Waves to Weather

Newsletter Apr /Jun 2017

Dear Friends,

We are now in the second year of Waves to Weather and it has been very exciting to see the results that the new doctoral students are starting to produce. Many of them are now writing papers that I look forward to reading, but in the meantime, here are some highlights of our activities from the past few months. We are also very proud to be co-sponsoring the international Conference on Predictability and Multi-scale Prediction of High Impact Weather, together with the WWRP HI-Weather program, and we hope to see many of you in Landshut in October!

Best wishes,
George Craig (Speaker of W2W)

Contents

Upcoming events

The **conference on Predictability and multi-scale Prediction of High Impact Weather** is organized by W2W and by the HIWeather project of WMO in Landshut from October 9th – 12th 2017. The program will feature keynote presentations and breakout group discussions on fundamental challenges in the prediction of high impact weather. For more information about keynote speakers, abstract submission and registration, deadlines and venue, please visit https://hiw2017.wavestoweather.de.

The **3rd Annual Meeting of W2W** will take place from November 6th – 9th 2017 in Kempten. The early career scientists in W2W will present their latest results and keynote speakers from international research institutes and from weather services will take part in the discussions. Visit http://www.wavestoweather.de/meetings/3rd-annual-meeting2017 for more information.

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

Please contact us if you have any questions.

Past activities

2nd NAWDEX workshop

More than 50 international scientists from the dynamical meteorology, the instrument, and the data communities met at the **second cross-cutting activity "Campaign Data" workshop** from March 8th – 10th 2017 in Munich to discuss the outcome of the NAWDEX field phase and to make plans for collaborations exploiting the data. This joint workshop was co-convened by W2W and by the DFG HALO-SPP (http://www.halo.dlr.de/dfg-spp/). The NAWDEX campaign is triggering very promising and exciting scientific collaborations between the different countries involved and between the different fields of expertise. This is partly due to the efforts of the instrumental and the database teams, who made most of the data collected during the campaign already available.

Preliminary results, first highlights and quicklooks of the data collected by the coordinated flights from the German/Swiss (HALO, DLR Falcon), French (SAFIRE), UK (FAAM), and the USA (SHOUT program) teams during the campaign have been presented. The weather systems during the campaign have been summarized, Intensive Observation Periods (IOPs) were defined, and collaborations on specific IOPs and scientific topics have been identified. Guidelines to share the data collected (e.g. licensing) and to access data via a database (e.g. HALO database) have been introduced to the participants. An overview article about NAWDEX has been discussed, in particular its structure, its content and its authors. The article is planned to be submitted to BAMS in summer 2017.

Participants of the NAWDEX workshop in Munich on March 8th - 10th 2017

For more information on this workshop, visit
http://www.wavestoweather.de/meetings/nawdex-w2w-workshop-mar2017

2nd Research Area A "Upscale Error Growth" meeting

The **second meeting of the Research Area A** took place in Munich from May 18th – 19th 2017. About 25 researchers from the Research Areas A, B, C and from the central projects took part in the meeting. The ECS presented their latest results, as well as their submitted and planned publications.

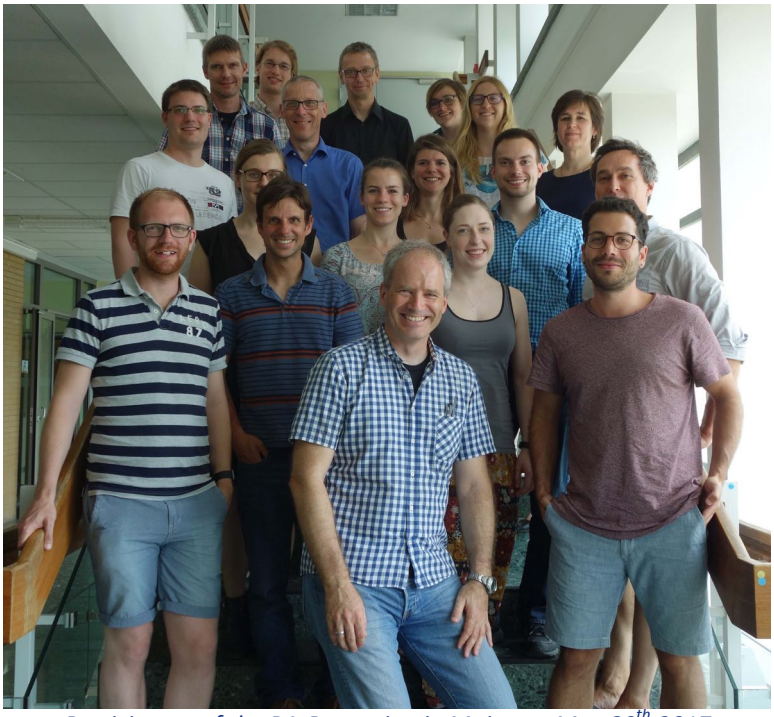
Participants of the RA-A meeting in Munich on May 18th – 19th 2017

