

4-year PhD contract

Contract linked to the *TransHyMed* research project

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The Research, Development and Innovation Secretary of the Spanish Ministry of Economy, Industry and Competitiveness is funding a 4-year PhD contract. This contract is associated to the project:

*Patrones espacio-temporales de transferencia de agua en cuencas Mediterráneas de cabecera. Conexiones entre vegetación y respuesta hidrológica (TransHyMed) (CGL2016-75957-R).*

*Spatio-temporal patterns of water transfer in headwater Mediterranean catchments. Links between vegetation and hydrological response.*

Research activity will be developed within the Surface Hydrology and Erosion group at IDAEA-CSIC Barcelona, Spain (<https://sites.google.com/site/surfacehydrologyerosioncsic/home>)

**Closing date for applications: 18/10/2017 (15:00h).**

The information and instructions of the call may be obtained [here](#)

Is recommended for those interested to send a CV, their academic records and a brief description of their main interests in relation to the *TransHyMed* project to [pilar.llorens@idaea.csic.es](mailto:pilar.llorens@idaea.csic.es)

***We offer:***

- ✓ 4-year PhD Contract
- ✓ Acquisition of scientific knowledge in Surface hydrology and Ecohydrology
- ✓ Scientific-technical training (meteorological and hydrometric monitoring, environmental tracing and modelling)
- ✓ Acquisition of tools for the preparation of reports, scientific articles and presentations to congresses.
- ✓ Incorporation to a dynamic group with a long research experience in Hydrology.

***Is required:***

- ✓ Interest in Surface hydrology, Ecohydrology and environmental tracing.
- ✓ Interest and availability for field work.
- ✓ Hold a degree related to Hydrology, Environmental Sciences, Physical Geography or similar.
- ✓ Good academic record.
- ✓ Fluency in spoken and written English.
- ✓ Possession of the driver's license.

**Spatio-temporal patterns of water transfer in headwater Mediterranean catchments.  
Links between vegetation and hydrological response (*TransHyMed*)**

*Reference number: CGL2016-75957-R*

Water resources in Mediterranean basins strongly depend on runoff production in mountain areas. Runoff generation processes are affected not only by climate and landscape physiographic factors, but also by vegetation cover, which is the only directly manageable factor by human actions. Improving the knowledge of the processes and mechanisms of ecosystems functioning and their relationships with the generation of water resources has, therefore, a key role for obtaining a better prognosis of catchment water resources under global change, adaptive forest management for optimising ecosystem services related with water resources, and sound fight against desertification.

As a continuation of the investigations carried out for more than 25 years in the Vallcebre research catchments (Southern Pyrenees), and in line with cutting-edge scientific questions highlighted by the international community, TransHyMed proposes the following hypotheses: (i) the evaluation of the effect of rainfall partitioning on soil moisture heterogeneity and/or on groundwater recharge will allow a better understanding and conceptualisation of subsurface flows in forest soils, facilitating the improvement of our perceptual model of hydrological functioning at the catchment scale; (ii) the study of the isotopic signal of water and its temporal variation across the diversity of runoff-contributing compartments (or water stores) will allow the detection of anomalies caused by the spatial distribution of forest patches in the catchment, as well as the assessment of the rates of water renewal in these stores.

In line with these hypotheses, the project proposes two scientific objectives: (i) to study the role of tree stemflow as a hotspot of soil moisture and preferential flow, and (ii) to analyse the spatiotemporal patterns of diverse runoff contributing water compartments. The functional connexions of these two objectives will further facilitate the analysis of the role of forest cover on plot and catchment hydrological processes.

In order to tackle these objectives, TransHyMed will combine hydrometric monitoring and environmental water tracing at diverse spatial scales. The Vallcebre research catchments, representative of Mediterranean headwaters and where the research team has an extensive experience, will act as a field laboratory to undertake the project objectives. Furthermore, the project will be supported by active collaboration of international researchers specialized in forest eco-hydrology, catchment hydrology, as well as water tracing and dating.

Finally, three public institutions involved with the management of water resources, forest and fight actions against desertification stated their interest on the project, and will act as mediators for TransHyMed results to the public bodies and community.

**Keywords:** Ecohydrology, Hydrological processes, Environmental tracers, Transit time, Uncertainty, Mediterranean catchments