

Post-doctoral Research Fellowship at Météo France

RADAR QUANTITATIVE PRECIPITATION ESTIMATION AT S, C AND X-BAND

Application deadline: 31 March 2021

Location: Météo France Weather Radar Centre. The radar center is located at the météopole, about 6 km from Toulouse town centre (about 20 minutes by bike and 30 minutes by metro).

Duration/Start: An initial contract of 6-8 months will be offered depending on the starting date. The contract is renewable annually, one calendar year at a time, up to 4 times. Starting date is as soon as possible ideally 1st May 2021.

Salary: between 2.6 and 3.2 k€ net monthly depending on candidate experience.

Work description

Météo France (the French National Weather Service) is seeking a post-doctoral researcher to work 24 months on quantitative precipitation estimation at X, C and S band.

The amount of precipitation at the ground level is usually measured using rain gauges. Weather radars can provide high resolution estimations that better represent the fine structure of the precipitation but that are unfortunately less accurate. At Météo France, the radar estimation is obtained by combining measurements made at different elevation angles and projected to ground level using the vertical reflectivity profile (VPR). The data from each elevation angle is synchronized using an advection field and the weight given to each elevation depends on the corrections applied, the height of the radar beam and the age of the observations (Tabary et al, 2007). In convective situations, the use of dual polarization measurements has greatly improved the estimation of the highest rain rates (Figueras et al., 2013, Yu et al. 2018), but in stratiform situations the VPR correction remains a major source of uncertainties as illustrated in the following papers:

Impact of the Altitudinal Gradients of Precipitation on the Radar QPE Bias in the French Alps, D Faure, G Delrieu, N Gaussiat - Atmosphere, 2019.

Le Bastard, T., Caumont, O., Gaussiat, N., & Karbou, F. (2019). Combined use of volume radar observations and high-resolution numerical weather predictions to estimate precipitation at the ground: methodology and proof of concept. Atmospheric Measurement Techniques, 12(10), 5669-5684.

The main objective of the work will be to improve the QPE estimation by:

- Taking advantage of the overlap between the radars using radar 3D reflectivity composites.
- Using precipitation profiles from numerical model forecasts.
- Incorporating high resolution radar measurements from bird bath scans.

- Adapting the VPR correction to the type of precipitation and microphysical signatures.
- Assessing the rain rate estimation uncertainty and using it to tune the radar – radar compositing weights.

The selected post-doc student will join an enthusiastic team of about 15 people including several other talented post-docs working full time on radar R&D.

Required qualification

Applicants should have a Ph.D. in Meteorology or Radar Remote Sensing. Knowledge of polarimetric radars and related algorithms is considered extremely important. Applicants should be fluent in oral and written English. Knowledge of French would be an advantage. A good knowledge of UNIX / LINUX and of programming languages (C, C++) is required. Experience with PYTHON, R or similar is highly recommended. The work will be supervised by Dr. Nicolas Gaussiat (Météo France, Toulouse, France). This job is offered with no restriction on age, sex or nationality, in accordance with French law.

Applicants should send:

- a letter of interest,
- a curriculum vitae (resume + list of publications),
- date of availability,
- names, fax numbers, e-mail and post addresses of two references to:

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