



2020 continues to be an unusual year. Most of us are working from home and expect to be doing so for the rest of the year. With everyone using video-conferencing, it is as easy to talk to a colleague in another city as to the person who normally sits in the office next door. This is an unexpected but very real benefit for the collaborative research projects in W2W. On the other hand, we need to pay special attention to integrate the newcomers, who sometimes have not had the chance to meet their colleagues in person.

As this newsletter shows, we are experimenting with new formats for interaction, both within our community and for outreach, and we are looking forward to what the rest of the year will bring!

George Craig

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If you have any questions or comments about this newsletter or W2W in general, we would be happy to hear from you!

Upcoming events

- An online **machine learning workshop** will be organized by and for the W2W early career scientists from 12 – 14th October 2020. More information will be available here soon:
<https://www.wavestoweather.de/meetings/ecs-ml-workshop2020>
- The **6th W2W Annual Meeting** will take place online from 16 – 18th November 2020. The keynote speakers are Daniela Domeisen (ETH Zürich), Tim Hewson (ECMWF), Ron McTaggart-Cowan (Environment Canada) and Axel Seifert (DWD). Further international guests are: Michael Morgan (University of Wisconsin), Carolyn Reynolds (NRL) and Susan van den Heever (Colorado State University). We are looking to an exciting online meeting! More information is available here:
https://www.wavestoweather.de/meetings/annual_meeting6
- The **ECS annual meeting** will be organized by and for the W2W early career scientists in 2021. More information will be available here soon:
<https://www.wavestoweather.de/meetings/ecs-annual-meeting-2021>
- A **presentation skill workshop** will be organized by and for the W2W early career scientists in 2021. More information will be available here soon:
<https://www.wavestoweather.de/meetings/ecs-presentation-workshop2021>

- The **Kompaktseminar Numerik workshop** has been postponed to 8 – 10th September 2021 in the Pfalzakademie Lambrecht, between Karlsruhe and Mainz. More information will be available here:
<https://www.wavestoweather.de/meetings/kompaktseminar2021>
- The **7th W2W Annual Meeting** will take place from 8 – 10th November 2021 in Eibelsstadt.

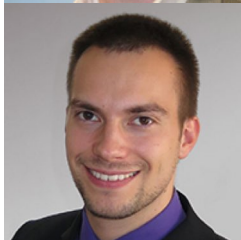
Additional information on upcoming events can be found here:

<http://www.wavestoweather.de/meetings>

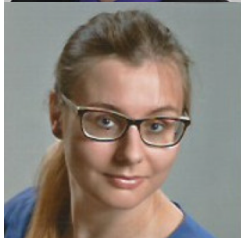
News



Martin Hanke-Bourgeois (project B7) became the Dean of the Faculty of Physics, Mathematics and Computer Science at the Johannes Gutenberg-University in Mainz. Congratulations Martin!



Alexander Kumpf (project B5, TUM) defended his PhD on 6 July. Congratulations Alexander and all the best in your future scientific endeavors!

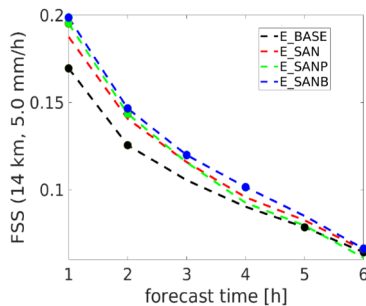


Juliane Rosemeier (project A2, JGU) defended her PhD on 7 September 2020. Congratulations Juliane, we wish you all the best for your next career steps!

Research Highlights

Here are some examples of recently published research from W2W.

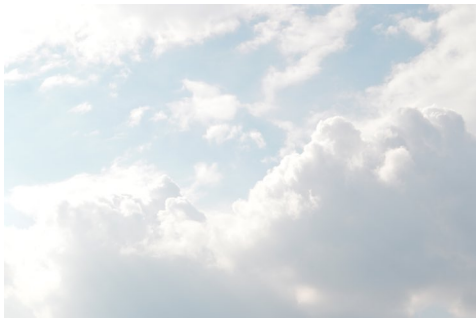
1. Comparison of Methods Accounting for Subgrid-Scale Model Error in Convective-Scale Data Assimilation (Y. Zeng, T. Janjić, A. de Lozar, S. Rasp, U. Blahak, A. Seifert and G.C. Craig)



Compared to the basic experiment (E_BASE), additive noise based on model truncation error (E_SAN) produces considerably better precipitation forecasts (based on the fractions skill score, dots indicate 95% confidence). Combining the additive noise with either the physically based stochastic perturbation scheme (E_SANP) or the advanced warm bubble technique (E_SANB) further improves the skill of precipitation forecasts, with the latter one being more beneficial.

