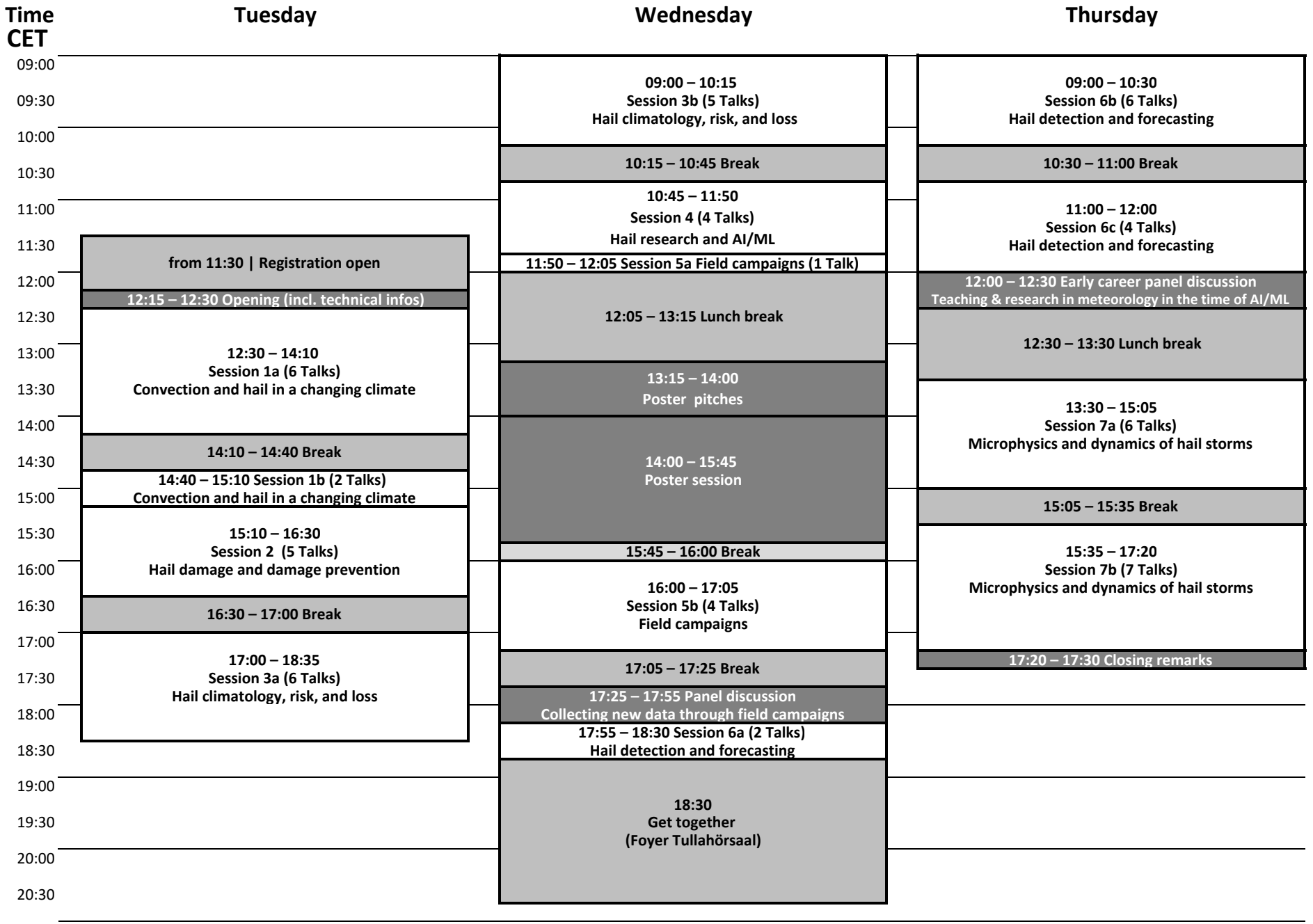
4th European Hail Workshop: 5 March – 7 March 2024

