

# Tenure Track Junior Professorship

## Profile n°4: Extreme hydrological events (floods, droughts) and global change in the South (HYDROSUD)

**Key words:** Water cycle, modelling, intertropical and Mediterranean critical zone, risks, decision support.

Planned tenured position as IRD Research Director after a **3 to 5** year contract.

Chair attached to the UMR HydroSciences Montpellier (CNRS, IRD, Université de Montpellier, IMT-Mines Alès), Montpellier, France

### ◊ Context and stakes for the Global South


The scientific community is working to provide solutions to societal concerns in terms of social-environmental risks and Sustainable Development Goals (SDGs). One of the challenges is to co-construct, with partners in the South and in a transdisciplinary approach, new methodologies designed to quantify, manage and anticipate changes in resources, for ecosystems and human uses, under the combined effects of climate change and human pressures. The major continental energy and biogeochemical cycles, as well as the regulation of ecosystems and natural resources, are mainly governed by the functioning of the Critical Zone. More specifically, the "Surface-Atmosphere-Ecosystems" and "Surface-Subterranean" interfaces represent the key zones in the functioning of the Critical Zone. Acquiring knowledge of the processes involved, understanding the interactions between compartments, drawing on local knowledge and then integrating and translating it into modeling approaches for the Earth system are all scientific challenges. They are a prerequisite for a systemic approach to knowledge of water resources, and for the evolution of modes of interaction between science and society, and of governance of socio-ecosystems (notably the challenges of the PEPR program TRANSFORM).

### ◊ Scientific objectives

The Chair is part of HydroSciences Montpellier's (HSM) cross-disciplinary Critical Zone theme, which promotes innovative, integrative research into understanding the atmosphere-vegetation-soil continuum, and the coupling and feedback between surface and subsurface flows.

The recruited applicant will be involved in water resource and/or risk (drought/flooding) issues, in line with major environmental and societal challenges: climate change and its impact on society, changes in resources under demographic and land-use pressure, and changes in the associated risks. The JP will help to: i) improve understanding and characterization of interactions between atmospheric, ecohydrological and hydro(geo)logical processes in tropical, subtropical and Mediterranean environments, ii) promote the translation of knowledge into statistical, conceptual and/or deterministic models applicable over a wide range of spatial and temporal scales.

This dual ambition will be carried out with a view to integrating surface processes, identified as a key step in the integrative study of surface-ground processes that underpins the UMR project. The successful candidate will be able to demonstrate expertise in complementary areas of hydrological science, such as : i) metrology and contribution to the development of new means of observation,



including satellites, to document and characterize processes and their monitoring (water and matter flows, including contaminants); ii) processing of in-situ data, development of spatialized products or design of mathematical methods for model implementation, analysis or control; iii) numerical modeling, of hydraulic, hydrological, SVAT and/or hydrogeological types, in order to move towards the emergence of integrated platforms for eco-hydro(geo)logical processes in the critical zone. The winner must be committed to operationalizing his or her research and will work in a transdisciplinary approach, in partnership with actors in the field in the South, on the societal implications of his or her research, in particular the support of public policies, within the framework of the principles of sustainability science.

### ◊ Teaching objectives

The person recruited will have a service of 48 HeqTD per year. He/she will be part of the Terre, Eau, Environnement (Earth Water Environment; TEE) teaching department at the University of Montpellier. He/she will be able to teach courses from undergraduate to doctoral level, with a focus on the Master's degree in Water Sciences (courses in "Water Resources", "Water and Society"), and above all the international IDIL - AWARE and SFRI ("Structuring Training through Research in Initiatives of Excellence", PIA-3) courses, in which he/she will particularly aim to integrate students from the South. He/she will also contribute to the international visibility of Montpellier's Earth and Water Sciences teaching. The person recruited will have to develop specific teaching approaches in the field (quantitative observations) and digitally, drawing on existing information systems, observatories and observations.

He/she will also be responsible for scientific outreach to the general public and secondary school teachers, to raise their awareness of water resource and risk issues.

He/she will coordinate training courses for partners in developing countries, in relationships with IRD departments dedicated to capacity building, in the form of workshops, structuring training projects or research training schools, in face-to-face and/or digitized versions (MOOC...).

### ◊ Funding available

The chair holder will receive (1) €200k in ANR funding (including a minimum of €120k in payroll costs - PhD students, post-docs, IT contract staff - with the balance earmarked for project operations), (2) IRD funding for a two-year PhD or post-doc contract and €30k for a long-term assignment (around 6 months), (3) Université de Montpellier funding between 50 and 100 k€.

### ◊ Conditions for applicants

Candidates must fulfil one of the following criteria :

- hold a doctorate as provided in article L.612-7 of the French Education Code;
- hold a PhD or doctoral level of education;
- hold a doctorate in engineering;
- hold a study and research diploma in computer science, GIS;
- hold a study and research diploma in remote sensing;
- hold an overseas university degree considered equivalent to the above-mentioned diplomas; in this case, applicants should submit an equivalence request.
- show proof of qualifications or scientific works considered equivalent to the above-mentioned diplomas; in this case, applicants should submit an equivalence request.

For the equivalence request - (refer to the file integrated into the platform « Talent Soft »).

## Applications, selection and interviews

Applications must be submitted online at: [\(page URL sur la plateforme Talent SOFT\)](#) by **15**, 2024 at **11:59 p.m. (metropolitan France time)**. Applications will be assessed by a committee comprising internal (IRD) and external experts. Candidates pre-selected by the committee will be invited for interview. Interviews will last for one hour, and will be conducted remotely by video-conference.

The recruitment date for the chair is set for **December 1, 2024**.

## Assessment criteria

- Excellence of the candidate, motivation, scientific and pedagogical supervision capacity
- Quality, originality, interdisciplinary of the research and teaching projects and their Global South component
- Relevance of the proposed methods with regard to the identified problems
- Relevance and structuring effect of the project within the laboratory and at the level of partnerships
- Coherence with the Site policy
- Adequacy of the means to the proposed project and capacity to mobilise complementary means.