

VN 22/18 Research Fellowship at CNR-ISAC

The Research Fellow will join the remote sensing team at the Institute of Atmospheric Sciences and Climate (ISAC) of the National research Council of Italy in Rome.

The team has a long lasting experience in the development of retrieval algorithms for precipitation rate estimation from passive microwave (PMW) sensors on board Low Earth Orbit (LEO) satellites and in radiative transfer modeling through precipitating clouds devoted to the analysis and interpretation of remote sensing measurements from different platforms. Within the EUMETSAT H-SAF program (<http://hsaf.meteoam.it>) CNR-ISAC is responsible for the development of the Level 2 precipitation rate products for all available PMW radiometers and for the future EPS-SG Microwave Sounder (MWS) and Microwave Imager (MWI). These products, designed as the main operational instantaneous precipitation rate products for the full EPS-SG program, are based on machine-learning based precipitation retrieval techniques developed at CNR-ISAC, and on dedicated studies on Passive Microwave (PMW) snowfall detection and estimation.

The main goal of this fellowship is to develop a multi-platform algorithm that provides a complete retrieval of hydrometeors and surface conditions (i.e., snow cover, sea ice, snow water path, snowfall rate, ice water content) with a focus on the high latitudes. This research activity will build on past developments and experience gathered at CNR-ISAC, and on the connections and collaboration between the EUMETSAT H SAF and NWC SAF on EPS-SG Level 2 precipitation products foreseen during the CDOP-4 (2022-2027).

The long-term objective is to be able to combine observations from Copernicus Imaging Microwave Radiometer (CIMR), MWI and ICI PMW sensors into a multi-input (brightness temperatures and model-derived ancillary atmospheric state variables) and multi-output (e.g., snowfall rate, sea ice concentration, snow cover radiative properties) machine learning algorithm (e.g. a neural network). This work is first step toward the development of the next operational satellite products of precipitation and surface variables for high latitude regions.

Duties

- Preparation of the
- Development of the



LOCATION
Rome, Italy



QUALIFICATIONS
University degree in
Physics,
Mathematics,
Meteorology,
Remote Sensing, or
equivalent, and
relevant research
experience, at PhD
level.



LANGUAGES
Candidates must be
able to work
effectively in
English, both
verbally and written.
Good working
knowledge of the
Italian language
(spoken and
written) is an
advantage.



DEADLINE
30 August 2022

dataset to be used for the study and for the retrieval algorithm development. It will be based on the simulations of a radiative transfer model (Atmospheric Radiative Transfer Simulator - ARTS).

- Development and analysis of a series of case studies analyses in order to assess the impact of different atmospheric and surface conditions on the observations;

machine learning-based algorithm to characterize the relevant parameters (i.e., snow cover and sea ice, snow water path, snowfall rate, ice water content, presence of supercooled droplets) with focus on the high latitudes;

- Implementation of data mining techniques to find the most relevant parameters (gradient boosting variable importance approach and/or SHAP method);
- Publication and presentation of results (conferences, meetings, journals).

Skills and Experience

- The Fellow should have a university degree in Physics, Mathematics, Meteorology, Remote Sensing, or equivalent, and relevant research experience, at PhD level;
- Candidates must be able to work effectively in English, both verbally and written. Good working knowledge of the Italian language (spoken and written) is an advantage;
- Experience in satellite data analysis and/or machine learning documented by scientific publications is highly desirable;
- Experience in working with ARTS and/or with large data sets applying statistical methods is desirable.
- Good knowledge of scientific programming (C/C++, Python, Matlab, R) and experience with statistical packages (e.g XGBoost, Keras, scikit-learn etc.) are significant assets;
- The ability to work as part of a team, a high level of commitment and interest in continuing education/training is required.

Employment Conditions

The initial contract will be of 4 years' duration, with subsequent 5 year contracts being awarded thereafter, subject to individual performance and organisation requirements. There is no limit to the amount of follow-up contracts a staff member can receive up to the EUMETSAT retirement age of 63 and there are certainly opportunities to establish a long career perspective at EUMETSAT.

This post is graded A2/A4 on the EUMETSAT salary scales. The minimum basic salary for this post is EURO 5,363 per month (net of internal tax but excluding pension contribution and

insurances) which may be negotiable on the basis of skills and experience. The salary scale provides for increments on the anniversary of taking up employment, and scales are reviewed by the EUMETSAT Council with effect from 1 January each year. In addition to basic salary, EUMETSAT offers attractive benefits. Further information, including salary details, is available on the EUMETSAT web site.

EUMETSAT is committed to providing an equal opportunities work environment for men and women.

Please note that only nationals of EUMETSAT Member States may apply. The EUMETSAT Convention requires that Staff shall be recruited on the basis of their qualifications, account being taken of the international character of EUMETSAT.

About EUMETSAT

EUMETSAT is Europe's meteorological satellite agency. Its role is to establish and operate meteorological satellites to monitor the weather and climate from space - 24 hours a day, 365 days a year. This information is supplied to the National Meteorological Services of the organisation's Member States in Europe, as well as other users worldwide.

EUMETSAT also operates several Copernicus missions on behalf of the European Union and provide data services to the Copernicus marine and atmospheric services and their users.

As an intergovernmental European Organisation, EUMETSAT has 30 Member States (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.)

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