as of 28 February 2024



Conference Programme

4th European Hail Workshop | 5 March – 7 March 2024

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Tuesday, 5 March 2024

from 11:30	**Registration**
12:15	**Conference start (KIT, Building 11.40, Tulla Lecture Hall)**
12:15 – 12:30	**Michael Kunz (KITy), Olivia Romppainen-Martius (Univeristy of Bern), Susanna Mohr (KIT)** Welcome, Opening remarks & Technical Infos
Session 1a: Convection and hail in a changing climate	
12:30 – 12:50	**Invited: Lasher-Trapp, Sonia (University of Illinois), Holly Mallinson, Robert J. Trapp, Matthew Woods, Sophie Orendorf** Hailfall in a future climate using a pseudo-global warming approach
12:50 – 13:10	**Invited: Mateusz Taszarek (Adam Mickiewicz University), Tomáš Púcik, John T. Allen** Common environmental features associated with large hail across Australia, Europe and the United States
13:10 – 13:25	**Timothy Raupach (University of New South Wales), Raphael Portmann, Christian Siderius, Stephen Sherwood** Global projections of hail hazard frequency under climate change
13:25 – 13:40	**Agostino Manzato (APRA FVG), Gabriele Fasano, Andrea Cicogna, Francesco Sioni, Arturo Pucillo** Are the relationships between environmental parameters and storm observations climate-change invariant?
13:40 – 13:55	**Francesco Battaglioli (ESSL), Pieter Groenemeijer, Mateusz Taszarek, Tomáš Púcik, Anja Rädler** Modeled multidecadal trends of (very) large hail in Europe, the United States and globally
13:55 – 14:10	**Anton Schulte-Fischedick (Universität Freiburg), Katharina Schröer** Variability and indication of change in convective storm patterns in the Western Alpine region: A storm-based analysis utilizing 20 years of observation
14:10 – 14:40	**Coffee Break (Tulla hall)**
Session 1b: Convection and hail in a changing climate	
14:40 – 14:55	**Iris Thurnherr (ETH Zurich), Patricio Velasquesz, Ruoyi Cui, Killian Brennan, Lena Wilhelm, Heini Wernli, Christian R. Steger, Christoph Schär** The effect of 3 °C global warming on hail in Europe
14:55 – 15:10	**Abdullah Kahraman (Newcastle University), Elizabeth J. Kendon, Hayley Fowler** Exploring future hailstorms and convective storm features across Europe using km-scale simulations
Session 2: Hail damage and damage prevention	
15:10 – 15:30	**Invited: Luis Ackermann (Bureau of Meteorology), Joshua Soderholm, Alain Protat, Rhys Whitley, Lisa Ye, Nina Ridder** Radar and environment-based hail damage estimates using machine learning
15:30 – 15:45	**Simon Eng (University of Western Ontario), Julian Brimelow, Gregory Kopp** Forensic post-storm investigations of hailstorms and their impacts
15:45 – 16:00	**Brenna Meisenzahl, Bryn Ronalds (Insurance Institute for Business and Home Safety)** Sub-severe hail: The missing piece in assessing property risk in North America
16:00 – 16:15	**Raphael Portmann (Agroscope,), Timo Schmid, Leonie Villiger, David N. Bresch, Pierluigi Calanca** Modelling crop hail damage footprints with single-polarization radar
16:15 – 16:30	**Mirjam Hirt (Munich RE), Anja Rädler, Jana Löffelmann, Thomas Hofherr, Peter Miesen, Alex Allmann** Hail diameter footprints and simulations of hail damages

