



Program

International conference on Terrestrial Systems Research: Monitoring, Prediction and High Performance Computing

April 4th-6th, 2018

University of Bonn, Bonn, Germany

Wednesday (Modelling)

9:00 Registration + coffee

9:30 Opening

9:45 Geoverbund ABC/J - The Geoscientific Network of RWTH Aachen, University of Bonn, University of Cologne, and Forschungszentrum Jülich

Daniel Felten

10:00 Lagrangian Predictability of Coupled Water Processes (invited)

Ana P. Barros

10:30 High-resolution climate modeling on emerging supercomputing platforms: Opportunities and challenges (invited)

Christoph Schär

11:00 Understanding the connection between root zone soil moisture and surface energy flux partitioning using modeling, observations and data assimilation for a temperate grassland site in Germany

Prabhakar Shrestha, Wolfgang Kurtz, Gerd Vogel, Jan-Peter Schulz, Mauro Sulis, Harrie-Jan Hendricks Franssen, Stefan Kollet and Clemens Simmer

11:15 Propagation of patterns from soil, vegetation and weather to soil moisture and surface fluxes

Tim G. Reichenau, Wolfgang Korres, Sabrina Esch and Karl Schneider

11:30 Break

12:00 Characterizing heat and mass flux patterns in agricultural crops using landsurface and crop modelling approaches

Matthias Langensiepen, Moritz Kupisch, Mauro Sulis, Anke Schickling, Hubert Hüging, Thuy Huu Nguyen, Anja Stadler and Frank Ewert

12:15 Comparison of water balance and root water uptake models in simulating CO₂ and H₂O fluxes and growth of wheat

Thuy Huu Nguyen, Matthias Langensiepen, Jan Vanderborght, Hubert Hueging, Cho Miltin Mboh and Frank Ewert

12:30 Aerodynamic Roughness Length over Heterogeneous Surface

Yaping Shao and Sascha Runge

12:45 Lunch

14:00 Advancing continental scale hydrology from bedrock to atmosphere and from summit to sea (invited)

Reed Maxwell, Lauren Foster, Caitlin Collins, Mary Forrester, Danielle Tijerina and Laura Condon

14:30 Increasing the depth of a Land Surface Model: implications for the subsurface thermal and hydrological regimes

Norman Steinert, Jesus Fidel González-Rouco, Stefan Hagemann, Philipp De-Vrese, Elena García-Bustamante, Johann Jungclaus and Stephan Lorenz

14:45 How human water use induced atmospheric feedbacks may contribute to continental drying

Jessica Keune, Mauro Sulis, Stefan Kollet, Stephan Henne, Anita Drumond, Stefan Siebert, Yoshihide Wada and Diego Miralles

15:00 Multi-model assessment of hydrologic impacts of climate change in a semi-arid Mediterranean catchment

Enrica Perra, Monica Piras, Roberto Deidda, Claudio Paniconi, Giuseppe Mascaro, Enrique R. Vivoni, Pierluigi Cau, Pier Andrea Marras, Swen Meyer and Ralf Ludwig

15:15 When Does Uncertainty Matter While Modeling Climate Change in Mountain Headwaters? Contrasting model resolution and complexity under a changing climate in an alpine catchment

Lauren M. Foster, Kenneth Williams and Reed M. Maxwell

15:30 Regional climate modelling at the convection permitting scale: Climate response to increasing greenhouse gasses and land use change (invited)

Nicole van Lipzig, Sam Vanden Broucke, Hendrik Wouters and Matthias Demuzere

16:00 Poster session

18:00 Ice breaker

Thursday (Modelling, assimilation, HPC)

9:00 The Community Terrestrial Systems Model (CTSM): Unifying land modeling efforts to advance research and prediction in climate, weather, water and ecology (invited)

Martyn Clark, Dave Lawrence, Bill Sacks, Mike Barlage, Sean Swenson and Mariana Vertenstein

9:30 OLAM-SOIL: A global soil and Earth system modeling platform (invited)

Robert Walko, Dani Or, Simone Fatichi, Harry Vereecken, Stefan Kollet, Tom Hengl and Roni Avissar

10:00 Coupling reactive transport processes with root system architecture and functions: principles and application examples

Frédéric Gérard, Hannah Gatz-Miller, Sergio Bea, Renato K. Braghiere, Philippe Hinsinger, Loïc Pagès and Klaus U. Mayer

