

Versus

Newsletter n° 2
March 2017

**Improving surveillance and forecasting
regional systems of atmospheric risks :**

Do changes in land cover play a role in the occurrence of atmospheric extreme events on the Spanish coasts ?

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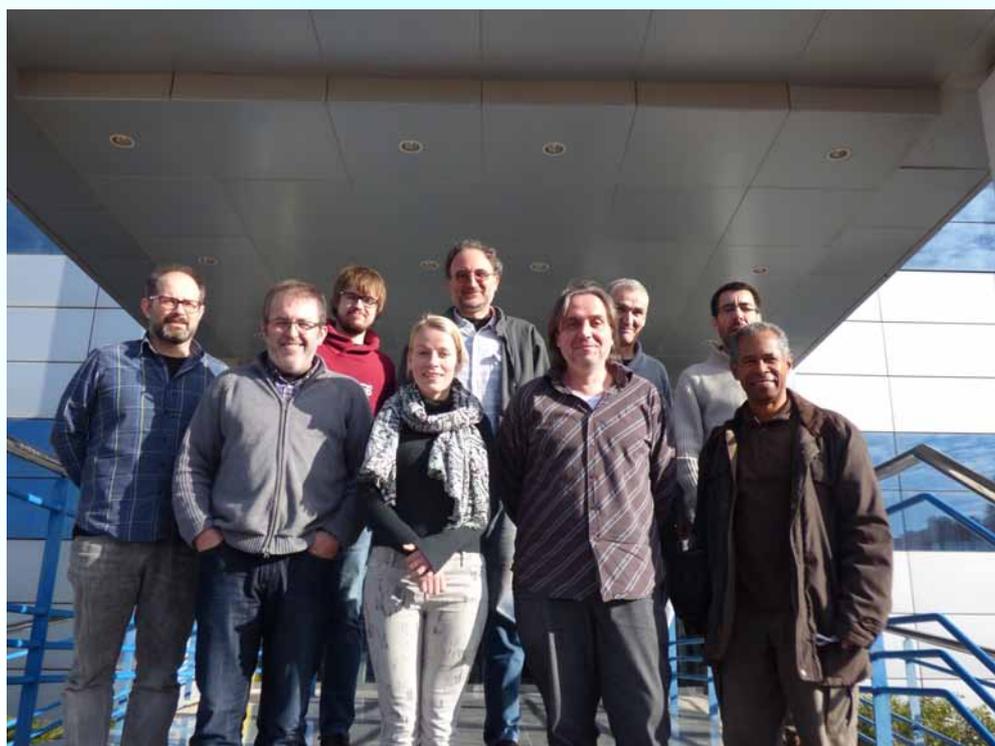
Reporting on the first year

At the end of the first year of the project it is time to recall the milestones reached and the main activities developed. Officially launched on January 2016, the reality is that the project was officially approved on May 2016 and, therefore, we began the planification of activities with the kick-off meeting in mid June.

During September two PhD students joined the VERSUS research team:

Pau Benetó, MSc. in Meteorology, directly involved in the meteorological modelling of heat interchange among soil, vegetation and atmosphere.

Elisabeth Larsen, MSc. in Ecophysiology, in charge of monitoring the evapotranspiration from vegetation into the atmosphere and to assess the total contribution of vegetation to the tropospheric water vapour along the Turia Valley (Valencia, Spain).

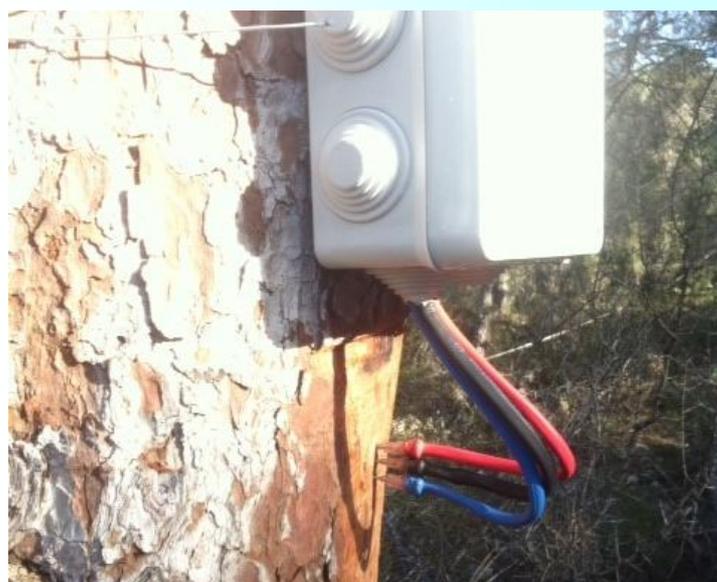


First Annual Meeting in Valencia, Spain



On the 22nd of December, we took advantage of Dr. Esteban Chirinos visit to Spain to hold the 1st annual meeting for the project at CEAM. During the day he inspected the monitored pine-plots, located around the prelitoral area of the Turia Valley.

We discussed how to proceed and how to link the different approaches, the different aspects to be accounted for with experimental deployment along the Turia Valley, and which modelling experiments to be run.



During these last six months we have instrumented six 20x20 m² pine plots with soil moisture sensors, heat-pulse-sensors for sap flow measurements, and meteorological stations located at the municipalities of Lliria and Vilamarxant (around 40 kilometers inland from the coast) and Aras de los Olmos (90 kilometers inland).

