

## UMR LISAH

**Laboratory for the study of Interactions  
between Soils, Agrosystems, Hydrosystems**  
(Laboratoire d'étude des Interactions Sols-  
Agrosystèmes-Hydrosystèmes)

**Director**  
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### Research area

The Joint Research Unit – Laboratory for the study of Interactions between Soils, Agrosystems, Hydrosystems groups both researchers and academic staff from the National Institute for Agricultural Research (INRA), the Institute of Research for Development (IRD) and the School of Agronomy of Montpellier (Supagro).

Its central research theme is the study of the spatial organisation and hydrology of agricultural landscapes both in developed and developing countries. Specific objectives are to

- increase basic understanding about erosion, water and pollutant transport processes in soils and farmed catchments as a function of their spatial and temporal heterogeneities, both natural and land use related
- develop new methods and tools for detecting and preventing threats to soil and water resources,
- design sustainable management strategies for rural landscapes.
- educate students on the concepts and tools for analysing and modelling the spatial organisation of farmed landscapes and their hydrological behaviour.

The unit has three main research programs:

- Studying and modelling transport mechanisms from field to catchment scales
- Analysing and modelling the spatial organization and evolution of the functional properties of farmed landscapes according to their hydrological behaviour
- Developing distributed eco-hydrological modelling approaches

The LISAH manages a long term environmental observatory, called OMERE (Observatoire Méditerranéen de l'Environnement Rural et de l'Eau), which aims at studying the impact of human activities on runoff, erosion and subsequent changes in water quality. This observatory consists of two experimental catchments located in South France near Montpellier and in Tunisia in the Cap Bon region. The two sites represent two different stages in the evolution of Mediterranean farmed landscapes.

Website: <http://www.umar-lisah.fr/>

### Research highlights

Development of distributed hydrological modeling in farmed catchments

Water contamination processes by pesticides at the catchment scale in semi-arid environments

Evaluation of water harvesting techniques at field and catchment scales

Impact of global change on the soil vulnerability to soil erosion

Development of digital mapping of soils and of anthropogenic landscape features

### Staff profile on October 2007

	Total permanent staff	Total Scientists*	Scientists with "HDR" <sup>1</sup>	Post-doct fellows	PhD
Staff	45	21	8	1	8

\*Scientists per member institution: 8 INRA, 11 IRD, 2 Montpellier SupAgro

### Research groups

- Water and pollutants transport in farmed catchments
- Erosion and solid matter transport
- Spatial organization and functioning of farmed landscapes

<sup>1</sup> French university degree for confirmed thesis supervisor

## Platforms

Modelling platform : MHYDAS : Modélisation HYdrologique Distribuée pour les AgroSytèmes (Distributed hydrological modelling for agrosystems) – website : <http://www.umr-lisah.fr/mhydas/>

## Most important International partnerships

Department of water resources engineering Lund University, Suède

Faculty of Agriculture, Food & Natural Resources, The University of Sydney, Australie

INRGREF Tunis, Tunisie

Institut Agronomique et Vétérinaire Hassan II Rabat Maroc

Institut National Agronomique Tunisien, Tunis, Tunisie

## Facts and figures

### Publications in international ranking journals

- ❖ 2007 : 12
- ❖ 2006 : 23
- ❖ 2005 : 28

### Representative publications

Brunel, J.P., Ihab, J., Droubi, A., Samaan, S. 2006. Energy budget and actual evapotranspiration of an arid oasis ecosystem : Palmyra (Syria). *Agricultural and Water management*, 84, 213-220.

Lagacherie, P., Mc Bratney, A.B., Voltz, M. (ed.) 2006. *Digital Soil Mapping , An Introductory Perspective* », *Developments in Soil Science*, vol. 31, Elsevier, Amsterdam, 600 pages.

Le Bissonnais, Y., Blavet, D., De Noni, G., Laurent, J. Y., Asseline, J., Chenu, C. 2007. Erodibility of Mediterranean calcareous soils: relevant aggregate stability methods and driving soil variables. *European Journal of Soil Science*, 58, 188-195.

Louchart, X., Voltz, M. 2007. Aging effects on the availability of herbicides to runoff water. *Environmental Science and Technology*, 41, 1137-1141.

Nasri, S., Albergel, J., Cudennec, C. & Berndtsson, R. 2004. Hydrological processes in macrocatchment water harvesting in the arid region of Tunisia: the traditional system of tabias. *Hydrological Sciences Journal*, 49, 261-272.

### List of softwares and devices developed within the unit

- MHYDAS : Modélisation HYdrologique Distribuée pour les AgroSytèmes (Distributed hydrological modelling for agrosystems) website: : <http://www.umr-lisah.fr/mhydas/>
- ATLASOLS : an atlas of the soils of the Languedoc-Roussillon region : website : <http://www.umr-lisah.fr/AtlaSols/>
- HYSAE : a database structure for storing spatial and temporal data from hydrological observatories
- EPI : a software for evaluating interactively the visibility of landscapes : website : <http://www.umr-lisah.fr/Produits/epi/>
- a drone for remote sensing PIXY@ <http://www.drone-pixy.com/>

### Total annual budget

	2006	2007
Total annual budget (excluding salaries of permanent staff- k€)	659. 3	773. 6
of which external contracts (k€):		
ANR	22. 5	60
EU	6 .8	48 .8
Private sector	0	0
Others	186. 2	138.1