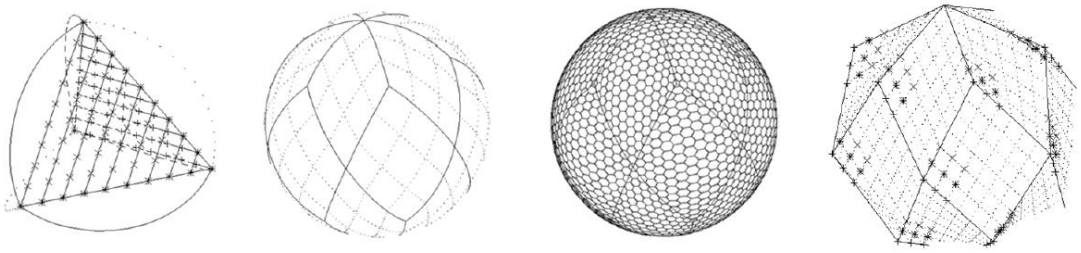
Mathematics of the weather

7 – 9 October 2024, Bad Orb, Germany



Agenda

Monday, 7 October 2024

11:30 - 12:45 Registration
Coffee and lunch snack will be served

12:45 - 13:15 Welcome

Session 1: Turbulence (13:15 - 14:15)

13:15 - 13:45 STIPERSKI, Ivana, invited: Challenges of turbulence modelling over realistic terrain

13:45 - 14:00 GUCCI, Federica: Directionality of the turbulent exchange of momentum: an eigen-decomposition approach

14:00 - 14:15 BAKSI, Aditya: Atmospheric turbulence with energy sources at two disparate length-scales.

Coffee Break (14:15 - 14:45)

Session 2: Parameterizations & Machine Learning (14:45 - 16:15)

14:45 - 15:00 JOCHUM, Felix: The impact of transience in the interaction between orographic gravity waves and mean flow

15:00 - 15:15 KNOP, Irmgard: Impact of small-scale gravity waves on tracer transport

15:15 - 15:30 KOSAREVA, Alena: Generalisation of the parametrisation for homogeneous ice nucleation due to gravity waves

15:30 - 15:45 MARRAS, Simone: LES of Tropical Cyclones with Adaptive Mesh Refinement and Non-Column Based Microphysics.

15:45 - 16:00 GAN, Pu: A Preliminary 3D AI-Driven Adaptive Mesh Technique in Adaptive Atmospheric Model Fluidity-Atmosphere

16:00 - 16:15 KWASNIOK, Frank: Data-driven deterministic and stochastic subgrid-scale parameterization for atmosphere and ocean models: a pattern-based approach

Coffee Break (16:15 - 16:45)

Session 3: Machine Learning A (16:45 - 18:15)

16:45 - 17:15 HASSANZADEH, Pedram, invited: Challenges of AI weather models in learning multi-scale dynamics and gray swans

17:15 - 17:45 DURRAN, Dale, invited: Coupled atmosphere-ocean simulations with a parsimonious deep learning model

17:45 - 18:15 KLEIN, Rupert, invited: Thoughts on Machine Learning

18:15 Icebreaker

Tuesday, 8 October 2024

Session 4: Machine Learning B (08:30 - 09:45)

08:30 - 09:00 FANG, Fangxin, invited: Hybrid AI and multiscale physical modelling for optimal urban decarbonisation combating climate change

09:00 - 09:15 LI, Linfeng: Neural Network Implementation of High-order Discontinuous Galerkin Methods

09:15 - 09:30 CONNELLY, David: Acceleration of a ray tracing parameterization of gravity wave momentum transport

09:30 - 09:45 FREESE, Philip: Improving performance of effectively submesoscale resolving ocean simulations

Coffee Break (09:45 - 10:15)

Session 5: Applied & Numerical Mathematics (10:15 - 11:50)

10:15 - 10:45 RADEMACHER, Jens, invited: Rotating convection and flows with horizontal kinetic energy backscatter

10:45 - 11:15 KORN, Peter, invited: On a Discrete Hierarchy for Atmosphere-Ocean Dynamics

11:15 - 11:30 BABBAR, Arpit Admissibility preserving Flux Reconstruction / Discontinuous Galerkin methods for compressible flows

11:30 - 11:50 GEIHE, Benedict HARTUNG, Kerstin: Adaptive mesh refinement in Earth-system modeling: first steps

Lunch Break (11:50 - 13:15)

