

Research Output 1999-2024

1. Articles in Scientific Journals [peer-reviewed]

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- [25] Spreitzer, E., 2021: Projekt Windwarnsystem - Arbeitspaket 3, Methodenentwicklung und Warnplattform. *Abschlussbericht zum Arbeitspaket 3*, 7 pp.

- [26] Schaer, Ch, and Th. Schulthess, 2021 (Editors): Extreme scale computing and data platform for cloud-resolving weather and climate modeling EXCLAIM Roadmap; Part I: Scientific Roadmap and Requirements. Contributors: Ch. Appenzeller, M. Arpagaus, M. Bianco, D. Brunner, F. Cruz, A. Dipankar, D. Domeisen, E. Fischer, N. Gruber, S., Kotlarski, X. Lapillonne, D. Leutwyler, M. Liniger, U. Lohmann, C. Osuna, W. Sawyer, Ch. Schär, S. Schemm, T. Schnadt Poberaj, Th. Schulthess, S. I. Seneviratne, **M. Sprenger**, S. Ubbiali, A. Walser, H. Wernli, M. Wild, Ch. Zeman, pp. 39.
- [27] GEOkompakt - Die Grundlagen des Wissens: Die Alpen. Inhaltliche Beratung zusammen mit Heini Wernli zum Beitrag 'Wetterküche - Wie Forscher versuchen, Ordnung ins himmlische Chaos zu bringen', 2021.
- [28] **Sprenger, M.** and U. Krieger, 2022: Schlussbericht zum Teilprojekt 'Zugmessungen' des Innouisse-Innovationprojekts 34360.1 IP-EE. 10 pp.
- [28] 2-min-Videobeitrag für *ETH News for Industry* zusammen mit Meteoschweiz (Irina Mahlstein) und den Appenzellerbahnen (Marielle Müller) - Vorstellung des Innosuisse-Projekts zur verbesserten Vorhersage des Laseyer-Windsturms, 2022, URL: ethz.ch/en/industry/industry/news/data/2022/03/forecasts-of-unpredictable-storms.html. The 2-min is also advertised at the ETH main page (www.ethz.ch) during a few days.
- [29] Info on front webpage of IAC (www.iac.ethz.ch) about the Innosuisse/Laseyer project, starting at 29 March 2022.
- [30] Appenzeller Magazin (Text: Martin Hüsler, Fotos: Carmen Wueest), April 2022: Laseyerwind - Ungebärdig und geheimnisumrankt. 4 pp.
- [31] Paper advertisement in the C2SM Newsletter 2022 (www.c2sm.ethz.ch) for the study: Mony, C., L. Jansing, and **M. Sprenger**, 2021: Evaluating Foehn Occurrences in a Changing Climate Based on Reanalysis and Climate Model Data Using Machine Learning. *Weather and Forecasting*, Vol. 36, doi: 10.1175/WAF-D-21-0036.1.
- [32] Caratsch, A., **M. Sprenger**, and I. Mahlstein, 2022: Description of the Laseyer-Wind Prediction and Alert Algorithm. Technical Report ETH Zurich, in collaboration with MeteoSchweiz, 19 pp.
- [33] Caratsch, A.: Handbuch für das Laseyer-Alarm Evaluation Tool, 13 pp. [Fachliche Betreuung durch **M. Sprenger** und I. Mahlstein].
- [34] **Sprenger, M.**, F. Aemisegger, H. Joos and H. Wernli, 2022: Lecture Notes 'Wettersysteme', 357 pp. [update of the lectures notes and transfer to Overleaf].
- [35] Müller, M., I. Mahlstein, and **M. Sprenger**: Interview at the ETH Industry Day, presenting the new warning system for the Laseyer wind storm. 7 September 2022.
- [36] Medienmitteilung der Appenzeller Bahnen, 2022: Weniger Bahnersatz dank neuem Windwarnsystem. Herisau, 9. September 2022,

[37] **Sprenger, M.**, 2023: Schlussbericht zum SNF-Projekt 200021L_181992 ‘Foehn Dynamics - Lagrangian Analysis and Large-Eddy Simulation’. Eingereicht beim SNF, 4 pp.

