

Investigations and monitoring at the Venice site (WP3)

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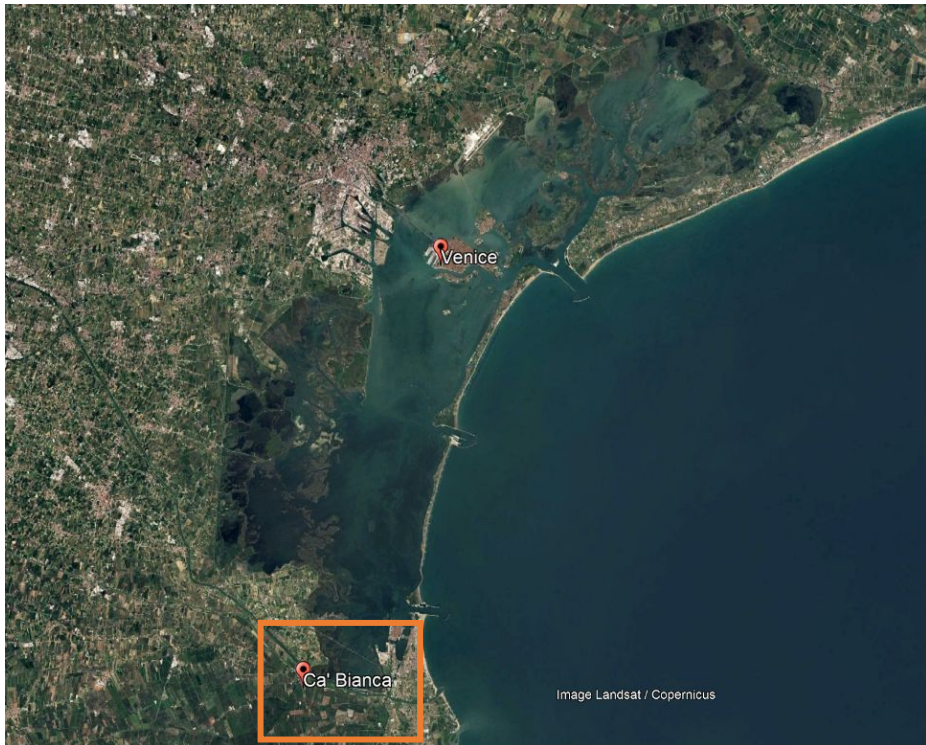
PP2. Consorzio di Bonifica Adige Bacchiglione:
Giuseppe Gasparetto-Stori, Cesare Vaccari

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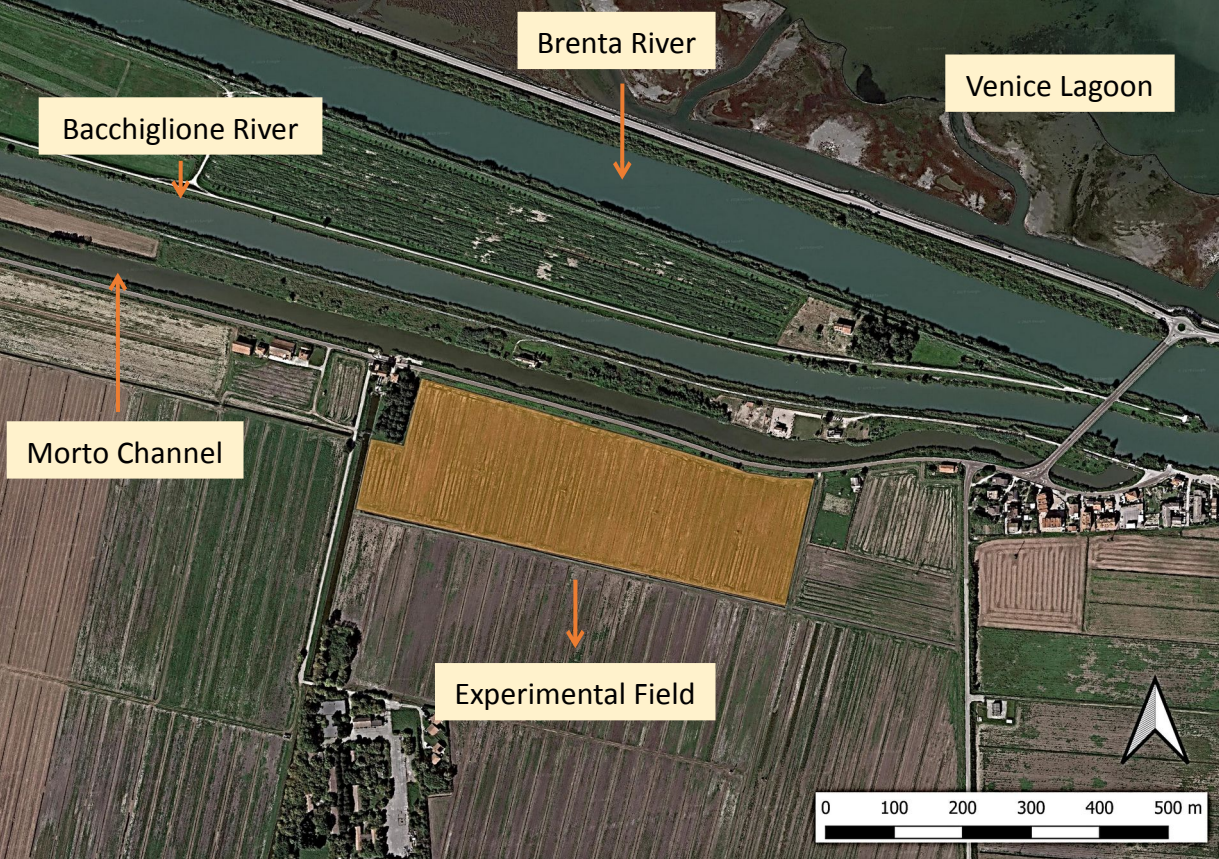
** Institute of Marine Sciences

GEOGRAPHICAL INTRODUCTION

The experimental site is located in Ca' Bianca (12°13'55.218"E; 45°10'57.862"N), right south of the Venice Lagoon

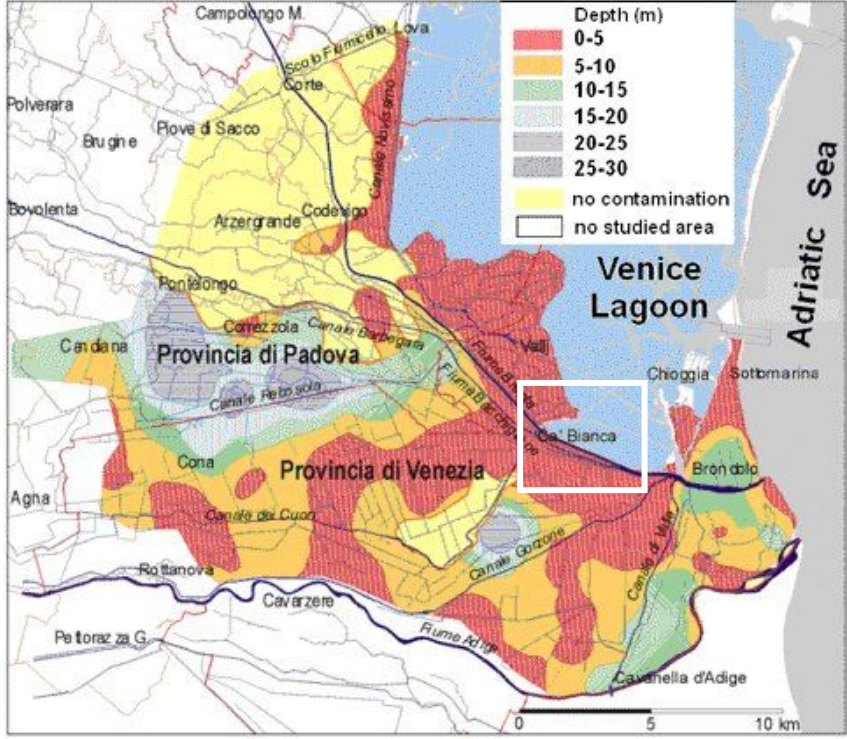


GEOGRAPHICAL INTRODUCTION

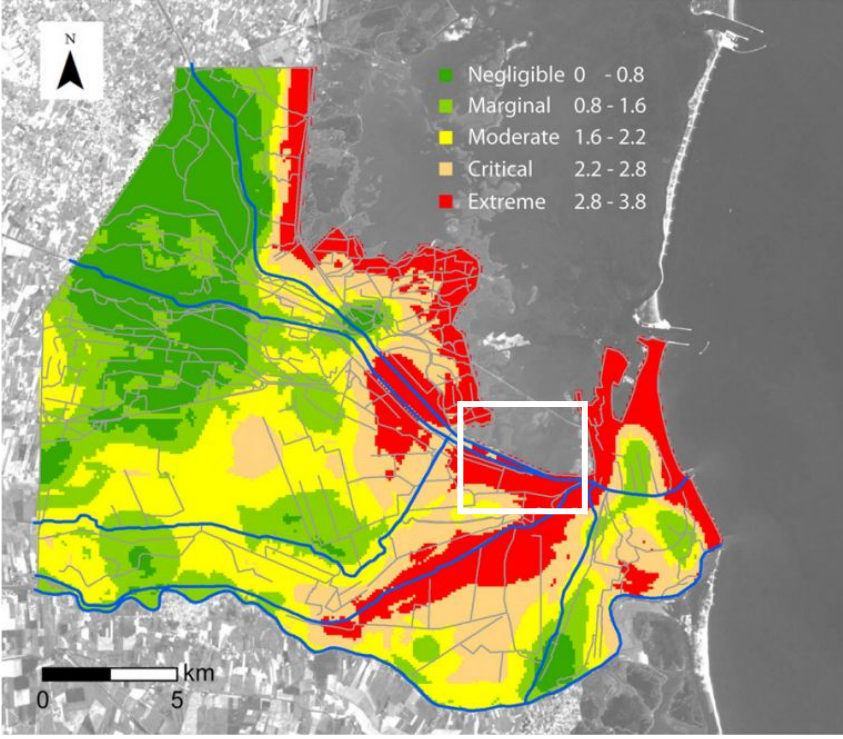


SALTWATER CONTAMINATION AT REGIONAL SCALE

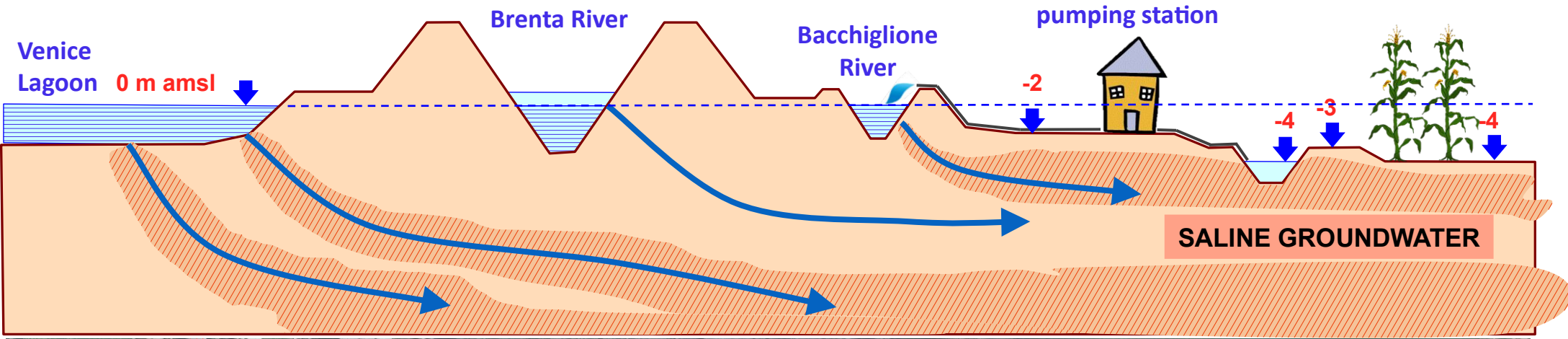
Depth of the freshwater-saltwater interface