For more information on this meeting, visit
http://www.wavestoweather.de/meetings/raa-meeting-2017

2nd Research Area B "Cloud-scale Uncertainties" meeting

The **second meeting of the Research Area B** took place on May 30th 2017 in Mainz. More than 20 researchers from the Research Areas B, A and C participated. The ECS presented their latest results, as well as ongoing and planned collaborations and publications. The discussions were lively and new collaborations have been proposed in addition to the ongoing ones. At this occasion the **Equal Opportunity Committee** met to report on the ongoing activities to promote equal opportunity in W2W and on the needs at all three locations.

For more information on this meeting, visit
http://www.wavestoweather.de/meetings/rab-meeting-2017



Participants of the RA-B meeting in Mainz on May 30th 2017

2nd Research Area C "Predictability of local Weather" meeting

The **second meeting of the Research Area C** took place on May 24th 2017 in Karlsruhe. Researchers from Karlsruhe, Mainz and Munich in the Research Areas C and A, as well as the central projects participated. The ECS presented their latest results and plans for collaborations and publications. The discussions were very lively and focused on collaborations with the other research areas, joint publications, connections with weather services and interdisciplinarity within W2W.

Participants of the RA-C meeting in Karlsruhe on May 24th 2017

For more information on this meeting, visit
http://www.wavestoweather.de/meetings/rac-meeting-2017

3rd Early Career Scientists meeting

The 3rd Early Career Scientists (ECS) meeting took place from April 3rd – 5th 2017 in Bad Tölz. Most ECS from W2W took part in this meeting, as well as master students contributing to W2W and invited guests from and outside of science. The program of the meeting included short talks by each ECS addressing basic concepts (e.g. cold pools, radiation parameterization) to improve the understanding among the different disciplines in W2W, in-depth talks about tools, methods and research themes relevant to W2W such as error growth, statistical significance and data assimilation, as well as presentations from invited guests about career opportunities in and outside of science (DLR, WMO, MunichRE) and work-life balance.

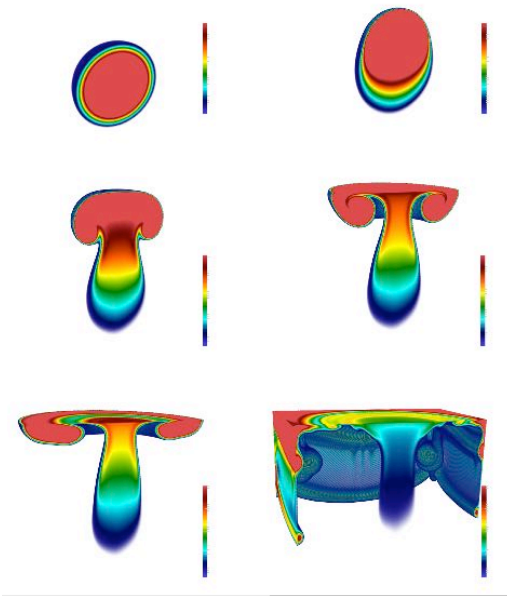
Participants of the ECS meeting in Bad Tölz on April 3rd – 5th 2017

For more information on this meeting, visit
http://www.wavestoweather.de/meetings/ecs_meeting_april2017

Research Highlights

Here are some examples of recently published research from W2W.

