



Waves to Weather Kick-off Meeting

November 10th -12th, 2015

Memmingen, Germany

Program

Tuesday 10 November

Welcome, Overview

(Chair: H. Volkert)

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| 12:00-12:30 | <i>Registration + Lunch buffet</i> |
| 12:30-12:50 | Overview of W2W (G. Craig) |
| 12:50-13:00 | The Z1 central project (A. Laurian) |
| 13:00-13:10 | Early-Career Scientists during Pandowae (A. Schäfler and F. Pantillon) |

Presentations Research Area A – Upscale Error Growth

(Chair: A. Fink)

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| 13:10-14:10 | Upscale influences on large-scale dynamics (John Methven, University of Reading, UK) (see abstract below) |
| 14:10-14:40 | <i>Coffee break</i> |
| 14:40-14:50 | Presentation of Research Area A (K. Kober) |
| 14:50-15:00 | A1 - Upscale impact of diabatic processes from convective to near-hemispheric scale (G. Craig, V. Wirth , M. Riemer , T. Selz) |
| 15:00-15:10 | A2 - Structure formation on cloud scale and impact on larger scales (P. Spichtinger , M. Lukacova, A. Hildebrandt) |
| 15:10-15:20 | A3 - Model error and uncertainty for midlatitude cyclones analyzed using campaign data (G. Craig, A. Schäfler) |
| 15:20-15:30 | A4 - Evolution and predictability of storm structure during extratropical |

	transition of tropical cyclones (<u>M. Riemer</u> , E. Schömer)
15:30-15:40	A5 - The role of soil moisture and surface- and subsurface water flows on predictability of convection (H. Kunstmann, K. Kober, <u>Joel Arnault</u>)
15:40-15:50	A6 - Representing forecast uncertainty using stochastic physical parameterizations (<u>K. Kober</u> , G. Craig)
15:50-16:00	A7 - Visualization of coherence and variation in meteorological dynamics (F. Sadlo, R. Westermann, <u>M. Rautenhaus</u>)
16:00-17:00	<i>Coffee break</i>
17:00-17:30	Presentation of the Cross-Cutting Activity (CCA) “Ensemble Tools“ (C. Keil)
17:30-18:00	Presentation of CCA “Campaign Data“ (A. Schäfler)
18:00-19:00	<i>Ice breaker</i>
19:00	<i>Dinner</i>

Wednesday 11 November

Presentations Research Area C – Predictability of local Weather (Chair: P.Spichtinger)

8:30-9:30	Potential vorticity structures in extratropical cyclones and their relationship to forecast evolution and surface winds (Suzanne Gray, University of Reading, UK) (see abstract below)
9:30-10:00	<i>Coffee break</i>
10:00-10:10	Presentation of Research Area C (A. Fink)
10:10-10:20	C2 - Prediction of wet and dry periods of the West African monsoon (A. Fink, <u>P. Knippertz</u> , T. Gneiting)
10:20-10:30	C3 - Multi-scale dynamics and predictability of Atlantic Subtropical Cyclones and Medicanes (A. Fink, <u>M. Riemer</u>)
10:30-10:40	C4 - Coupling of planetary-scale Rossby wave trains to local extremes in heat waves over Europe (<u>V. Wirth</u> , <u>A. Fink</u>)
10:40-10:50	C5 - Forecast uncertainty for peak surface gusts associated with European cold-season cyclones (P. Knippertz, U. Corsmeier, <u>E. Pantillon</u>)
10:50-11:00	C7 - Statistical postprocessing and stochastic physics for ensemble predictions (T. Gneiting, K. Kober, <u>S. Lerch</u>)

11:00-12:00	<i>Group Picture</i>
12:00-13:00	<i>Lunch</i>
13:00-15:00	<i>Guided tour of Memmingen</i>
15:00-15:30	<i>Coffee break</i>

Presentations Research Area B – Cloud-scale Uncertainties (Chair: K. Kober)