16:30 – 17:00	**Coffee Break (Tulla hall)**

Session 3a: Hail climatology, risk, and loss

17:00 – 17:20	**Invited: Leonie Villinger (ETH Zurich), Martin Aregger, Killian Brennan, Pierluigi Calanca, Ruoyi Cui, Olivia Martius, Raphael Portmann, Christoph Schär, Timo Schmid, Iris Thurnherr, Patricio Velasquez, Heini Wernli, Lena Wilhelm, David N. Bresch** Seamless coupling of kilometer-resolution weather predictions and climate simulations with hail impact assessments for multiple sectors (scClim)
17:20 – 17:35	**Vera Meyer (Geosphere Austria), Gregor Ehrensperger, Marc Falkensteiner, Tobias Hell, Georg Pisotnik, Lukas Tüchler, Hildegard Kaufmann** New hail hazard map for Austria
17:35 – 17:50	**Jannick Fischer (KIT), Matthew Kumjian, Kelly Lombardo, Michael Kunz** How do updraft width, intensity, and water content influence hail size in toy simulations?
17:50 – 18:05	**Henry M. Wells (Loughborough University), John Hillier, Freya K. Garry, Nick Dunstone, Huili Chen, Mateusz Taszarek** Environment and convective mode of severe hail-producing storms in the United Kingdom
18:05 – 18:20	**Lena Wilhelm (Uni Bern), Olivia Martius, Cornelia Schwierz, Katharina Schröer** Hail in Switzerland – Modeled trends, decadal variability, and large-scale drivers
18:20 – 18:35	**Timo Schmid (ETH Zurich), Raphael Portmann, Leonie Villinger, Katharina Schröer, David N. Bresch** Radar-based hail damage modelling for buildings and cars in Switzerland: Model evaluation and ways forward

Wednesday, 6 March 2024

Session 3b: Hail climatology, risk, and loss

09:00 – 09:15	**Hans Feyen (Schweizer Hagel)** Practical use of hail climatology in crop insurance
09:15 – 09:30	**Charles Jackson (Verisk), Alex Sokolowsky, Greg Bopp, Boyko Dodov** A new global model framework for representing weather systems responsible for observed hail occurrence over the US and Europe
09:30 – 09:45	**Subin Thomas (Moddy'S RMS), Kieran Pope, Phil Haines, Juergen Grieser** Comparison of ML models to create hail risk in the Contiguous United States
09:45 – 10:00	**Punit Bhola (Verisk), Caroline McMullan, Alexander Doyle, Harsh Mistry, Stefanie Alarcon, Bernhard Reinhardt, Shane Latchman** A comprehensive review of recent catastrophic hail events and their impacts on the insurance industry
10:00 – 10:15	**Stefan P. Ritz (RenaissanceRE), David R. Bachiochi, David Hamilton** Considering climate change and natural climate variability when comparing stochastic hail loss model output against recent loss history
10:15 – 10:45	**Coffee Break (Tulla hall)**

Session 4: Hail research and AI/ML

10:45 – 11:05	**Invited: John T. Allen (Central Michigan University), Cameron Nixon, Tobias Schmidt, Amy McGoven, Corey Potvin, Randy Chase, John Williams, Cameron Homeyer, Benjamin Scarino, Kyle Itterly, Kris M. Bedka, Kyle Gillett, Mateusz Taszarek** Leveraging machine learning and AI in hail prediction and forecasting
11:05 – 11:20	**Martin Lainer (MeteiSwiss), Killian P. Brennan, Alessandro Hering, Jérôme Kopp, Samuel Monhart, Jannis Portmann, Daniel Wolfensberger, Urs Germann** Drone-based photogrammetry combined with deep-learning to estimate hail size distributions and melting of hail on the ground
11:20 – 11:35	**Alfonso Ferrone (EPFL), Jérôme Kopp, Martin Lainer, Matteo Guidicelli, Marco Gabella, Urs Germann, Alexis Berne** Double moment normalization of the number distributions of hail size over Switzerland
11:35 – 11:50	**Boris Blanc (ETH Zurich), Andreas Prein, Ulrike Lohmann, Neil Aellen** Improving our understanding of hail hazards using machine learning

