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News

Fundamental Research

Water cycle management

Groundwater: IFPEN co-founder of the GeEAUde chair to study the dynamics of groundwater resources and interactions with associated ecosystems

In response to the urgent need to preserve groundwater resources, which are becoming more fragile as a result of climate change and pressure from human activity, the research community is taking action. As a specialist in geological characterization and flow modeling in complex porous media, IFPEN is a co-founder, along with INRAE, of the GeEAUde partnership chair launched by Avignon University, and will be bringing to the table its renowned expertise ranging from experimental characterization to subsurface modeling.

On May 31st 2024, the GeEAUde Chair in “Dynamics of Groundwater Resources and Interactions with Associated Ecosystems” was inaugurated, an initiative that unites researchers, decision-makers, managers and industry around a common objective: **develop tools to characterize and model groundwater resources and propose strategies for their sustainable and equitable management in the Mediterranean context, which is severely exposed to global warming.**

Groundwater, a strategic resource that is under threat

Groundwater accounts for 99% of the planet’s liquid freshwater reserves and is responsible for 25% of the freshwater used by humans. It constitutes a genuinely strategic resource: “invisible” but

nonetheless crucial to supplying drinking water and to our ecosystems.

- **53% of France's drinking water**, agricultural and industrial water is sourced from groundwater.
- **Over 96% of drinking water in Vaucluse** is sourced from groundwater.

These natural resources, which are vital to mankind and ecosystems, are inadequately understood and scarcely or poorly monitored, which can result in them becoming overexploited. In order to optimize aquifer management, we need to gain a better understanding of these systems, their heterogeneity and how water flows through them. The situation is all the more critical in the Mediterranean context, where severe water stress can lead to conflicts over how water is used.

>> Find out more: water cycle management and climate change

GeEAUde: a multidisciplinary, global and operational approach

The GeEAUde Chair's research work will benefit from the expertise of numerous national and international socio-economic, private and public partners, as well as regional bodies with an interest in water-related issues, and will be more specifically geared towards:

- **Technological advances and integrative solutions** through the development of tools to study changes in groundwater resources and model aquifer behavior;
- **Understanding geological and hydrological processes** by analyzing the physical, chemical and geological factors that govern aquifers to promote sustainable management;
- **Research into interactions between aquifers and ecosystems** to understand how aquifers interact with terrestrial and aquatic ecosystems, and assess the impact of human activity (overexploitation, tourism, etc.) or climate change.

The GeEAUde Chair will focus on applying global approaches to **aquatic systems that are characteristic of the Mediterranean rim**, where major environmental and socio-economic issues are at stake. Three types of underground aquatic systems, which are typical of the Mediterranean rim and islands, have been selected: karst aquifers, alluvial aquifers and deep sedimentary aquifers.

Characterization and modeling: IFPEN's invaluable expertise

The GeEAUde Chair will benefit from IFPEN's Carnot IFPEN Ressources Energétiques expertise, which ranges from geological field characterization to flow modelling in complex media.

>> Find out more about the Karst project, that aims to set up a multi-scale physical modeling framework for karst aquifers

>>Discover the Carnot IFPEN Ressources Energétiques solutions in the field of water treatment

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