Post-doctoral position at CNRM-CEN
Regional modelling of the effect of light absorbing particles on snow evolution

General information :

- Workplace: Centre d'Etudes de la Neige, Grenoble, France
- Contract from ERC Starting Grant project IVORI
- Duration: 12 months
- Expected date of employment: 1 May 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 growth monthly salary is about 3280€ for 1-2 years research experience after PhD.
- Desired level of education: PhD and at least one year of post-doc
- Contact: marie.dumont@meteo.fr matthieu.lafaysse@meteo.fr

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 groundthermal 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

Light absorbing particles (LAPs) such as soot or mineral dust are known to darken the snow surface when deposited on the snow cover. This darkening of the snow surface increases the amount of solar energy absorbed by the snowpack, leading to enhanced metamorphism and potentially faster melt. The presence of LAPs in snow triggers and amplifies several snow albedo feedbacks, drastically modifying the snowpack evolution and the snow cover duration. Mineral dust deposition on snow is generally more event-driven than soot deposition and usually exhibit a high inter and intra-annual variability.

This work aims at quantifying the role of Saharan dust deposition on the snow cover evolution in the Alps and the Pyrenees. The work will primarily focus on the past period since 1979, but future projections are also envisioned. The deliverables are the quantification of one of the major snow-climate feedbacks to account for in the IVORI project.

The work will be supervised by Marie Dumont (CNRM / CEN) and Matthieu Lafaysse (CNRM/CEN). The position will take place at CNRM/CEN in Grenoble, France. 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 microstructure and modelling. Intense collaborations are expected with CNRM/GMGEC, IGE (Grenoble, France) and NOAA/GFDL (USA).

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 and observations.

Skills

This job requires interest and recognized skills in snow physics, numerical modelling (good knowledge of Git, Fortran90 and python) and snow remote sensing. Any previous experience on snow modelling and light absorbing impurities is beneficial to the application. It requires an interest for team work. Fluency in written and spoken English is required. Skills for writing scientific papers, work organization and work independently are required.