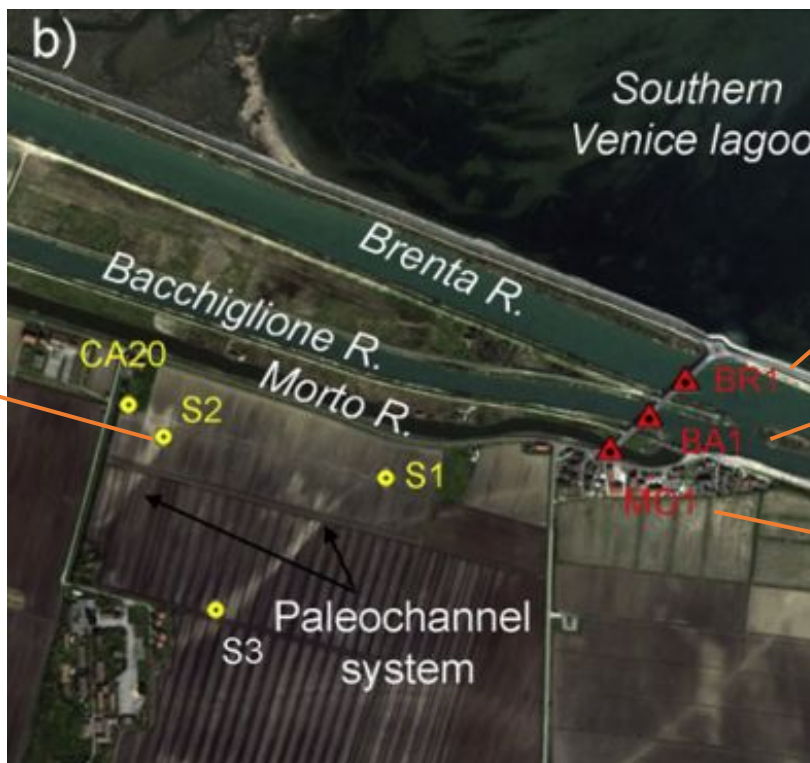
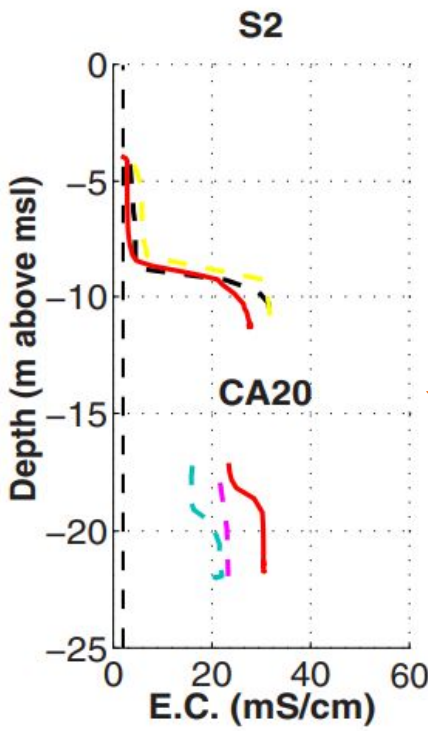
Map of the vulnerability to salt contamination



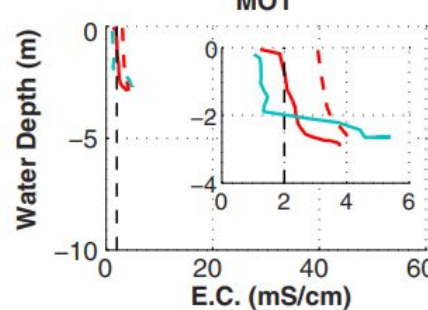
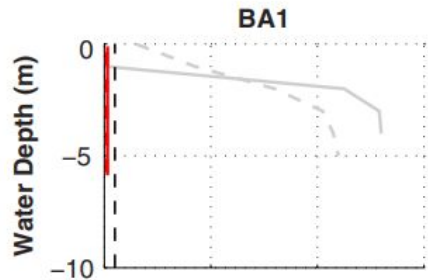
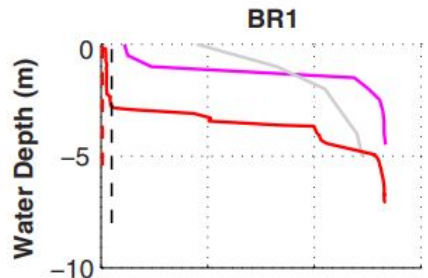
SALTWATER INTRUSION DYNAMICS AT LOCAL SCALE



SALTWATER CONTAMINATION IN THE PILOT SITE: Saltwater variability in watercourses and subsoil

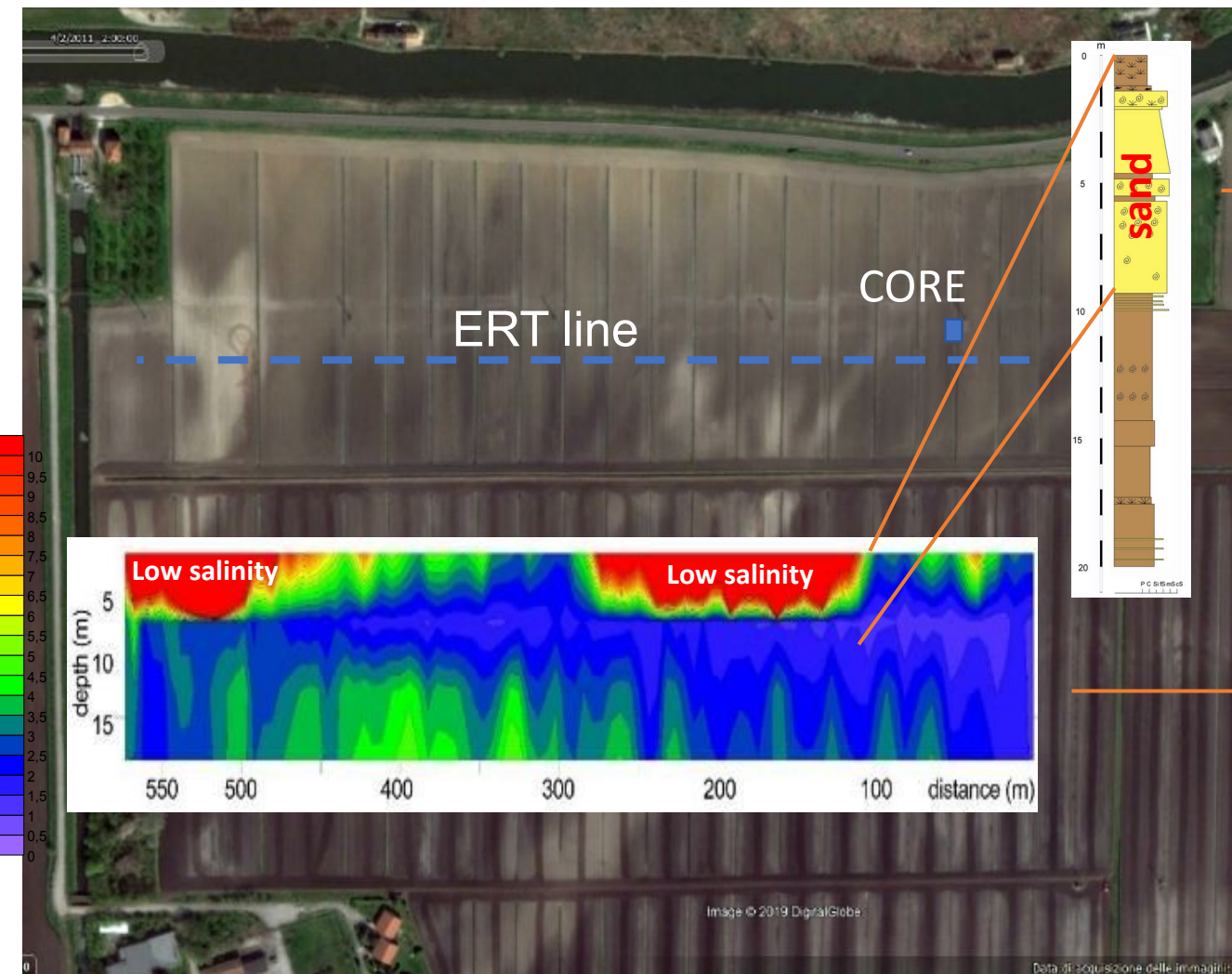


Watercourses



Shallow and deep subsoil

PALEOCHANNEL CHARACTERIZATION



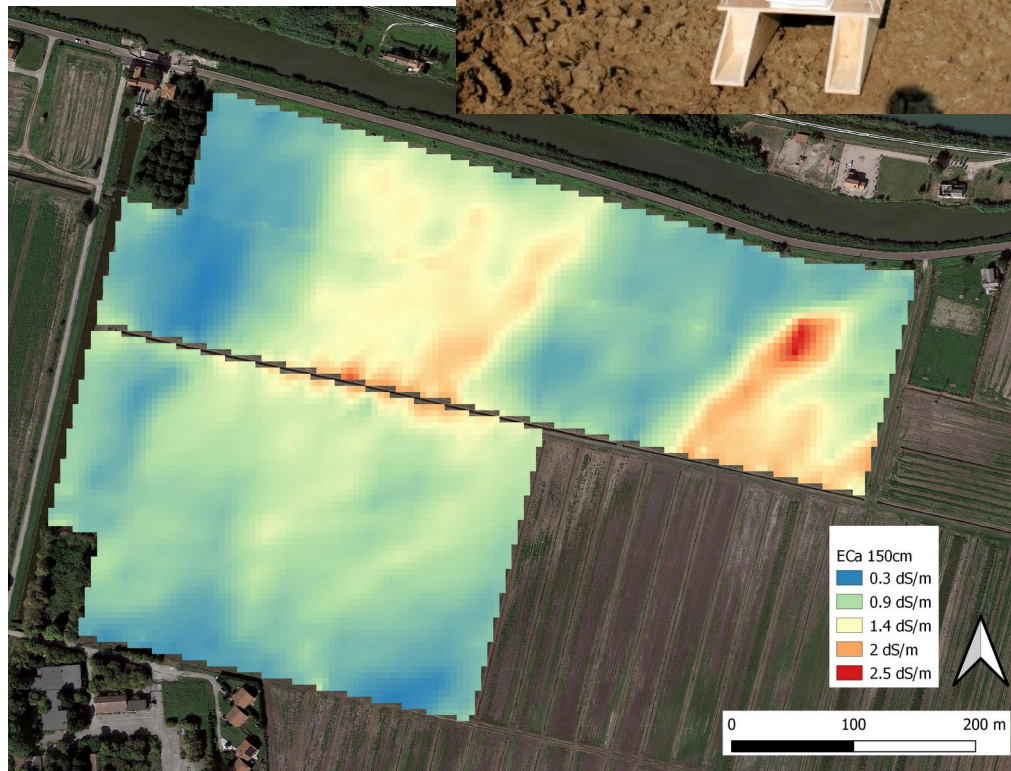
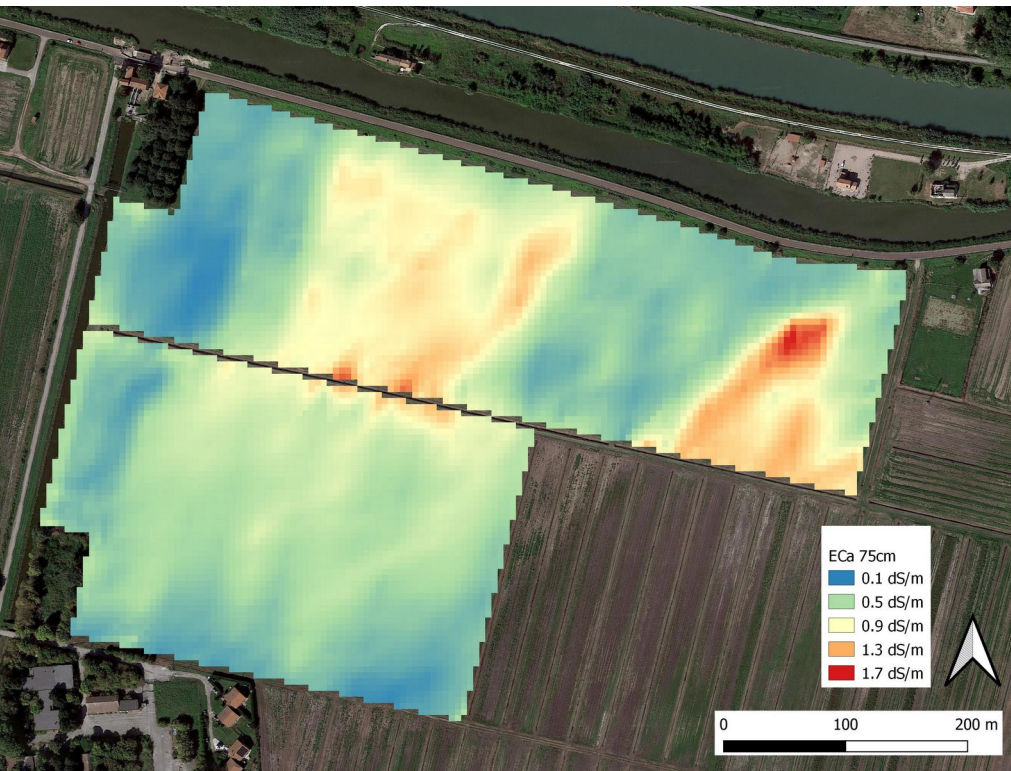
Sediment core

