

POST-DOCTORAL APPLIED RESEARCH FELLOWSHIP IN THUNDERSTORM SYSTEMS NOWCASTING

Affiliation and location : Nowcasting Development Group, Forecasting Department, Météo-France, Toulouse, France

Application deadline : 15 December 2006

Dates/duration : 12 months possibly extended by one 6 months time periods, starting March 1st, 2007.

Context : This position is proposed in the framework of a Météo-France's contribution to the European Union R&D Framework Programme #6 "FLYSAFE " Integrated Project. FLYSAFE, an Aeronautics & Space priority project, aims at improving aircraft safety and security by developing the Next Generation Integrated Surveillance System. The contribution of Météo-France addresses mainly the meteorological risk and the present proposition is focused on thunderstorm nowcasting by non-linear extrapolation; **the objective is to anticipate by a few tens of minutes the changes in the thunderstorms systems overall activity in a semi-quantitative way.** The method will be based on radar reflectivity and Doppler data, advanced fine-scale dynamics retrieval, meso-scale environment description, and must be adequate for real-time (~every 5 to 15 minutes) provision of nowcasts; this precludes the use of high resolution modelling as the main forecast method. Emphasis is put on conditions where orographic forcing is not the main driving mechanism.

Work description : The candidate will have :

1. To undertake case studies of convective situations documented by 3D high resolution radar reflectivity data and wind retrievals from multiple-Doppler measurements (Bousquet et al., 2006), and by LAM simulations; this case studies will help to assess the real-time usefulness of the fine scale wind retrievals in diagnosing the trend in thunderstorm systems activity, when combined with environmental diagnostics such as instability and low-level moisture fields
2. Based on the first task, to design, develop and test a method for an automated , non-linear, nowcasting of pre-existing thunderstorm systems, using a combination of radar reflectivity observations and of the trend derived from the other data sources quoted above (see e.g., Megenhardt et al., 2004). Anticipating the onset of new convective structures is out of the scope.
3. Time permitting, to extend the study to the use of diagnostics derived from pre-existing realistic high resolution (1-3 km) simulation of convective cases, from the MesoNH and/or Arome models; this could include applying the time-evolution of simulated thunderstorm systems to observed ones after a relevant matching (see e.g. Wilson and Xu, 2006)

The successful candidate will join a team having experience in the development of thunderstorm nowcasting using various observation data sources such as satellite, radar; lightning data. (e.g. : Autones et al. 2005, Brovelli et al. 2005, Hering et al, 2006). He will also work in co-operation with engineers and scientists involved in the development of advanced use of radar data (Bousquet et al., op cit).

Required qualification :

1. Education :
 - a. A PhD in geosciences or related fields is required at time of beginning of contract.
 - b. Research and/or practical experience in deep convection is recommended.
 - c. Experience in thunderstorm nowcasting is welcome.
2. Language

- a. Ability to read, write, speak, English is necessary for an insertion in the international dimension of the project and for access to and production of the project documentation.
- b. A basic ability in French is recommended.

The candidate will be based in Météo-France at Toulouse (possibility of on site lodging). The salary will be around 2 300 euros per month (before income tax).

Application : For full consideration, an application letter including a detailed statement of research interest and computer literacy, along with a Curriculum Vitae, a publication list and recommendation letters(s) (incl. telephone and email address of the referee) should be sent by email to : Stephane.Senesi@meteo.fr, and Patrick.Josse@meteo.fr

Contact information :

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References :

Autones, F., S. Sénési, C. Morel, Y. Guillou , 2005 : Tuning the Rapid Developing Thunderstorm Product for Meteosat Second Generation, and Comparing to GOES-EAST and to RAPID Scan Service. Proceedings, WMO Symposium on Nowcasting and Very Short Range Forecasting, Toulouse, France. <http://www.meteo.fr/cic/wsn05/DVD/resumes/longs/2.02-70.pdf>

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Hering, A.M.; Germann, U.; Boscacci, M.; Sénési, S, 2006 : Operational thunderstorm nowcasting in the Alpine region using 3D-radar severe weather parameters and lightning data, ERAD 2006, Barcelona, Spain, <http://www.grahi.upc.edu/ERAD2006/proceedingsMask/00122.pdf>

Bousquet, O.; Tabary, P.; Parent du Chatelet, J.; Watrelet, E.; Montmerle, T., 2006 : A radar-model coupled approach to produce real time high resolution 3-D wind fields over Paris' major airports in the context of the FLYSAFE project , ERAD 2006, Barcelona, Spain, <http://www.grahi.upc.edu/ERAD2006/proceedingsMask/00091.pdf>

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