10:15 Hydrological networks as optimal transport structures

Enrico Facca, Mario Putti and Franco Cardin

10:30 Break

11:00 Selected Comparisons between Machine Learning and Deep Learning in Earth Science Applications (invited)

Morris Riedel

11:30 Improved hydrology over peatlands in a global land modeling system

Michel Bechtold, Gabrielle J M De Lannoy, Rolf H Reichle, Randal D Koster, Sarith P Mahanama and Dirk Roose

11:45 3-D physically-based modeling of the Panola hillslope

Matteo Camporese, Claudio Paniconi and Mario Putti

12:00 Representing winter wheat in the Community Land Model (version 4.5) (invited)

Yaqiong Lu, Ian N. Williams, Justin E. Bagley, Margaret S. Torn and Lara M. Kueppers

12:30 Lunch

13:30 Workflows in Geosystems Analysis (invited)

Olaf Kolditz, Hua Shao, Uwe-Jens Görke, Haibing Shao, Thomas Nagel, Lars Bilke, Thomas Fischer, Karsten Rink and Thomas Kalbacher

14:00 Coupled Systems, Numerical Libraries, and High Performance Computing: How Do We Bring These Together? (invited)

Carol Woodward

14:30 Incorporating ICON into TerrSysMP

Slavko Brdar, Cunbo Han, Stefan Kollet and Wendy Sharples

14:45 Linking coupled water-energy engineered system simulation models to HPC resources via a generalised web-interface

Stephen Knox, James Tomlinson and Julien Harou

15:00 High Performance Computing in Basin Modeling: Stratigraphic Layer tracking with the Level Set Method

Sean McGovern, Stefan Kollet, Wolfgang Bangerth, Claudius Buerger, Ronnie Schwede and Olaf Podlaha

15:15 Break

15:45 Using Data Assimilation Diagnostics to Assess the SMAP Level-4 Soil Moisture Product (invited)

Rolf H. Reichle, Qing Liu, Gabrielle J.M. De Lannoy, Wade T. Crow, John S. Kimball, Randal D. Koster and Joseph V. Ardizzone

16:15 Global Soil Moisture Estimation from L-Band Satellite Data: the Impact of Radiative Transfer Modeling in Assimilation and Retrieval Systems (invited)

Gabrielle De Lannoy, Rolf Reichle, Alexander Gruber, Michel Bechtold, Jan Quets, Jasper Vrugt and Jean-Pierre Wigneron

16:45 TerrSysMP-DART Interface: An Integrated data assimilation platform for coupled atmosphere, land surface and groundwater model

Prabhakar Shrestha, Timothy Hoar, Jeffrey Anderson, Wolfgang Kurtz, Harrie-Jan Hendricks Franssen, Fabian Gasper, Bernd Schalge, Mauro Sulis, Stefan Kollet and Clemens Simmer

17:00 The data assimilation framework TERRSYSMP-PDAF

Harrie-Jan Hendricks Franssen, Wolfgang Kurtz, Hongjuan Zhang, Dorina Baatz, Sebastian Gebler, Stefan Kollet and Harry Vereecken

17:15 Bayesian Inverse Problems for radar observation of drop-size distributions

Christian Rieger

17:30 Use and challenges of geophysics to study processes in agro-ecosystems (invited)

Sarah Garré, Mathieu Javaux, Gael Dumont, Nolwenn Lesparre, Thomas Hermans and Frederic Nguyen

19:00 Conference diner (Landesmuseum)

Friday (Monitoring, patterns)

9:00 Validation of spring wheat responses to elevated CO₂, irrigation, and nitrogen fertilization in the Community Land Model 4.5 (invited)

Yaqiong Lu and Bruce A. Kimball

9:30 Quantification of root length density at the field scale with electrical impedance tomography: a numerical study

Shari van Treeck, Andreas Kemna, Maximilian Weigand and Johan Alexander Huisman

9:45 Ground-based quantitative electromagnetic induction measurements and inversions show that patterns in airborne hyperspectral data are caused by subsoil structures

Christian von Hebel, Maria Matveeva, Elizabeth Verweij, Uwe Rascher, Patrick Rademske, Cosimo Brogi, Manuela Sarah Kaufmann, Achim Mester, Harry Vereecken and Jan van der Kruk

10:00 Large-scale subsurface characterization using Multi-Configuration EMI and image classification

Cosimo Brogi, Johan Alexander Huisman, Lutz Weihermüller, Stefan Pätzold, Christian von Hebel, Jan van der Kruk and Harry Vereecken