Paleochannels are characterized by **high sand percentage** and **low salinity**

Electrical resistivity tomography (ERT)

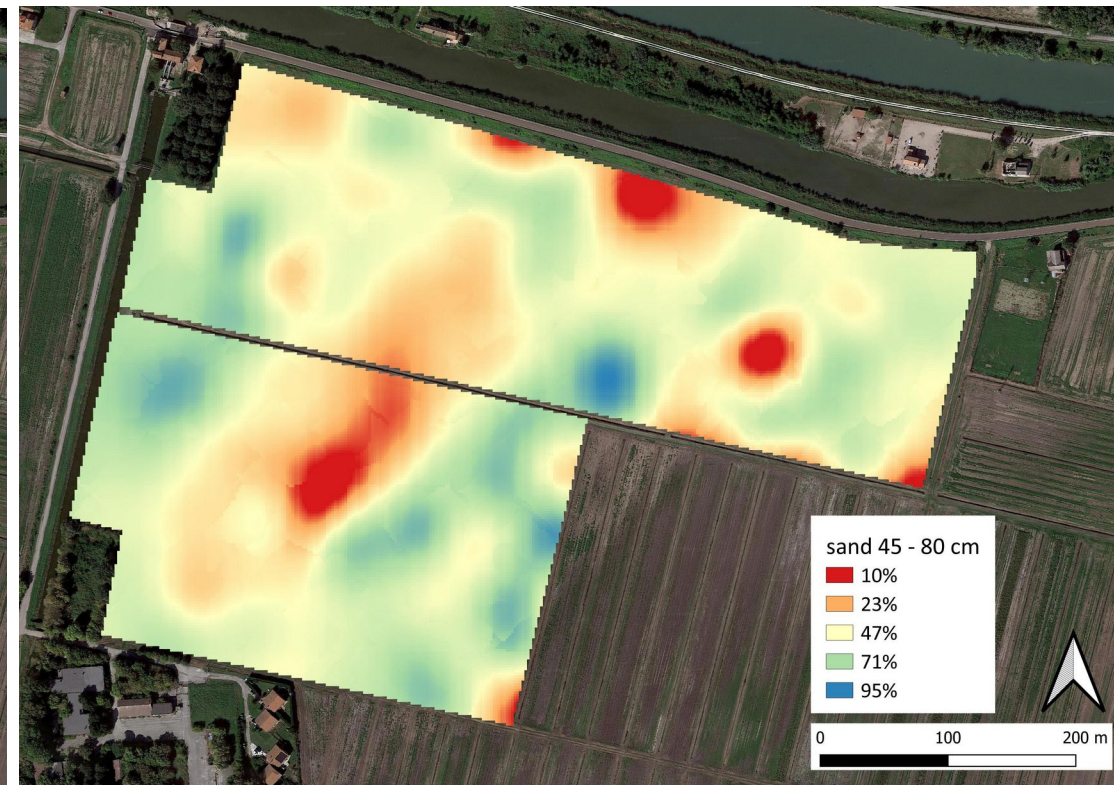
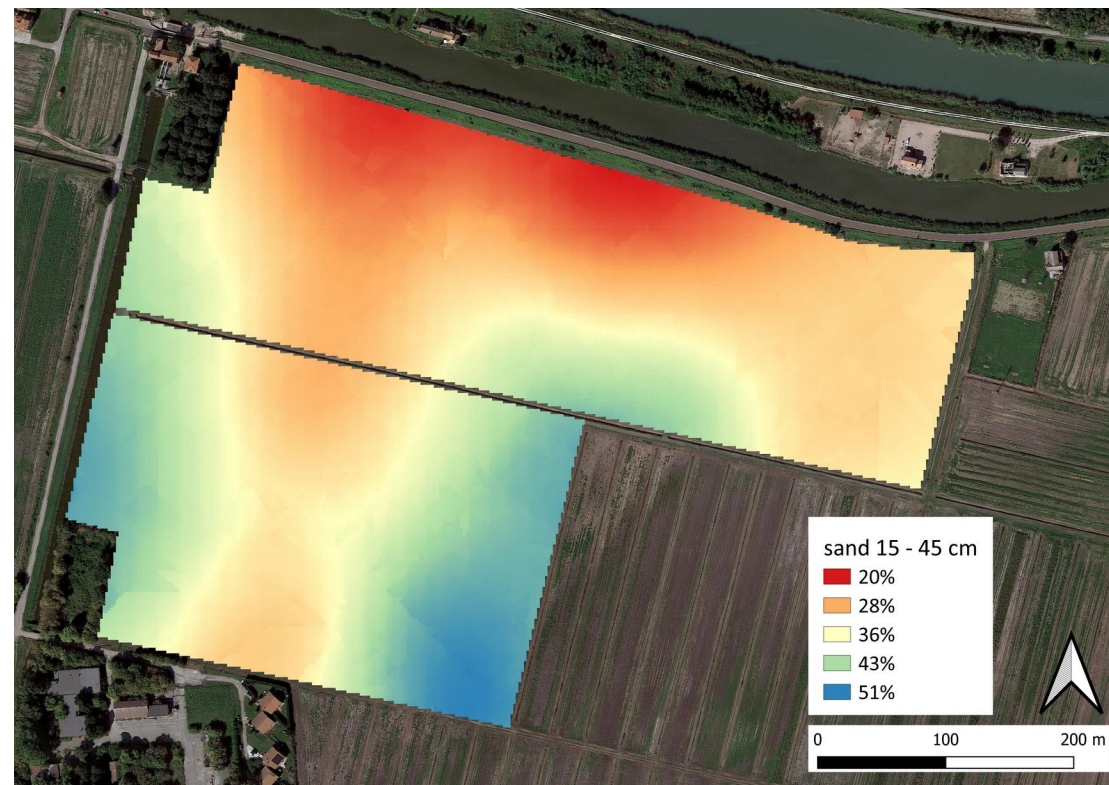
EXPERIMENTAL SITE CHARACTERIZATION

soil EC mapping by using electromagnetic induction (EMI) sensors (CMD - MINIEXPLORER)



EXPERIMENTAL SITE CHARACTERIZATION

Soil texture



The area has been characterized thanks to data collected during previous studies



It's time for a MITIGATION STRATEGY

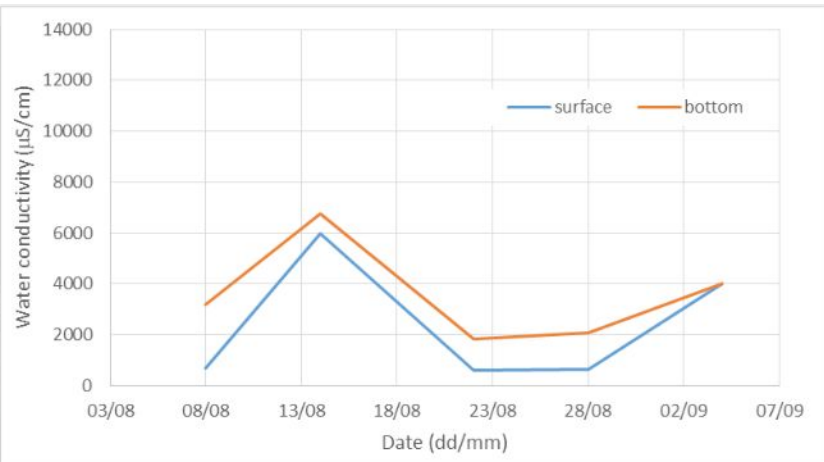
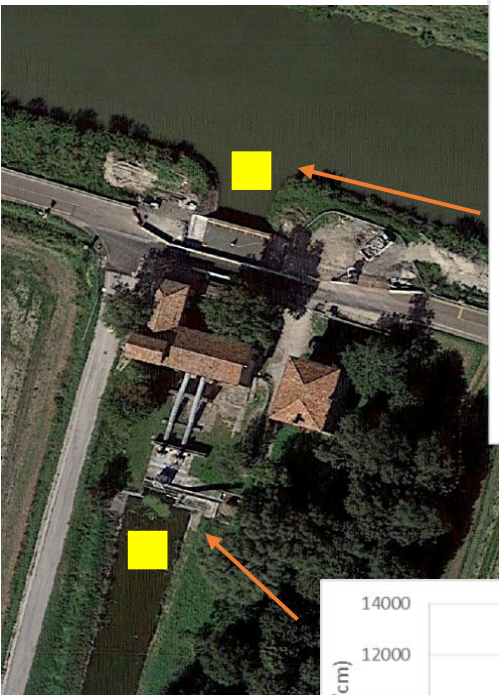
OBJECTIVE: supply freshwater to the farmland taking advantage of sandy paleochannels