Session 5a: Field campaigns	
11:50 – 12:05	**Joshua Soderholm (Bureau of Meteorology), Matthew Kumjian, Julian Brimelow, Michael Kunz, Silke Trömel** Observations of hailstone-like trajectories and growth
12:05 – 13:15	**Lunch Break (Tulla hall)**
13:15 – 14:00	**Poster pitches (Tulla Lecture Hall)**
14:00 – 15:45	**Poster session (Tulla hall)**
15:45 – 16:00	**Coffee Break (Tulla hall)**
Session 5b: Field campaigns	
16:00 – 16:20	**Invited: Julian Brimelow (University of Western Ontario), Gregory Kopp, Simon Eng** Unravelling the mysteries of hail
16:20 – 16:35	**Michael Kunz (KIT), Elias Hühn, Jannick Fischer, Susanna Mohr, Melissa Latt, Silke Trömel, Joshua Soderholm** Enhancing insights into large hail formation and trajectories through targeted field campaigns
16:35 – 16:50	**Ian Giammanco, Tanya Brown-Giammanco** The IBHS field research program: Over a decade of observing hail and hailstorms
16:50 – 17:05	**Carme Farnell (Servei Meteorològic de Catalunya), Tomeu Rigo, Javier Martín-Vide** Going inside of hailstones from a giant hail event in Catalonia
17:05 – 17:25	**Coffee Break (Tulla hall)**
17:25 – 17:55	**Panel discussion: The truth aloft: Collecting new data through field campaigns. A community exchange on ongoing and planned field projects** Panellist: Becky Adams-Selin, Julian Brimelow, Pieter Groenemeijer, Robert J. Trapp
Session 6a: Hail detection and forecasting	
17:55 – 18:15	**Invited: Ulrich Blahak (DWD) and the SINFONY Team** Current status of SINFONY – The combination of nowcasting and numerical weather prediction on the convective scale at DWD
18:15 – 18:30	**Michael Debertshäuser (DWD), Paul James** Integrating KONRAD3D into the nowcasting guidance system NowCastMIX at DWD
18:30	**Get-Together (Tulla hall)**

Thursday, 7 March 2024

Session 6b: Hail detection and forecasting

09:00 – 10:30	**Alessandro Hering (MeteoSwiss), Luca Nisi, Martin Aregger, Marco Boscacci, Lorenzo Clementi, Urs Germann** Improvements of the object-based nowcasting system TRT for automatic thunderstorm and hail warnings in the Alpine area
09:15 – 09:30	**Vito Galligani (CIMA-IFAECI), Maite Cancelada, Paola Salio, Sarah Bang, Hernán Bechis** Testing a spaceborne passive-microwave severe hail retrieval over Argentina using ground-based dual-polarization radar
09:30 – 09:45	**Jérôme Kopp (Uni Bern), Alessandro Hering, Urs Germann, Olivia Martius** Investigating hail remote detection accuracy: A comprehensive verification of radar metrics with 150’000 crowdsourced observations over Switzerland
09:45 – 10:00	**Tomáš Púcik (ESSL), Mateusz Taszarek, Pieter Groenemeijer, Francesco Battaglioli** Pre-storm environments and storm-scale properties of the major hailstorms of 2021, 2022 and 2023 in Europe
10:00 – 10:15	**Robert J. Trapp (University of Illinois), Gabrielle Christo, Melinda Berman, Stephen Nesbitt, Larry Di Girolamo, Edward Wolff** Satellite-based quantification of convective updraft characteristics: Application to hail severity
10:15 – 10:30	**Martin Aregger (Uni Bern), Olivia Martius, Alessandro Hering, Urs Germann** Differential reflectivity columns and hail-linking C-band radar-based estimated column characteristics to a uniquely large dataset of crowdsourced surface observations in Switzerland
10:30 – 11:00	**Coffee Break (Tulla hall)**

