LISAH

Laboratoire d'étude des Interactions
Sol - Agrosystème - Hydrosystème

Postdoctoral Research Opportunity

Estimating soil available water content components by inversion of the STICS crop model over a vineyard watershed

Starting date: as soon as possible

We have one postdoctoral position (12 months) within the ANR RUEdesSOLS project (2014-2018): "Estimation of the soil Available Water Content by direct measurements and crop-model inversion, from the plot to the territory scales". The postdoctoral position will be devoted to the estimation of the components of the soil available water content (AWC) by inversion of the STICS crop model on vineyards. During the year 2015, an extensive experiment was conducted on the La Peyne vineyard watershed (southern France), including soil and plant monitoring over 15 vineyard plots, and acquisition of a large number of satellite images. Two types of remotely sensed variables will be tested in the inversion procedure: the leaf area index (LAI), derived from visible-NIR images, and the actual evapotranspiration (ETa) derived from visible-NIR and thermal infrared images.

The selected candidate will be in charge of the following points:

- to analyse the remotely sensed data (SPOT5-Take V, Landsat 7 & 8, ASTER) acquired during the 2015 campaign by comparison with the vegetation and soil measurements acquired at the plot scale
- to conduct and evaluate inversions of STICS on the monitored plots for estimating AWC components
- to conduct inversions of STICS on a large sample of non-monitored plots disseminated over the studied watershed
- depending on the progress of the work, to participate in the inclusion of AWC component estimates in digital soil mapping procedures
- to publish the results in scientific articles.

The candidate will work with Philippe Lagacherie, Laurent Prévot and Guillaume Coulouma at UMR LISAH, and in collaboration with Samuel Buis at UMR EMMAH (Avignon).

This position requires a PhD by the start date of employment in agronomy, environmental engineering or related fields. Preferred research skills and interest include knowledge of modelling of water transfers in the sol-plant continuum and/or crop modelling. Good computer programming skills (e.g. R or Matlab) are required.

To apply, please send letter of application detailing research interest and experiences, curriculum vitae, and names of references (with telephone numbers and email addresses). Please direct questions about the position to Philippe Lagacherie (philippe.lagacherie@inra.fr) and Laurent Prévot (laurent.prevot@inra.fr). For more information on the research group and project, please visit: https://www.umr-lisah.fr/ and https://www6.inra.fr/rue-des-sols

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References related to the position:

M. Galleguillos, F. Jacob, L. Prevot, A. French, and P. Lagacherie, 2011, "Comparison of two temperature differencing methods to estimate daily evapotranspiration over a Mediterranean vineyard watershed from ASTER data," *Remote Sensing of Environment,* vol. 115, pp. 1326-1340, 2011.

Sreelash K., Sekhar M., Ruiz L., Tomer S. K., Guérif M., Buis S., Durand P., and Gascuel-Odoux C., 2012, Parameter estimation of a two-horizon soil profile by combining crop canopy and surface soil moisture observations using GLUE, Journal of Hydrology, 456-457, pp.57-67.

Sreelash, K., Buis, S., Sekhar, M., Ruiz, L., Sat Kumar Tomer, Guérif, M., Estimation of available water capacity components of two-layered soils using crop model inversion: Effect of crop type and water regime, 2017, Journal of Hydrology, Vol. 546, 166-178