

# Waves to Weather



Newsletter Jan. /Mar. 2017

Dear Reader,

This is the first issue of a quarterly newsletter informing you about Waves to Weather ([www.wavestoweather.de](http://www.wavestoweather.de)), a new research program in Germany that aims to investigate the limits of predictability of high impact weather. Each issue will feature current activities, upcoming events and research highlights. We hope that you will enjoy reading this newsletter and that you will recommend it to your colleagues. However, if you do not wish to receive it again, please send an email to [audine.laurian@lmu.de](mailto:audine.laurian@lmu.de).

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## Upcoming events

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- A **NAWDEX workshop** is organized together with the HALO SPP 1294 from March 8<sup>th</sup> – 10<sup>th</sup> 2017 in Munich. The aim of the workshop is to bring together the two communities of dynamical meteorologists and instrument scientists to present and discuss the outcome of the NAWDEX field campaign, and to make plans for collaborations exploiting the data. Some presentations might be broadcasted. Please contact us if you are interested.

Additional information on upcoming events can be found here:  
<http://www.wavestoweather.de/meetings>

Please contact us if you have any questions.

## Guest program and seminars

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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.

Information about invited scientists is posted here: <http://www.wavestoweather.de/guest>.

## Past activities

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### NAWDEX campaign

The NAWDEX campaign took place from September 19<sup>th</sup> to October 16<sup>th</sup> 2016 over Iceland and the North Atlantic region. Coordinated flights with the HALO, DLR Falcon, FAAM (UK) and Saphire (France) aircrafts have allowed the collection of an unprecedented dataset of the jet stream, warm conveyor belts, polar vortices, extratropical cyclones, downstream impact, forecast busts and much more.

The NAWDEX campaign has been featured in the news at several occasions:  
<http://www.wavestoweather.de/cca/campaign-data/nawdex>



*Top, left: over the North Atlantic and across a warm conveyor belt on Sep. 23<sup>rd</sup> 2016. Top, right: HALO in the hangar at Keflavik (photos: Manuel Gutleben). Bottom: the NAWDEX team (photo: Julia Mack)*

### 2<sup>nd</sup> Annual Meeting of W2W

The 2<sup>nd</sup> Annual Meeting of W2W took place in Speyer from November 8<sup>th</sup> – 11<sup>th</sup> 2016. The Early Career Scientists (ECS) presented their research and results. During the breakout group discussions, the W2W participants reported on ongoing and planned collaborations with the partner institutions in W2W, as well as on collaborations outside of W2W. The invited



speakers and guests provided valuable insights and feedback, making the many discussions lively and inspiring for all participants. Among them, Wojciech Grabowski (NCAR), Dale Durran (University of Washington) and Ron McTaggart-Cowan (Canadian Meteorological Center) visited Karlsruhe, Munich and Mainz to further discuss with W2W researchers and give seminars.

The program and more information about the meeting can be found here: [http://www.wavestoweather.de/meetings/annual\\_meeting2](http://www.wavestoweather.de/meetings/annual_meeting2)

During the 2<sup>nd</sup> General Assembly, the W2W members have unanimously elected a new steering group: [http://www.wavestoweather.de/about\\_us](http://www.wavestoweather.de/about_us)

During the 2<sup>nd</sup> ECS meeting, the ECS have elected a new ECS committee and a new ECS representative: <http://www.wavestoweather.de/early-career>



