



## Research Engineer position at CNRM-CEN, Grenoble, France Design and implementation of a new physical snow model

### General information:

- Workplace: Centre d'Etudes de la Neige, Grenoble, France
- Contract from ERC Starting Grant project IVORI
- Duration: 12 months (possibility of a longer contract to be discussed)
- Expected date of employment: 01 March 2021
- Deadline for application: 15 January 2021
- Work proportion: 100%
- Salary will be provided according to Météo-France salary rates and depends on the background of the retained candidate. For example, the gross monthly salary is about 2552€ for an engineer with 1-2 years experience.
- Desired level of education: master or equivalent, PhD is not mandatory but considered as a plus
- Contact: [marie.dumont@meteo.fr](mailto:marie.dumont@meteo.fr) , [bavay@slf.ch](mailto:bavay@slf.ch)

*Interested in this position? please send CV and motivation letter to the contact persons.*

### Context:

The position is part of the ERC starting grant project IVORI, starting in February 2021 (5 years project). IVORI's goal is to build a microstructure-based snow-firn model encompassing all the relevant snow and firn physical variables to improve the modeling of seasonal and perennial snow. Drawing on advanced observations of snow and firn, the proposal has three objectives:

- (1) Understand the role of water vapour transport in snow and its subsequent impacts on the ground thermal regime governing permafrost evolution;
- (2) Understand how initial changes in surface snow microstructure are transferred deeper into the firn and affect ice core records;
- (3) Determine the contributions of snow-climate feedbacks, triggered by changes in the albedo and insulating capacity of snow to the past and future of snow cover and ground temperature.

### Activities

The engineer will be in charge of the design of the 1D snow model. The design should allow the model to be as modular as possible and will be based on a core module. The core module will include the governing equations. The model will be wrapped in Python. The details of the physical governing equations and numerical schemes will be the task of a post-doctoral position that will work closely with the engineer.

Marie Dumont (CNRM/CEN) and Mathias Bavay (WSL/SLF) will supervise the work. The position will take place at CNRM/CEN in Grenoble, France but short visits in SLF, Davos, Switzerland are to be expected. The position will benefit from the computing facilities of Météo-France including the HPC facilities. It will also benefit from a motivating scientific environment in the context of the research project ERC IVORI about snow. Intense collaborations are expected with Matthieu Lafaysse at CNRM/CEN and several other laboratories: IGE (Grenoble, France), WSL/SLF (Davos, Switzerland).

The CNRM is the research center of Météo-France, it is a joint unit of the CNRS. With about 230 permanent staff, its mission is to develop the knowledge and tools that Météo-France needs to produce its forecasts of weather, air quality or climate. One of the six units forming the CNRM, the CEN, focuses on the study of snow. With about 25 permanent staff, CEN has been involved for many years in the snow modelling.

### **Skills**

This job requires strong skills in computing sciences, code design and numerical modeling (Python, C++ and Fortran). A general interest in the cryosphere and experience in modelling of physical processes such as phase change, heat diffusion, are assets. Skills for writing documentation, work organization and work independently are also required.