<u>**POSITION VACANCY ANNOUCEMENT (1YEAR CONTRACT)**</u>

The National Centre for Meteorological Research, CNRM (METEO-FRANCE & CNRS), is offering a 1-y scientist position in hydrometeorology modelling.

<u>***Place :***</u> CNRM, Toulouse, France (*http://www.umr-cnrm.fr*)

<u>***Application deadline :***</u> 29 May 2017

<u>***Starting dates/duration :***</u> September 2017 / 12 months.

<u>***Background***</u> :
In the frame of the collaborative work between the French weather service Météo-France and the hydrological service SCHAPI, enhanced soil moisture products will be first developed through a state-of-the-art hydrometeorological model driven by radar-based precipitation observations and then evaluated when used to initialise hydrological model forecasting.
The evaluation will concern fast responding watersheds of the French Mediterranean area that are subject to flash flooding. Initial soil moisture conditions are a key issue for the hydrological modelling over these catchments, for both event scale and continuous modelling. They are particularly crucial for very short forecast ranges (first hours of simulations).
The Soil Water Index (SWI) of the soil root layer simulated by the SIM model (SAFRAN ISBA MODCOU, Habets et al. 2008) is used to provide initial soil moisture conditions for many hydrological models in France. SIM is able to provide information all over France on a regular grid at 8-km horizontal resolution, which is rough compared to the size of fast responding Mediterranean watersheds.
Soil moisture maps at a higher resolution could allow to reduce the uncertainty that affects the knowledge of antecedent soil conditions for hydrological models dedicated to fast responding catchments. The objective of the present work is to assess the benefit of using this kind of sub kilometric maps for flash flood simulations.
Another approach is to sample the uncertainty on initial soil moisture conditions. For instance, slight perturbations of the initial soil moisture field allow to provide several *scenarii,* or an ensemble, of soil moisture maps to initialize hydrological models. Such a perturbation method has been developed at CNRM and can be applied for flash flood simulations purpose.

<u>***Work description***</u>:
The successful candidate will perform the following activities:
- The ISBA land surface model, which is coupled to a TOPMODEL approach within the ISBA-TOP coupled system for flash-flood modelling, will be run at high resolution (from 1km down to 250-300m) driven by radar-based rainfall observations to produce soil moisture fields at kilometric and sub-kilometric resolution.
- The higher-resolution soil moisture fields will be used as initial conditions of two hydrological distributed models (ISBA-TOP, MARINE) dedicated to simulation of flash-flooding over Mediterranean catchments.
- Various scores against observations will be computed to evaluate the benefit of using enhanced soil moisture products as initial conditions of the hydrological model simulations.
- A perturbation method recently developed at CNRM will be applied to the initial soil moisture conditions to provide an ensemble of soil moisture fields for the same flash-flooding events. They will be used to initialize the distributed hydrological models and the discharge ensemble produced will be assessed comparing to the deterministic simulated and the observed discharges.
- The writing of a scientific report related to the above activities. Although not mandatory, a research article could be prepared for submission to a peer-reviewed international journal.
The work will imply interactions with SCHAPI.

The appointment is for 1 year. The net salary will be around 2000 euros/month (according experience) before income tax.

Required qualifications and experience:
The candidate should have a PhD or an engineering degree in hydrology or atmospheric sciences.
Good programming and scripting skills (Fortran 90, Linux/Unix,...) is required.
An experience in hydrological modelling is recommended.
The applicant should be fluent in French or English.

Application
For full consideration, an application letter including a detailed statement of research interest, along with a CV (including past experience, computing skill and different language practise) and the names, telephone and email address of 1 or 2 referees should be sent by email to :
beatrice.vincendon@meteo.fr and veronique.ducrocq@meteo.fr