

2nd LENSES E-DIALOGUE WEBINAR: SUSTAINABLE WATER MANAGEMENT IN SEMID-ARID AREAS

20 June 2023
h. 10:00 CET



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 857125.

The ATLAS project: Data driven irrigation and groundwater availability services for sustainable water management

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Soil & Water Resources Institute

Hellenic Agricultural Organization «DIMITRA»

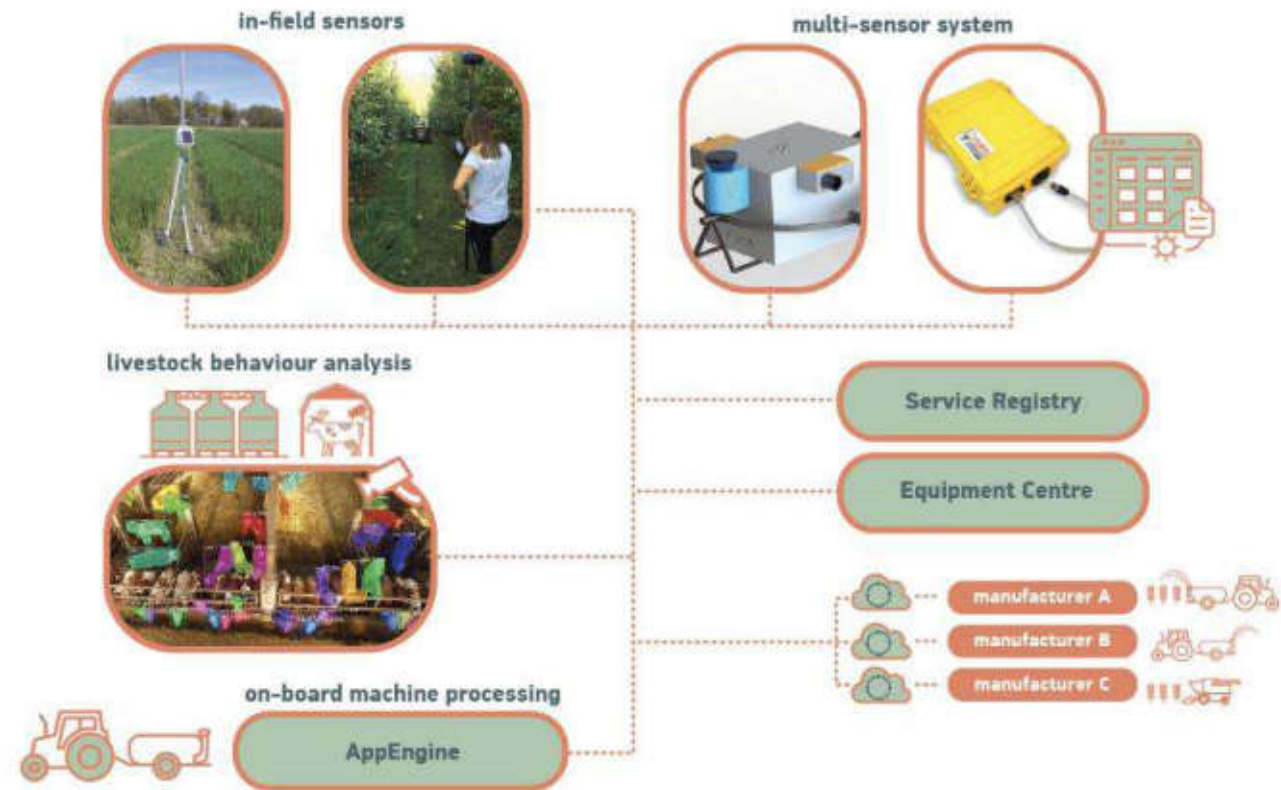


The H2020 ATLAS Project

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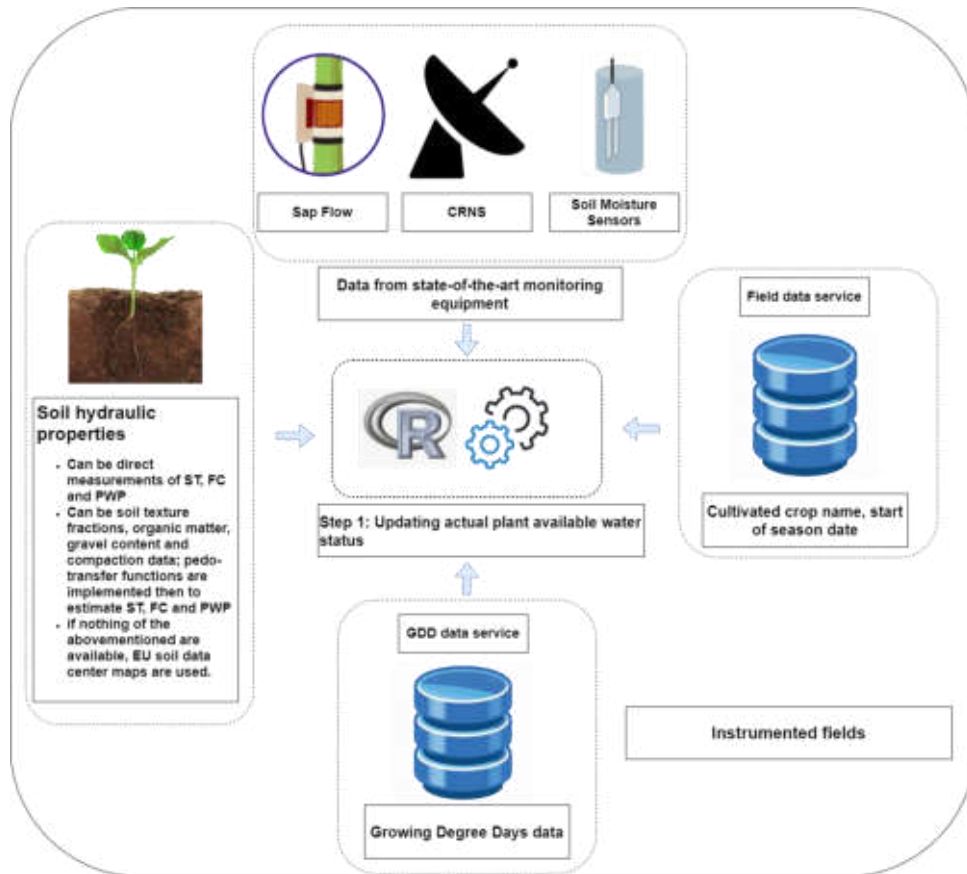
The goal of ATLAS is the development of an open interoperability network for agricultural applications and to build up a sustainable ecosystem for innovative data-driven agriculture.

- Open, distributed and extensible service Interoperability Network.
- Based on a service-oriented architecture.
- Interoperability of sensors, machines and data services.
- From farm scale to global scale through interconnected service registries.