10:15 Simultaneous non-invasive measurement of soil moisture and biomass dynamics using the cosmic-ray neutron probe

Heye R. Bogaen, Jannis Jakobi, Johan A. Huisman and Harry Vereecken

10:30 Break

11:15 The temperature sensitivity (Q₁₀) of soil respiration: controlling factors and spatial prediction at regional scale based on environmental soil classes

Nele Meyer, Gerhard Welp and Wulf Amelung

11:30 Linking spatial and temporal sun-induced fluorescence patterns to soil and atmospheric properties in a heterogeneous agriculture landscape

Maria Matveeva, Christian von Hebel, Vera Krieger, Tobias Marke, Patrick Rademske, Alexander Damm, Sergio Cogliati, Cosimo Brogi, Guido Waldhoff, Jan van der Kruk, Susanne Crewell and Uwe Rascher

11:45 Empirical Derivation of Soil Moisture and Vegetation Parameters from Sentinel-1 SAR in the Rur catchment

Sabrina Esch, Wolfgang Korres, Tim G. Reichenau and Karl Schneider

12:00 Severe Hail Detection: Hydrometeor Classification for Polarimetric C-band Radars Using Fuzzy-Logic and T-matrix Scattering Simulations

Mari L. Schmidt, Silke Trömel, Alexander Ryzhkov and Clemens Simmer

12:15 Effects of parameterizations of the drop size distribution with variable shape parameter on polarimetric radar moments

Katharina Schinagl, Christian Rieger, Martin Schneider, Clemens Simmer, Silke Trömel and Petra Friederichs

12:30 Lunch

13:30 Assessing the Applicability of CHELSA (Climatologies at High resolution for the Earth's Land Surface Areas) data for Monthly and Seasonal Precipitation Predictions

Arash Malekian and Elaheh Ghasemi

13:45 Topological pattern analysis of atmospheric boundary layer turbulence

Jose Licon, Cedrick Ansorge and Angela Kunoth

14:00 Recent Progress on Intrinsic Mode Function Representation and Its Applications to Hydrological Data

Boqiang Huang and Angela Kunoth

14:15 Exploring small-scale patterns in a forest soil-vegetation-atmosphere system

Inken Rabbel, Burkhard Neuwirth, Heye Bogena and Bernd Diekkrüger

14:30 Analysis of Soil Moisture Patterns in a Mesoscale Catchment Using Plot to Catchment Scale Datasets

Wolfgang Korres, Tim G. Reichenau, Sabrina Esch and Karl Schneider

14:45 Synthesis/closing session

15:45 End

Posters

The poster session is Wednesday from 16 to 18h in the Aula.

P01 Remote sensing and GIS-based land use and crop rotation mapping for regional soil-vegetation-atmosphere modelling

Guido Waldhoff, Ulrike Lussem, Mauro Sulis and Georg Bareth

P02 A Bayesian unsupervised clustering approach for spatial and statistical pattern extraction of subsoil using satellite derived NDVI time series and electromagnetic induction measurements

Hui Wang, J. Florian Wellmann, Maximilian Kanig, Elizabeth Verweij, Christian von Hebel and Jan van der Kruk

P03 Linking remotely sensed multispectral data to large-scale electromagnetic induction measurements for soil parameter prediction by means of multiple linear regression kriging

Maximilian Kanig, Y.P. Villa-Acuna, Christian von Hebel, Hui Wang, Florian Wellmann and J. van der Kruk

P04 Modeling and Theoretical Investigation of multi-scale Interactions between Convection and Land-Surface Heterogeneity

Zahra Parsakhoo, Cedrick Ansorge and Yaping Shao

P05 Describing the spatial pattern of a shallow cumulus cloud population in terms of size and spacing

Thirza van Laar and Roel Neggers

P06 Effects of Land Surface Heterogeneity on Simulated Boundary-Layer Structure

Stefan Poll, Prabhakar Shrestha and Clemens Simmer

P07 Impact of downscaled atmospheric forcing on surface energy flux partitioning

Tanja Zerener, Prabhakar Shrestha, Philipp Moss, Victor Venema, Petra Friederichs and Clemens Simmer

P08 Simulating soil surface temperature of a bare soil using an energy balance model at West of Iran

Younes Khoshkhoo

P09 Validation of the MODIS land surface temperature data in West of Iran

Younes Khoshkhoo

P10 Validation and Reanalysis of ERA-Interim Dataset of European Center for Medium-Range Weather Forecasts (ECMWF) in Iran