- |                                |                               |                                 |                           |                                |                              |
|--------------------------------|-------------------------------|---------------------------------|---------------------------|--------------------------------|------------------------------|
| 01 Peter SPICHTINGER, JGU      | 12 Georgios FRAGKOLIDIS, JGU  | 23 Michael KUNZ, KIT            | 34 Andreas SCHÄFLER, DLR  | 45 Ron McTAGGART-COWAN, EC     | 56 Rüdiger WESTERMANN, TUM   |
| 02 Dale DURRAN, UW (USA)       | 13 Roland POTTTHAST, DWD (DE) | 24 Andreas FINK, KIT            | 35 Aiko VOIGT, KIT        | 46 Michael RIEMER, JGU   (CAN) | 57 Sebastian LERCH, KIT      |
| 03 Andrew BARRETT, KIT         | 14 Lance BOSART, SUNY (USA)   | 25 Enrico Di MUZIO, KIT         | 36 Tobias KREMER, JGU     | 47 Christian KEL, LMU          | 58 Marc RAUTENHAUS, TUM      |
| 04 Martin HANKE-BOURGEOIS, JGU | 15 Manuel KLAR, KIT           | 26 Heini WERNLI, ETHZ (CH)      | 37 Robert REDL, LMU       | 48 Lotte BIERDEL, LMU          | 59 Nikolas PORZ, JGU         |
| 05 Andreas SCHLÜTER, KIT       | 16 Ulrich CORSMEIER, KIT      | 27 Florian PANTILLON, KIT       | 38 Tobias SELZ, LMU       | 49 Christian EULER, JGU        | 60 Stephan RASP, LMU         |
| 06 Alexander KUMPF, TUM        | 17 Detlev MAJEWSKI, DWD (DE)  | 28 Wojciech GRABOWSKI, NCAR     | 39 Juliane ROSEMEIER, JGU | 50 Filip SADLO, RKU            | 61 Florian BAUR, LMU         |
| 07 Michael KERN, TUM           | 18 Peter KNIPPERTZ, KIT       | 29 Elmar SCHÖMER, JGU   (USA)   | 40 Kevin BACHMANN, LMU    | 51 Ole KLEIN, RKU              | 62 Michael MAIER-GERBER, KIT |
| 08 Maria LUKÁČOVÁ, JGU         | 19 Pila BOSSMANN, KIT         | 30 Peter VOGEL, KIT             | 41 Sophia SCHÄFER, KIT    | 52 Mirjam HIRT, LMU            | 63 Bernhard VOGEL, KIT       |
| 09 Tijana JANJIĆ-PFANDER, LMU  | 20 Yvonne RUCKSTUHL, LMU      | 31 Marlene BAUMGART, JGU        | 42 Federico GRAZZINI, LMU | 53 Christian BARTHLOTT, KIT    | 64 Andrea SCHÄFER, LMU       |
| 10 George CRAIG, LMU           | 21 Bettina WIEBE, JGU         | 32 Constanze FISCHERKELLER, KIT | 43 Nina CRNVEC, LMU       | 54 Audine LAURIAN, LMU         | 65 Volkmar WIRTH, JGU        |
| 11 Paolo GHINASSI, KIT         | 22 Theresa DIEFENBACH, LMU    | 33 Anne MARTIN, LMU             | 44 Joël ARNAULT, KIT      | 55 Hans VOLKERT, DLR           | 66 Martin WEISSMANN, LMU     |

Legend: *id*, Given name SURNAME, affiliation (*invited guests underlined*, country code in brackets)

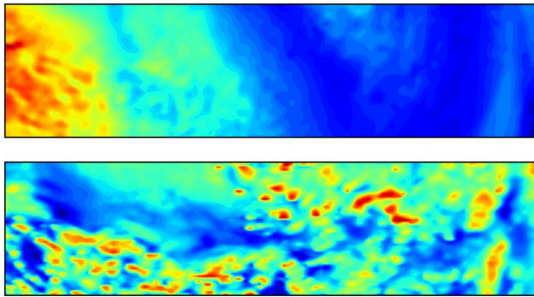
Photos & arrangement: Hans Volkert & Axel Lauer

Participants of the 2<sup>nd</sup> Annual Meeting of W2W, Nov. 2016, Speyer

## Research Highlights

Here are some examples of recently published research from W2W.

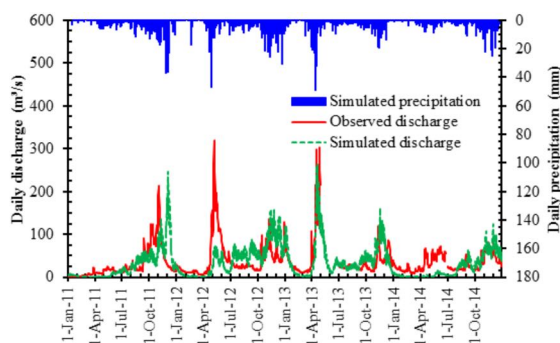
### 1. Structure function analysis of water vapor simulated with a convection-permitting model and comparison to airborne lidar observations (T. Selz, L. Fischer, and G. C. Craig)



*Specific water vapor content of two horizontal slices obtained from a cloud resolving model simulation with COSMO. The upper slice shows a non-convecting air mass, the lower slice shows an air mass with shallow convection. The clearly visible difference between the two is quantified using several parameters derived from a structure function analysis of the simulated water vapor field. In addition the accuracy of determining these parameters from airborne LIDAR observations is estimated.*