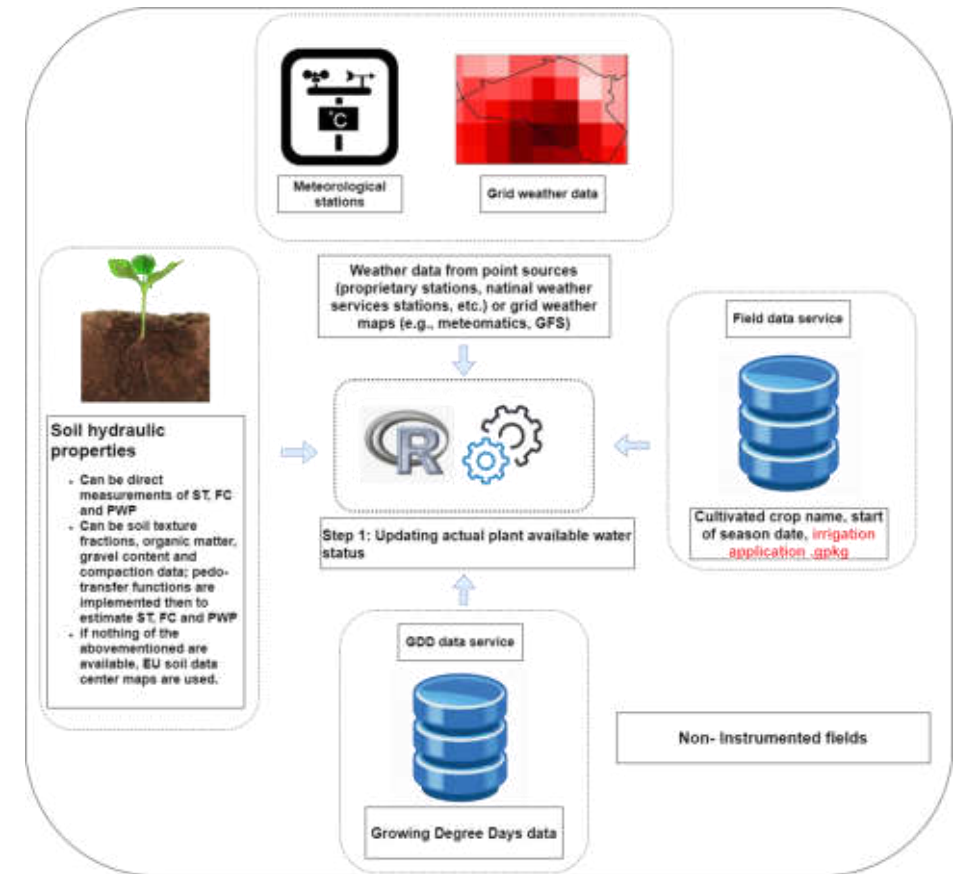


The ATLAS irrigation planning services

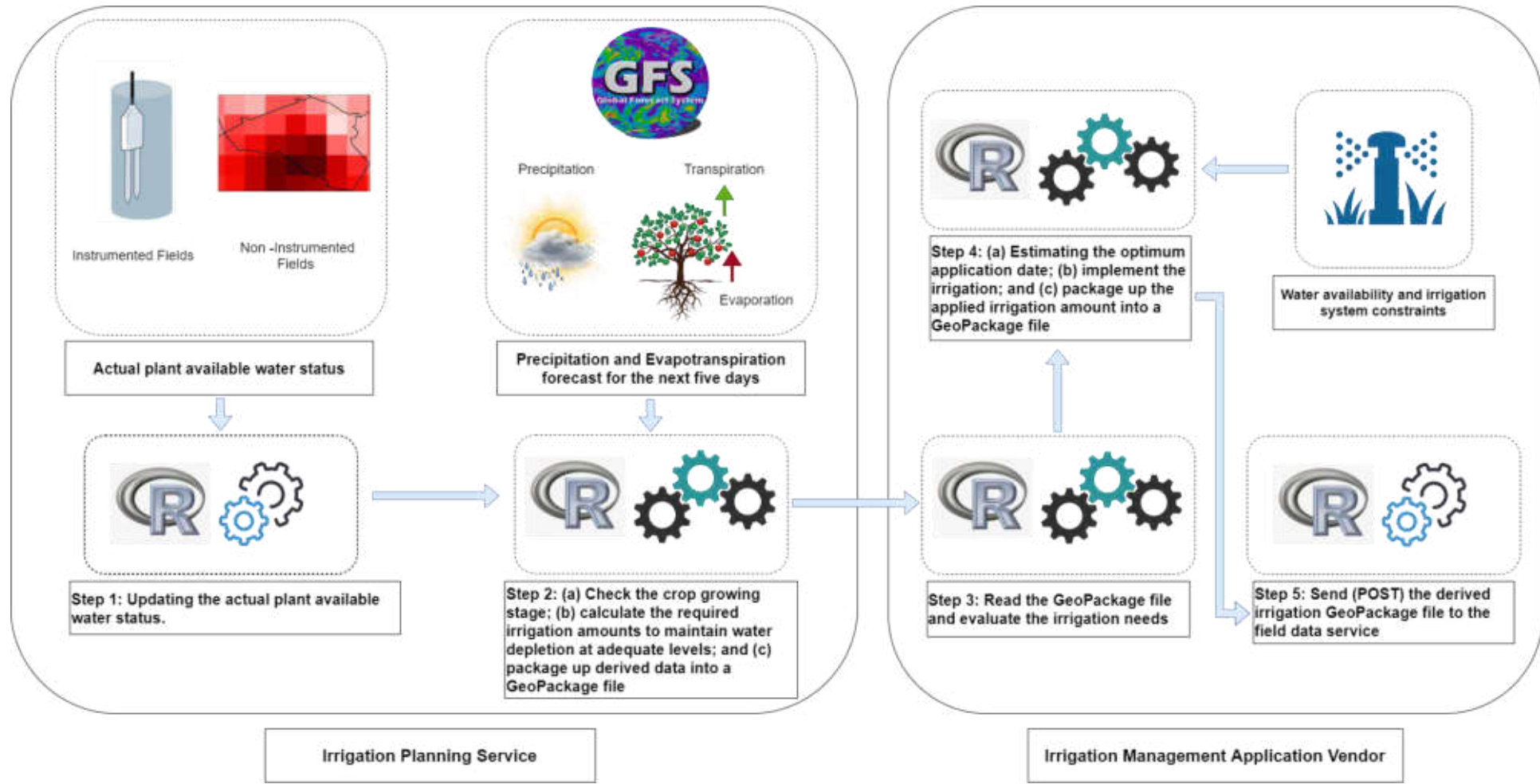
Instrumented fields



Non-instrumented fields



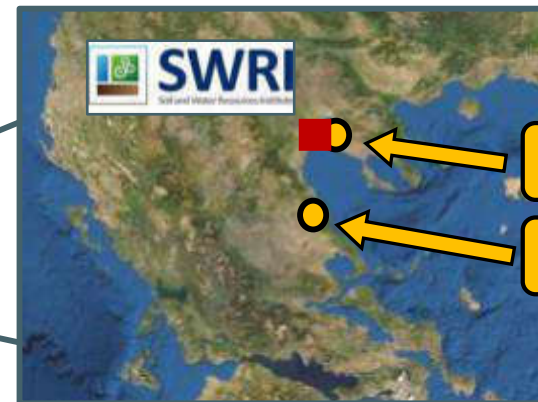
The ATLAS irrigation planning services



Pilot implementation of irrigation planning tools

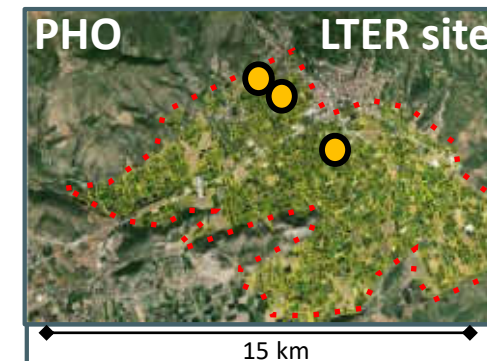
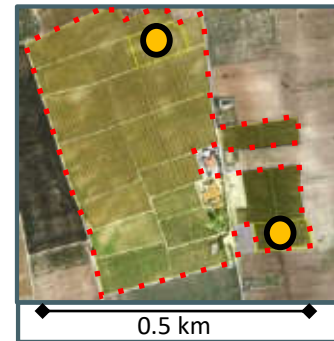