[38] Berechnung von Trajektorien zum Projekt ‘**PURE AIR**’ von Khalil Berro (khalilberro.com/pure-air-1), 2023/2024. Projektbeschreibung: “PURE AIR comprises nine SCBA air tanks used by firefighters seeking to breathe non-toxic, clean air in polluted environments. Khalil Berro and his team transported these cylinders to various seemingly untouched locations in the Alps, representative for the general visual concept of nature, facilitating an exchange not only of air but also of culture and atmospheric pressure. Each cylinder has been filled with air from one of nine distinct remote locations, transforming them into time capsules that encapsulate our current atmospheric conditions for future generations. Alongside the exchange and capture of air, trajectory calculations of air parcels were made by Dr. **Michael Sprenger** at the Institute for Atmospheric and Climate Science at ETH Zurich, led by Prof. Dr. Heini Wernli. The histories and past positions of the collected air samples are calculated and visualized, fostering a new comprehension of the interrelated dynamics within our global systems and the profound interconnectedness of all life facilitated by the presence of air.”

[39] Turbulenz und Klima, 2024: Medienanfrage (Tagesanzeiger) von Martin Läubli zu Clear Air Turbulence.

[40] Berechnung von Trajektorien, Erstellen eines Lauftextes, Mitgestaltung der Webseite für das Projekt ‘**BREATHE**’ von Khalil Berro (khalilberro.com/breathe), 2024. Projektbeschreibung: “As you breathe in and feel the air coursing down into your lungs, the origins of this air are often disregarded unless catastrophic events such as volcanic eruptions or radioactive fallout demand increased awareness. Through the calculation of air parcels from each exhibition space, the historical journey of every person's breath present is tracked and simultaneously constructed. This mixture of imagination and scientific data is fuelled by real-time calculations conducted by Dr. **Michael Sprenger** and Dr. Hanna Joos at the Institute for Atmospheric and Climate Science, ETH Zurich, led by Prof. Dr. Heini Wernli. The results of these calculations, delineating the air’s journey, complete with city names and timestamps – are projected onto multiple facades across Europe. The scrolling text, reminiscent of stock tickers cascading across Wall Street skyscrapers, echoes the ambiance of high-stakes trading.” BREATHE is shown at: NOI Tech Park, Bolzano, Italy (13/06/2025-09/08/2024); Washington D.C, Soirée Suisse (18/09/2024); ETH Hauptgebäude, Zurich, Switzerland (26/09/2024-25/10/2024). BREATHE attracted some media attention:

- ✓ Swiss Meteorological: <<https://sgm-meteo.ch/en/activities>>
- ✓ D-USYS starting webpage: <<https://usys.ethz.ch/en/research/breathe-art.html>>
- ✓ IAC starting webpage: <<https://iac.ethz.ch/news-and-events/news-en/2024/09/breathe-art-project-a-journey-to-the-origins-of-the-air-we-breathe.html>>
- ✓ SRF Meteo: <<https://www.srf.ch/meteo/meteo-stories/eth-trifft-kunst-wissenschaft-im-alltag-woher-kommt-unsere-luft>>
- ✓ SRF Meteo Abendausgabe, Friday 27 October:
<<https://www.srf.ch/play/tv/meteo/video/abendausgabe?urn=urn:srf:video:e748a022-d520-408d-86bf-315210632ba4>>

- ✓ SRF Regionaljournal Zürich Schaffhausen: <<https://www.srf.ch/audio/regionaljournal-zuerich-schaffhausen/kunstprojekt-eth-woher-die-atemluft-kommt?partId=12668261>>
- ✓ Südtirol News: <[NOI Techpark präsentiert Kunstinstallation „BREATHE“ von Khalil Berro – Südtirol News \(suedtirolnews.it\)](https://www.suedtirolnews.it/NOI-Techpark-praesentiert-Kunstinstallation-BREATHE-von-Khalil-Berro)>
- ✓ Quotidiano Nazionale: <<https://www.quotidiano.net/video/uninstallazione-che-monitora-i-movimenti-dellaria-che-respiriamo-knbz2ncp>>
- ✓ myswitzerland: <<https://www.myswitzerland.com/en-ch/experiences/events/breathe-kunstinstallation-von-khalil-berro/>>
- ✓ Meteoswiss Blog: <<https://www.meteoschweiz.admin.ch/ueber-uns/meteoschweiz-blog/de/2024/10/tief-durchatmen.html>>
- ✓ ETH main webpage <<https://www.ethz.ch>> on 26 September 2024.

