

Research ingeneer

Satellite data merging for documentation of tropical Mesoscale Convective Systems over their life cycle

This **12-month**, renewable, position is funded by the CNES in the framework of the Megha-Tropiques mission and will take place at the Mesoscale Meteorology Group of CNRM, Météo-France / CNRS, in Toulouse (France).

Expected starting date is September 1<sup>st</sup>, **2018**.

Applications should be sent by email to Dominique Bouniol ([dominique.bouniol@meteo.fr](mailto:dominique.bouniol@meteo.fr)), Rémy Roca ([remy.roca@legos.obs-mip.fr](mailto:remy.roca@legos.obs-mip.fr)) and Thomas Fiolleau ([thomas.fiolleau@legos.obs-mip.fr](mailto:thomas.fiolleau@legos.obs-mip.fr)) no later than June 20<sup>th</sup>, **2018**.

Net salary of the successful applicant will range from 2000 to 2600 €/month, commensurate with experience.

General Information:

The « Centre National des Recherches Météorologiques » (CNRM) is a joined research center of Meteo-France, the French weather service, and CNRS. 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 Megha-Tropiques mission is a joined french-indian (CNES/ISRO) mission launched in october 2011. The mission payload associates three radiometric instruments (ScaRaB, MADRAS and SAPHIR) allowing to observe simultaneously three interrelated components of the atmospheric engine: water vapour, condensed water (clouds and precipitations), and radiative fluxes.

Scientific objectives of this mission are :

- to improve the knowledge of the water cycle in the intertropical region, to evaluate its consequences on the energy budget.
- to study the life cycle of tropical convective systems over ocean and continents, the environmental conditions for their appearance and evolution, their water budget, and the associated transports of water vapor.

Description of work:

Mesoscale convective systems are the major source of rain in the Tropics. Megha-Tropiques mission aims at improving the documentation of the life cycle of these systems thanks to its slanted orbit. Complementary measurements are provided by other satellite missions like geostationary satellites or polar orbiting missions like the A-Train or TRMM for instance. Tracking algorithms of Mesoscale convective systems are available in the Megha-Tropiques group and have been applied to the archive of geostationary images in order to build global and regional archives of Tropical Mesoscale Convective System characteristics at regular time steps.

The purpose of this position is to take advantage of the synergy between the different measurements and derived physical products from orbiting satellites in order to build physical composites of physical properties over the Mesoscale Convective System life cycle.

The final aim is to provide to the Megha-Tropiques mission group elaborated physical diagnostics on the processes involved in Mesoscale Convective System life cycle. Cross-evaluation of the different physical parameters available from the different satellite missions will be performed.

Merging data from different origin whether from instruments with different spatial resolutions, different swaths or from different orbiting satellites generally involves a sub-sampling of the MCS sampled within geostationary infrared images. For each new synergetic products, one will seek to characterize the MCS sub-sample in term of MCS size, life duration, sampling hour...

Throughout the product development a particular attention will be given to product versioning and documentation .

The work will also proceed in close collaboration with researchers and developpers of the Megha-Tropiques

group in order to feed the understanding of Mesoscale Convective Systems life cycle as well as their impact at larger scale. More information can be found at <http://megha-tropiques.ipsl.polytechnique.fr>.

Required qualifications:

The candidates should hold PhD degrees in geophysics or a "Ecoles d'Ingenieurs" diploma and experience in data processing, statistical analysis and diagnostic building. Experience with large data sets (in particular spaceborne measurements) would be appreciated as well as knowledge in convective processes especially in the Tropics.

The successful candidate should be a quick-starter and able to work on multiple tasks and be able to find innovative solutions when needed.

Good programming skills (C/Fortran and visualization tools) are required. A minimal proficiency in linux is needed.

Good level in English is necessary for reading and writing technical product documentation.

Applications should be send to [dominique.bouniol@meteo.fr](mailto:dominique.bouniol@meteo.fr), [remy.roca@legos.obs-mip.fr](mailto:remy.roca@legos.obs-mip.fr) and [thomas.fiolleau@legos.obs-mip.fr](mailto:thomas.fiolleau@legos.obs-mip.fr) including a resume, a brief statement of interests and the name and contact details of two referees.