- Instrumented field
- ▭ Non-instrumented field



Epanomi (vineyards)

Agia (apple orchards)



Pilot implementation of irrigation planning tools



3 compact weather stations



12 water meters equipped with pulse data loggers



6 sap flow measurement loggers



53 clusters for soil moisture monitoring equipped with 318 TDT sensors



6 RGB cameras

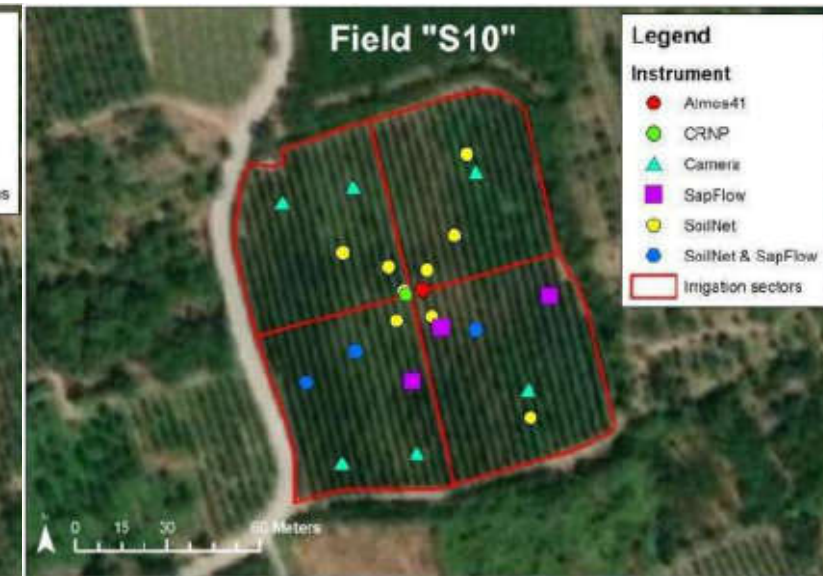
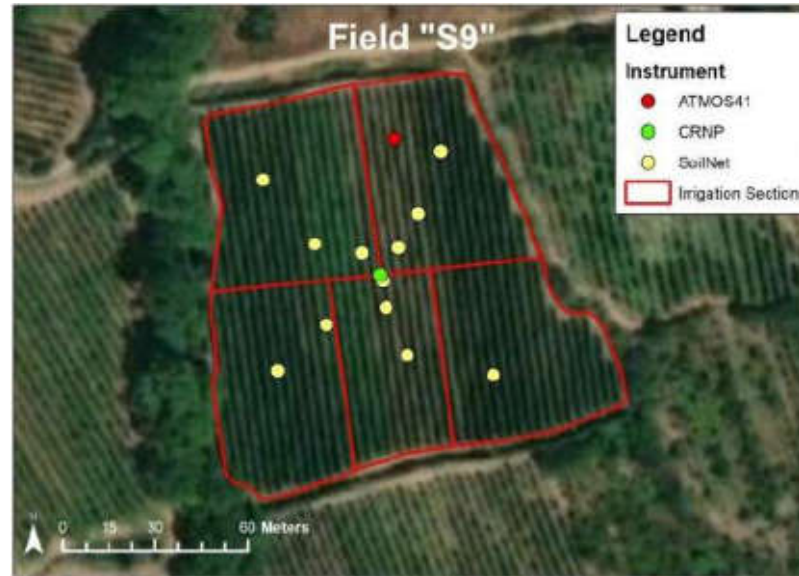
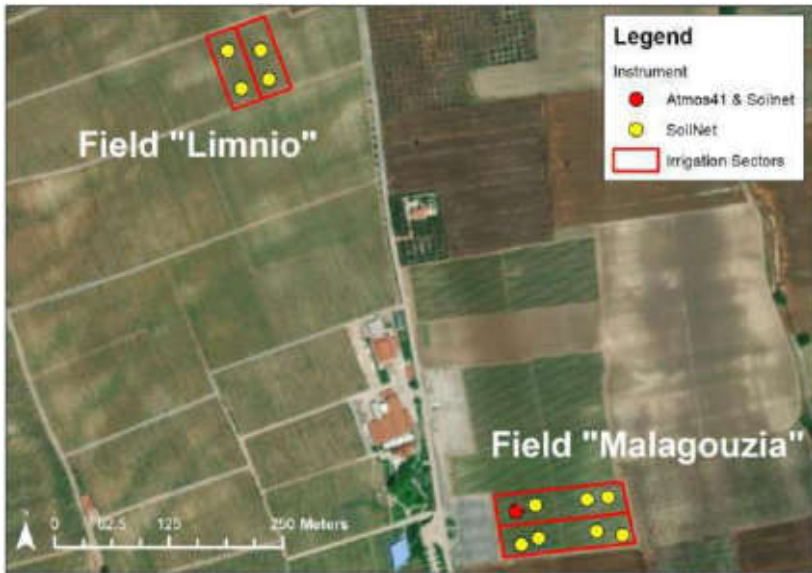


2 Cosmic-Ray Neutron Sensors

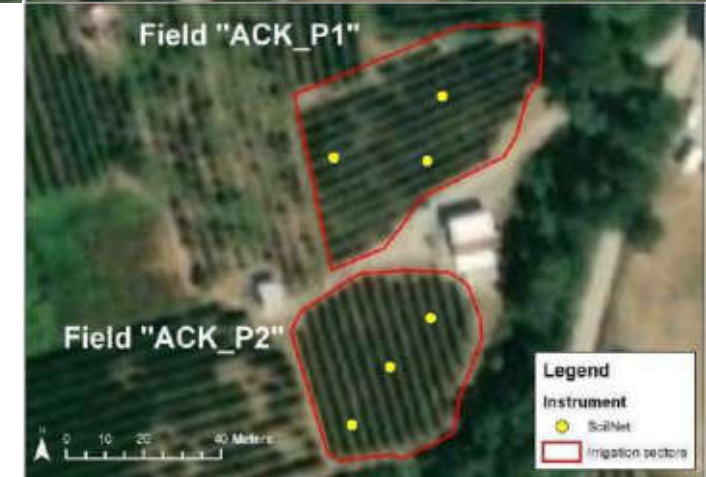
Data transmission with 3 different technologies: 4G, NB-IoT and LoRaWan