Read the full article: <http://journals.ametsoc.org/doi/abs/10.1175/JAS-D-16-0160.1>

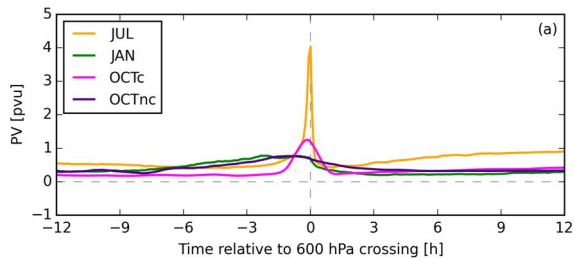
### 2. Joint atmospheric-terrestrial water balances for East Africa: A WRF-Hydro case study for the upper Tana River basin (N. Kerandi, J. Arnault, P. Laux, S. Wagner, J. Kitheka, and H. Kunstmann)



*The improvements made with the hydrologically enhanced version of the Weather Research and Forecasting model WRF-Hydro applied to the Mathiyoia-Sagana river basin in Kenya, East Africa are investigated. The figure shows the simulated daily discharge and precipitation in the region. The paper demonstrates the potential of WRF-Hydro for joint atmospheric-terrestrial water balance studies.*

Read the full article: <http://link.springer.com/article/10.1007/s00704-017-2050-8>

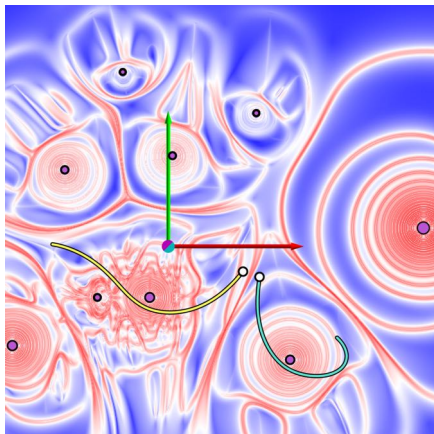
### 3. Convective and slantwise trajectory ascent in convection-permitting simulations of mid-latitude cyclones (S. Rasp, T. Selz, and G. C. Craig)



*Evolution of the mean potential vorticity (PV) for the three cases, separated into convective and non-convective parcels (OCTc and OCTnc) in the autumn case. The time axis is centered relative to the midpoint of the ascent ( $t = 0$ ). The PV peak at the time of the ascent is clearly visible, and is much sharper for the convective cases (JUL and OCTc). All four lines, however, show a remarkable similarity of the mean PV value before and after the ascent*

Read the full article: <http://journals.ametsoc.org/doi/10.1175/MWR-D-16-0112.1>

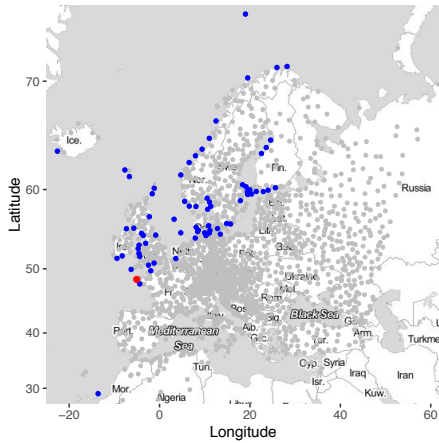
### 4. Topological Analysis of Inertial Dynamics (A. Sagristà, S. Jordan, A. Just, F. Dias, L. G. Nonato, and F. Sadlo)



*Analysis of 2D gravitational field induced by nine stationary bodies (purple points, mass by point radius). Phase-space finite-time Lyapunov exponent field (low values blue, high values red) constrained to zero initial velocity visualizes regions of qualitatively different phase-space dynamics (yellow, cyan: spatial projection of phase-space trajectories within different regions). Note that the rings around the bodies separate different periodicities of orbits*

Read the full article: <http://ieeexplore.ieee.org/document/7539608/>

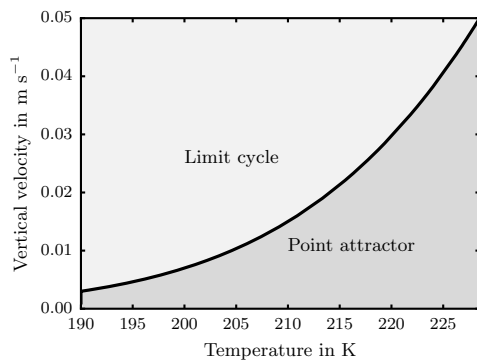
**5. Similarity-based semilocal estimation of post-processing models (S. Lerch and S. Baran)**



