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UMR1114

Mediterranean Environment and Modelling of Agroecosystems (EMMAH)

Management

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Research themes

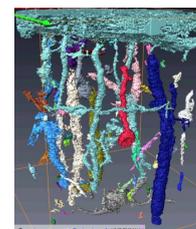
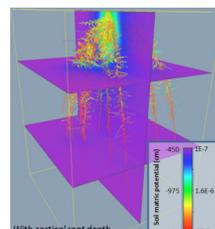
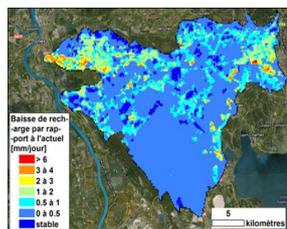
- To develop concepts and tools for the joint management of agrosystems and aquifers in Mediterranean context and global changes framework

In brief

- 37 researchers
- 12 engineers and assistant engineers
- 13 technicians and administrative staff
- 40 PhD students and post-doctoral staff

Missions et objectifs

The scientific aim of the laboratory is to develop concepts and tools for analysing and predicting the dynamics of aquifers, of agro- and ecosystems and their interactions in the framework of global changes (land use, climate, development of ecological farming practises) from field to landscape level. We are involved in collective scientific expertises, in supporting public policies and natural resource (soil and groundwater) management. We focus on Mediterranean eco- and agrosystems.



Photos: @INRAE-AU

(1) The unit focuses on the interactions between land use, climate and groundwater. (2) The phenomobile: a robot vehicule to characterize automatically crops within experiments. (3) 3D models of soil-plant interactions in the framework of soil water depletion. (4) 4D X-ray CAT of soils to characterize water flows in biopores.

Research

Themes

- Interactions between water balance, crop growth, agricultural practices and land use changes;
- Characterization of aquifers functioning using isotopic hydrochemistry, hydrogeophysics, remote sensing and modelling;
- Modelling of reactive mass transport, energy and wave propagation in the critical zone;
- Characterization and modeling of Soil-Plant-Microflora Interactions in relation to the nutrition of plants and the evolution of soil water properties;
- Characterization and modeling of the impact of agricultural practices and climate change on meso- and macro-fauna and soil functions;
- Development of measurement systems and algorithms for environmental characterisation (phenotyping from remote sensing images, plant and soil dynamics, land use, hydric and mechanical soil properties...);
- Environmental evaluation of wastewater reuse in agriculture.



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Objectives

- To develop tools for monitoring, analysing and forecasting the biophysical response of Mediterranean ecosystems and aquifers at the territorial scale to global changes;
- To predict yields, the evolution of agricultural potential and the availability of groundwater resources in relation to agro-pedoclimatic dynamics;
- To identify leverages for adapting agrosystems to global changes, in particular by using nature-based solutions;
- To develop tools for decision support and resource management at different scales;

The research work of the EMMAH unit is part of the «Risks and Adaptation to Global Change» research cluster of the INRAE Provence-Alpes-Côte d'Azur centre.

Education

EMMAH manages the following post-degree trainings: Earth and Water BSc, Physics BSc, Hydrogeology Soil and Environment MSc, Water Resources and Environment Master of Engineering. EMMAH also participates in the EI-CNAM84 higher school in engineering.



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