[41] Davies, H. C., **M. Sprenger**, and H. Wernli, 2024: Quasi-Geostrophic Theory. Update of H. C. Davies, H. Wernli, DYNAMICAL METEOROLOGY | Quasigeostrophic Theory, Editor(s): Gerald R. North, John Pyle, Fuqing Zhang, *Encyclopedia of Atmospheric Sciences (Second Edition)*, Academic Press, 2015, Pages 393e403, ISBN 9780123822253, doi:10.1016/B978-0-12-382225-3.00326-1.

3. Oral and Poster Presentations at International Conferences [last five years]

[1] **Sprenger, M.**, N. Piaget, S. Ruedisuehli, D. Leutwyler, and H. Wernli, **2015**: Lagrangian Perspective of Orographic Blocking. 33rd International Conference on Alpine Meteorology, 31 August – 4 September 2015, Innsbruck, Austria.

[2] **Sprenger, M.**, M. Graf, and H. Wernli, **2016**: Classification of extratropical cyclogenesis events based on a set of precursors. 16th EMS Annual Meeting & 11th European Conference on Applied Climatology (ECAC), 12–16 September 2016, Trieste, Italy.

[3] **Sprenger, M.**, S. Limbach, E. Schömer, and H. Wernli, **2016**: IWAL – An Interactive Weather Analysis Laboratory. 16th EMS Annual Meeting & 11th European Conference on Applied Climatology (ECAC), 12–16 September 2016, Trieste, Italy.

[4] **Sprenger, M.**, 2017: Nowcasting Foehn Wind Events using the AdaBoost Machine Learning Algorithm. 17th EMS Annual Meeting & 12th European Conference on Applied Climatology (ECAC), 4–8 September 2017, Dublin, Ireland.

[5] **Sprenger, M.**, 2017: Lagrangian Analysis of Weather Systems. Institute of Applied Physics, 17 November 2017, Berne, Switzerland [invited presentation].

[6] **Sprenger, M.**, J. Jenkner, S. Schemm, R. Oechslin, 2018: Nowcasting Foehn Wind Events using the AdaBoost Machine Learning Algorithm, EGU General Assembly 2018, 8-13 April 2018, Vienna, Austria.

[7] **Sprenger, M.**, J. Schmidli, and L. Egloff, 2018: The Laseyer Wind Storm. EGU General Assembly 2018, 8-13 April 2018, Vienna, Austria.

[8] **Sprengr, M.**, 2019: Lagrangian Aspects of Orographic Blocking. Latsis Symposium on High-Resolution Climate Modelling: Perspectives and Challenges, 21-23 August 2019, ETH Zurich, Switzerland.

[9] **Sprengr, M.**, 2019: Lagrangian Aspects of Orographic Blocking. International Conference on Alpine Meteorology (ICAM), 2-6 September 2019, Riva del Garda, Italy.

[10] **Sprengr, M.** and L. Jansing, 2020: Lagrangian Methods in Mountain Meteorology - Challenges and Opportunities. 12th Symposium on Discovery, Fusion, Creation of New Knowledge by Multidisciplinary Computational Sciences, University of Tsukuba, 6 October 2020 [invited presentation, via Zoom].

[11] Franco, L. and **M. Sprengr**, 2023: Synoptic Weather Systems and Clear Air Turbulence (CAT). The Aerospace Human Factors Research Division (AHFRD) New and Emerging Aviation Technologies (NEAT), Federal Aviation Administration “New and Emerging Aviation Technologies” (NEAT) Virtual Presentation, 7 November 2023 [invited presentation, via Zoom].

4. Organisation of Workshops and Conferences / Activities at conferences

[1] Annual Meeting of the **Swiss Meteorological Society**, Bern, 17 November 2012; ca. 40 participants.

[2] Annual Meeting of the **Swiss Meteorological Society**, Lausanne, 16 November 2013; ca. 20 participants.

[3] **Deutsch-Österreichisch-Schweizerische Meteorologentagung (DACH)**, 2-6 September 2013, Innsbruck, Austria; Convenor of a Session on mountain meteorology.