Pilot implementation of irrigation planning tools

Epanomi, vineyards

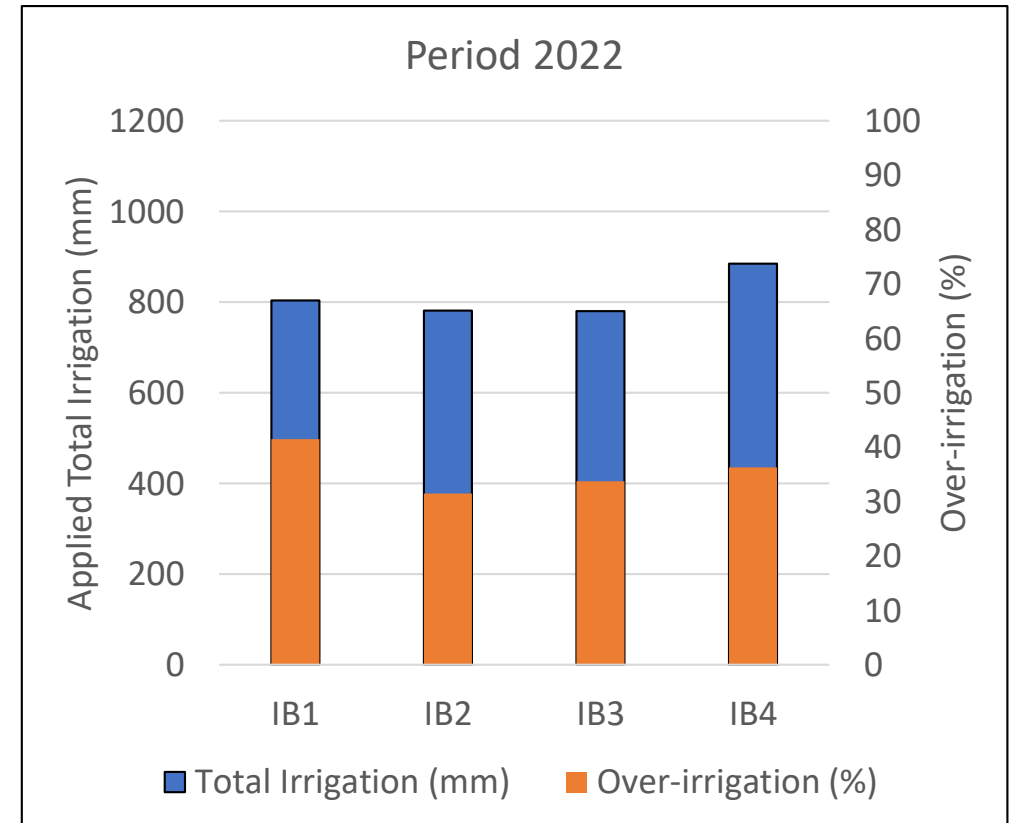
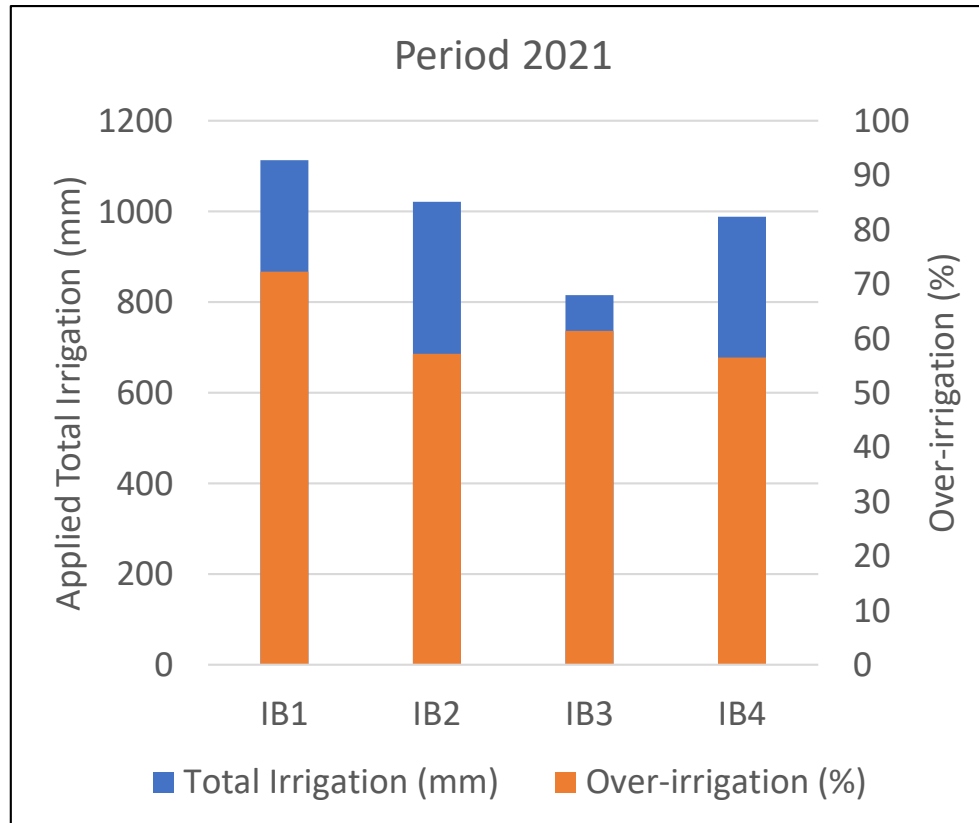


Pinios Hydrologic
Observatory, apple
orchards



Pilot implementation of irrigation planning tools

Field S10



IB=Irrigation Block

Groundwater availability services

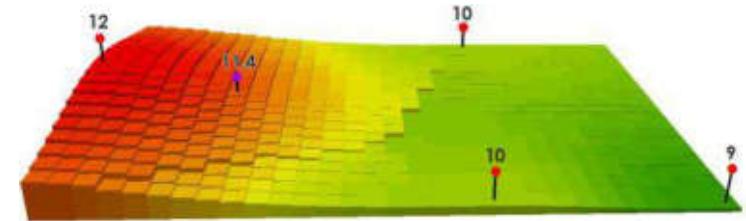
Model driven service

- **Mathematical simulation of groundwater flow/head/budget** at the aquifer scale.
- **USGS MODFLOW** (MODular Finite-Difference Ground-Water flow model) is **the most widely-used software package** for simulating groundwater flow.



Data driven service

Point groundwater level data of telemetric sensors
+
geostatistical interpolation.
= groundwater level distribution
!!Groundwater level sensors must be **sufficiently distributed across the aquifer domain!**



Model vs data driven service

Model driven availability service

+ ability to forecast groundwater availability
- groundwater level simulation errors can cumulatively introduced

Model driven availability service

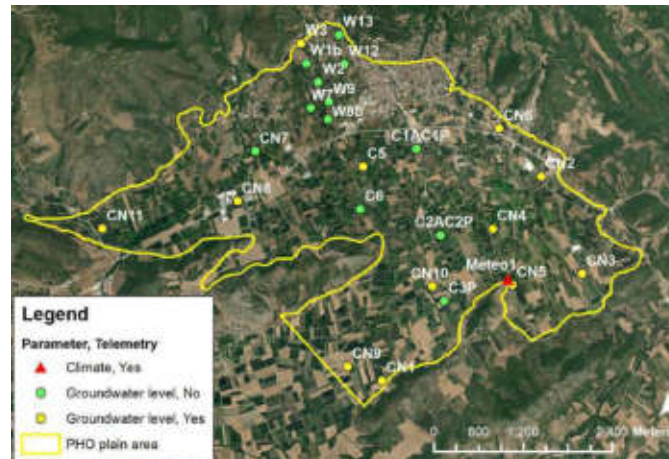
+ Based on actual groundwater level values, reflects the actual groundwater fluctuation patterns
- It lacks from the ability to forecast groundwater level, thus groundwater availability.

