Advanced monitoring system for agroecosystemsthreatened by salinization and pollution

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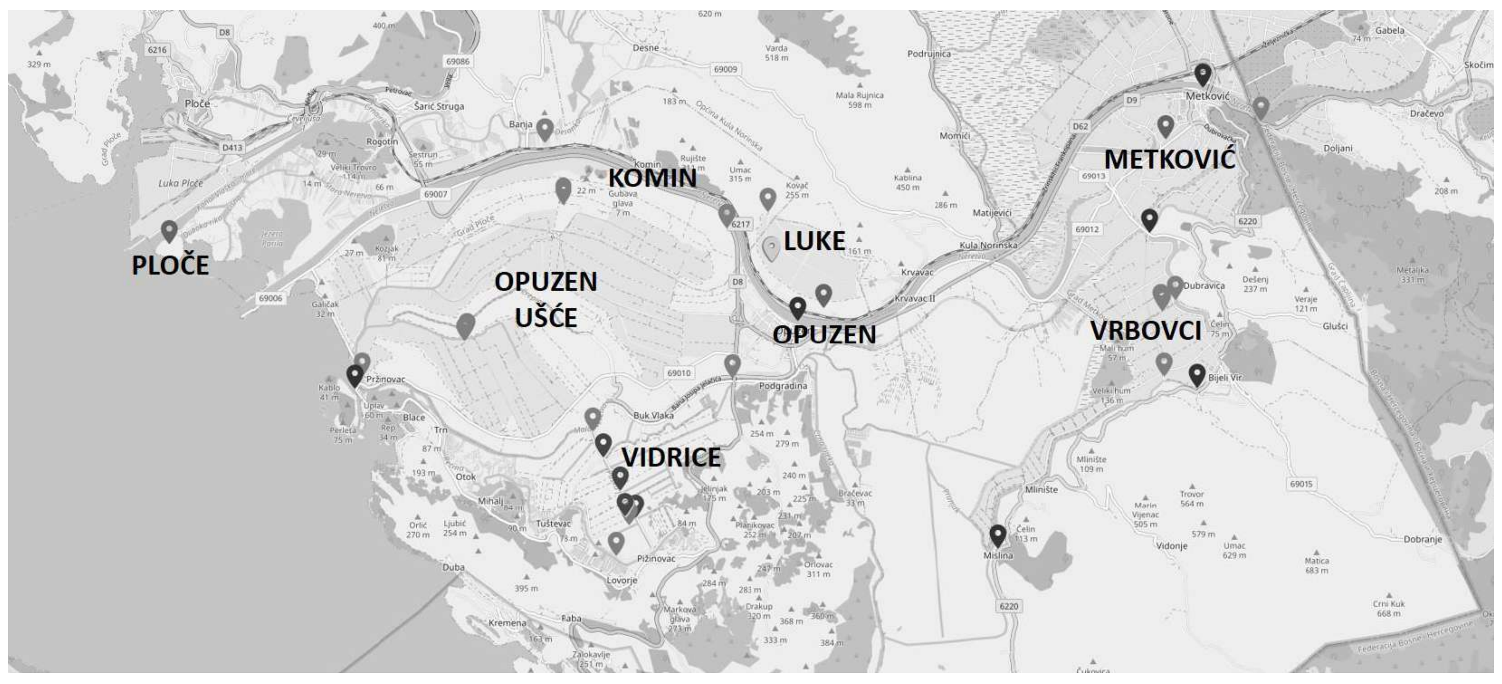
Introduction

- Monitoring the state of the environment is extremely important for the delta Neretva River due to the diversity of ecological zones, which alternate spatially, have different degrees and intensities of use, and are generally very sensitive to the effects of climate change
- automatic, continuous monitoring that can provide data in real time and includes a range of sensors to monitor various parameters



Map of long-term and automatic continuous monitoring locations (meteorological, hydrological and soil and water quality data)

Soil sensors (FDR) at SML1

Soil sensors (FDR) at SML2

Automatic weather station at SML1

Materials & Methods

- The TEROS 12 (Meter Group) sensors measure soil temperature, bulk electrical conductivity (EC_b), and volumetric water content using frequency-domain technology are installed every 25 cm up to 1 m at two representative soil monitoring locations (SML) site Vidrice (SML1) and Luke (SML2)
- An automatic weather station (Pinova) was installed at SML1 site to record rainfall, air temperature and moisture, wind speed and global radiation.
- Data from each station and sensor is collected at 10-minute intervals and sent to the newly developed platform.