15:30-16:30	New approaches to quantifying the aerosol influence on the cloud radiative effect (Graham Feingold, NOAA, USA) (see abstract below)
16:30-16:40	Presentation of Research Area B (P. Spichtinger)
16:40-16:50	B1 - Microphysical uncertainties in deep convective clouds and their implications for data assimilation (<u>C. Hoose</u> , M. Kunz, B. Vogel, M. Weissmann)
16:50-17:00	B3 - Relative impact of surface and aerosol heterogeneities on the initiation of deep convection (<u>C. Barthlott</u> , C. Hoose, C. Keil)
17:00-17:10	B4 - Radiative heating and cooling at cloud scale and its impact on dynamics (B. Mayer)
17:10-17:20	B5 - Data-driven ensemble visualization (R. Westermann)
17:20-17:30	B6 - Parameter estimation using a data assimilation system for improved representation of clouds (T. Janjic-Pfander, <u>Y. Ruckstuhl</u>)
17:30-17:40	B7 - Identification of robust cloud patterns via inverse methods (<u>P. Spichtinger</u> , M. Hanke-Bourgeois)
17:40-18:10	Presentation of CCA “Visualization“ (M. Rautenhaus)
18:10-18:45	<i>Coffee break</i>
18:45-20:00	General assembly (see separate agenda) - all PIs - (Chair: G. Craig; minutes: A. Laurian)
18:45-20:00	The W2W Early Career Program - all young scientists - (Chairs: F. Pantillon and A. Schäfler; minutes: Y. Ruckstuhl)
20:00	<i>Dinner</i>

Thursday 12 November

Discussion and future plans

08:30-10:00	Research area breakout groups (see list attached)
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10:00-11:00	<i>Coffee break</i>	
11:00-11:30	Report on group discussions	(Chair: G. Craig; minutes: A. Laurian)
11:30-11:45	Election of a Gender Equality representative	(Chair and minutes: A.Laurian)
11:45-12:15	Final Discussion	(Chair: G. Craig; minutes: A. Laurian)
12:15-13:30	<i>Lunch</i>	
13:30	<i>End of Meeting</i>	

Notes:

1) Here are a few important **guidelines for the speakers** (keynote speakers are not concerned):

- The program is dense so please respect the 10-minute timeslot for your presentation.
- Present the science questions and aims of your project, and explain how it contributes to W2W.
- Introduce the W2W PhDs, Postdocs and PIs working on, or connected to, your project.
- Briefly present your results if you already have some.
- In Pandowae, the PIs were strongly encouraged to let their PhDs and postdocs present. If this is already possible for W2W, please let the ECS present.
- If several people will present the project/results, please all take a seat in the front row to reduce the transition times between speakers.

2) **Keynote presentations** are 45 minutes long + 15 minutes for questions

3) The following persons have offered to help with the organization: Florian Baur (technique), Enrico di Muzio (time and people gathering), Yvonne Ruckstuhl (time and people gathering), Andreas Schlüter (technique), Peter Vogel (time)

Research area breakout groups

(Thursday 12th, November, 9:00am-10:30am)

Research Area A	Research Area B	Research Area C
Upscale Error Growth <i>Chair: Kirstin Kober</i> <i>Minutes: T. Selz</i>	Cloud-scale Uncertainties <i>Chair: Peter Spichtinger</i> <i>Minutes: L. Schneider</i>	Predictability of local Weather <i>Chair: Andreas Fink</i> <i>Minutes: E. Di Muzio</i>
Joel Arnault Marlene Baumgart Fabian Brundke George Craig (PI) Christian Euler Paolo Ghinassi Andreas Hildebrandt (PI) Ole Klein Harald Kunstmann (PI) Tobias Kremer Maria Lukacova (PI) Stephan Rasp Marc Rautenhaus Michael Riemer (PI) Juliane Rosemeier Andreas Schäfler Tobias Selz	Mares Barekzai Christian Barthlott (PI) Florian Baur Constanze Fischerkeller Martin Hanke-Bourgeois (PI) Corinna Hoose (PI) Christian Keil (PI) Carolin Klingner Michael Kunz (PI) Bernhard Mayer (PI) Yvonne Ruckstuhl Linda Schneider Bernhard Vogel (PI) Martin Weissmann (PI) Peter Knippertz (PI) Rüdiger Westermann (PI)	Pila Bossmann Ulrich Corsmeier (PI) Enrico Di Muzio Georgios Fragkoulidis Manuel Klar Sebastian Lerch Michael Maier-Gerber Florian Pantillon Andreas Schlüter Elmar Schömer (PI) Peter Vogel Volkmar Wirth (PI)
→ Main room	→ Coffee room	→ Early-Career room

Please note that if you are a PI involved in different research areas, you are free to change group.