Model driven groundwater availability service

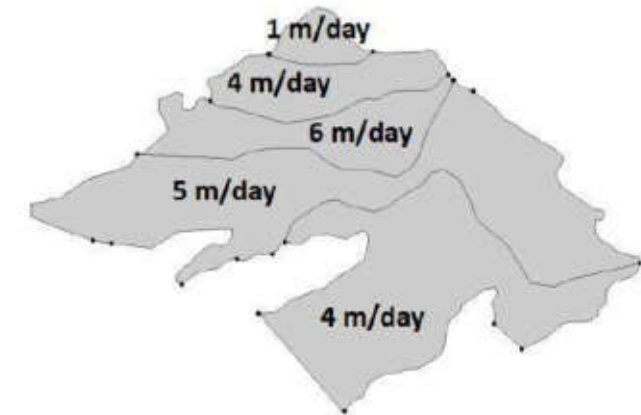
Hydrolithological data



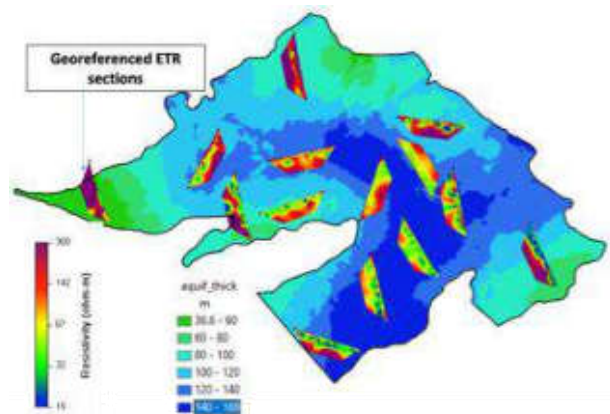
Groundwater level data



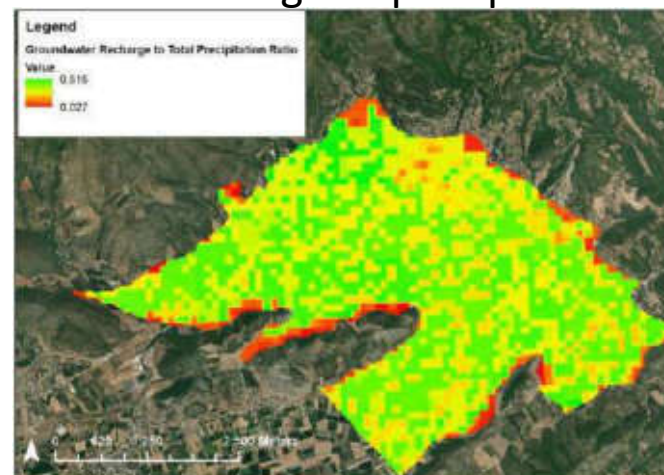
Hydraulic Properties



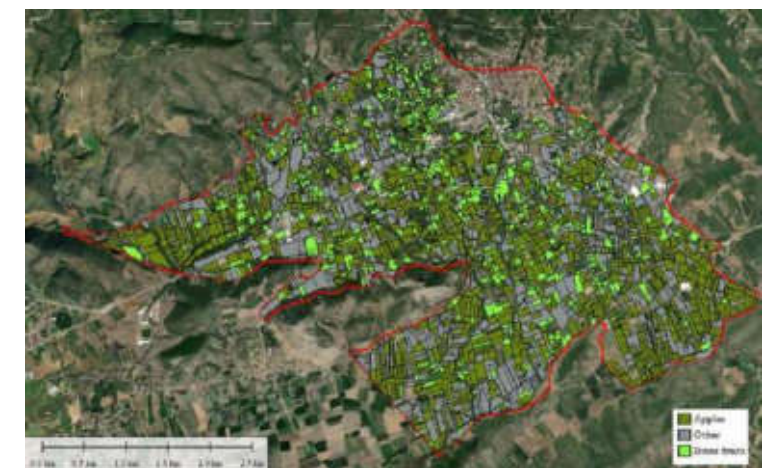
Electrical resistivity tomography



GW recharge to precip. ratio

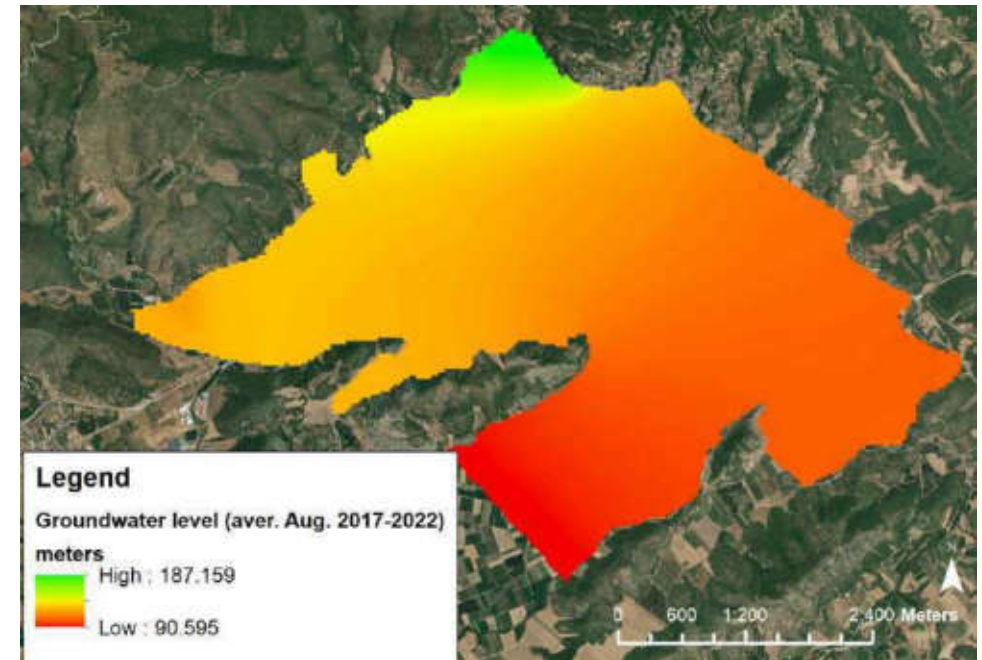
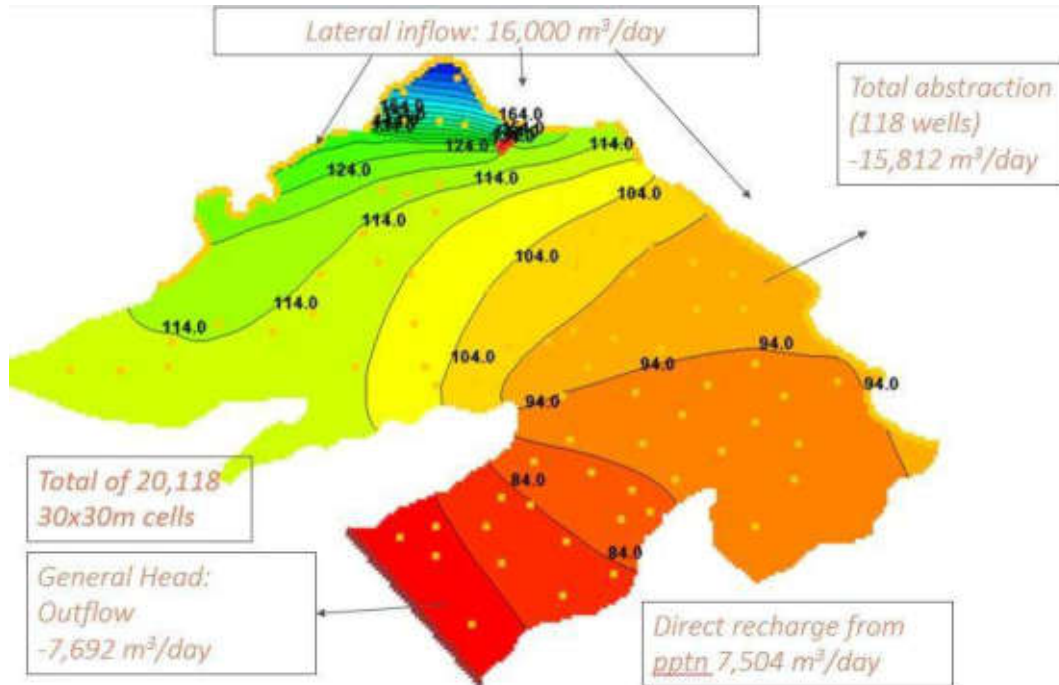