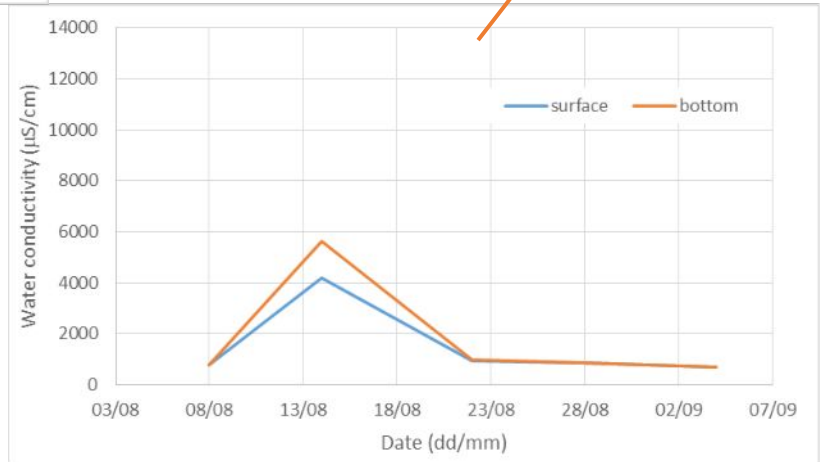
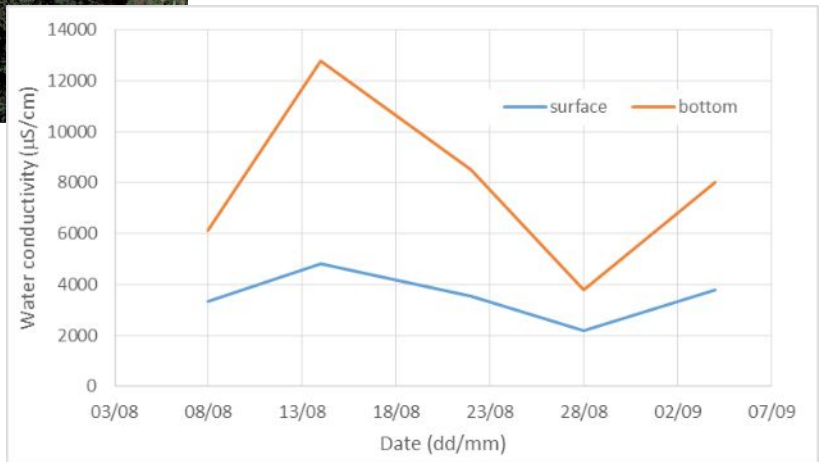
New monitoring network

- Monitoring salt water intrusion in both watercourses and groundwater
- Monitoring soil water and salinity dynamics inside and outside paleochannels
- Assess the effect of water and salt dynamics on productivity and grain quality

MONITORING OF SURFICIAL WATER QUALITY August 2019 - Morto Channel Electrical Conductivity (EC)



Casetta pumping station

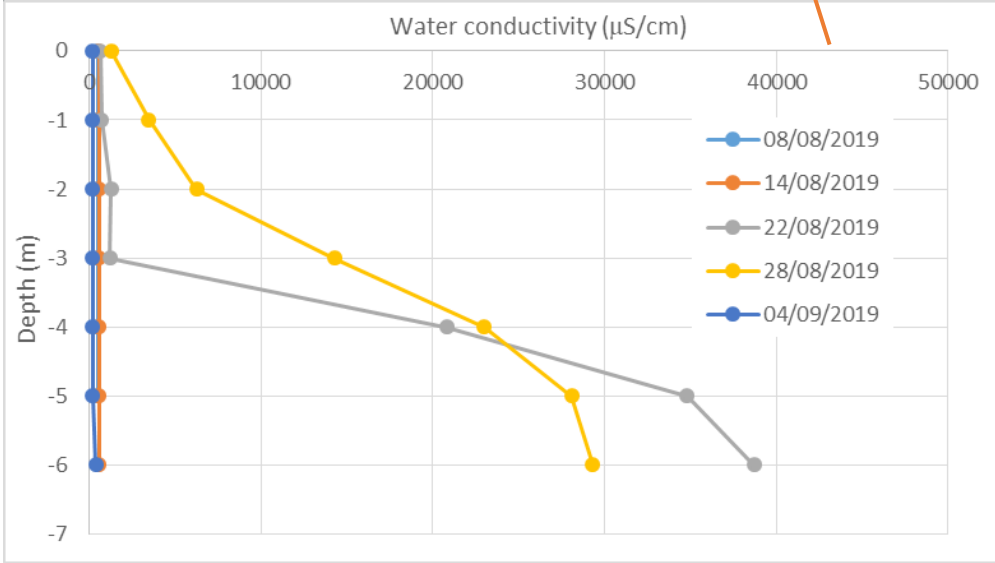
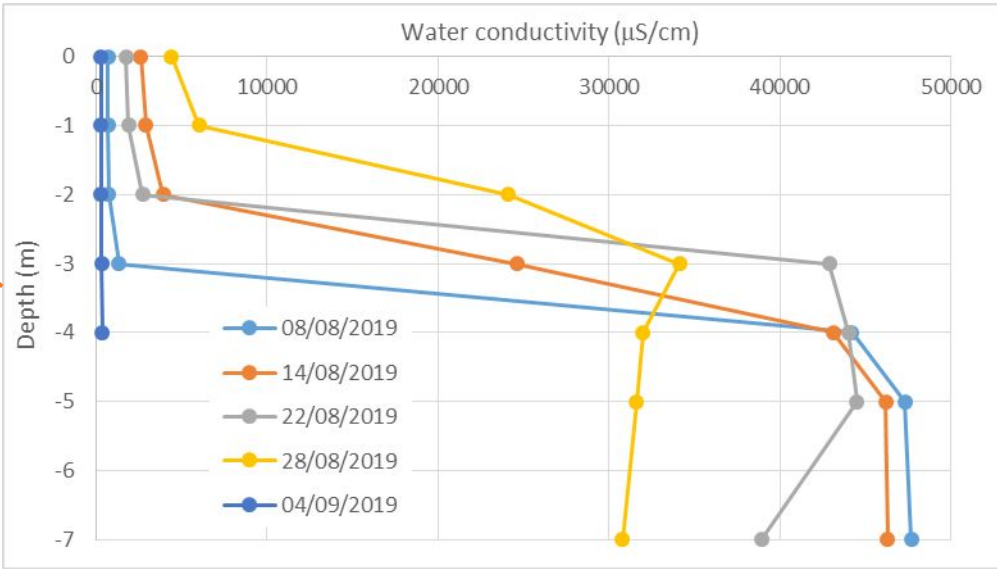


