Federico Covi

Curriculum Vitae

federico.covi@cmcc.it
Centro Euro-Mediterraneo sui Cambiamenti Climatici
Viale Carlo Berti Pichat, 6/2, 40127 Bologna, Italy
February 4, 2026

Research Interests

Climate prediction on decadal timescales; atmosphere and cryosphere interactions; precipitation processes in high mountains; energy and mass balance of alpine glaciers and ice sheets; subsurface processes in seasonal snow and firn; field measurements; numerical modeling and remote sensing

Education

2022 **PhD in Geophysics**, *University of Alaska Fairbanks*
Thesis: Processes in the percolation zone in southwest Greenland: challenges in modeling surface energy balance and melt, and the role of topography in the formation of ice slabs. Supervised by Dr. Regine Hock. (Available online at: `https://www.proquest.com/docview/2760168291/4B499CCB4AE047ACPQ/1`).

2016 **MSc in Atmospheric Sciences**, *University of Innsbruck*
Thesis: Assessing precipitation mechanisms on Mount Kenya and Kilimanjaro: an idealized modeling study. Supervised by Dr. Alexander Gohm and Dr. Georg Kaser. (Available online at: `http://diglib.uibk.ac.at/ulbtirolhs/download/pdf/1542475?originalFilename=true`).

2013 **BSc in Physics**, *University of Trento*
Thesis: Working procedure and data analysis for weather radar on Macaion site. Supervised by Dr. Claudio Della Volpe.

Professional Career

1/2026 - **Junior Associate Scientist**, *Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC)*, Italy

11/2025 - 12/2025 **Post-doc**, *University of Oslo, Department of Geosciences*, Norway

7/2023 - 10/2025 **Mountain Snow Scientist**, *British Antarctic Survey*, United Kingdom

1/2023 - 5/2023 **Post-doc**, *University of Oslo, Department of Geosciences*, Norway

1/2017 - 12/2022 **PhD student research/teaching assistant**, *University of Alaska Fairbanks, Geophysical Institute*, USA

5/2014 - 12/2016 **Field worker**, *University of Innsbruck, Institute for Atmospheric and Cryospheric Sciences*, Austria

Awards

2023 **"Best Student Paper Award"**, for paper Covi et al. (2023) at Geophysical Institute, University of Alaska Fairbanks

2017 **"Scientific Computing Thesis Award"**, for master thesis at University of Innsbruck

Publications

in preparation Gumber S, Orr A, Field P, **Covi F**, Pritchard H, Deb P, Girona-Mata M, Phillips T, Potter E, Thakur Chandni and Widmann M. Improving snowfall prediction in mountain regions: optimising the high-resolution regional UK Met Office Unified Model with novel lake-based snowfall measurements from supersites in the Alps, Himalayas and Rockies. *Monthly Weather Review (submitted in August 2025)*

2025 Innanen S, Hock R, Schmidt LS, Schuler T, **Covi F** and Moholdt G (2025). Witnessing the transition from cold to temperate firn on Austfonna ice cap, Svalbard, through observations and model simulations. *Journal of Glaciology*. Published online 2025:1-23. https://doi.org/10.1017/jog.2025.10072

– Hartl L, **Covi F**, Sticker-Waldhuber M, Baldo A, Fugazza D, Di Mauro B and Naegeli K (2025). Loss of accumulation zone exposes dark ice and drives increased ablation at Weißseespitze, Austria. *The Cryosphere* **19**, $3329 - 3353$. https://doi.org/10.5194/tc-19-3329-2025

– **Covi F**, Hock R, Rennermalm ÅK, Fettweis X and Noël B (2025). Spatio-temporal variability of air temperature biases in regional climate models over the Greenland Ice Sheet. *Journal of Glaciology*. 2025;71:e64. https://doi.org/10.1017/jog.2025.38

2024 Vandecrux B, Fausto RS, Box JE, **Covi F**, Hock R, Rennermalm ÅK, Heilig A, Abermann J, van As D, Bjerre E, Fettweis X, Smeets PCJP, Kuipers Munneke P, van den Broeke MR, Brils M, Langen PL, Mottram R and Ahlstrøm AP (2024). Recent warming trends of the Greenland ice sheet documented by historical firn and ice temperature observations and machine learning. *The Cryosphere* **18**, $609 - 631$. https://doi.org/10.5194/tc-18-609-2024

2023 **Covi F**, Hock R and Reijmer CH (2023). Challenges in modeling the energy balance and melt in the percolation zone of the Greenland ice sheet. *Journal of Glaciology* **69**(273):$164 - 178$. https://doi.org/10.1017/jog.2022.54