Irrigation water consumption

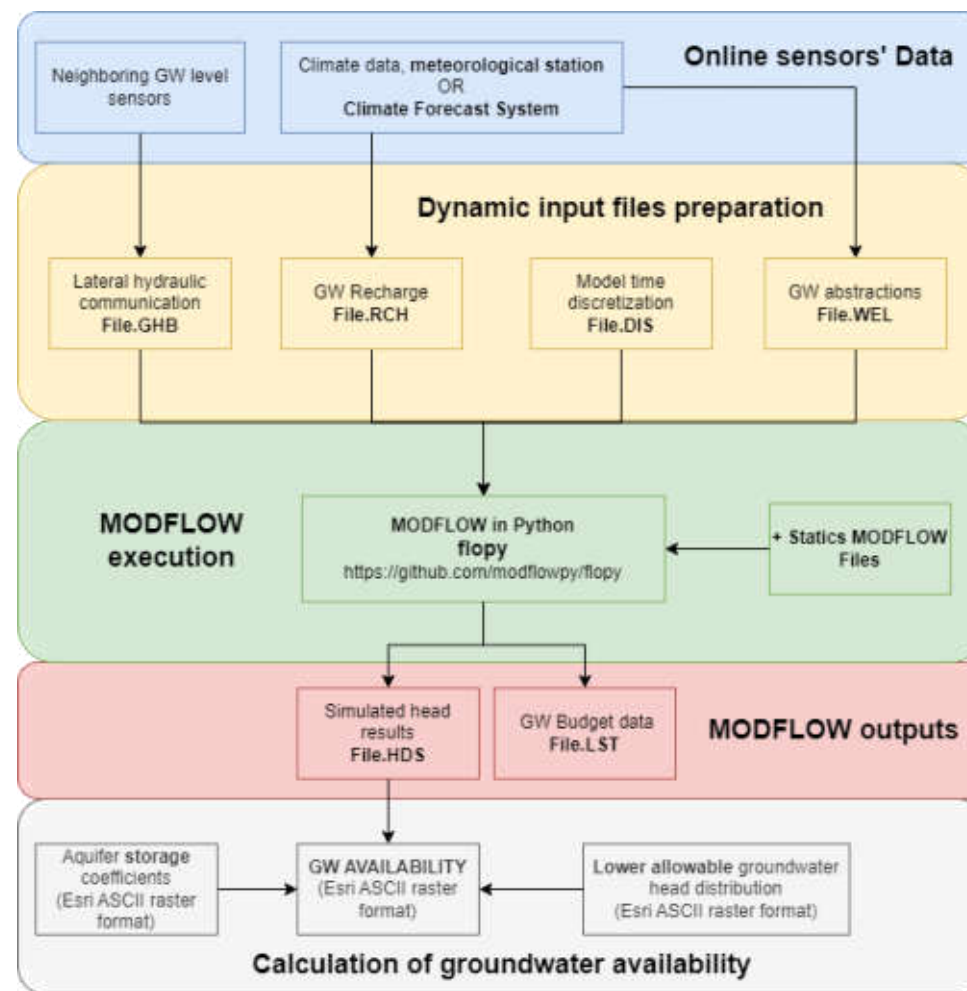


Model driven groundwater availability service

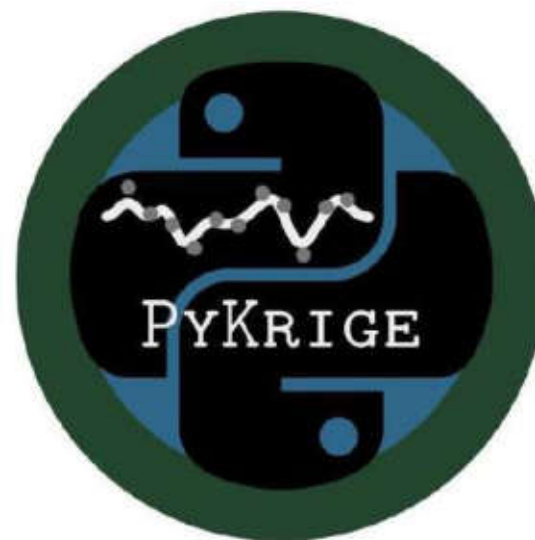
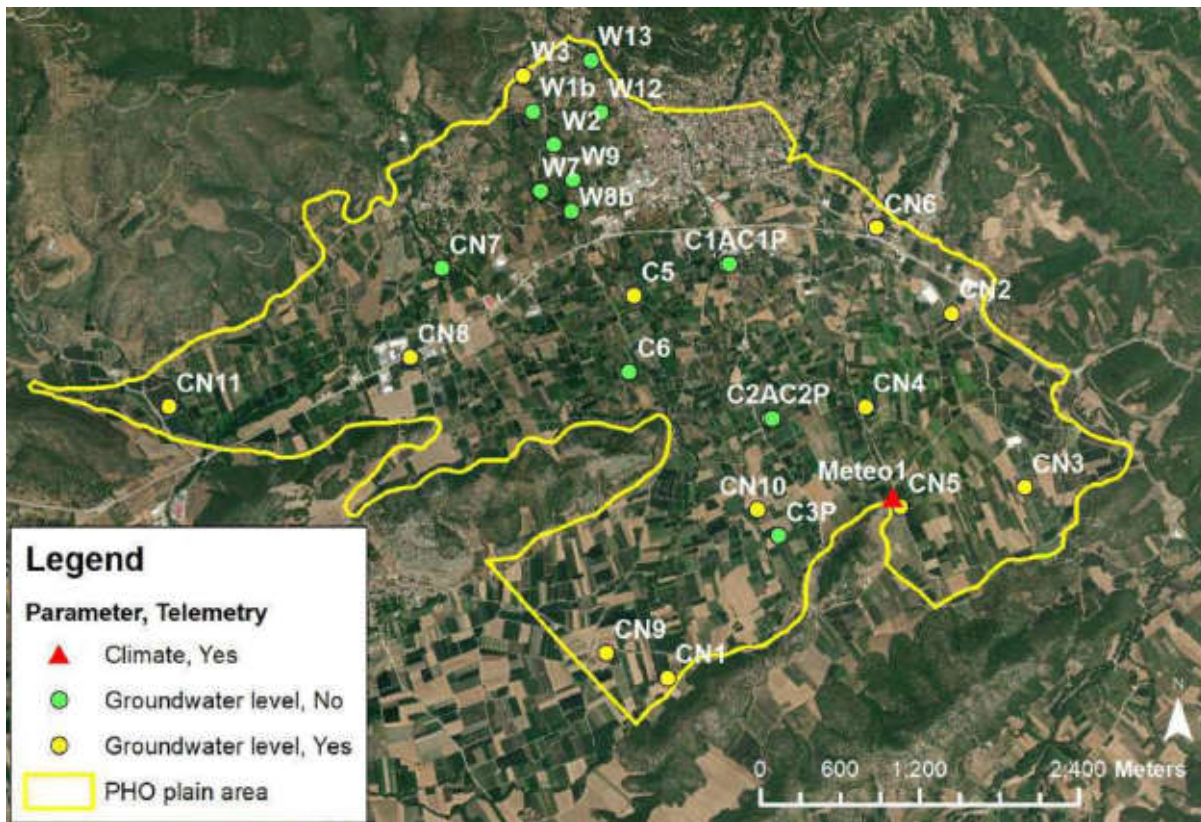
Maximum allowable depletion of groundwater level