MONITORING OF SURFICIAL WATER QUALITY

August 2019: Electrical Conductivity in the Brenta and Bacchiglione rivers

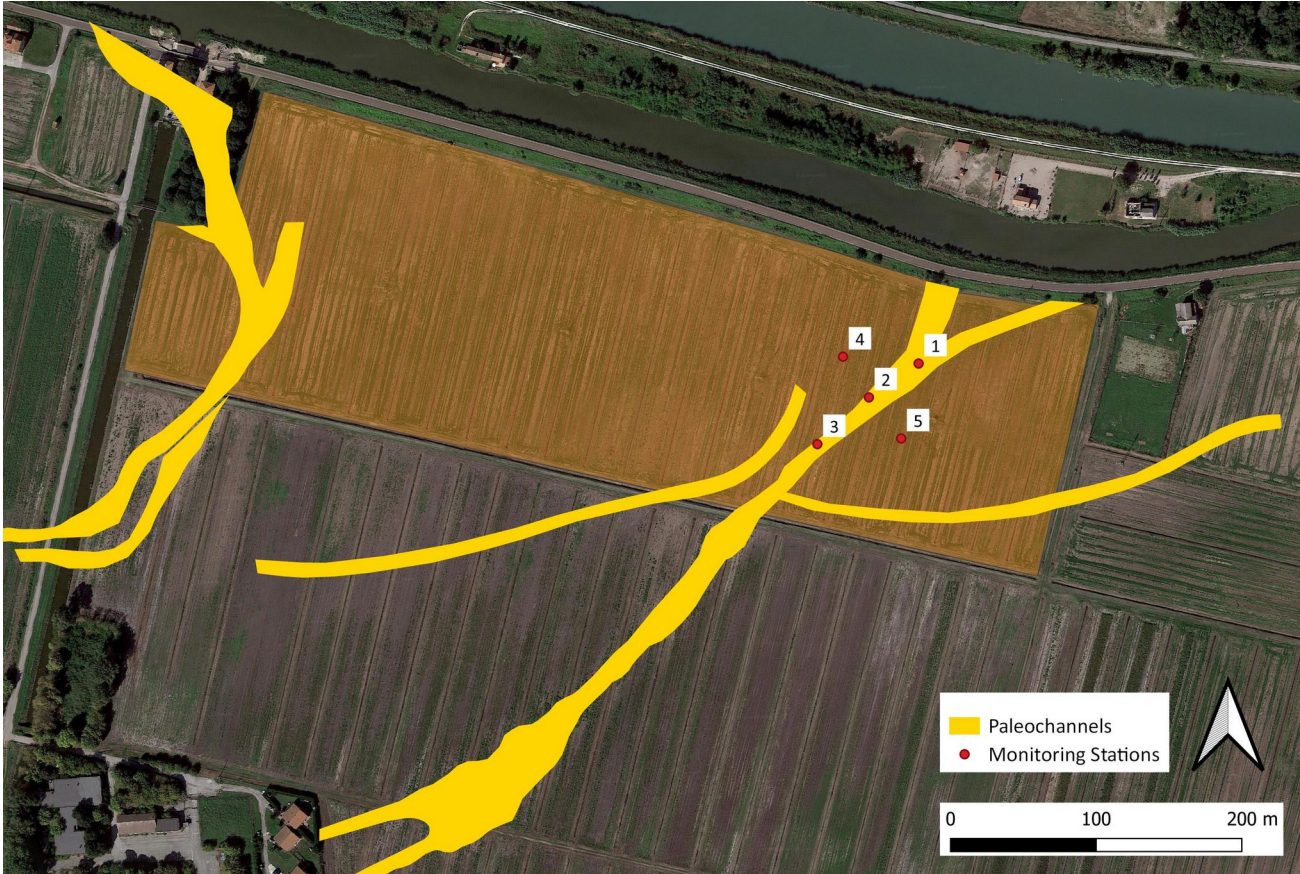


Brenta river



Bacchiglione river

EXPERIMENTAL SITE CHARACTERIZATION



Identification of highly permeable sandy paleochannels



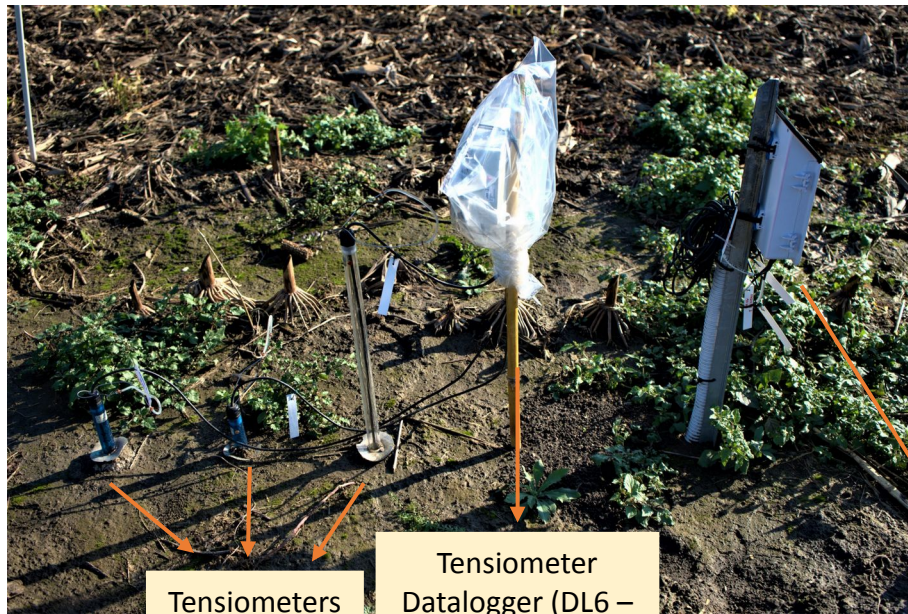
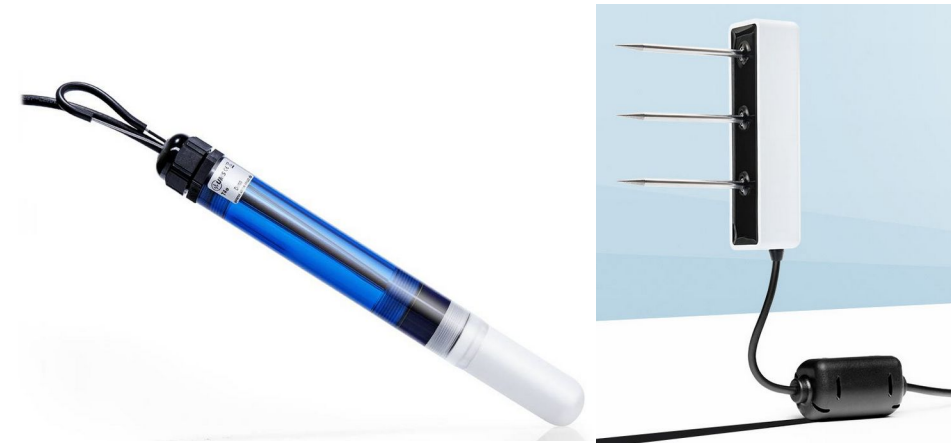
Identification of 5 MONITORING STATIONS

- Experimental field area: 11.7 ha
- Altitude: -1 to -3 m below MSL
- Crop: maize (sowing date 3/24/19; harvesting date 10/1/19)

MoST INFODAY

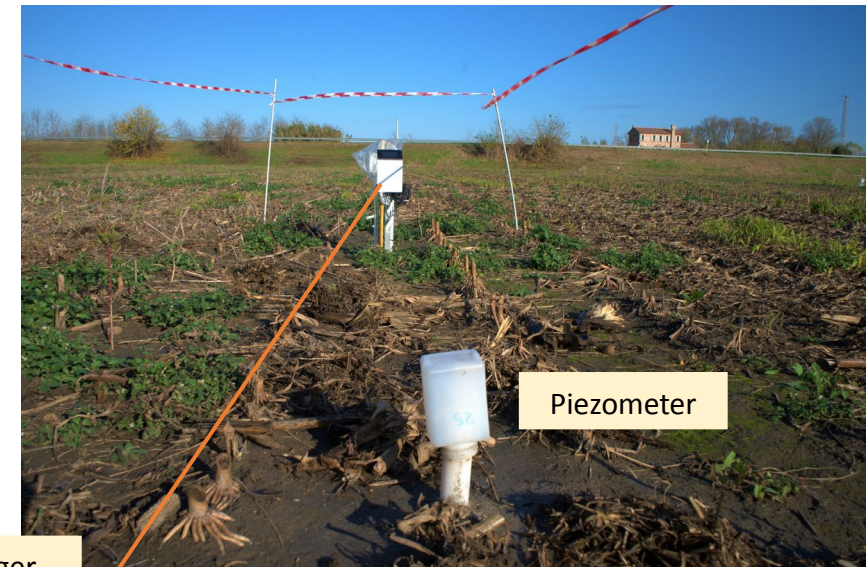
MONITORING STATION design:

- 4 SOIL MOISTURE and ELECTRICAL CONDUCTIVITY sensors (TEROS 12, METER Group) installed at 4 depths (10, 30, 50 and 70 cm)
- 2 or 3 TENSIMETERS (T4e, METER Group) installed at 2 or 3 depths (30, 50 and 70 cm)
- 1 PIEZOMETER (2m deep)



Tensiometers

Tensiometer
Datalogger (DL6 –
Delta-T devices)



Piezometer

ZL6 Datalogger
(METER Group)
and TEROS12
sensors

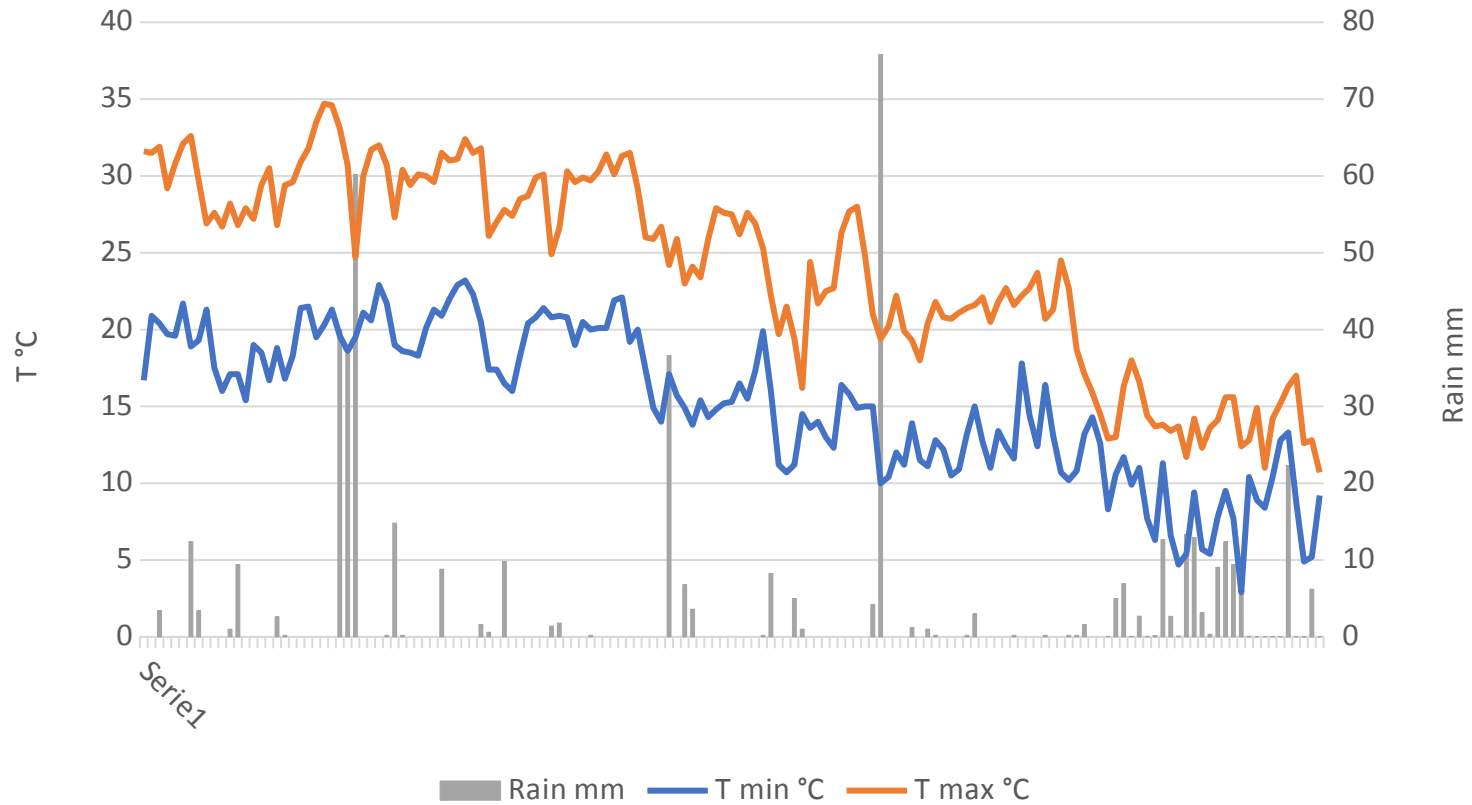
MoST INFODAY

SAMPLING design:

- SOIL SAMPLING and soil TEXTURE analysis
- 4 BIOMASS SAMPLINGS (7/25, 8/2, 8/13, 9/20): harvest and analysis of 2 m² of biomass per each monitoring station
- WATER TABLE measurements (once per week)
- Ground water electrical conductivity (EC) and temperature measurements (once per week)



WEATHER DATA acquisition

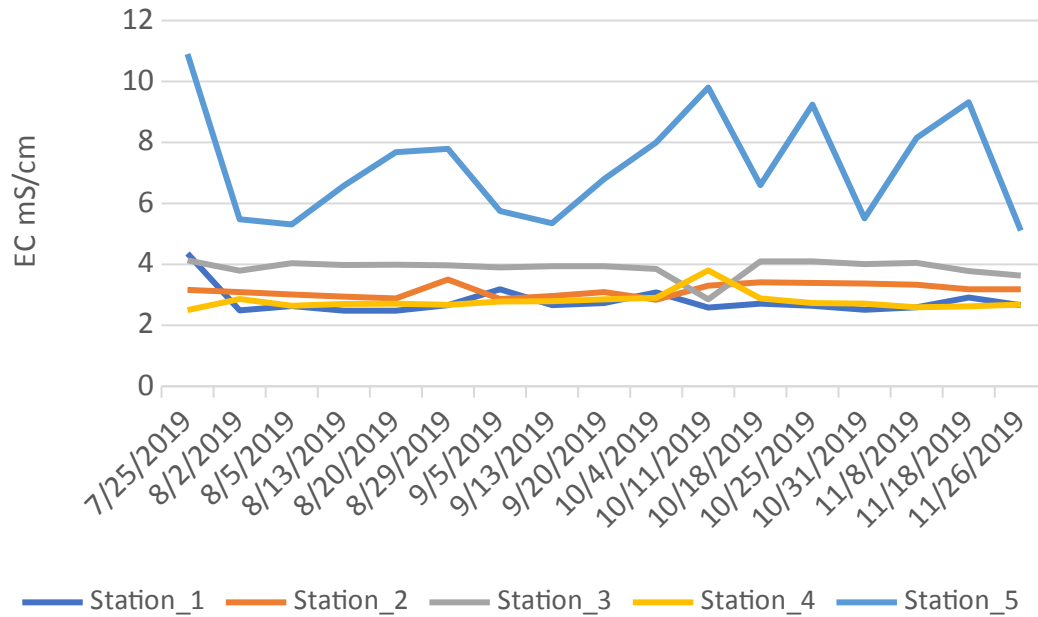


ATMOS41 all-in-one weather station with ZL6 datalogger (METER Group)