2022 Xiao J, Rennermalm ÅK, **Covi F**, Hock R, Leidman SZ, Miège C, MacFerrin MJ and Samimi S (2022). Local-scale spatial variability in firn properties in Southwest Greenland. *Frontiers Earth Science*. $10 : 938246$. https://doi.org/10.3389/feart.2022.938246

– Rennermalm ÅK, Hock R, **Covi F**, Xiao J, Corti G, Kingslake J, Leidman SZ, Miège C, MacFerrin M, Machguth H, Osterber E, Kameda T and McConnell JR (2022). Shallow firn cores 1989–2019 in southwest Greenland's percolation zone reveal decreasing density and ice layer thickness after 2012. *Journal of Glaciology* **68**(269):$431 - 442$. https://doi.org/10.1017/jog.2021.102

2017 Galos SP, Klug C, Maussion F, **Covi F**, Nicholson L, Rieg L, Gurgiser W, Mölg T and Kaser G (2017). Reanalysis of a 10-year record (2004–2013) of seasonal mass balances at Langenferner/Vedretta Lunga, Ortler Alps, Italy. *The Cryosphere* **11**, $1417-1439$. https://doi.org/10.5194/tc-11-1417-2017

Published Datasets

2024 Vandecrux B, Amory C, Ahlstrøm AP, Akers PD, Albert M, Alley RB, ... **Covi F**, ... and Cunde Xiao (2024). The SUMup collaborative database: Surface mass balance, subsurface temperature and density measurements from the Greenland and Antarctic ice sheets (2024 release). *Arctic Data Center*. `https://doi.org/10.18739/A2M61BR5M`

2022 **Covi F**, Hock R, Rennermalm ÅK, Leidman S, Miège C, , Kingslake J, Xiao J, MacFerrin M and Tedesco M (2022). Meteorological and firn temperature data from three weather stations in the percolation zone of southwest Greenland, 2017 - 2019. *Arctic Data Center*. `https://doi.org/10.18739/A2BN9X444`

2022 Rennermalm ÅK, Hock R, **Covi F**, Xiao S, Corti G, Leidman S, Miège C, Kingslake J, MacFerrin M and Tedesco M (2022). Density and ice layer stratigraphy in 24 shallow firn cores from Southwest Greenland, 2017 - 2019. *Arctic Data Center*. `https://doi.org/10.18739/A2Q52FD98`

Presentations

2023 **Covi F**, *Glacier and snow hydrology* (guest lecture)
Indian Institute of Technology Roorkee, Roorkee, India, 10 October 2023.

– **Covi F**, *Spatio-temporal variations of blue slush and water flow in the percolation zone of Greenland: the role of local topography* (talk)
EGU General Assembly, Wien, Austria, 23–28 April 2023.

– **Covi F**, *Spatio-temporal variations of blue slush and water flow in the percolation zone of Greenland: the role of local topography* (talk)
26th Alpine Glaciology Meeting, Zurich, Switzerland, 9 February 2023.

2020 **Covi F**, *Challenges in modeling melt in the percolation zone of the Greenland ice sheet* (talk)
Laboratory of Hydraulics, Hydrology and Glaciology (VAW - ETH), Zurich, Switzerland, 19 November 2020.

2018 **Covi F**, *Modeling energy balance and refreezing in firn in southwest Greenland during the 2017 melt season* (talk)
AGU Fall Meeting, Washington DC, USA, 10–14 December 2018.

– **Covi F**, *Modeling energy balance and refreezing in firn in southwest Greenland during the 2017 melt season* (talk)
AGU Fall Meeting, Washington DC, USA, 10–14 December 2018.

– **Covi F**, *Refreezing in firn in southwest Greenland* (poster)
International Summer School in Glaciology, McCarthy, Alaska, USA, 5–15 June 2018.

– **Covi F**, *Spatio-temporal variability of refreezing in firn in west Greenland* (talk)
IASC-NAG Workshop on Arctic Glaciology and Proglacial Marine Ecosystem, Obergurgl, Austria, 22–24 January 2018.

2017 **Covi F**, *Spatio-temporal variability of refreezing in firn in west Greenland* (talk)
Workshop by North-American - Norwegian Exchange Program 'RemoteEX', Iceland, 11–17 June 2017.

2016 **Covi F**, *Assessing potential reasons for different accumulation patterns on Mount Kenya and Kilimanjaro* (poster)
EGU General Assembly, Wien, Austria, 18 April 2016.

– **Covi F**, *Assessing potential reasons for different accumulation patterns on Mount Kenya and Kilimanjaro* (talk)
20th Alpine Glaciology Meeting, Munich, Germany, 25 February 2016.