Read the full article: <https://doi.org/10.1175/MWR-D-19-0064.1>

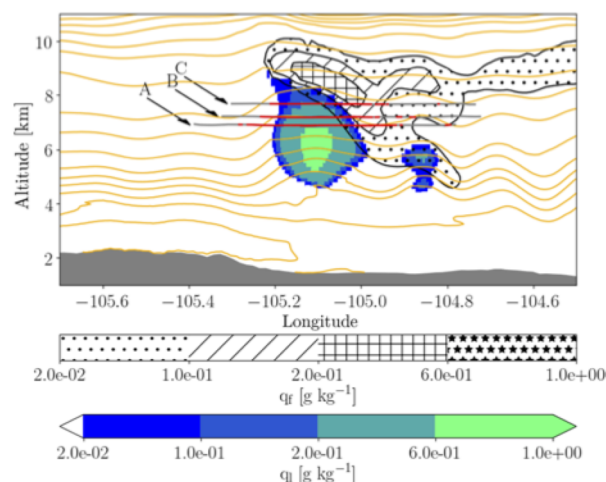
2. Machine learning for total cloud cover prediction (A. Baran, S. Lerch, M. El Ayari and S. Baran)



Accurate and reliable forecasting of total cloud cover is vital for areas including astronomy, solar energy production, and agriculture. However, most NWP models' forecasts of cloud cover are substantially less skillful compared to other weather variables. We propose and compare various statistical and machine learning methods for post-processing cloud cover ensemble forecasts. All methods significantly improve the ensemble predictions, with specifically tailored statistical and neural network models showing the best results.

Read the full article: <https://doi.org/10.1007/s00521-020-05139-4>

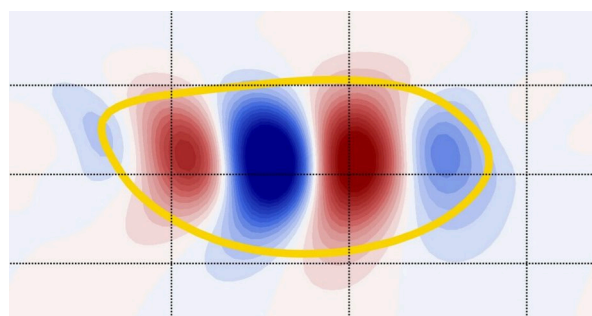
3. Vertical redistribution of moisture and aerosol in orographic mixed-phase clouds (A.K. Miltenberger, P. R. Field, A. H. Hill and A. J. Heymsfield)



Orographic wave clouds offer a natural laboratory to investigate cloud microphysical processes and their representation in atmospheric models. They impact the larger-scale flow by a vertical redistribution of moisture and aerosol. We use detailed observations from the ICE-L campaign to evaluate the representation of these clouds in the Unified Model with a focus on their microphysical structure. The simulations are then used to investigate the modification of aerosol and moisture profiles by the wave cloud. With idealised simulations we investigate the dependence of the downward moisture flux on environmental conditions and summarise the results in a conceptual model.

Read the article: <https://acp.copernicus.org/articles/20/7979/2020/>

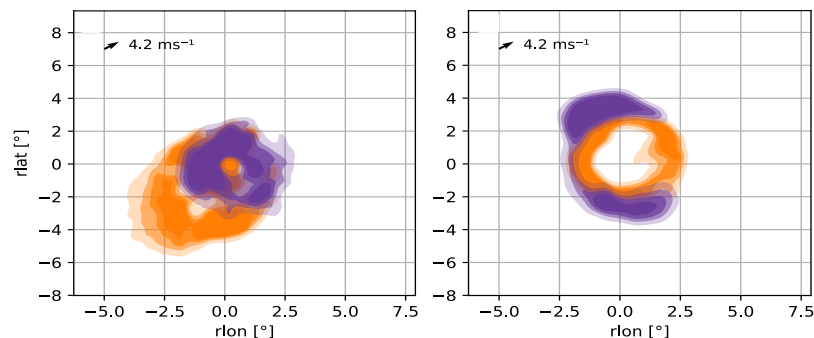
4. Local Rossby Wave Packet Amplitude, Phase Speed, and Group Velocity: Seasonal Variability and their Role in Temperature Extremes (G. Fragkoulidis and V. Wirth)



Based on the analytic signal of upper-tropospheric meridional wind, this study proposes a method for the diagnosis of Rossby wave packet (RWP) phase speed and group velocity locally in space and time. Global climatologies of these RWP properties are produced and distinct features of seasonal and inter-regional variability are highlighted. In addition, pronounced anomalies are found in the amplitude and zonal phase speed distributions over Central Europe during short-lived and persistent temperature extremes, thus reflecting the role of upper-tropospheric dynamics in this respect and the value of the new diagnostics.