[4] **32th International Conference on Alpine Meteorology (ICAM)**, 3 – 7 June 2013, Kranjska Gora, Slovenia; Session Convenor on downlope wind systems.

[5] Annual Meeting of the **Swiss Meteorological Society**, Zürich, 8 November 2014; ca. 60 participants.

[6] **14th Annual Meeting of the European Meteorological Society & 10th European Conference on Applied Climatology (ECAC)**, 6-10 October 2014, Prague, Czech Republic; Convenor of a Session on mountain meteorology.

[7] Annual Meeting of the **Swiss Meteorological Society**, Zürich, 7 November 2015; ca. 60 participants.

[8] **33th International Conference on Alpine Meteorology (ICAM)**, 31 August – 4 September 2015, Innsbruck, Austria; Member of Programme Committee & Session Convenor on dynamically driven mountain flows.

[9] Annual Meeting of the **Swiss Meteorological Society**, Zürich, 25 November 2016; ca. 60 participants.

[10] Bi-annual meeting of the **Arbeitsgemeinschaft Föhnforschung Rheintal/Bodensee (AGF)**, Zürich, 3 May 2017; ca. 15 participants [co-organized with B. Dürr, D. Gerstgrasser].

- [11] Annual Meeting of the **Swiss Meteorological Society**, Zürich, 10 November 2017; ca. 60 participants.
- [12] Organisation of a '**Media and Climate Communication Workshop**' with Beat Glogger from scitec-media, Zurich, 14 September 2017. The workshop was jointly organized by the Swiss Meteorological Society (SGM) and the Center for Climate System Modeling (C2SM); 27 participants.
- [13] Annual Meeting of the **Swiss Meteorological Society**, Bern, 23 November 2018; ca. 60 participants.
- [14] Workshop on **Aviation Meteorology**, Winterthur, 27 May 2019. Organized together with ZHAW (Julien Anet) and MeteoSwiss (Marco Stoll); 75 participants.
- [15] Annual Meeting of the **Swiss Meteorological Society**, Zürich, 8 November 2019; ca. 50 participants.
- [16] **35th International Conference on Alpine Meteorology (ICAM)**, 2-6 September 2019, Riva del Garda, Italy: Member of Programme Committee & Session Convenor on dynamically driven mountain flows.
- [17] Virtual (Zoom) Mini-Workshop '**Clear Air Turbulence & Aircraft Icing**', 29 April 2020, 11 participants from MeteoSwiss, SWISS and ETH.
- [18] **35th International Conference on Alpine Meteorology (ICAM)** - Online with Qiqochat and Zoom (www.icam2023.ch/online-event-2021); co-organisation with L. Jansing (IAC) and MeteoSwiss (Marco Arpagaus, Seda Durmus, Sophie Storrer), six invited presentations and four topical discussion sessions, ~170 participants.
- [19] Hosting at ETH the bi-annual meeting of the **Arbeitsgemeinschaft Föhnforschung Rheintal/Bodensee (AGF)**, Zürich, 2 May 2022 [co-organized with B. Dürr, D. Gerstgrasser].
- [20] **36th International Conference on Alpine Meteorology (ICAM)** – 19 to 23 June St. Gallen, Switzerland, and Poster Session (Gather.town) on-line 27 June 2023; chair of programme committee; co-organisation with L. Jansing (IAC) and MeteoSwiss (M. Arpagaus), eight invited presentations and eight topical sessions, ~90 oral and ~90 poster presentations; 160 registered participants (general website: www.icam2023.ch / programme website: www.iacweb.ethz.ch/events/icam2023/programme.htm).
- [21] Eintägiges **Symposium der Schweizerischen Gesellschaft für Meteorologie (SGM) "Verrücktes Wetter"** 20 March 2024, 120 participants, Siemens-Auditorium, ETH Höggerberg. Moderierte Gesprächsrunde, Vorträge, Podiumsdiskussion. Organisiert zusammen mit T. Schnadt (C2SM), S. Kotlarski (Meteoschweiz), N. Glaus (Umweltbeauftragte Hängegleiterverband), Helene Barras (MeteoSchweiz), Y. Brugnara (EMPA).