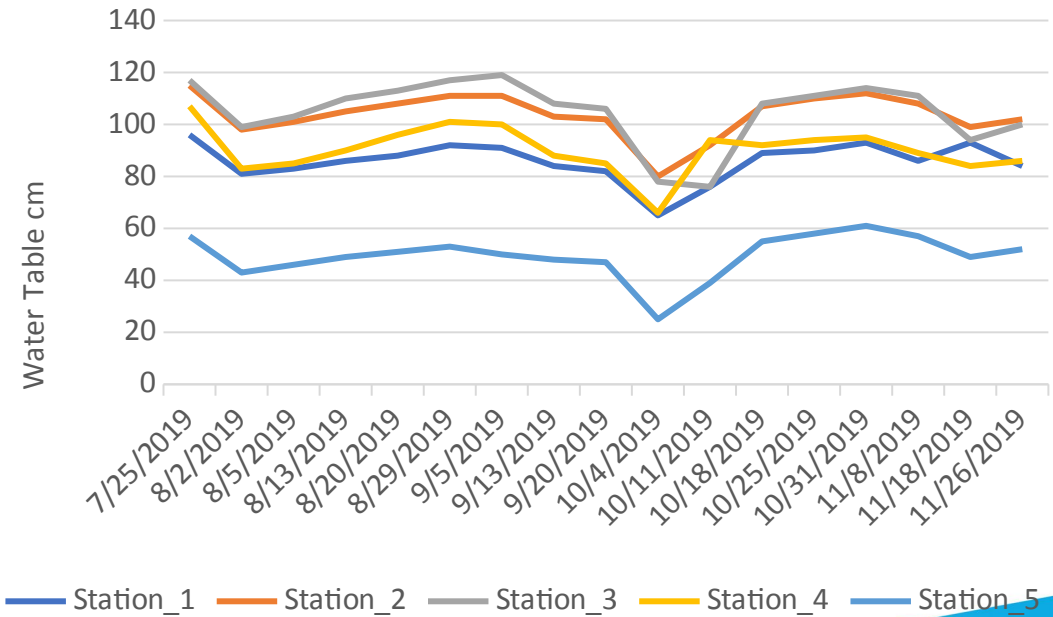
GROUND WATER EC AND WATER TABLE MONITORING



Ground Water EC



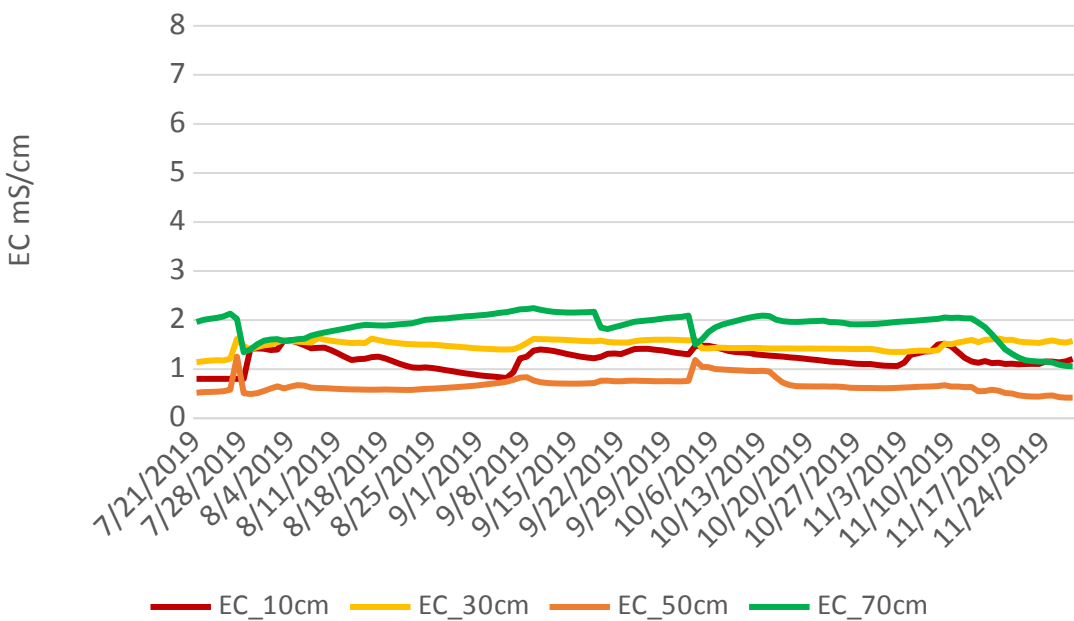
Water Table



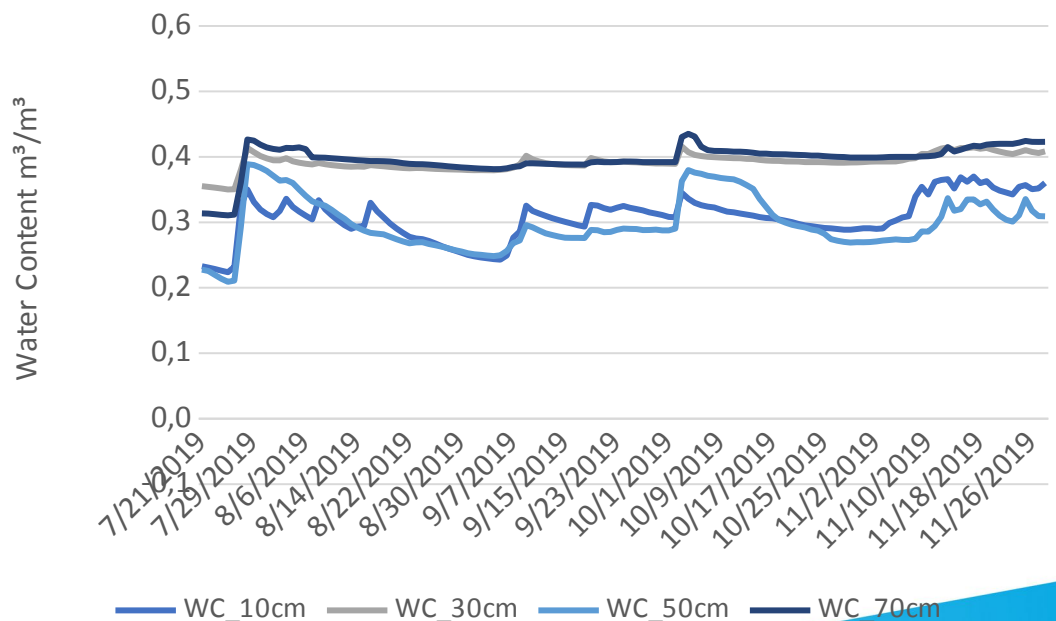
SOIL VOLUMETRIC WATER CONTENT and SOIL EC monitoring – STATION 2



Electrical Conductivity (EC) - STATION 2



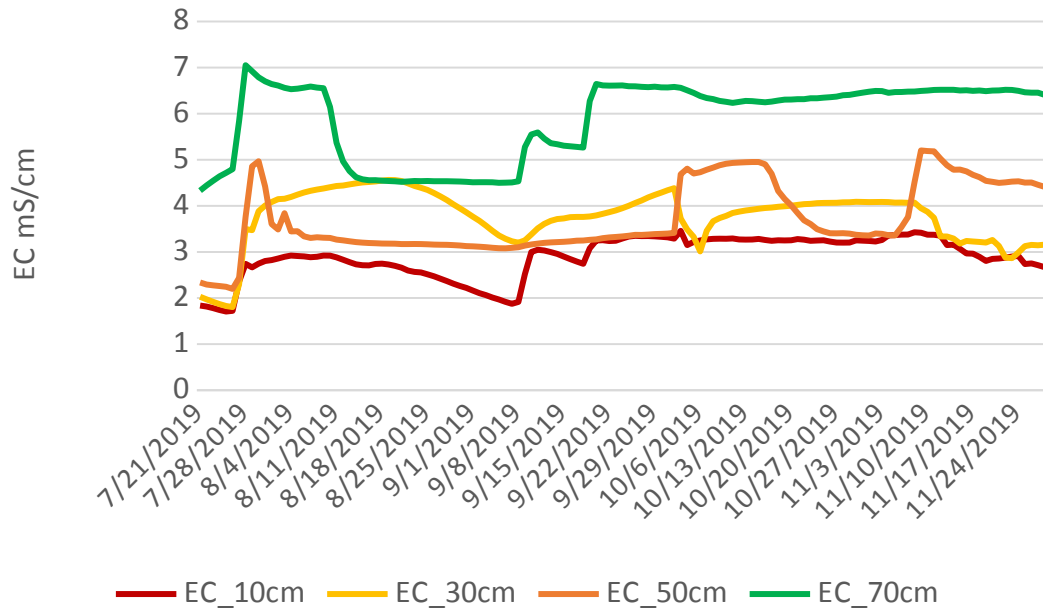
Volumetric Water Content (WC) - STATION 2



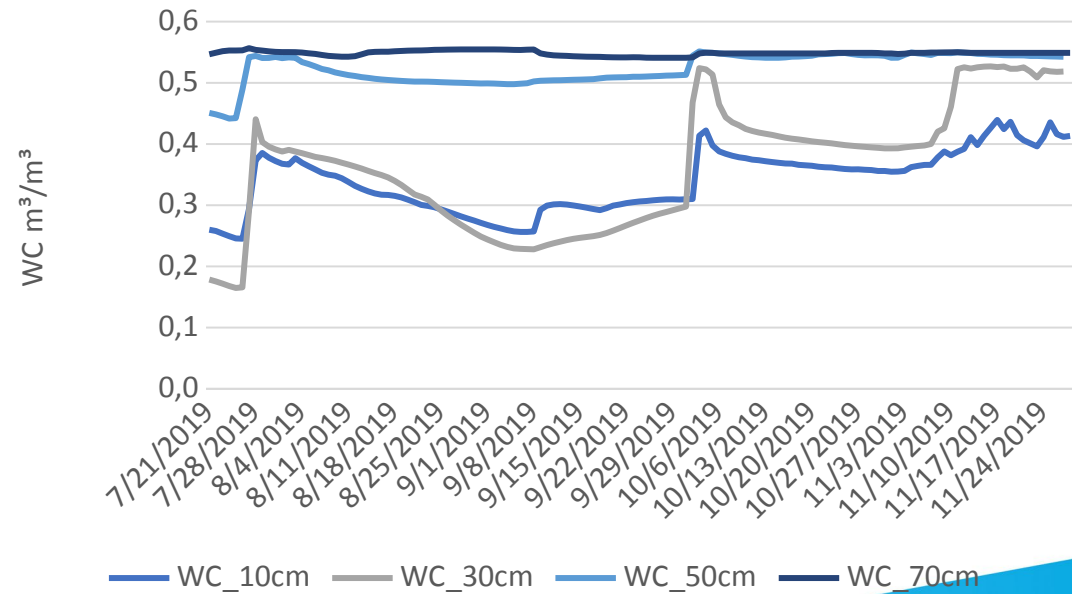
SOIL VOLUMETRIC WATER CONTENT and SOIL EC monitoring – STATION 5



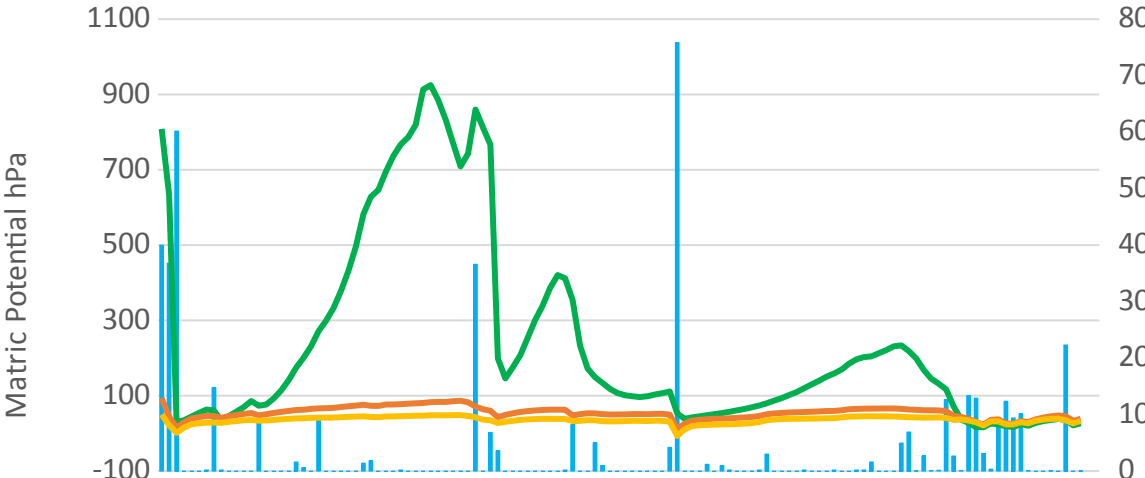
Electrical Conductivity (EC) - STATION 5



