



**FICHE NAVETTE : Chercheurs IDEX (hors doctorants)**

**SECTOR:** Higher Education Institution

**INSTITUTION:** Univ. Grenoble Alpes, University of Innovation

One of the major research-intensive French universities, Univ. Grenoble Alpes\*\*1 enjoys an international reputation in many scientific fields, as confirmed by international rankings. It benefits from the implementation of major European instruments (ESRF, ILL, EMBL, IRAM, EMFL\*2). The vibrant ecosystem, grounded on a close interaction between research, education and companies, has earned Grenoble to be ranked as the 5th most innovative city in the world. Surrounded by mountains, the campus benefits from a natural environment and a high quality of life and work environment. With 7000 foreign students and the annual visit of more than 8000 researchers from all over the world, Univ. Grenoble Alpes is an internationally engaged university.

A personalized Welcome Center for international students, PhDs and researchers facilitates your arrival and installation.

In 2016, Univ. Grenoble Alpes was labeled «Initiative of Excellence ». This label aims at the emergence of around ten French world class research universities. By joining Univ. Grenoble Alpes, you have the opportunity to conduct world-class research, and to contribute to the social and economic challenges of the 21st century ("sustainable planet and society", "health, well-being and technology", "understanding and supporting innovation: culture, technology, organizations" "Digital technology").

\* ESRF (European Synchrotron Radiation Facility), ILL (Institut Laue-Langevin), IRAM (International Institute for Radio Astronomy), EMBL (European Molecular Biology Laboratory), EMFL (European Magnetic Field Laboratory)

**Key figures:**

- + 50,000 students including 7,000 international students
- 3,700 PhD students, 45% international
- 5,500 faculty members
- 180 different nationalities
- 1st city in France where it feels good to study and 5th city where it feels good to work
- ISSO: International Students & Scholars Office affiliated to EURAXESS

**LOCATION :** France, Grenoble, Institut des Géosciences de l'Environnement

**MANDATORY REFERENCES:**

CDP TITLE: Trajectories

JOB PROFILE (Title): High-impact climate events in a changing climate

**RESEARCH FIELD (cf mots clefs sur Euraxess Jobs): Environmental Sciences; Geosciences; Computer Sciences; others**

**RESEARCHER PROFILE:**

- *Established researcher (Researchers who have developed a level of independence)*

---

<sup>1</sup> Univ. Grenoble Alpes

## **JOB PROFILE (Description):**

### **Main objectives of the work:**

High-Impact (climate) Events (HIE) such as floods, windstorms, hot waves, etc. are highly destructive natural hazard causing widespread impacts on socio-ecosystems (e.g. life loss, damage to infrastructure and crops, economic deprivation). In the context of climate change, the frequency and intensity of these events are expected to change, which constitutes an increasingly relevant issue for the public and insurance companies. However, processes leading to such events are still poorly understood, which limits reliable prediction. This remains a priority challenge for the scientific community and stakeholders (IPCC reports, 2013 and Future Earth program).

This postdoc position proposes to improve the prediction of such events through an in-depth understanding of the triggering atmospheric processes and their use as predictors. The study will focus on the Arve catchment area.

### **Objective 1: Identify and analyse the atmospheric processes under which High-Impact Events (HIE) have occurred in the past (1850-2015)**

- Focus on HIE defined in WP1

In WP1, HIE will be identified based on observations, historical impacts, and societal perceptions as defined by stakeholders and other partners of the Trajectories project (e.g. What is the minimal discharge for which a hydrological event is considered as highly impacting for society? What are the wind characteristics for which a wind event is considered as highly impacting for the forestry community? etc.)

- Analysis of past HIE in climate reanalyses and MAR outputs (1850-2015)

Atmospheric conditions will be analyzed from climate reanalyses and outputs from the atmospheric regional model MAR (c.f. Trajectories sub-project from Gallee et al.). The analysis of model outputs will allow a deeper understanding of the atmospheric processes involved.

### **Objective 2: Identify atmospheric predictors (1850-2015)**

- Atmospheric features that can be used as predictors will be selected using the ANALOG method on climate reanalyses and model outputs. This method identifies all days showing atmospheric conditions similar to the ones associated with the identified HIE. The atmospheric features of the days which preferentially lead to HIE will be retained as predictors.

### **Objective 3: Estimate the evolution of these HIE through time (1950-2050)**

- The atmospheric conditions simulated in the MAR scenario will be used as atmospheric predictors to create a new climate index. The HIE index quantifies the probability for a HIE to occur through time, and hence, allow to evaluate how it may change in the future.

### **Deliverables**

- Focused analyses (important variables and key diagnostics) of the atmospheric situations associated with the HIE of interest (1850-2015).

- Set of atmospheric predictors for the HIE of interest.

- Recurrence of HIE in the future (1950-2050).

### **5 references to support the work**

- Bichet A., D. Folini, M. Wild, and C. Schaer (2014). Enhanced Central European summer precipitation in the late 19th century: a link to the Tropics. *Quarterly Journal of the Royal Meteorological Society*, 140, 111-123.

- Chardon J., B. Hingray, A.-C. Favre et al. (2014). Spatial similarity and transferability of analog dates for precipitation downscaling over France. *Journal of Climate*, 27(13), 5056-5074.

- IPCC (2013) *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth, Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley(eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

- Mélo A., B. Wilhelm, Ch. Giguët-Covex, et al. (2015). Construire une chronique d'inondations : événements hydrologiques et histoire climatique dans le bassin de l'Arve (Alpes du Nord, France) entre les XVIIIe et XXIe siècles. Dans: *L'homme et son environnement : des lacs, des montagnes et des rivières. Bulles d'archéologie offertes à André Marguet* (ed. P.J. Rey et A. Dumont). *Revue Archéologique de l'Est* : 407-416

- Wilhelm B., F. Arnaud, P. Sabatier, O. Magand, E. Chapron, T. Courp, K. Tachikawa, B. Fanget, E. Malet, C. Pignol, E. Bard, J.J. Delannoy (2013). Paleoflood activity and climatic changes over the last 1400 years from lake sediments of the NW European Alps. *Journal of Quaternary Science* 28(2): 189-199.

**Required languages:** *French - English*

**TYPE of CONTRACT:** temporary

**JOB STATUS:** full time

**Hours per week:** 35

**Offer starting date:** 1 October 2017

**Application deadline:** 31 August 2017

#### **ELIGIBILITY CRITERIA**

Applicants:

- must hold a PhD degree or have a university degree equivalent to a European PhD (8-year duration),
- must have a background in atmospheric sciences; regional climate modeling.

Applicants must send their last diploma, their cv to Bruno Wilhelm and Sandrine Anquetin prior to the deadline. Letters of recommendation are welcome.

Address to send the application form:

[Bruno.wilhelm@univ-grenoble-alpes.fr](mailto:Bruno.wilhelm@univ-grenoble-alpes.fr)

[Sandrine.anquetin@univ-grenoble-alpes.fr](mailto:Sandrine.anquetin@univ-grenoble-alpes.fr)

#### **Selection procedure**

Application deadline: **31 August 2017** at 1200 (CET)

Applications will be evaluated through a three-step process:

1. Eligibility check of applications in September 4th 2017
2. 1st round of selection: the applications will be evaluated by a Review Board in September 5<sup>th</sup> 2017. Results will be given in September 5<sup>th</sup> 2017.
3. 2nd round of selection: shortlisted candidates will be invited for an interview session in Grenoble on September 8th 2017.

**CO-FINANCEMENTS** : préciser en cas de Co financements l'institution partenaire et la durée du co-financement.