Read the full article: <https://doi.org/10.1175/JCLI-D-19-0377.1>

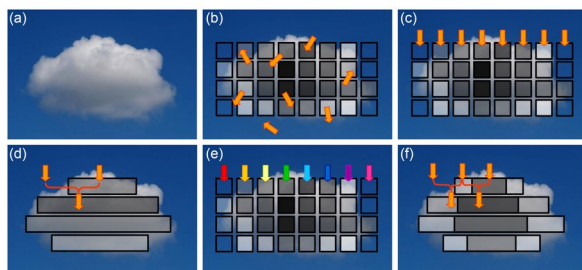
5. Cluster analysis tailored to structure change of tropical cyclones using a very large number of trajectories (T. Kremer, E. Schömer, C. Euler and M. Riemer)



For the first time, in a collaboration between computer sciences and atmospheric dynamics, we have identified these major airstreams based on objective, automated cluster analysis of order of 1 Million trajectories. The substantial structure change of Karl during its extratropical transition is described from this airstream perspective. Analysis of bulk thermodynamic properties along major airstreams provide new aspects into Karl's intensification in vertical wind shear and structure change, and outlines avenues for future research building on our clustering technique.

Read the full article: <https://journals.ametsoc.org/mwr/article/doi/10.1175/MWR-D-19-0408.1/354262/Cluster-analysis-tailored-to-structure-change-of>

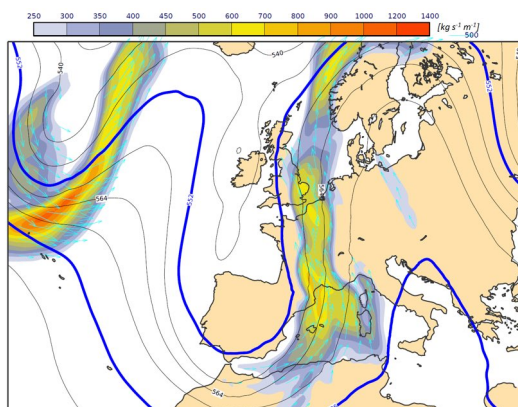
6. The incorporation of the Tripleclouds concept into the δ -Eddington two-stream radiation scheme: solver characterization and its application to shallow cumulus clouds (N. Črnivec and B. Mayer)



Unresolved interaction between clouds and atmospheric radiation is a source of uncertainty in weather and climate models. The present study highlights the potential of the state-of-the-art Tripleclouds radiative solver for shallow cumulus clouds, exposing the significance of properly representing subgrid cloud horizontal heterogeneity. The Tripleclouds concept was thereby incorporated in the widely employed δ -Eddington two-stream radiation scheme within the comprehensive libRadtran library.

Read the full article: <https://doi.org/10.5194/acp-20-10733-2020>

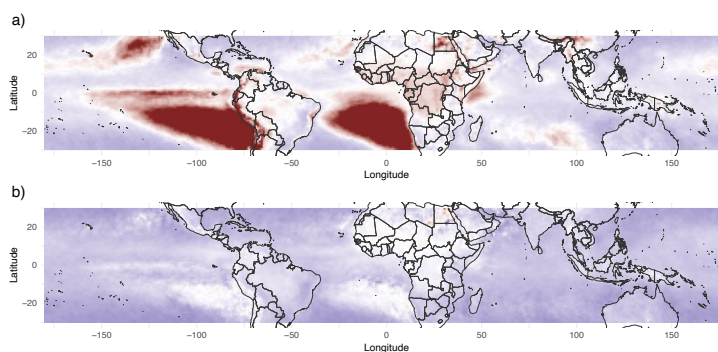
7. The 1994 Piedmont flood: an archetype of extreme precipitation events in Northern Italy (F. Grazzini, G. Fragkoulidis, V. Pavan and G. Antolini)



Extreme precipitation events (EPEs) are recurrent phenomena in northern Italy in autumn. In this respect, we show how the meteorological conditions leading to the 1994 Piedmont flood represent a typical flow evolution for this type of extreme events. Exploiting the systematic classification of EPEs recently developed by the authors, this article revisits the role of the large-scale flow on this and on similar cases of past EPEs.