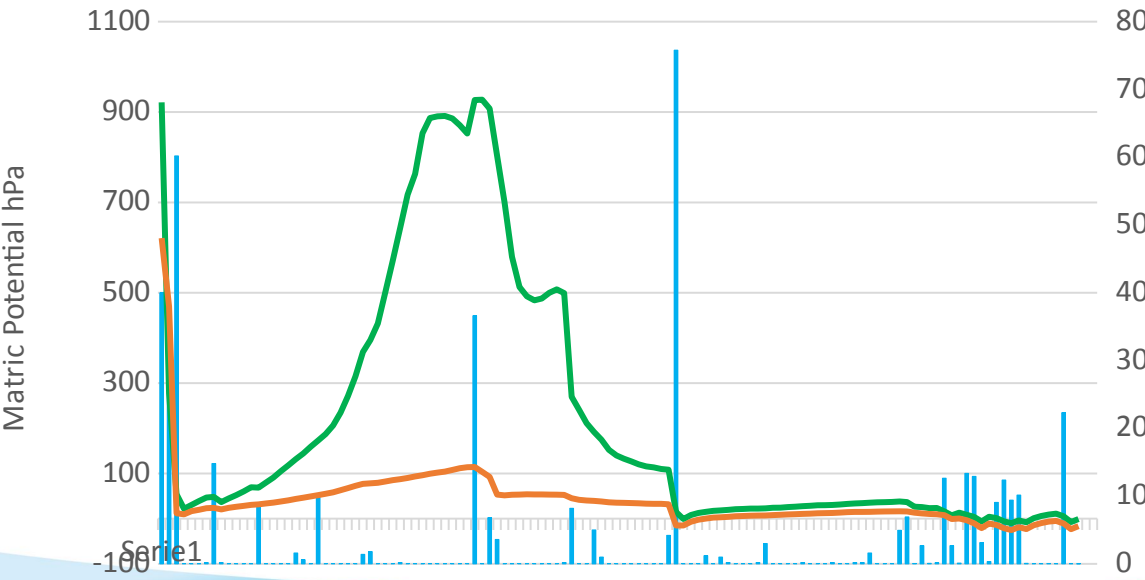
Volumetric Water Content (WC)_STATION 5



SOIL WATER MATRIC POTENTIAL MONITORING



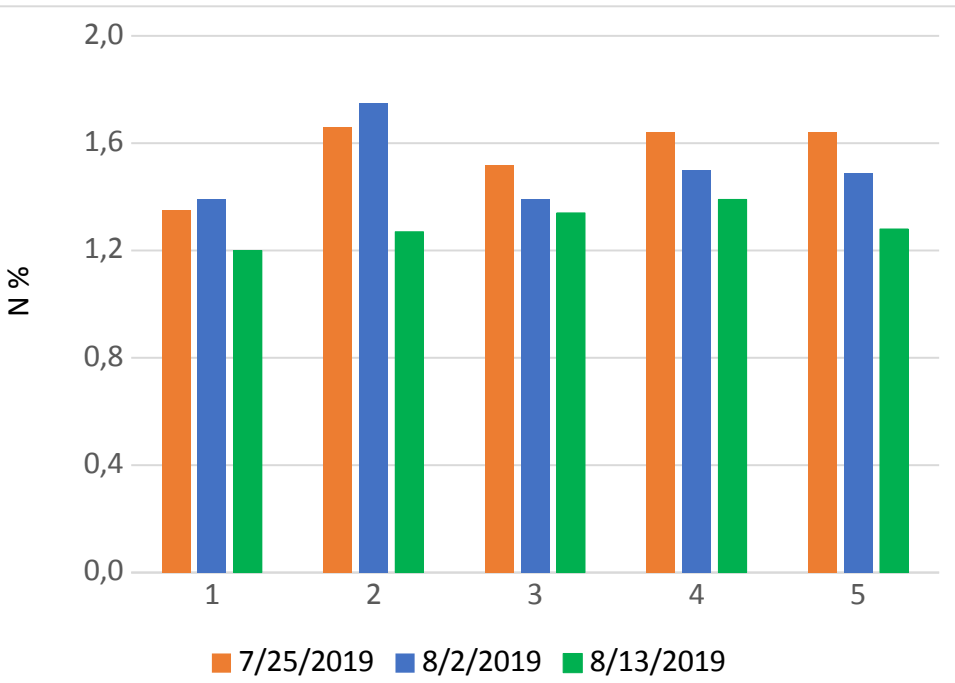
Soil Water Matric Potential - STATION 2



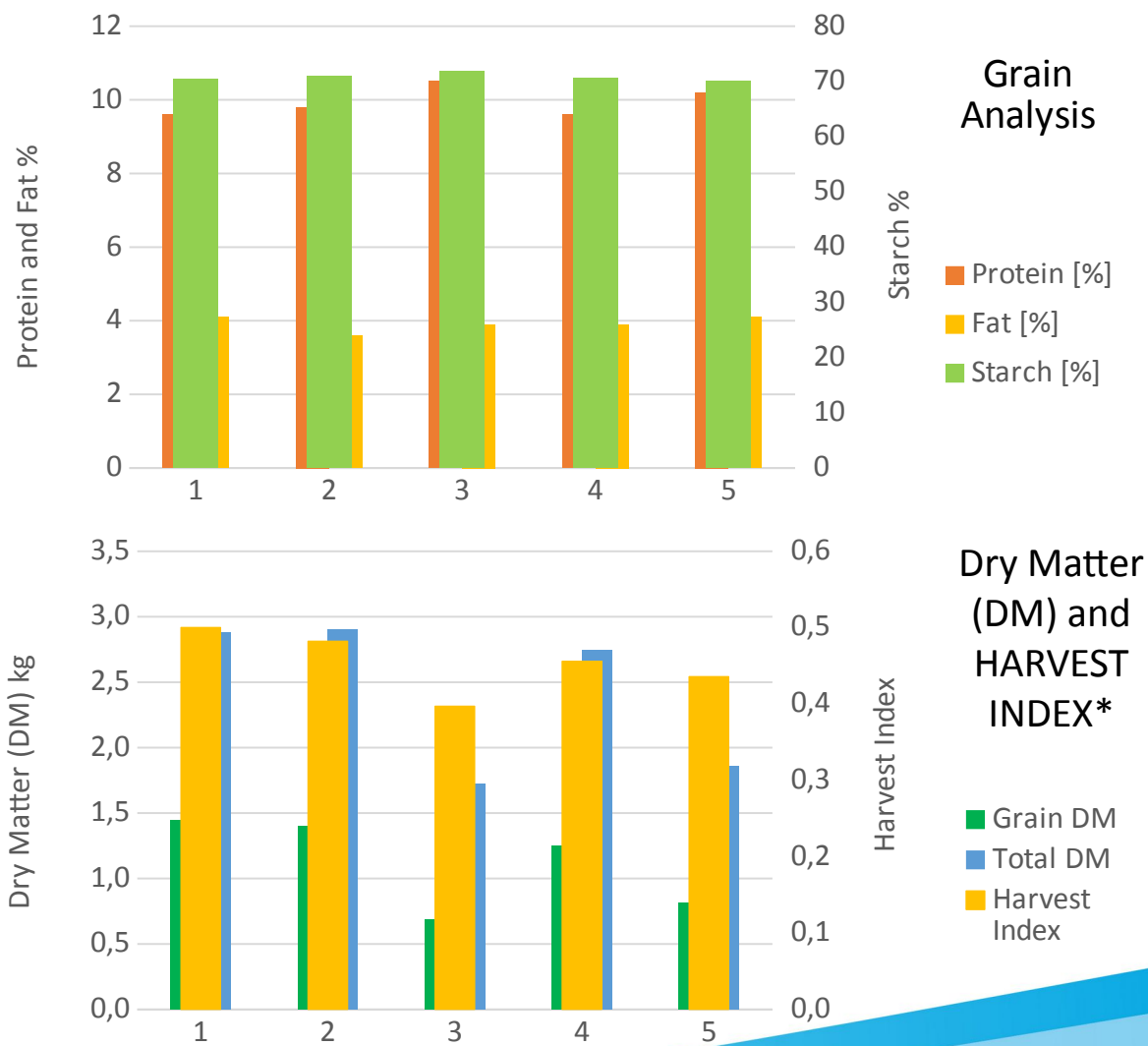
Soil Water Matric Potential - STATION 5

BIOMASS SAMPLING results

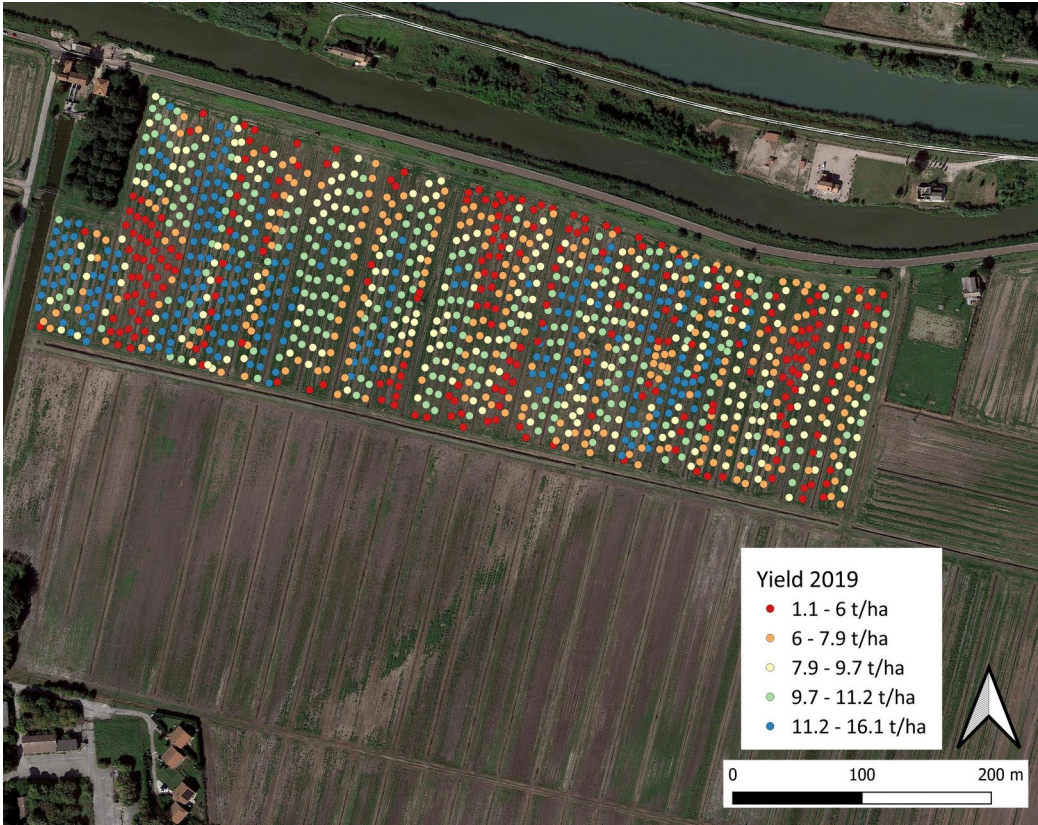
Biomass Nitrogen %



*Biomass sampled on the 9/20/19 (10 days before harvesting)
DM values refer to 1 m² of biomass