Model driven groundwater availability service



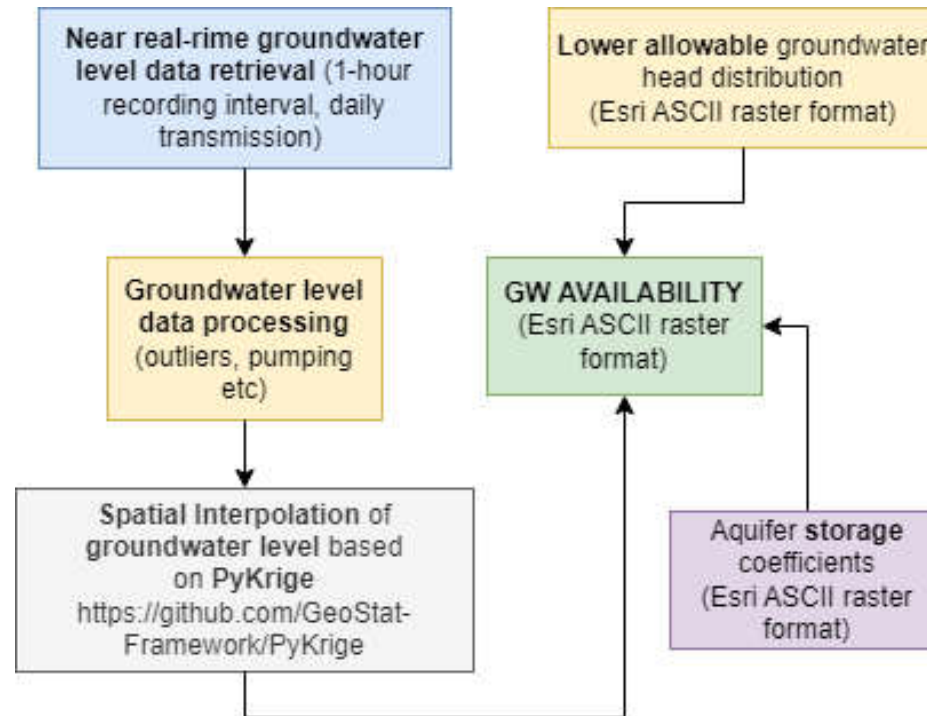
Data driven groundwater availability service