Session 6c: Hail detection and forecasting

11:00 – 11:15	**Vinzent Klaus (University of Natural Resources and Life Sciences), John Krause** Updraft characteristics of hailstorms and their utility in hail size nowcasting
11:15 – 11:30	**Monika Feldmann (Uni Bern), Daniela I.V. Domeisen, Olivia Martius** Investigating the predictability link between heatwaves and severe convective outbreaks in Europe
11:30 – 11:45	**Minda Le (Colorado State University), V. Chandrasekar** Global hail distribution as observed by GPM DPR
11:45 – 12:00	**Francesco De Martin (University of Bologna), Agostino Manzato, Nicola Carlon, Federico Pavan, Sebastiano Carpentari, Guido Cioni, Mario Marcello Miglietta** European record-breaking hailstorms in northern Italy on 19 and 24 July 2023
12:00 – 12:30	**Early career panel discussion: Teaching and research in meteorology in the time of AI** Panellist: Monika Feldmann, Vincent Forcadell, Yuzhu Lin
12:30 – 13:30	**Lunch Break (Tulla hall)**

Session 7a: Microphysics and dynamics of hail storms

13:30 – 13:20	**Invited: Annette Miltenberger (Uni Mainz)** Impact of initial condition and cloud physics perturbations on predictions of convective storms and associated hail
13:50 – 14:05	**Mathias Gergely (DWD), Michael Frech, Friedrich Seeger** Exploiting DWD's operational C-band radar birdbath scan for quantifying hail characteristics
14:05 – 14:20	**Andrew Heymsfield (NCAR), Miklos Szakall, Alexander Theis** A Wind Tunnel IA wind tunnel investigation of the melting of hailstones – Part II: Implications for hailstone size distributions measured at the ground
14:20 – 14:35	**Yuzhu Lin (Pennsylvania State University), Matthew Kumjian** Implementing physical assumptions about nonspherical hailstone shapes
14:35 – 14:50	**Sarah Bang (NASA Marshall Space Flight Cent)** Spaceborne remote sensing of hail: Retrievals, climatologies, and challenges going forward
14:50 – 15:05	**Killian P. Brennan ETH Zurich), Heini Wernli, Michael Sprenger, André Walser, Marco Arpagaus** A modeling case study of a severe hail storm in complex topography
15:05 – 15:35	**Coffee Break (Tulla hall)**

Session 7b: Microphysics and dynamics of hail storms

15:35 – 15:50	**Patrick Kuntze (Uni Mainz), Corinna Hoose, Michael Kunz, Lena Frey, Annette Miltenberger** Impact of aerosol and microphysical uncertainty on the evolution of a severe hailstorm
15:50 – 16:05	**Xiaofei Li (Northwest University)** CCN effects on hail and its uncertainty evaluation compared with initial meteorological condition
16:05 – 16:20	**Xiangyu Lin, Haifan Zhang, Qinghong Zhang, Andrew Heymsfield** Isotopic analysis for tracing vertical growth trajectories of hailstones
16:20 – 16:35	**Johanna Seidel (KIT), Alexei Kiselev, Susan Hartmann, Frank Stratmann, Alice Keinert, Thomas Leisner** Hailstones falling through a cloud of supercooled droplets: No evidence of efficient ice multiplication
16:35 – 16:50	**Becky Adams-Selin (Verisk), Conrad Ziegler** The impact of hailstone shape on hail trajectory stochasticity
16:50 – 17:05	**Hannah Vagasky (Verisk), Becky Adams-Selin, Sarah Bang, Andrew Heymsfield, Aaron Bansemer, Sarah Stough, Andrew Detwiler** An Exploration of Hail Melt Sensitivities Using Hail Trajectory Models and Observations
17:05 – 17:20	**Anthony Crespo (University of Wisconsin-Madison), Angela Rowe, Lucia E. Arena, William O. Nachlas** Characterizing hailstones from different storm modes: A novel method for analyzing physicochemical properties of non-soluble particles in hailstones
17:20 – 17:30	**Closing remarks**