Read the full article: <https://doi.org/10.1007/s42865-020-00018-1>

8. Skill of global raw and postprocessed ensemble predictions of rainfall in the tropics (P. Vogel, P. Knippertz, A.H. Fink, A. Schlueter and T. Gneiting)



Accurate forecasts of rainfall could support tropical countries to more effectively manage key resources such as water, food, health, and energy. Here we assessed the usefulness of 1- to 5-day predictions from two leading weather centers (ECMWF, Canadian MSC) against satellite-based rainfall estimates (TRMM). The forecast models failed to predict the probability of rainfall occurrence better than a climatological reference in many parts of the tropics but showed some value in predicting rainfall amounts and even extremes. Statistical correction methods can significantly improve the raw model output except for high mountain ranges, some coastal areas, and most of tropical Africa.

Read the full article: <https://doi.org/10.1175/WAF-D-20-0082.1>

Additional publications relevant to W2W are listed here:

<http://www.wavestoweather.de/publications>

Past activities

ECMWF ↔ W2W collaboration meeting

On 20 July 2020, a few SG members met with ECMWF representatives to discuss future collaborations, e.g., in the form of transfer projects.

Early Career Scientists online coffee breaks

The ECS committee organizes bi-monthly online coffee breaks to foster informal exchange and to strengthen the communication within the projects and between the different W2W locations. The virtual coffee breaks go very well, even if the participation of ECS from nearly all W2W locations fluctuates. Topics of discussion included home office, work satisfaction, productivity tricks and other contemporary issues. All ECS enjoy themselves and give positive feedback about the format.

Language exchange within the ECS community

The ECS committee created a language exchange activity within the ECS community of W2W. Pairs of people are matched up depending on their interests and skills in languages and they then meet online. As well as developing and improving language skills, these meetings bring the ECS closer together during these physically unconnected times. The languages offered include English, Chinese, Dutch, Japanese, French and German.

Seminars and guest program

Information about previous guest scientists invited by W2W is posted here:

<http://www.wavestoweather.de/guest>

Past and upcoming W2W seminars are listed here:

<http://www.wavestoweather.de/seminars>

The seminars and colloquium are broadcasted live using **Adobe Connect**. If you would like to receive a link to listen to the presentation, please contact us.

Communication

Dissemination

Past issues of this newsletter

You will find the previous issues of this newsletter here:

http://www.wavestoweather.de/outreach/quarterly_newsletter

Outreach

Presentation at the Ulm University

On July 10th Tilmann Gneiting was invited to talk about the successes and limits of weather predictability at the mathematical colloquium of the Ulm University. The presentation was online, and about 40 participants from the general public listened to the presentation. The discussion included topics such as the effects of climate change and COVID19 on weather forecasts. Read more about this event here:

<https://www.wavestoweather.de/communication/outreach-activities/presentations-general-public/>

Article in „Welt am Sonntag“

Andreas Fink has been extensively interviewed about the current heat wave in Siberia in the newspaper “Welt am Sonntag”. The article appeared on 5 July 2020 and can be read here:

<https://www.wavestoweather.de/communication/outreach-activities/press-releases/interview-siberia-2020>

Spielstadt Mini-München

Two workshops have been offered at the “Mini-München” event (<https://www.mini-muenchen.info>) by ECS from the meteorological institute in Munich (Tabea Gleiter Mirjam Hirt, Theresa Diefenbach and Richard Maier). This event takes place over three weeks and is for children and teenagers between 7 and 15 years.

The first workshop on 30 July focused on short and fun experiments to learn about pressure, temperature, clouds, etc. The participants asked lots of questions and even performed additional experiments they had designed together.



Tabea, Richard and Theresa introduce meteorological concepts to the participants on 30 July.

presentation will be available as live stream and about 50 participants will be allowed in the room (Ehrensaal). For more information, visit:

<https://www.wavestoweather.de/communication/outreach-activities/presentations-general-public/deutsches-museum-oct-2020>

Equal opportunity (EO) activities

EO measures in W2W

- Read about the EO committee:
http://www.wavestoweather.de/equal_opportunity/contact
- Read about the EO measures offered in W2W:
http://www.wavestoweather.de/equal_opportunity/eo_measures
- Read about the EO measures and activities already implemented:
http://www.wavestoweather.de/equal_opportunity/activities

Summer's highlight



Calm before the thunderstorm over Munich on 1 July 2020. Photo: Matthias Schindler

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