Field Experience

2023–2025 **Himalayas and Alps**, *British Antarctic Survey*, During my time at the British Antarctic Survey, I was responsible for planning and leading field expeditions in the Indian Himalayas (lasting up to one month) and the European Alps (up to one week). The goals of these expedition were to deploy and maintain water pressure sensors in high altitude lakes used to monitor winter snowfall using a novel method. I was involved in all aspects of these expeditions, from planning and sensor development to their successful deployment, which was often carried out alone or with the support of local field guides

2017–2019 **Greenland**, *Geophysical Institute, University of Alaska Fairbanks*, I took part in three, months long, spring expeditions and one fall expedition to the percolation zone of southwest Greenland. During these expeditions I was responsible of the design, installation, maintenance, retrieval, and data collection and processing of three weather stations including snow and firn thermistors. I also took shallow firn cores (up to 25 m), and performed GPR surveys, snow pit and mass balance measurements, and was involved in the overall logistics and planning of these expeditions

2014–2016 **European Alps**, *Department of Atmospheric and Cryospheric Sciences, University of Innsbruck*, I was heavily involved in the glaciological mass balance monitoring programs at several glaciers in Austria and Italy including Hintereisferner, Kasselwandferner, and Vedretta Lunga. My role was to plan and organize field work, lead field expedition, document field activities and contribute to data analysis and report writing

Teaching and Mentoring Experience

1/2023 - 6/2023 **Co-supervisor MSc student**, *University of Oslo*, Title of thesis: Changes in firn properties and meltwater retention on Austfonna ice cap, Svalbard, based on observations and model simulations (Satu Innanen)

8/2018 - 12/2018 **Teaching Assistant**, *University of Alaska Fairbanks*, Teaching assistant for the course General Physics I at the Physics Department, involving two 3 hours lab sessions per week, grading lab notebooks and exams

6/2017 - 8/2017 **Co-supervisor of undergraduate students**, *University of Alaska Fairbanks*, 8 weeks summer project)

10/2015 - 1/2016 **Tutor**, *University of Innsbruck*, Tutor for the Mountain Meteorology course in the Master's program in Atmospheric Sciences

Professional Service and Outreach

2019 - **Reviewer**, Paper reviewing for the *Journal of Glaciology*, *The Cryosphere*, and *Meteorological Applications*

2017 - **Outreach**, Several outreach activities, mostly involving kids and young adults (e.g. Summer Kids Camp at University of Alaska Fairbanks (2017); Interior Alaska Science Fair (2018); Eastern Alaska Range Avalanche Center clinic at Nenana high school (2018), ...)

Other

Language Italian (Fluent), English (Excellent)

IT Python (Expert), C and C++ (Advanced), CRBasic (Advanced), Fortran (Advanced), QGIS (Advanced), WRF (Advanced)

Training Advanced first aid by British Antarctic Suvery Medical Unit (2024), Off road driving (2024), Crevasse rescue (last update 2020), Bear safety (2019)

List of Referees

PhD supervisor **Prof Regine Hock**, University of Oslo and University of Alaska Fairbanks
✉ regine.hock@geo.uio.no

postdoc mentor **Dr Hamish Pritchard**, British Antarctic Survey
✉ hprit@bas.ac.uk

collaborator **Prof Åsa Rennermalm**, Rutgers University
✉ arennerm@geography.rutgers.edu

University of Alaska Fairbanks

The Board of Regents of the University of Alaska System
on recommendation of the University Faculty and by virtue of the
authority vested in Them by Law has conferred upon

Federico Covi

the degree of

Doctor of Philosophy

Geophysics

with all the Rights, Privileges, Honors, and Obligations pertaining thereto and
given at the University of Alaska Fairbanks, this month of December, A.D., 2022.

Chair, Board of Regents

President, University of Alaska System

Chancellor, University of Alaska Fairbanks

Universität Innsbruck

Universitätsstudienleiterin / Universitätsstudienleiter

Translation
Notice of Award

In accordance with § 87, sect. 1 of the federal act on the organisation of universities and their studies (Universities Act 2002), BGBl. 1 No. 120/2002, the director of studies of the University of Innsbruck confers upon:

Mr. Federico Covi
date of birth 30 March 1990, nationality: Italy

the academic title of:

Master of Science
(MSc)

on the successful completion of all compulsory examinations and a master's thesis in the subject

Master's Programme
Atmosphere Sciences

(Curriculum for the master's programme Atmosphere Sciences, as stipulated in the University's notification bulletin of 27 April 2007, ed. 44, no. 210).

On behalf of the Universitätsstudienleiterin / Universitätsstudienleiter:

Ao. Univ.-Prof. Mag. Dr. Ernst Steinicke
Innsbruck, 2 December 2016

DVR: 0083917