*Illustration of the 75 most similar stations (blue) for a reference station at Ouessant, France (red), with similarities determined based on climatological properties and forecast errors*

Read the full article: <http://onlinelibrary.wiley.com/doi/10.1111/rssc.12153/abstract>

**6. Subvisible cirrus clouds – a dynamical system approach (E. J. Spreitzer, M. P. Marschalik, and P. Spichtinger)**

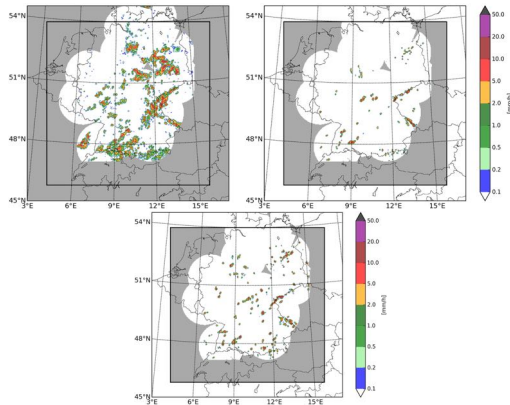


*Bifurcation diagram for "positive point attractor" (state 1) and "limit cycle" (state 2) regimes in the w-T-space. The thick line indicates the location of the Hopf bifurcation*

Read the full article: <http://www.nonlin-processes-geophys-discuss.net/npg-2015-78/npg-2015-78.pdf>



## 7. Physically-based stochastic perturbations (PSP) in the boundary layer to represent uncertainty in convective initiation (K. Kober and G. C. Craig)



*Snapshots of hourly-accumulated precipitation on a convective summer day. (Upper left) radar observations, (upper right) reference run without perturbations, (lower panel) one simulation with stochastic boundary layer perturbations*

Read the full article: <http://journals.ametsoc.org/doi/abs/10.1175/JAS-D-15-0144.1>

## 8. Aerological data spurred dynamical meteorology: Richard Scherhag's contribution of 1934 as an early milestone (H. Volkert)



*Richard Scherhag on the observation platform of the newly founded meteorological institute at the Free University in Berlin, in 1952*

Read the full article: <http://www.schweizerbart.de/papers/metz/detail/prepub/85677>

**Additional publications relevant to W2W** are listed here:

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

## Outreach activities

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### Selected past activities

- On October 21<sup>st</sup>, the weather reports of the **ARD-Morgenmagazin** were presented from DLR Oberpfaffenhofen. About 15 minutes have been dedicated to the NAWDEX campaign including interviews with George Craig and Andreas Schäfler. More information here:

[http://www.wavestoweather.de/outreach/nawdex\\_in\\_ardmorgenmg\\_21102016](http://www.wavestoweather.de/outreach/nawdex_in_ardmorgenmg_21102016)

- On November 23<sup>rd</sup> 2016, George Craig gave an overview presentation about W2W in the **Deutsche Meteorologische Gesellschaft (DMG) seminar series**.
- On December 8<sup>th</sup> 2016, Michael Riemer gave an invited presentation at the **KlimaCampus Colloquium** in Hamburg. More information can be found here: [http://www.wavestoweather.de/outreach/talk-klimacampus-08\\_12\\_2016](http://www.wavestoweather.de/outreach/talk-klimacampus-08_12_2016)
- George Craig gave an interview in the **Tiroler Tageszeitung** on December 11<sup>th</sup> 2016. The text (in German) is here: [http://www.wavestoweather.de/outreach/interview\\_tiroler\\_11122016](http://www.wavestoweather.de/outreach/interview_tiroler_11122016)
- A Doppler Lidar to measure wind speed and to track storms in Karlsruhe was successfully installed by Florian Pantillon, Ulrich Corsmeier and Peter Knippertz. A **press release** (in German) issued by KIT on December 16<sup>th</sup> 2016 can be read here: <http://www.wavestoweather.de/outreach/press-release-16122016>

#### Upcoming activities

- On March 1<sup>st</sup> 2017, Volkmar Wirth is invited to give a presentation at the **Deutsches Museum** in Munich in the “Wissenschaft für jedermann” seminar series. The title of his presentation (in German) is: *“The forecast: fair to cloudy”: how come the weather forecasts are (still) so uncertain?*  
More information can be found here: <http://www.wavestoweather.de/outreach/presentation-deutsches-museum>

## Equal Opportunity (EO)

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A flyer advertising EO measures offered to all W2W members and staff is available online and has been distributed during the 2<sup>nd</sup> Annual Meeting of W2W. Among the EO measures already implemented in W2W, student helpers have been hired to support parents of young children, outreach events for school girls have been organized at three partner institutions of W2W, and childcare has been organized during W2W meetings.

