

PhD Opportunity

Title of the topic	Large scale hydrological simulation: anthropic processes and drought in Iberia.
Host institution	Observatori de l'Ebre - Ramon Llull University. <i>Roquetes (Tarragona Province), Spain.</i> The student may spend some time at Polytechnic University of Madrid and in foreign research centers.
Advisors	Dr. Pere Quintana-Seguí (Observatori de l'Ebre-URL) Dr. Luis Garrote (Polytechnic University of Madrid)
Financial Framework	<i>Ayudas para contratos predoctorales para la formación de doctores 2018. Programa Estatal de Promoción del Talento y su Empleabilidad en I+D+i. Subprograma Estatal de Formación.</i> Spanish Ministry of Science. <ul style="list-style-type: none"> ● The call is expected to open in early September and close in October 2018. ● The position is for 3 years (maximum of 4 years). ● Annual gross salary: 16.420 €. ● The funding also includes money for visiting other research centers. ● The funds are linked to the HUMID project. <p>Furthermore, the student may travel abroad (Morocco or Niger) using funds tied to the ACCWA project (Marie Skłodowska-Curie Research And Innovation Staff Exchange, 2018).</p> <ul style="list-style-type: none"> ● These funds include a generous travel allowance (which is added to the monthly salary) for the student for every month spent abroad.
Profile of applicant	The candidate must have a M.Sc. or equivalent degree in Physics, Hydrology, Meteorology, Climatology, Civil Engineering or similar. <ul style="list-style-type: none"> ● Experience in scientific programming with FORTRAN and Python (or similar analysing programming languages, such as R or Matlab). ● Excellent communication skills, including writing, and the ability to work in a team and individually with passion, dedication and integrity. ● Good proficiency in the English language.

<p>Description of the topic</p>	<p>The student will work large scale hydrological simulation with the SASER (SAFRAN-SURFEX-EAUDYSEE-RAPID) hydrological modelling chain, with the objective to better understand drought processes in an anthropized environment (Ebro River basin and Iberia as a whole).</p> <ul style="list-style-type: none"> • Improvement and validation of the model. • Dam simulation, including the deduction of dam operating rules. • Use of the resulting model in order to better understand drought processes in an anthropic environment. <p>The HUMID and ACCWA projects deal also with remote sensing of soil moisture, applied to the quantification of drought and irrigation, among other related topics. The student might also work on these topics, depending on his/her progress during the PhD, in collaboration with other national and international research teams.</p>
<p>Description of the projects</p>	<p>HUMID (Hydrological Understanding and Modeling of Iberian Drought) Project</p> <p>HUMID will study the utility of LSM models in a context of drought. The project will assess whether these models adequately reproduce the processes and characteristics of drought, both when operating independently (offline) and when used within a regional climate model (coupled). In addition, the SASER model, a distributed and physically based hydrological model for the Iberian Peninsula, based on the SURFEX LSM, will be improved. In this case, reservoirs will be introduced in the model to study the impact of these on drought processes. To this aim, models will be developed to reproduce the management rules of the main irrigation reservoirs of the Ebro basin.</p> <p>In collaboration with an innovative company, HUMID will also use state-of-the-art remote sensing products, mainly soil moisture, to assess the usefulness of this information for drought monitoring. It will be evaluated how remote sensing data can be used to validate and to complement LSMs, by means of indices and, if possible, by means of data assimilation.</p> <p>HUMID, in collaboration with stakeholders, will develop useful drought indices for managers, based on the observed data already in use, in combination with modelling and remote sensing data,</p>

	<p>ensuring that the results of the project will have a real impact on society.</p> <p>ACCWA (Accounting for Climate Change in Water and Agriculture management)</p> <p>The Mediterranean and Sahel regions are among the most sensitive areas to climate change as demonstrated in many studies (IPCC, 2013). Increased rainfall variability and ET rates will compromise irrigation potential and expansion plans and increased competition and conflict over limited water resources. More information regarding water use is necessary to improve agricultural planning and to manage water more efficiently at different scales. Temperature and precipitation changing patterns will also increase hazards linked to environmental conditions such as droughts, floods or crop pests like locust swarms. ACCWA aims to develop the remote sensing based monitoring tools for agriculture and water and management that help risk guidance in a climate change context.</p>
<p>Application</p>	<p>In order to apply, the student will have to fill the forms in electronic form and provide:</p> <ul style="list-style-type: none"> ● copy of the passport (for foreign students who do not reside in Spain). ● Curriculum Vitae (in the appropriate format) ● Academic certificate showing the marks obtained for each subject and the dates in which the subjects were passed. <p>More details will be published when the call opens in September 2018.</p>
<p>Contact</p>	<p>For any enquiry, please contact Dr. Pere Quintana-Seguí (pquintana@obsebre.es) adding HUMID-FPI to the subject line.</p>