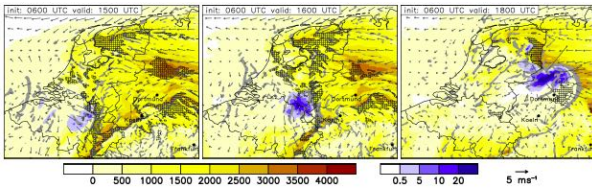
1. Asymptotic preserving IMEX finite volume schemes for low Mach number Euler equations with gravitation (G. Bispen, M. Lukacova-Medvidova, L. Yelash)



Time evolution of the potential temperature for warm bubble computed by an efficient and asymptotically stable implicit-explicit finite volume scheme. Only a half of the computational domain is shown in the x1-direction to visualize the interior temperature profiles. Colors correspond to the potential temperature θ′ in the range 0 − 0.1K. The background color (θ′ = 0) has been removed. A large scale oscillation appears at the bottom of the air bubble interface, which is caused by the Kelvin–Helmholtz instability caused by the shear flow interactions along the interface between the rising bubble with the surrounding air at rest. These long wavelength oscillations of the interface lead to the turbulent structure at later times.

Read the full article: http://www.sciencedirect.com/science/article/pii/S002199911730030X

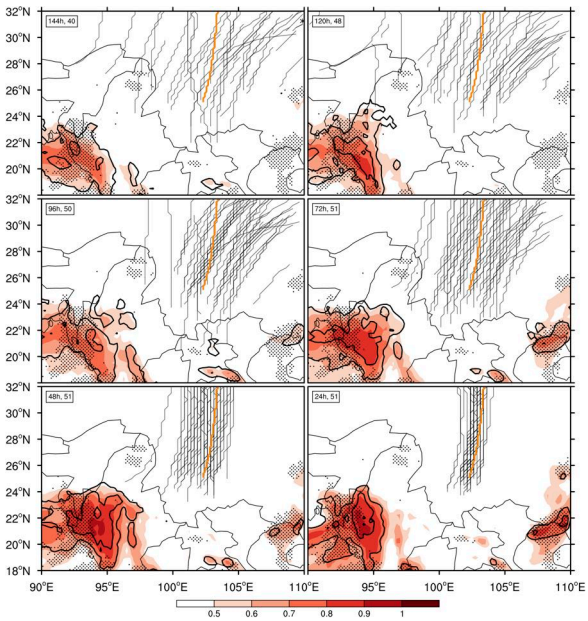
2. Sensitivity of the 2014 Pentecost storms over Germany to different model grids and microphysics schemes (C. Barthlott, B. Mühr, C. Hoose)



Simulation of a convective cell from the 2014 Pentecost storms with the COSMO model. The figure shows convective available potential energy (color shading, in J kg^{-1}), 30-min precipitation rate (blue color shading, in mm per 30 min, and 10-m wind field (arrows) on 9 June 2014. Gray areas indicate low-level wind convergence larger than 0.35×10^{-3} m s^{-1} and hatched areas represent regions where convective inhibition is smaller than 25 J kg^{-1}.

Read the full article: http://dx.doi.org/10.1002/qj.3019

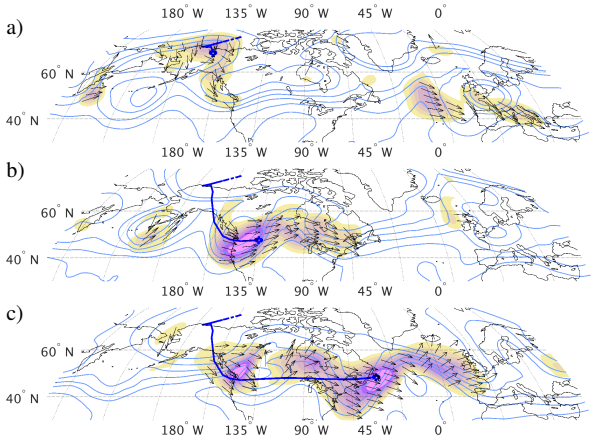
3. The Dynamics of an Extreme Precipitation Event in Northeastern Vietnam in 2015 and its Predictability in the ECMWF Ensemble Prediction System (R. van der Linden, A. Fink, J. G. Pinto, and T. Phan-Van)