First results

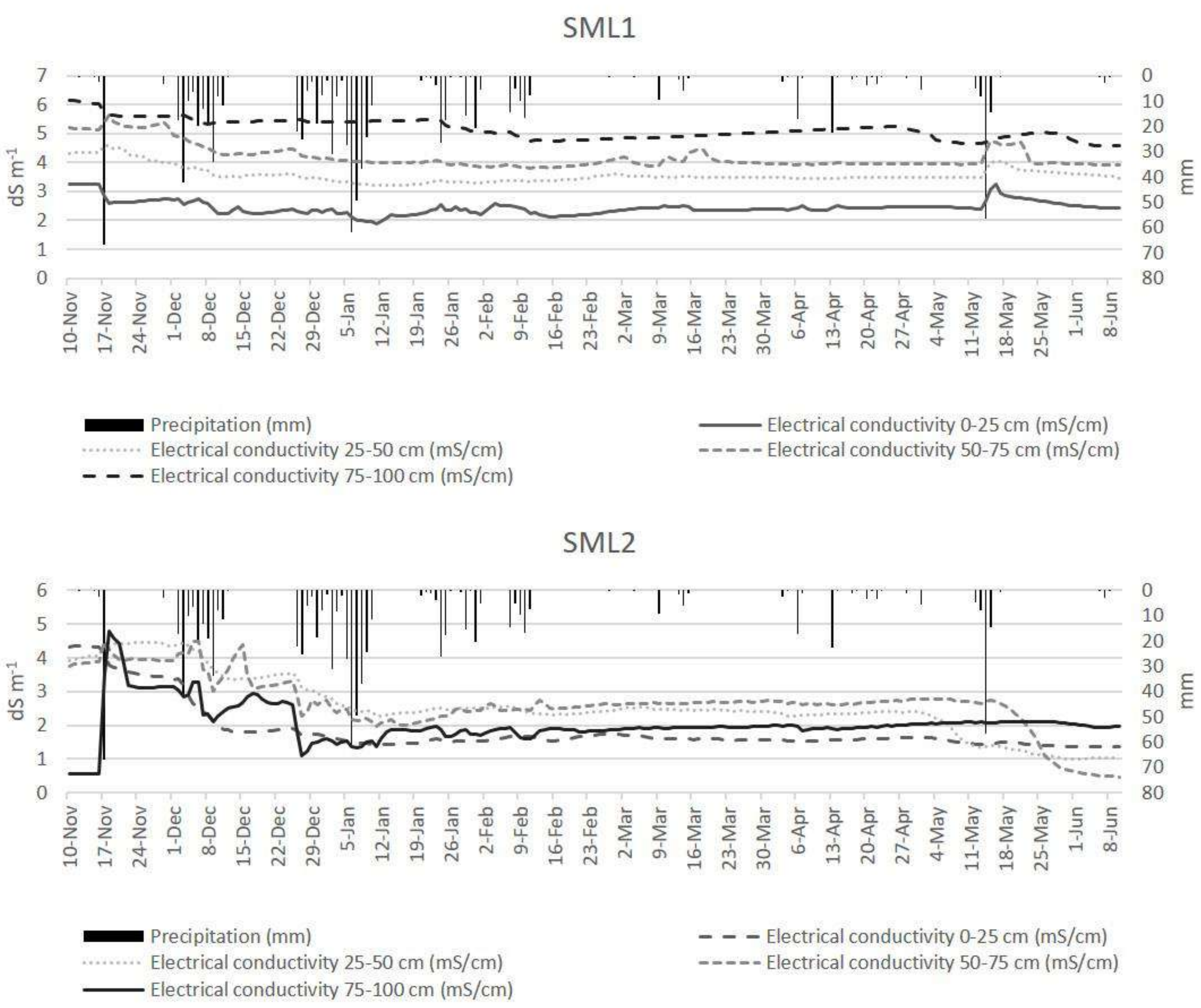


Chart 1. Daily variation of soil EC_b at monitoring stations SML1 and SML2 obtained by FDR sensors and daily rainfall (November 2020 – June 2021)

- Since soil sensors were installed in mid-November 2020, results for first seven months are presented (to June 2021). On SML1 average daily value of EC_b was 3.89 dS m^{-1} with maximum value of 6.16 dS m^{-1} at 75-100 cm. SML2 had lower daily average of 2.28 dS m^{-1} with maximum of 4.77 dS m^{-1} also at 75-100
- Daily variation of soil EC_b at both SMS1 and SMS2 along with precipitation is given at Chart 1. As shown in the Chart 1.the EC_b varied differently on each location, but on both locations rainfall caused changes in EC_b values indicating the movement of salt through the profile. After the end of May, values of EC_b stabilised in all horizons at both locations.
- Variation coefficient was significantly lower at SML1 indicating low soil EC_b variation in all horizons. At SML2 variation coefficient ranged from 29 % to 39 % indicating high EC_b variability in all horizons
- At SML1 mean EC values were similar in both monitoring approaches and higher then at SML2. On the other hand, variability of EC in the soil profile was higher at SML2 in both approaches compared to SML1.
- The similarity in obtained results indicate that soil sensor data may be used as an alternative to classical soil salinity monitoring.

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Conclusions and further plans

- Implementing modern technologies like soil sensors can give us an insight at data in high temporal resolution.
- This can make decision making much more accurate and precise, especially in vulnerable agro environments such as river deltas.