YIELD MAPPING

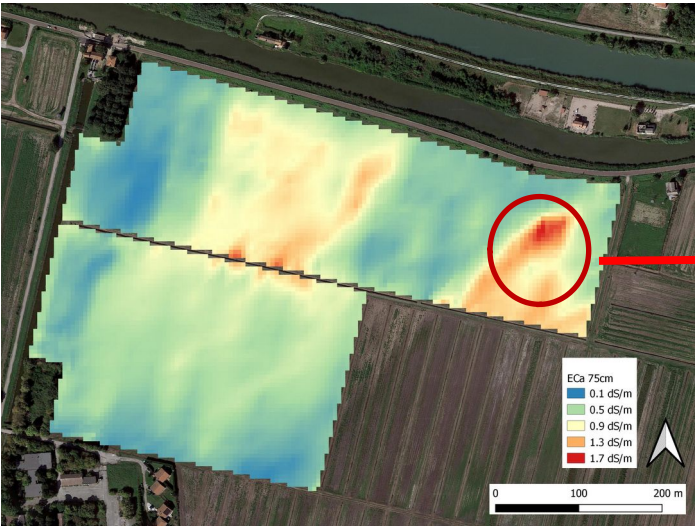


Sensors in the combine harvester measure the yield and grain moisture

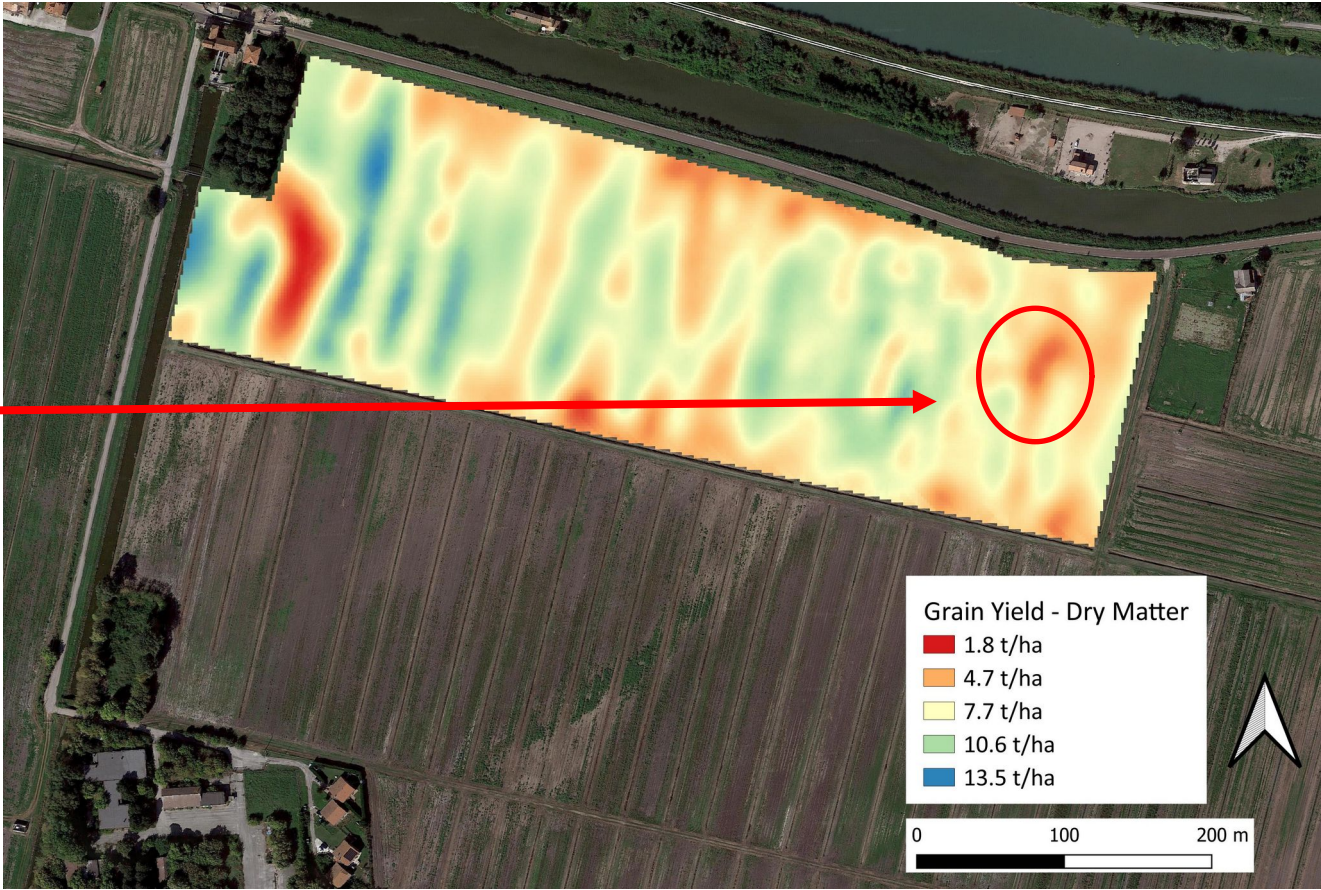
Geographic coordinates are added using GPS satellite data

YIELD MAPPING

From point layer to continuous map by using geostatistical tools

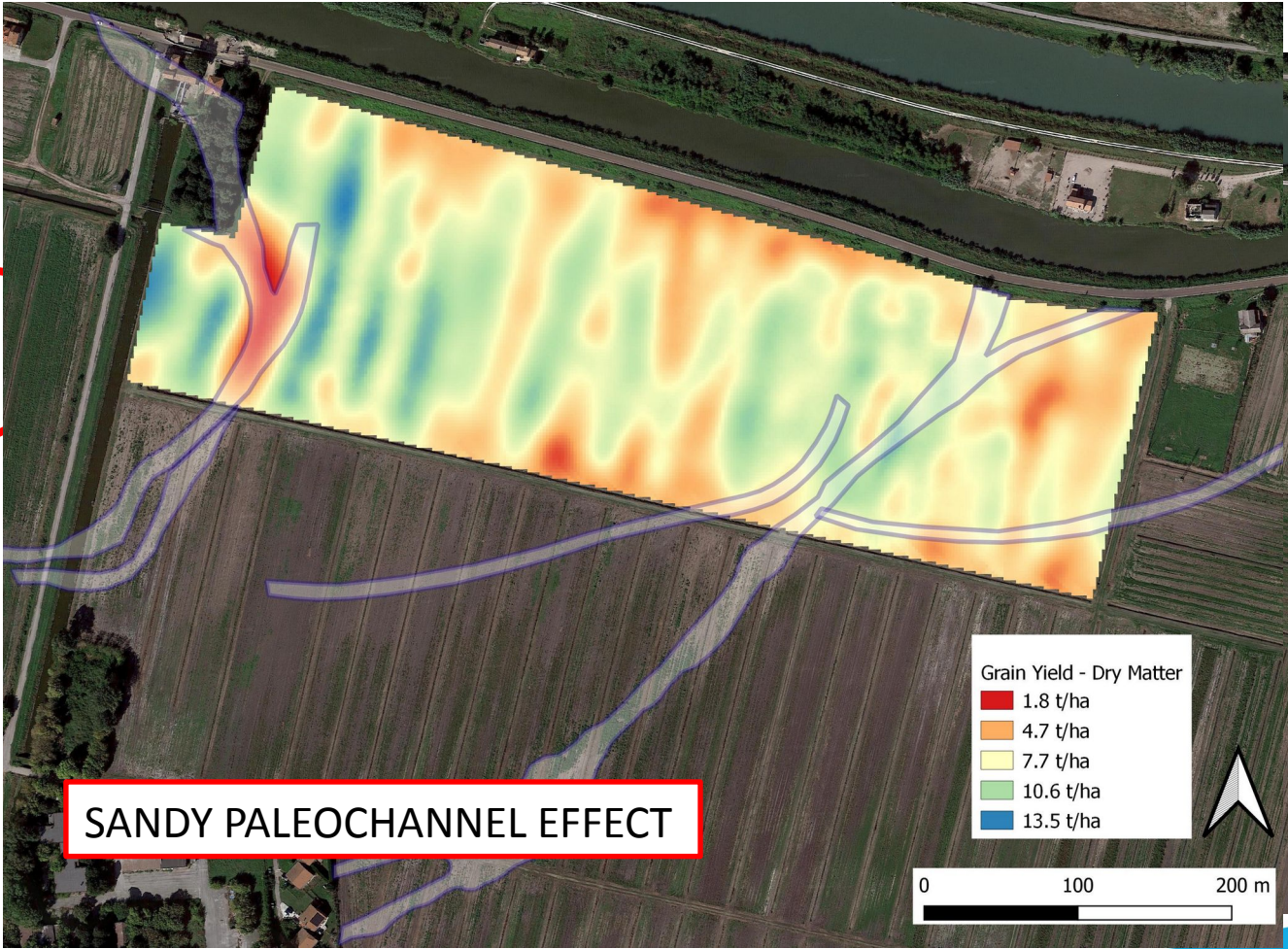
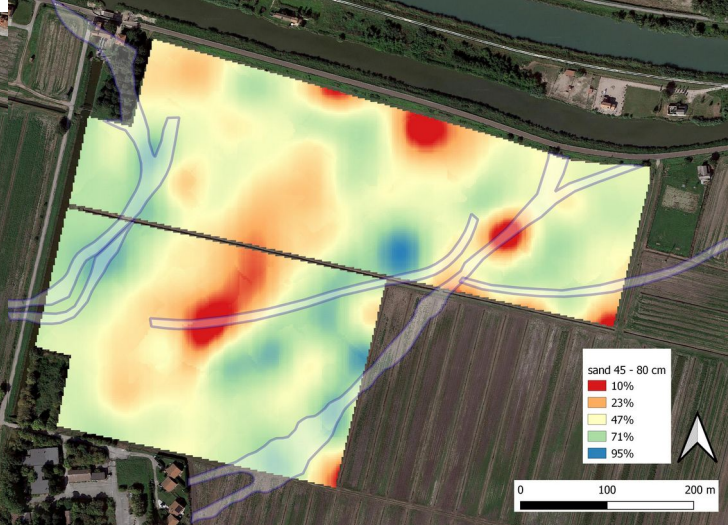
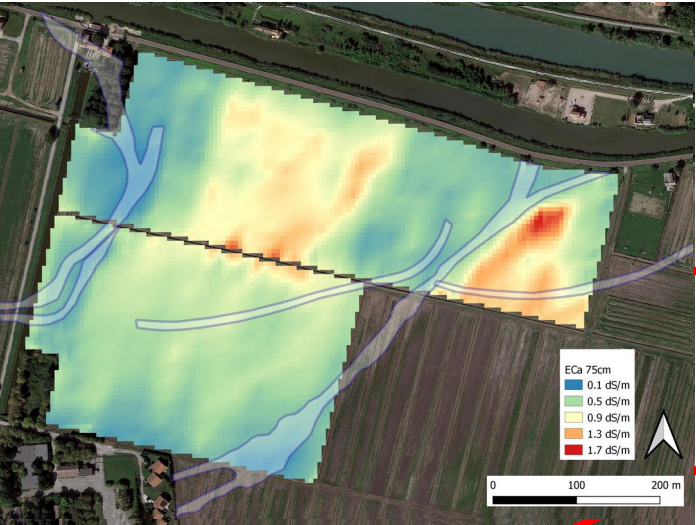


SALINITY EFFECT



YIELD MAPPING

From point layer to continuous map by using geostatistical tools



Thank you for your attention