Hydrological patterns within the pine plots will finally be estimated from long-time series of soil humidity, precipitation, sap-flow, air temperature and relative humidity.



First Annual Meeting in Valencia, Spain

Thereby, daily soil water content (SWC) measured in the field will be used for validating the SWC estimated by HYDROBAL model. In addition, sap-flow measurements could contribute for this same purpose (i.e. validation model). Subsequently, using the actual evapotranspiration calculated for the different land uses in the basin, and by means of an up-scaling method, the contribution to the total precipitable water vapor will be estimated.



Furthermore, a sub-meter GNSS receiver and a high accurate and stable barometer sensor have been installed at the Astronomical Observatory of Aras de los Olmos (around 90 km inland from the coast) to continuously monitor the Total Precipitable Water Vapor (TPW) column in the atmosphere.



Since January 17, 2017 the new GNSS receiver has been incorporated in the ERVA Network (Network of Reference Stations of Valencia). This station will support our studies through the estimation of the TPW once the station is included in the E-GVAP international project.

Collaboration Agreements

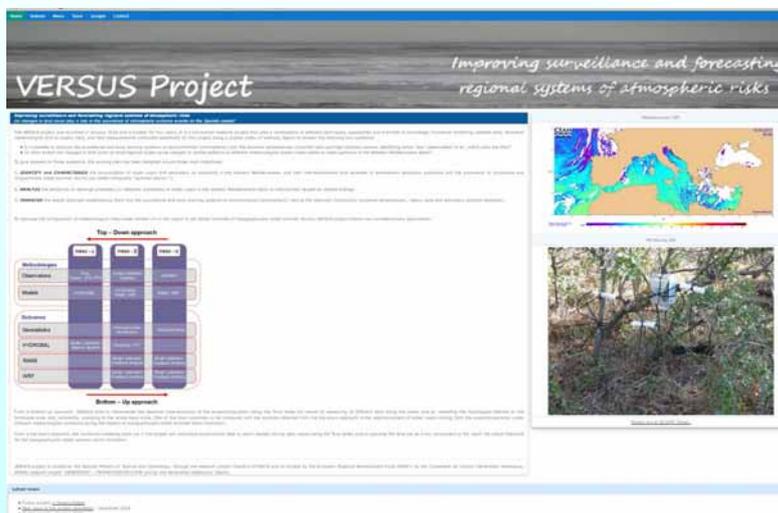
In the framework of the VERSUS project, CEAM has signed two collaboration agreements with the Astronomical Observatory of the University of Valencia (<http://www.pcu.v.es/en/instituto-de-investigacion/oauv>) and with the Valencian Cartographic Institute (<http://www.icv.gva.es>)

Thanks to these agreements VERSUS has been able to install the GNSS receiver at the Observatory facilities and also to get access to the ZTD (Zenital Total Delay) from GNSS ERVA Network to process the TPW on the vertical of the different receivers.

Last-minute News

VERSUS WebPage

<http://www.ceam.es/VERSUS>



Congress Presentations

1.- Palau J.L., Valiente J.A., Pastor F., Benetó P., Larsen E. and Chirino E. (2017) Assessing the Role of changes in Land Uses in the accumulation and feedback of water vapor and pollutants. Research Project: VERSUS.

Poster Presentation at: Joint Congress of the 6th International Conference on Meteorology and Climatology of the Mediterranean & Challenges in Meteorology 5 - 20-22 Feb. 2017, Zagreb (Croatia).
www.metmed.eu

2.- Pastor F., Valiente J.A., Palau J.L. (Submitted) Sea surface temperature in the Mediterranean: climatology, trends and spatial patterns. 10th HyMeX workshop 4-7 July 2017, Barcelona, Spain.
<https://www.hymex.org/?page=workshops>

Research question
Do land use changes play a role in the occurrence of atmospheric extreme events on the Spanish coasts?

Multidisciplinary approach
Bottom-up Approach | Top-down approach

Eco-hydrology
Vegetation characterization, measurements of Sap Flow, Soil Moisture, Temperature and Relative Humidity in six field plots (20m x 20m)
Modeling water balance with HYDROBAL
Elaborate detailed maps with information on land use in the Tuna basin
Extrapolate on-site water balance to estimate evapo transpiration for the whole basin

Meteorology
Simulation of base year (2015) with selected parametrizations
Simulation of periods with extreme weather events in 2015 using estimates from HYDROBAL
Comparison of simulations and analysis of the critical thresholds for triggering topographically-aided summer storms
Simulation of the base year considering land use changes at local and regional scales according to IPCC scenarios

Research goals
Identify "key" observables that trigger extreme weather events in the Western Mediterranean
Improve surveillance and early warning systems on atmospheric risks in the Tuna Basin
Assess the extent to which land use changes at local/regional scales can cause variations in rainfall patterns at different meteorological scales (meso- α to meso- γ) in the Western Mediterranean Basin

Publications

Palau J.L., Rovira F. and Sales M.J. (In press, accepted 2 March 2017) Satellite Observations of the Seasonal Evolution of Total Precipitable Water Vapour over the Mediterranean Sea. *Advances in Meteorology*.

<https://www.hindawi.com/journals/amete/aip/4790541/>