For more information:

- About the EO committee: [http://www.wavestoweather.de/equal\\_opportunity/contact](http://www.wavestoweather.de/equal_opportunity/contact)
- About EO measures offered in W2W: [http://www.wavestoweather.de/equal\\_opportunity/eo\\_measures](http://www.wavestoweather.de/equal_opportunity/eo_measures)
- About EO measures already implemented: [http://www.wavestoweather.de/equal\\_opportunity/activities](http://www.wavestoweather.de/equal_opportunity/activities)



## New people in W2W

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We wish a warm welcome to



**Mirjam Hirt** who started her PhD on December 1<sup>st</sup> 2016 in Munich (LMU) in the A6 project.

Mirjam says: “I have just finished my meteorology studies in Berlin and am looking forward to working in the W2W project as a PhD student. During my studies I visited Svalbard for a semester and worked as an intern at the MPI-M in Hamburg and at Munich Re. I worked as a tutor in the theoretical meteorology group and I wrote my master's thesis there on blocking weather patterns and how they can be represented with an idealized point vortex model. I am very interested in the mathematical and physical representation of atmospheric processes and I am looking forward to working on smaller scales for my PhD project.”

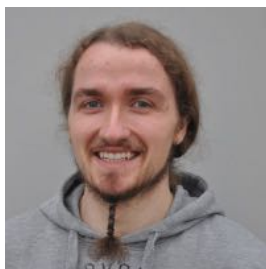
[http://www.wavestoweather.de/research\\_areas/a6](http://www.wavestoweather.de/research_areas/a6)



**Aiko Voigt** who joined W2W as a member on November 9<sup>th</sup> 2016. At KIT, he will mainly contribute to Research Area A.

Aiko says: “I am leading a junior research group on storm tracks and cloud-radiative interactions within the project HD(CP)<sup>2</sup> (<http://www.hdcp2.eu>) at the Karlsruhe Institute of Technology (KIT). Most of my work so far focused on climate dynamics and how the atmospheric circulation influences regional climate change. Within W2W, I am hoping to strengthen the links between my work and the weather community, and to build on common interests of the weather and climate communities in understanding cloud processes and their impact on the short-term and long-term evolution of the atmospheric circulation.”

[http://www.wavestoweather.de/research\\_areas/](http://www.wavestoweather.de/research_areas/)



**Matthias Schindler** will start his PhD mid-March 2017 at the LMU in Munich in the A3 project.

Matthias says: “As I have always been fascinated by the atmosphere and its diversity, I decided to study physics and meteorology with a consecutive Master's program at the Ludwig Maximilians University (LMU) Munich. The extensive course work on theoretical meteorology sparked my enthusiasm for atmospheric dynamics and data assimilation and prompted me to write my Master's thesis on a related topic (spurious convection in dynamically imbalanced radar data assimilation). As the open PhD position in the A3 project appeals to my existing research interests and offers a unique chance to specialize and develop new expertise, I am looking forward to taking up this challenge in February.

I greatly appreciate the opportunity to contribute to the W2W research project!”

[http://www.wavestoweather.de/research\\_areas/a3](http://www.wavestoweather.de/research_areas/a3)



**Philipp Zschenderlein** will start his PhD on January 2017 at KIT in Karlsruhe in the C4 project.

Philipp says: “I have studied Meteorology at the Freie Universität Berlin. During my studies, I have been a student assistant and a tutor for the 1<sup>st</sup> semester of Meteorology. I have also gained experience during a research internship at DLR Oberpfaffenhofen. I am interested in processes in the atmosphere, in particular these that influence the weather. I find the C4 project very interesting because the research questions are highly relevant for society and a lot can be learned about the dynamics of heat waves.”

[http://www.wavestoweather.de/research\\_areas/c4](http://www.wavestoweather.de/research_areas/c4)

## Winter's highlight

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*Northern lights at the Gardur lighthouse in Iceland on September 26<sup>th</sup> 2016 (photo: Pila Bossmann)*

### Contact

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