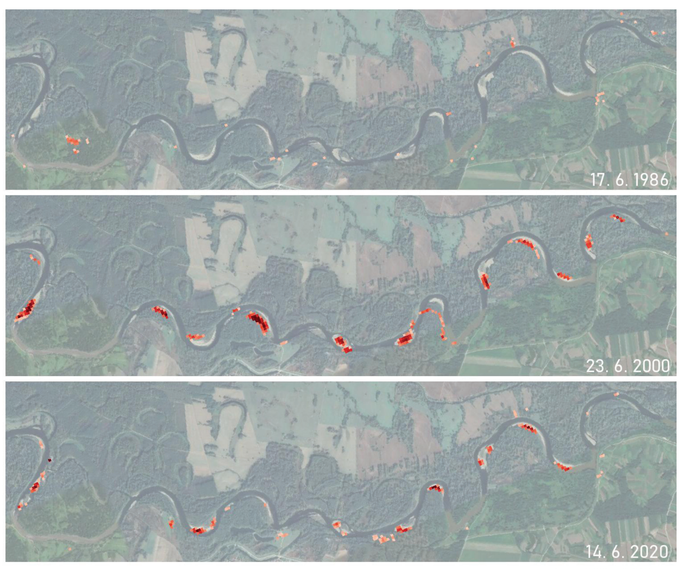
Changes detected by the people



Changes detected by the EO data



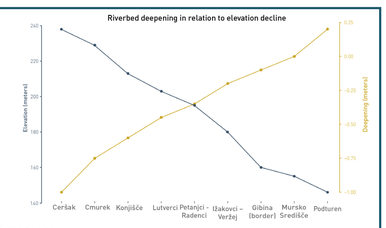
- The spectral signal mixture analysis for gravel bar detection



MURA

VJOSA

CONCLUSIONS



- the riverbed of Mura is deepening - changes NOT detected using RS data
- Vjosa is dealing with high gravel changes
- high correlation between the water surface area identified from the EO data and the water level measured in-situ at the gauging stations
- people observe most of the changes in their environment that we detected using the EO data
- the combination of social, historical, geographical, and hydrological aspects adds more value to the RS results

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