Poster session (Wednesday, 06 March 2024 14:00 – 15:45)

Session 1: Convection and hail in a changing climate	
02	**Tomeu Rigo (Servei Meteorològic de Catalunya), Carme Farnell** Identification of the causes in the increase of hail records in Catalonia since 2010
Session 2: Hail damage and damage prevention	
03	**Denislav Bonchev (Stroyproject Ltd), Tsvetelina Dimitrova, Rumjana Mitzeva** A case study of the evolution of severe hail thunderstorm developed over Bulgaria on 06 August 2023 in relation to hail suppression
04	**Nadezhda Kadiyska, Tsvetelina Dimitrova (Hail Suppression Agency), Denislav Bonchev and Rumjana Mitzeva** Analysis of radar characteristics of seeded and non-seeded hail cells developed over Bulgaria
05	**Jana Löffelmann (Munich Re), Thomas Hofherr, Anja Rädler, Mirjam Hirt, Peter Miesen, Alex Allmann** Developing a synthetic hail event set for risk assessment
06	**Julijana Nadj, Đorde Kardum (TRAYAL Corporation), Dragana Vujovic, Jovan Janevski (TRAYAL Corporation)** Damage to crops caused by hail in Serbia
07	**Đorde Kardum (TRAYAL Corporation), Zoran Babic, Julijana Nadj, Jovan Janevski (TRAYAL Corporation)** Automation of the hail suppression system in Serbia
08	**Satyanarayana Tani (Graz University of Technology)** Sharing insights from coordinating and recent developments in hail defence operations in Styria Province, Austria
Session 3: Hail climatology, risk, and loss	
09	**Andreas Muehlbauer (FM Global)** Global hail hazard modeling framework
10	**Stella Berzina, Lena Wilhelm, Martin Aregger (Uni Bern), Olivia Martius** Co-occurrence of hail and heavy precipitation in Switzerland
11	**Lilia Bocheva (1National Institute of Meteorology and Hydrology), Krastina Malcheva, Radoslav Evgeniev** Recent spatial distribution and frequency of hail precipitation in Bulgaria
12	**Jannick Fischer (KIT), Kris M. Bedka, Michael Kunz** Hail climatology, trend, and hazard models for South America and Australia
13	**Susanna Mohr (KIT), Michael Kunz (KIT)** An updated 3D radar-based hail statistic for Germany (2005 – 2023)
14	**Sioutas Michalis** Thunderstorm-hailstorm relationships and hailswath characteristics in Greece
Session 4: Hail research and AI/ML	
15	**Denislav Bonchev (Stroyproject Ltd), Nikolay Penov, Martin Slavchev, Tsvetelina Dimitrova, Guergana Guerova** Machine learning algorithm for hail nowcasting in Northwest Bulgaria
16	**Monika Feldmann (Uni Bern), Louis Poulain-Auzéau, Milton Gomez, Tom Beucler, Olivia Martius** Convective environments in AI-models – What have Panguweather, Graphcast and Fourcastnet learned about atmospheric profiles?
17	**Paula Bigalke (University of Cologne), Claudia Acquistapace, Daniele Corradini** Investigation of climatic changes for hail storms over the Alps using spatiotemporal satellite imagery and self-supervised machine learning
18	**Ge Qiao (Peking University), Qinghong Zhang** Construction and feature analysis of surface hail report data set in China based on crowdsourcing
19	**Vincent Forcadell (Météo-France, CNRM), Clotilde Augros , Olivier Caumont** Towards using artificial intelligence to estimate the occurrence and size of hail? Progress and challenges with the French dual-polarization radars

