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Expression of Interest

Contact Person/Scientist in Charge

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UNIVERSIDAD DE JAÉN

Department / Institute / Centre

- **Name:** UNIVERSIDAD DE JAÉN - DEPARTAMENTO DE FÍSICA
- **Address:** Campus Las Lagunillas s/n, 23071, Jaén (Spain)
- **Province:** Jaén

Research Area

- Information Science and Engineering (ENG)
- Environmental Sciences and Geology (ENV)

Brief description of the institution:

The University of Jaén (UJA) is an EHEA medium-sized Spanish public university (some 16000 students and almost 1000 lecturers) that was established in 1993 and is organized into 6 main Schools/Faculties (Faculty of Law and Social Sciences, Faculty of Social Work, Faculty of Human Sciences, Faculty of Experimental Sciences, Faculty of Health Sciences and two Schools of Engineering). In addition to its 124 research groups, the University of Jaén is proud of its 4 Advanced Research Centers (Earth Sciences, Energy and Environmental Sciences, Olive Oil Research and Development, and Computational Sciences) and of its Institute on Iberian Archaeology Research. Moreover, UJA is integrated into a university network recognized as Campus of International Excellence in the fields of Agrifood (CEIA3), Climate Change (CamBio) and Historical Heritage (PatrimoniUN10).

UJA permanently welcomes new foreign research proposals as part of a conscious effort to increase its international profile and widen both its knowledge and its horizons.

Brief description of the Centre/Research Group (including URL if applicable):

The Centre for advanced studies in Energy and Environment (<https://www10.ujaen.es/conocenos/centros/ceaema>) is a research institute of the UJEAN founded in 2008, conducting research in solar energy and biomass related aspects is. Current research staff is over 20. In this centre, the MATRAS group (matras.ujaen.es) is involved in solar resources evaluation and prediction as well as in renewable energy. Notably, activities of the MATRAS group ranges from solar radiation measurements and modelization to solar radiation forecasting and evaluation based on Numerical Weather Prediction models and the evaluation of high penetration renewable energy scenarios. The group is involved in several international networks, as IEA Task 46 “Solar Resources Assessment and Forecasting”, and the Weather Intelligence for Renewable Energy (WIRE) COST action (<http://www.wire1002.ch/>).

Project description:

Project Title: Improving WRF model short term solar radiation forecasting reliability based on local cloud data assimilation

This project aims to improve the capabilities of the WRF numerical weather prediction model to provide local accurate high spatial resolution (1 km) solar radiation (both direct and diffuse components) forecasts on time horizons up to 48 h. The focus will be in the local scale, aiming the model to provide accurate solar radiation forecast at plant scale. Main test facility will be the Univ. of Jaen campus, where the group have deployed a complete set of measuring instrument. A comprehensive evaluation of cloud forecast based on different WRF setups. Different microphysics and shortwave radiation schemes, as well as vertical levels configuration, will be evaluated to determine the best setup. Special attention will be paid to the cloud fraction estimates. Evaluation will be based satellite and local clouds characteristic measurements (ceilometer, sky camera images, etc.).

As the main and innovative strategy, we propose to assimilate local cloud data into the WRF model. Initial 3-D cloud fields in WRF, immediately after the data assimilation cycles, will be modified (assimilated) according to local estimates of cloud characteristics derived from a ceilometer, sky cameras and satellite images (MSG).

Applications

CV, Motivation letter and Summary of project proposal (250 words) by 15th June 2018