# Cloud radiative forcing over West Africa

This **12-month** postdoc is funded by the EU project EUCLIPSE and will take place at the Mesoscale Meteorology Group of Météo-France / CNRM-GAME, in Toulouse (France).

Expected starting date is approximately **November 1<sup>st</sup>, 2011**. Applications should be sent by email to Dominique Bouniol (dominique.bouniol@meteo.fr), Françoise

Guichard (<u>francoise.guichard@meteo.fr</u>) and Fleur Couvreux (<u>fleur.couvreux@meteo.fr</u>) no later than **September 1<sup>th</sup>, 2011**.

Net salary of the successful applicant will range from 2500 to 3000€/m, depending on experience.

### General Information:

The « Centre National des Recherches Météorologiques » (CNRM) is the research center of Meteo-France, the French weather service. To carry out its missions, CNRM hosts approximately 275 permanent positions (one third being research scientists), and about 60 students and visitors. The mesoscale meteorology group, GMME, leads studies (experimentally and numerically) on mesoscale and microscale processes of the atmosphere and its interfaces. Research topics are cloud physics, boundary layer, soil-vegetation-atmosphere transfers, remote-sensing of continental surfaces, mesoscale predictability, high-impact weather events and climate change impacts. Research seeks to improve the representation of the mesoscale processes within numerical weather prediction and climate models through development and improvement of physical parametrizations.

### The projects:

The **EUCLIPSE** project is an international effort, funded under the Framework Program 7 of the European Union, designed to improve the evaluation, understanding and description of the role of clouds in the Earth's climate with a focus on the cloud feedback in a warming climate. The central objective of EUCLIPSE is to reduce the uncertainty in the representation of cloud processes and feedbacks in the new generation of Earth System Models (ESMs), in support of the IPCC's fifth assessment report. In this framework, dedicated studies will take place at specific sites around the globe among which eleven in West Africa corresponding also to instrumented sites of the AMMA project. Further information can be found on <a href="http://www.euclipse.eu/">http://www.euclipse.eu/</a>

#### Description of work:

The cloud field over West Africa displays marked meridional and vertical structures (Bouniol et al. 2011). It is dominated by the occurrence of a few distinct cloud types. Surface radiative forcing of these different cloud categories have been estimated at the Niamey (Niger) site using data from one monsoon season. This analysis will be extended further. First, the successful applicant will refine these estimates using a radiative transfer code and existing data sets. Special care will be given to better discriminate between cloud and aerosol radiative impacts. Then, the approach will be applied to other selected sites within West Africa. The behaviour of the estimated cloud radiative forcing will be assessed through comparison with ground-based measurements provided through the AMMA project and against satellite data sets. This work is expected to provide a new, comprehensive, observationally-based cloud diagnostic tool for an in depth evaluation of ESMs.

So, the cloud radiative forcing will then be carried out with ESM profiles extracted at the various sites (cf. CFMIP). First, the simulated cloud vertical structure, amount and frequency of occurrence will be assessed on different time scales (from diurnal to annual).

Cloud properties (overlap, microphysical and radiative properties) assumed within the various ESM will also be evaluated.

Finally, high-frequency simulated temperature and water budgets will be used to further identify the mechanisms linking the simulated clouds, the physical processes and the properties of the environment. Their relevance with respect to the observations will be analysed.

## Required qualifications

The candidate should hold PhD degrees and experience in cloud physics and/or radiative transfer modelling. Experience with satellite and/or ground-based measurements would be greatly appreciated. Good programming skills (especially FORTRAN90 or C, Unix shell) are required. Knowledge of PV-WAVE, Ferret or GMT is an advantage. Fluency in English is necessary.

Applicants should send to <u>dominique.bouniol@meteo.fr</u>, <u>francoise.guichard@meteo.fr</u> and <u>fleur.couvreux@meteo.fr</u>:

[1] a curriculum vitae (including research experience, publications and conferences, computing skills and different language practice...)

[2] a brief statement of research interests

[3] names and contact details (email + telephone number) of three referees