Keynote presentations

John Methven (University of Reading, UK)

Tuesday, 13:10-14:10

Title: Upscale influences on large-scale dynamics

Abstract: Various mechanisms are discussed for the influence of small-scale processes on larger scale dynamics. The quantity potential vorticity (PV), a measure of local spin in a fluid, will be central to the discussion. In the absence of diabatic or frictional processes, PV is materially conserved. This has the consequence that it is stirred through chaotic advection, generating a cascade to finer scales. However, under suitable approximations the PV describes the evolution of a "balanced component" of the flow which can at any instant be inferred from the PV distribution by a mathematical inversion operation. The dynamics of the balanced component reduces to a consideration of the evolution of one variable, PV. A property of the PV inversion operator is that it possesses a "scale-effect" whereby larger scales in PV have more influence on the induced velocity field. Stirring, mixing, PV homogenisation and the scale effect of inversion together give rise to upscale influence on velocity. Another consequence is that sharp PV gradients, associated with jet streams, emerge between regions where PV has been partially homogenised. The PV gradients act as Rossby wave guides and the sharpness of those gradients matters to the wave propagation and downstream dispersion. So, small-scale processes altering the PV gradient can have influence on much larger scales via Rossby wave propagation.

In addition, heating in a region can have a major influence on the PV distribution and thus the balanced component of the flow. However, changes to a PV anomaly in one location rarely have an isolated effect. Typically, the heating is coupled to the motions within large-scale waves altering their propagation and growth characteristics. Examples, are given for Rossby waves on the jet stream, extratropical baroclinic waves and tropical waves. The open challenges in our understanding of large-scale waves with moisture are discussed.

Suzanne Gray (University of Reading, UK)

Wednesday, 08:30-09:30

Title: Potential vorticity structures in extratropical cyclones and their relationship to forecast evolution and surface winds.

Abstract: Extratropical cyclones are classically described in terms of their air flows (conceptualised as conveyor belts), fronts and cloud patterns. Potential vorticity (PV) provides a complementary, dynamically-relevant, picture of cyclone structure and development. Here extratropical cyclones will be presented from a PV perspective starting from dry idealised cyclones and progressing quickly to the modification of those PV structures by diabatic processes within cyclones, and impacts of those diabatic modifications on both the cyclone itself and downstream forecast evolution. Strong surface winds and gusts are a major hazard of extratropical cyclones. A broad region of strong winds has long been characteristically associated with the warm conveyor belt. By contrast the causes of, and interplay between, cold sector strong wind jets (including sting jets) is active research area. Advances in our understanding of these topics over the past decade will be presented and open questions raised.

Graham Feingold (NOAA, USA)

Wednesday, 15:30-16:30

Title: New Approaches to Quantifying the Aerosol Influence on the Cloud Radiative Effect

Abstract: Despite frequent documentation of aerosol effects on cloud microphysical and radiative forcing, the robustness and prevalence of these effects is still highly uncertain. We develop a conceptual approach to systematically constrain the aerosol-cloud radiative effect in shallow clouds through a combination of routine process modeling, and satellite and surface-based shortwave radiation measurements. We call for a merging of top-down (Darwinian) and bottom-up (Newtonian) strategies by balancing microphysical detail with scaling, emergence, and simple dynamical system analogues of cloud systems.

Questionnaire for Early-Career Scientists (ECS)

If you are a PhD student or a postdoc, please take the time to fill out this questionnaire before the meeting.

1. Would you be interested in attending workshops and/or intensive training courses on specific themes relevant to W2W? If yes, indicate the themes you are interested in:

2. Would you be interested in obtaining hands-on expertise with complex simulation codes by visiting meteorological services (e.g. DWD, ECMWF)? If yes, which service would you like to visit and how would this expertise benefit your research?

3. Would you be interested in organizing a workshop on a specific theme relevant to W2W? If yes, which theme would you be interested in and how would the organization of the workshop benefit your research?