Session 6: Hail detection and forecasting

20	**Becky Adams-Selin (Verisk), Chase Calkins** Environments associated with hail production in subtropical South America
21	**Pieter Groenemeijer, Francesco Battaglioli (European Severe Storms Laboratory), Tomáš Púcik** Stormforecast.eu: Real-time automated forecasts for hail and lightning based on post-processed NWP
22	**Hernán Bechis (University of Buenos Aires), Bruno Zanetti Ribeiro, Paola Salio** Analysis of convective parameters associated with hail reports from the South American meteorological hazards and their impacts database
23	**Mark Gartner, Julian Brimelow (University of Western Ontario)** The effectiveness of a continuous-wave radar to measure the fall speed of hailstones
24	**Orietta Cazzuli (ARPA Lombardia), Luca Baldini, Roberto Cremonini, Antioco Vargiu, Giulio Camisani, Gian Paolo Minardi, Renzo Bechini** Hail monitoring in Milan district by a network of dual-polarization X-band weather radars
25	**Stefan Georgiev (Hail Suppression Agency), Denitsa Barakova** Wind shear as a predictor of severe and non-severe hail – Preliminary results from Bulgaria in 2018 – 2023
26	**Mateusz Taszarek (Adam Mickiewicz University), Bartosz Czernecki, Piotr Szuster** ThundeR – A rawinsonde package for processing convective parameters and visualizing atmospheric profiles
27	**Markus Schultze (DWD), Tabea Wilke, Christian Berndt** Radar-based hail detection and hail size estimation at DWD
28	**Yi-Xuan Shou (National Satellite Meteorological Center), Lu Feng, Haibo Zhao** Deriving Hail likelihood from Fengyun-4 satellite observations using an ensemble machine learning method
29	**Jake Sorber (IBHS), Rafi Marandi, Ian Giammanco, Aaron Prabhakaran** Development of an omni-directional disdrometer for detection of wind-driven hail
30	**Arne Spitzer (DWD), Ulrich Blahak, Matthias Jerg, Harald Kempf, Manuel Werner** Using crowdsourced data to verify object-based nowcasting
31	**Valentina Campana (ARPA Piemonte), A. Fornasiero, Roberto Cremonini, P.P. Alberoni** Identification of large hail using weather radar data in Piemonte and Emilia-Romagna regions
32	**Tomeu Rigo, (Servei Meteorològic de Catalunya,) Carme Farnell** A radar analysis of two giant hail thunderstorms in Catalonia
33	**Cloé David (Météo-France, CNRM), Clotilde Augros, François Bouttier, Benoît Vié** Preliminary findings on the links between ZDR columns and hail in France

Session 7: Microphysics and dynamics of hail storms

34	**Carme Farnell (1Servei Meteorològic de Catalunya), Tomeu Rigo, Andy Heymsfield** The different shapes of hailstones depending on the thermodynamics
35	**Agostino Manzato, Charles Knight, Matthew Kumijan, Barbara Stenni, Giuliano Dreossi, Mauro Masiol, Qinghong Zhang, Xiangyu Lin, Andrew Heymsfield** A comprehensive description of first August 2021 hailstorm in Azzano Decimo, NE Italy
36	**Katerina Skripniková (Czech Academy of Sciences), Zbynek Sokol** Evolution of severe hailstorms as observed by polarimetric X-band radar at the Milešovka observatory
37	**Miklos Szakall (Uni Mainz), Alexander Theis, Andrew Heymsfield, Subir Kumar Mitra, Waldemar Schledewitz, Stephan Borrmann** Comparative study into the melting of spherical and natural-like hailstones
38	**Alexander Theis (Max Planck Institute for Chemistry), Laura Gömmer, Laura Werner, Subir Kumar Mitra, Andrew Heymsfield, Stephan Borrmann, Miklos Szakall** A wind tunnel investigation on the heat and mass transfer of hailstones
39	**Haifan Zhang (Peking University), Xiangyu Lin, Qinghong Zhang, Kai Bi, Chang-Pang Ng, Yangze Ren, Huiwen Xue, Li Chen, Zhuolin Chang** Analysis of insoluble particles in hailstones in China