13:15 - 15:15 Postersession & Coffee

Session 6: Numerical Mathematics A (15:15 - 16:45)

15:15 - 15:45 BALDAUF, Michael, invited: Further steps towards a Discontinuous Galerkin solver as an alternative dynamical core for the ICON model

15:45 - 16:15 RANOCHA, Hendrik, invited: Modern discontinuous Galerkin methods for atmospheric physics

16:15 - 16:45 LI, Jinxi, invited: The construction of a three□dimensional dynamically adaptive finite-element atmospheric model Fluidity-Atmos

Coffee Break (16:45 - 17:15)

Session 7: Numerical Mathematics B (17:15 - 18:30)

17:15 - 17:45 MESINGER, Fedor, invited: What features, beyond the vertical coordinate, are responsible for the Eta model skill?

17:45 - 18:00 STEPPELER, Juergen: Noise producing smooth surfaces with cut cells

18:00 - 18:30 VASYLKEVYCH, Sergiy, invited: 3D TIGAR: Vertical spectral representation of a global atmospheric primitive equation dynamical core based on Hough harmonics

19:00 Conference Dinner at Kärrners Gasthausbrauerei

Wednesday, 9 October 2024

Session 8: Time-Scale Interactions & Balancing (08:30 - 09:45)

08:30 - 09:00	OLIVER, Marcel, invited: Surrogate models for fast-slow mode interactions
09:00 - 09:15	CHEW, Ray: Balanced data assimilation with a blended numerical model
09:15 - 09:30	YAMAZAKI, Hiroe: Time-parallel integration and phase averaging for the rotating shallow-water equations on the sphere
09:30 - 09:45	COX, Michael: Phase Averaged Deferred Correction for Multi-Timescale Systems

Coffee Break (09:45 - 10:15)

Session 9: Understanding by Advanced Data Analysis (10:15 - 11:30)

10:15 - 10:45	GERBER, Edwin, invited: Using Explainable AI and Transfer Learning to understand and predict the maintenance of Atlantic blocking with limited observational data
10:45 - 11:15	VERCAUTEREN, Nikki, invited: Atmospheric flow regimes: stochastic modelling and data clustering for sensitivity studies and reduced stochastic models
11:15 - 11:30	ERTZ, Philipp: A Spatial Bayesian Hierarchical Postprocessing of Wind Gusts

Break & Lunch Snack & Discussions (11:30 - 12:30)

Session 10: Pushing the Frontier of Atmospheric Modelling: Pushing the Frontier of Atmospheric Modelling (12:30 - 14:00)

12:30 - 13:00	SATOH, Masaki, invited: Development of a global large-eddy simulation model by the Nonhydrostatic Icosahedral Atmospheric Model (NICAM)
13:00 - 13:30	KUEHNLEIN, Christian, invited: Developing numerical weather prediction models in Python
13:30 - 14:00	Final Discussion & Outlook

Posters:

The session will take place on Tuesday afternoon; all posters will be visible during the whole conference, authors will be available during the poster session and on demand during the other times

ACHATZ, Ulrich: Realistic and Efficient Gravity-Wave Modelling

CHEN, Boyang: Solving the Discretised Flow Equations on Structured Grid using Machine Learning: Applications in Urban Flows Dynamics

CHEW, Ray: A novel constrained spectral approximation method

CHEW, Ray: pyBELLA+: A laboratory testbed for investigating novel NWP applications

DOLAPTCHIEV, Stamen: Ice cloud generation by transient gravity wave parameterization

GASSMANN, Almut: Analysis of the entropy budget at stable stratification using LF Richardson's notion of the intrinsic energy

GASSMANN, Almut: Revision of moist PV under the notion of the particle relabeling symmetry

GROOT, Edward: Model uncertainty model intercomparison project - an intercontinental comparison of physics suites in weather prediction and climate modelling

GROOT, Edward: Model Uncertainty – MIP

KNOTH, Oswald: CGDycore: A Julia implementation of numerical dycores for different backends

KWASNIOK, Frank: The structure of predictability in an intermediate-complexity atmospheric model: covariant Lyapunov vectors and finite-time Lyapunov exponents

LIAN, Ruxu: Well-Posedness of the Dynamic Framework in Earth-System Model

MARRAS, Simone: Jexpresso: an open source software package for the solution of general PDEs of computational mechanics.

PROCHAZKOVA, Zuzana: Spectral Analysis of Gravity Waves in a High-Resolution ICON Simulation

SPICHTINGER, Peter: A hierarchy of ice cloud models