Farid Ait-Chaalal, PhD French and British citizen

Contact Information

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Profile

Senior climate and weather risk expert and Director at Moody's Analytics, leading catastrophe model development for European and North American weather perils in the (re)insurance sector.

Expertise in atmospheric dynamics, climate science, statistics and quantitative risk modelling, with experience leading multidisciplinary scientific teams and developing innovative approaches to catastrophe risk modelling.

Previously a climate dynamics researcher at ETH Zürich and Caltech. PhD in Atmospheric and Oceanic Sciences from McGill University, Canada; engineering graduate of École Polytechnique, France.

Work experience

05.2016 - present

Moody's Analytics (Insurance Solutions, ex-RMS), London, UK
Director *(07/2025 - present); Associate Director (10/2023 - 06/2025); Principal modeller (12/2021 - 09/2023); Lead modeller (12/2018 - 11/2021); Senior modeller (11/2017 - 11/2018); Modeller (05/2016 - 10/2017)*

- Lead the development of catastrophe model hazard for mid-latitude weather perils across Europe and North America.
- Lead the European windstorm peril, coordinating multidisciplinary scientific and client-facing teams and driving the successful delivery of several market-leading catastrophe models and products.
- Lead, mentor and develop a multidisciplinary team of scientists.
- Research climate variability, climate change and cross-peril correlation to support clients and drive innovation in catastrophe modelling.
- Contributed to the development of drought hazard assessment frameworks tailored to financial-sector applications.

01.2014 - 03.2016

ETH, Zürich, Switzerland
Postdoctoral research associate in climate dynamics

- Investigated novel mathematical approaches to compute climate statistics.
- Conducted fundamental research in atmospheric dynamics via numerical modeling and theoretical physics.
- Maintained and updated high-performance atmospheric general circulation models on supercomputing clusters.

12.2011 - 12.2013

California Institute of Technology, Pasadena, California, USA
Brown University, Providence, Rhode Island, USA
Joint postdoctoral position in climate dynamics and theoretical physics

- Conducted theoretical climate research (Research group relocated from Caltech to ETH Zürich in 2013).

09.2006 - 12.2011

McGill University, Montreal, Quebec, Canada
Graduate research position in atmospheric sciences

- Applied statistical approaches to evaluate chemical reactions in chaotic fluid dynamics.
- Developed numerical algorithms to compute chemical reaction rates in turbulent flows.

Technical skills

Domain & Modelling: Expert in atmospheric dynamics, climate and climate change science, catastrophe modelling and risk management. Advanced mathematical and statistical analysis, and machine learning/AI methods, including downscaling.

Programming & Infrastructure: Advanced Linux, R and Fortran; experience with Python. Extensive experience with High-Performance Computing (HPC), large datasets and Large Language Models (LLMs).
Languages: French (native), English (fluent), Spanish (elementary), German (elementary).
Certification: RMS CCRA® (Certified Catastrophe Risk Analyst).

Education

McGill University, Montréal, Canada

02.2007 - 11.2011 **Doctor of Philosophy**, *Atmospheric and Oceanic Sciences*
"Bimolecular Chemical Reaction in a Two-Dimensional Navier-Stokes Flow"

Dissertation awarded top 10% and top 25% marks by examiners.

09.2005 - 01.2007 **Master of Science**, *Atmospheric and Oceanic Sciences*
Transferred to PhD program in 2007 (GPA 3.8/4.0)

Coursework: Geophysical fluid dynamics, ocean dynamics, turbulence, climate dynamics, synoptic meteorology, mathematical statistics.

Ecole Polytechnique, Palaiseau, France

09.2004 - 06.2005 **Master of Science & "Diplôme d'ingénieur de l'Ecole Polytechnique"**
Majors in fluid mechanics and Earth sciences.

09.2002 - 08.2004 **Bachelor of Science**
Mathematics, applied mathematics, physics, mechanics, computer science.

Selected Publications

M. Ali, F. Ait-Chaalal, S. Gururani, and A. Dobbin, 2026: **LASDM: A Linear Attention based Hybrid CNN-Transformer for Snow Downscaling**, Under review.

L. Novak, T. Schneider, and F. Ait-Chaalal, 2020: **Midwinter suppression of storm tracks in an idealized zonally symmetric setting**, Journal of the Atmospheric Sciences, **77**, 297–313.

F. Ait-Chaalal, T. Schneider, B. Meyer and JB. Marston, 2016: **Cumulant expansions for atmospheric flows**, New Journal of Physics, **18**, 025019.

F. Ait-Chaalal and T. Schneider, 2015: **Why eddy momentum fluxes are concentrated in the upper troposphere**, Journal of the Atmospheric Sciences, **72**, 2744–2761.

F. Ait-Chaalal, M.S. Bourqui and P. Bartello, 2012: **Fast chemical reaction in two-dimensional Navier-Stokes flow: initial regime**, Physical Review E, **85**, 046306.

Interests

- Member of the Board of *Climanosco*, a Swiss non-profit association providing free public access to state-of-the-art climate science (2016 - present).
- Outdoor sports including long-distance and trail running, cycling, climbing, ski touring and mountaineering.
- Photography, with a focus on nature, urban landscapes, architecture, street photography and travel. Portfolio: www.faridaitchaalalphoto.com