The Kriging
Toolkit for Python

Data driven groundwater availability service

Data driven service



Groundwater availability frontend



SENSORS

YDOC

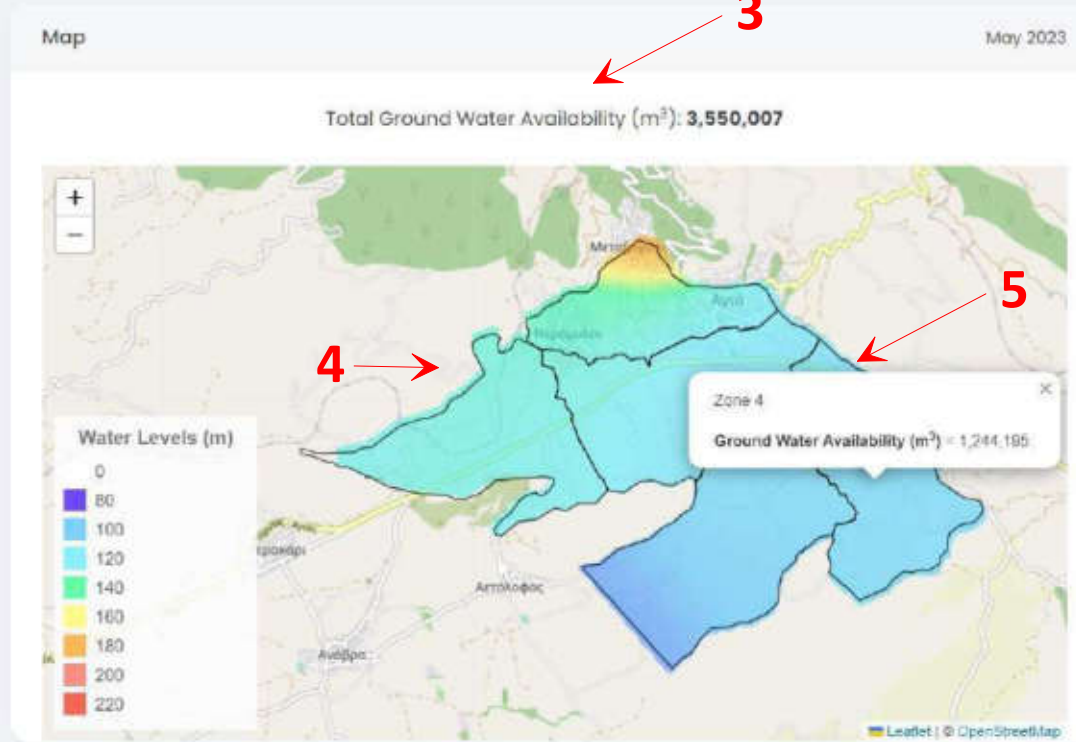
Diver Link

AGIA GROUND WATER AVAILABILITY

- a) Model-Driven
- b) Model-Driven Forecast
- c) Data-Driven

Login

Agia - Model Driven Ground Water Availability



Model Run

Pick a date to run the model



Groundwater availability frontend



SENSORS

- YDOC
- Diver Link

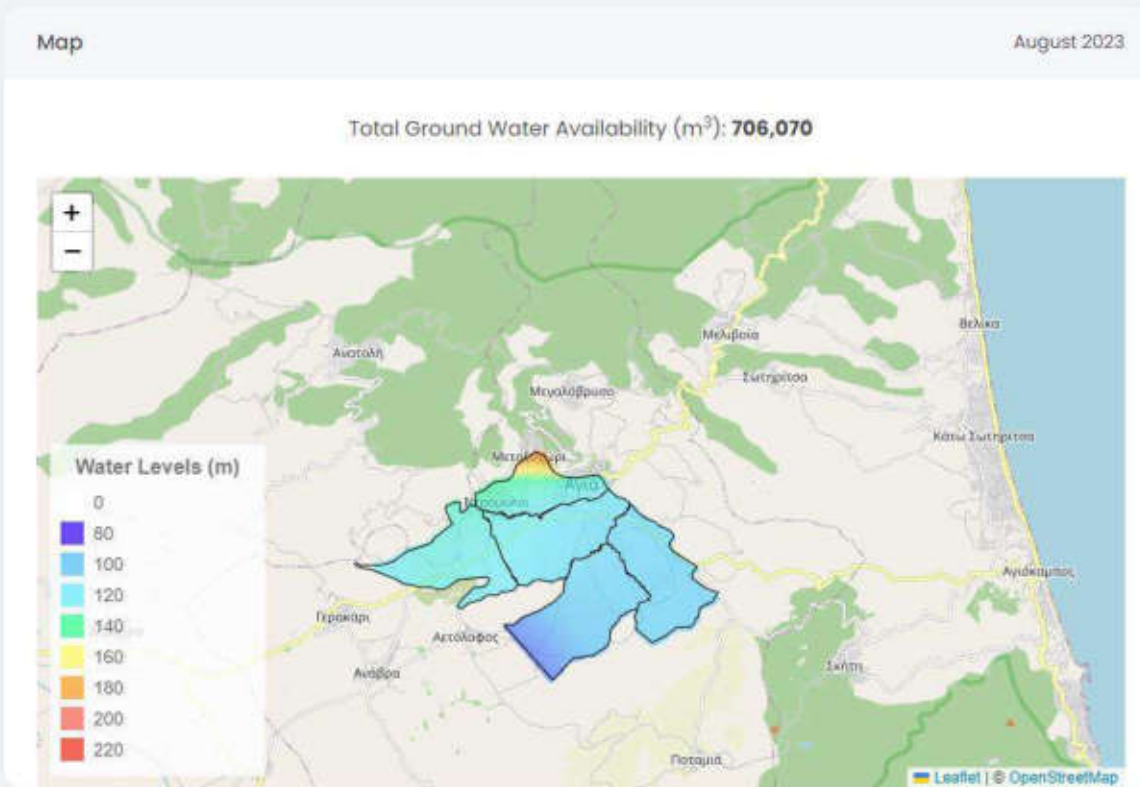
AGIA GROUND WATER AVAILABILITY

- Model-Driven
- Model-Driven Forecast
- Data-Driven

Login



Agia - Model Driven Forecast Of Ground Water Availability



Model Run

Pick a date to run the model

2023

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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1

Groundwater availability frontend



SENSORS

YDOC

Diver Link

AGIA GROUND WATER AVAILABILITY

Model-Driven

Model-Driven Forecast

Data-Driven

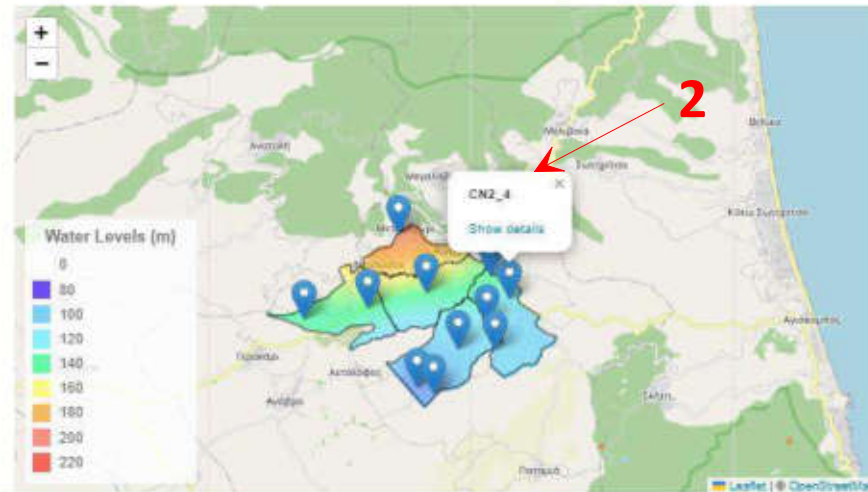
Login

Agia - Data Driven Ground Water Availability

Map

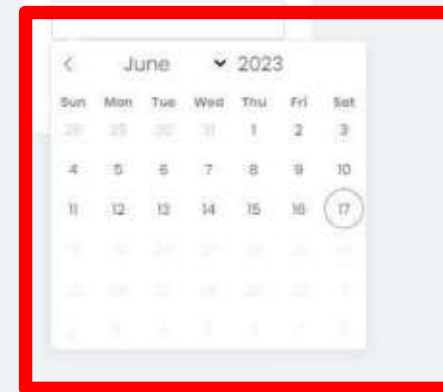
T7 June 2023

Total Ground Water Availability (m³): 6,518,030



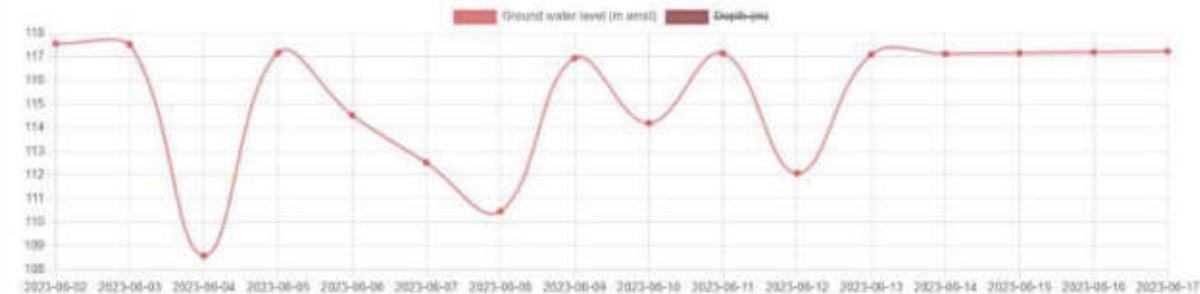
Date Selection

Pick a date to show data



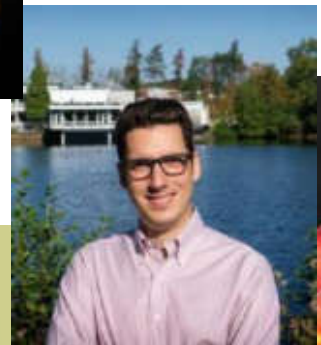
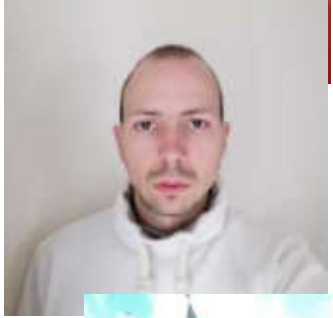
1

Sensor CN2_4 (average values per day)



3

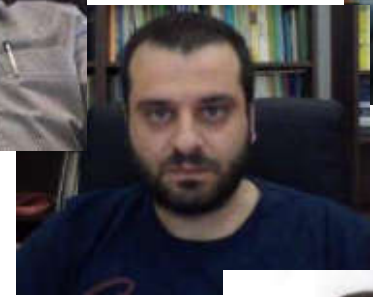
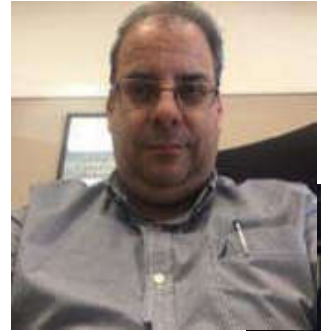
The ATLAS team



OIK



Δήμος Αγιάς
Municipality of Agia



THANKS FOR YOUR ATTENTION!



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