An extreme precipitation event with rainfall totals of up to 1500 mm in nine days affected the northeastern Vietnamese coast in late July/early August 2015. Practical predictability beyond climatology of the event in ECMWF Ensemble Prediction System (EPS) forecasts emerged suddenly at lead times of approximately three days. The figure shows ECMWF Extreme Forecast Index (colors), Shift-of-Tails index (black contours; contour levels 0, 1, and 5), ECMWF EPS 200-hPa geopotential height trough axes (gray lines), and ECMWF operational analysis 200-hPa geopotential height trough axis (orange line) at 0000 UTC 27 Jul 2015 and for 144-, 120-, 96-, 72-, 48-, and 24-h lead times. Stippling indicates NASA GPM IMERG rainfall amounts of more than 50 mm day^{-1}. The article provides a description of the emergence of practical predictability.

Read the full article: http://dx.doi.org/10.1175/WAF-D-16-0142.1

4. Diagnosing the horizontal propagation of Rossby wave packets along the midlatitude waveguide (G. Wolf and V. Wirth)



The paper makes the point that the horizontal component of the wave activity flux is useful to diagnose the dynamics of Rossby wave packets in the upper troposphere. The wave activity flux provides information about the direction of propagation of a wave packet, which is not contained in more traditional measures such as the envelope of the meridional wind field. The figure shows a wave packet on the 300 hPa surface on 3 August 2002 (panel a), 6 August 2002 (panel b), and 9 August 2002 (panel c). The arrows indicate the direction of the wave activity flux, the color indicates its magnitude, and the blue line connects the center of gravity of the wave packet at the three different stages. The analysis suggests that this particular Rossby wave packet originated from polar latitudes.

Read the full article: http://journals.ametsoc.org/doi/abs/10.1175/MWR-D-16-0355.1?journalCode=mwre

Additional publications relevant to W2W are listed here:
http://www.wavestoweather.de/publications

News

The ECMWF Fellow status of Prof. Tilmann Gneiting (HITS, Heidelberg) has been extended through June 2020.
To read more, please visit http://www.wavestoweather.de/news/ecmwf-fellow

Seminars and guest program

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 guest scientists invited by W2W is posted here:
http://www.wavestoweather.de/guest

Selected past outreach activities

Volkmar Wirth was invited by the **Deutsches Museum** in Munich to talk about "The forecast: fair to cloudy: how come the weather forecasts are (still) so uncertain?" in the "Wissenschaft für jedermann" seminar series on March 1st 2017. For more information, visit http://www.wavestoweather.de/outreach/presentation-deutsches-museum

Volkmar Wirth at the Deutsches Museum on March 1st 2017

Tilmann Gneiting (HITS, Heidelberg) and Sebastian Lerch (KIT, Karlsruhe) gave an **interview in the newspaper "Die Welt"** on April 11th 2017. The interview addressed the so-called "forecaster's dilemma" related to forecast evaluation, extreme events, and improvement of weather forecasts. Read more:
http://www.wavestoweather.de/outreach/interview-in-die-welt_11042017

Equal Opportunity (EO)

Selected past activities

Girls' Day is a countrywide event to introduce schoolgirls to disciplines and careers in which women are usually underrepresented. On April 27th 2017, W2W researchers in Munich, in Mainz and in Karlsruhe organized activities to present research activities and university studies in meteorology and weather forecasting.
Visit http://www.wavestoweather.de/equal_opportunity/activities/girls_day_2017 for more information.

On April 28th 2017 Audine Laurian presented the measures implemented in W2W to promote equal opportunity at the **European Geophysical Union** in Vienna. The oral presentation was part of the session on "Promoting and supporting equality of opportunities in geosciences", which featured a number of posters and oral presentations on very diverse topics including reports on personal experience and statistics on larger scale (e.g. ERC and NSF grantees and awardees).
Read more about this here:
http://www.wavestoweather.de/equal_opportunity/activities/egu2017

About EO measures within 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 already implemented:
  http://www.wavestoweather.de/equal_opportunity/activities

Spring's highlight

Sunset on the Lac d'Anneçy with thunderstorms over the French Alps (photo: Peter Knippertz)

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