4. Would you like to invite an international ECS? If yes, who, how would this person contribute to W2W and would your research benefit from this visit?

5. Would you be interested in visiting an institute involved in W2W? If yes, which one and how would your research benefit from this visit?

6. Would you be interested in taking part in mentoring sessions on career planing, work-life balance, communication skills, etc? If yes, indicate the themes you are interested in:

Questionnaire on Gender Equality and Family-friendly Measures

Please take the time to fill out this questionnaire before the meeting.

1. Would you be interested in obtaining support from W2W to better combine your work- and your family-life? If yes, indicate the kind of support you would need (e.g. childcare, home office):

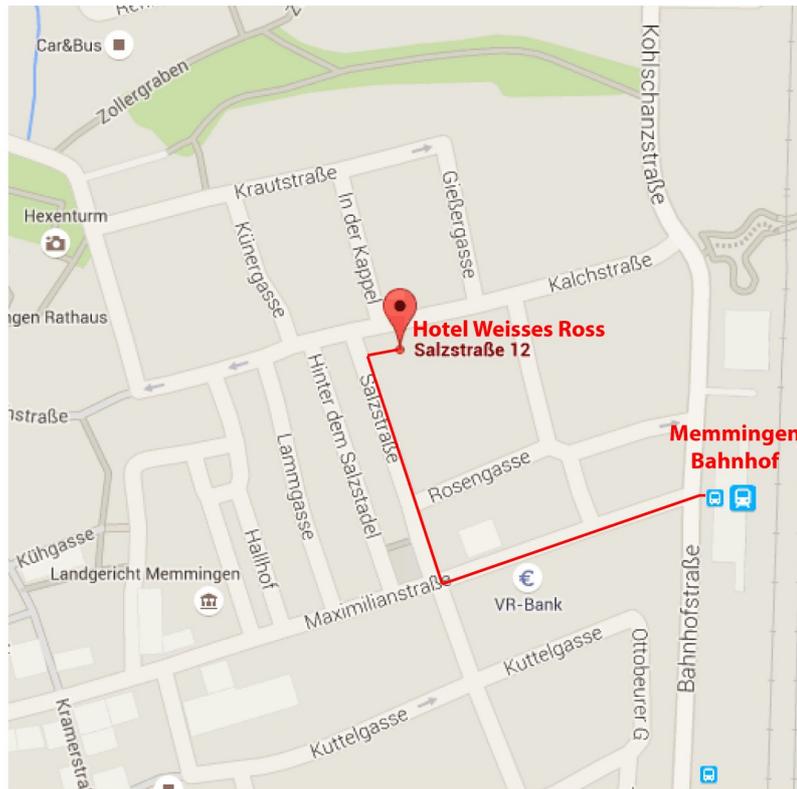
2. Would you be interested in taking part in specific training courses related to career support, time management, networking, conflict management, scientific writing, rhetoric, etc? If yes, indicate the themes you are interested in:

3. If you are a female scientist, would you be interested in obtaining individual counselling by a female senior mentor on a regular basis?

4. Would you be interested in taking part in meetings to exchange experiences and to discuss specific questions regarding gender equality? (These meetings are open to all scientists and not only for female scientists.)

How to get there?

The W2W Kick-off meeting will take place in the **Hotel Weisses Ross** in the old city center of Memmingen (<http://www.hotelweissesross.de/>). The hotel is located 300 meters away from the Memmingen train station (see map below) and the address of the hotel is Salzstraße 12, 87700 Memmingen.



- If you come **by train**, the trip lasts:
 - about 2h50 from Karlsruhe (1 connection in Ulm)
 - about 3h20 from Mainz (2 connections in Mannheim and in Ulm)
 - about 2h45 from Heidelberg (1 connection in Ulm)
 - about 1h30 from München
- If you come **by car**, there is a customer parking lot in front of the hotel.
- If you come **by plane**, the easiest way is to land at Munich airport (MUC) and to take the train from „München Flughafen Terminal“ to „Memmingen“ (DB Bahn; <http://reiseauskunft.bahn.de/bin/query.exe/>). The trips lasts approximately 2h30.

Please make your own travel plan and keep your receipts for reimbursement at your institute. Hotel and food is taken care of (i.e. organized and paid) by the Z1 project.