Elaheh Ghasemi, Ebrahim Fattahi and Arash Malekian

P11 High-resolution profile measurements of wind speed and scalars within and above short canopies: Applicability to flux measurement, source partitioning and process understanding

Alexander Graf, Patrizia Ney, Anne Klosterhalfen, Normen Hermes, Marius Schmidt and Harry Vereecken

P12 Understanding the Spatiotemporal Structures in Atmosphere-Land Surface Exchange at the Jülich Observatory for Cloud Evolution

Tobias Marke, Susanne Crewell, Ulrich Löhnert and Uwe Rascher

P13 CO₂ fluxes before and after partial deforestation of a spruce forest

Patrizia Ney, Alexander Graf, Marius Schmidt, Thomas Pütz, Clemens Drüe, Odilia Esser, Anne Klosterhalfen, Veronika Valler, Katharina Pick and Harry Vereecken

P14 Soil respiration and its temperature sensitivity (Q₁₀): rapid acquisition using mid-infrared spectroscopy

Gerhard Welp, Nele Meyer, Hanna Meyer and Wulf Amelung

P15 Recolonization of root-induced macropores

Mirjam Zörner, Andrea Schnepf and Jan Vanderborght

P16 Magnetic Resonance Imaging: a tool to study preferential flow in porous media

David Caterina, Andreas Pohlmeier and Harry Vereecken

P17 Small-scale surface to borehole geoelectrics - opportunities and challenges

Johanna Ochs and Norbert Klitzsch

P18 Improving subsurface characterization by combining multiple layer inversions of fixed-boom multi-coil electromagnetic induction and ground penetrating radar data

Christian von Hebel, Jan van der Kruk, Manuela Sarah Kaufmann, M. Iwanowitsch, Johan Alexander Huisman and Harry Vereecken

P19 Water content in natural soil by low-field NMR

Xin Cai, Baoxin Guo, Markus Küppers and Bernhard Blümich

P20 MRI of Water-Content Changes in Unconsolidated Natural Porous Media with Short T₂

Alexander Görges, Andreas Pohlmeier, Bernhard Blümich and Sabina Haber-Pohlmeier

P21 Comparing borehole GPR FWI images with CPT data obtained at the Krauthausen test site

Zhen Zhou, Schmäck Jessica, Anja Klotzsche, Nils Güting, Harry Vereecken and Jan van der Kruk

P22 Estimating Infiltration-Induced Soil Water Content Changes using Combined Horizontal Borehole GPR and Dispersive Surface GPR data

Yi Yu, Anja Klotzsche, Denise Schmidt, Jan Vanderborght, Harry Vereecken and Jan van der Kruk

P23 Investigating the spatial and temporal soil water content variations at Rhizotron-test site using time-lapse horizontal borehole GPR data

Lena Laerm, Anja Klotzsche, Jan van der Kruk and Jan Vanderborght

P24 Scalable Subsurface flow Simulations with ParFlow

Carsten Burstedde, Jose A. Fonseca and Stefan Kollet

P25 Calculating terrain parameters from Digital Elevation Models on multicore processors

Grethell Castillo Reyes and Dirk Roose

P26 Research data management support for the large-scale, long-term, interdisciplinary Collaborative Research Center / Transregio 32: Patterns in Soil-Vegetation-Atmosphere-Systems

Constanze Curdt, Georg Bareth and Ulrich Lang

P27 Optimizing albedo simulations of the ORCHIDEE land surface model by assimilating the MODIS satellite observation data

Vladislav Bastrikov, Philippe Peylin and Catherine Ottlé

P28 Assimilating GRACE data with different spatial resolution into a high-resolution hydrological model over Europe

Anne Springer, Jürgen Kusche, Jessica Keune, Wolfgang Kurtz and Makan A. Karegar

P29 Ensemble Data Assimilation with the Community Land Model and the US National Water Model

Timothy Hoar, Mohamad El Gharamti, James McCreight, Arezoo RafieeiNasab and Andrew Fox

P30 Ensemble experiments with a coupled atmosphere-land surface-subsurface model

Bernd Schalge, Harrie-Jan Hendricks Franssen and Stefan Kollet 2 3 and Clemens Simmer

P31 Improving continental-scale hydrologic simulations over Europe using TerrSysMP-PDAF

Bibi S. Naz, Wolfgang Kurtz, Stefan Kollet, Harrie-Jan Hendricks Franssen, Carsten Montzka, Wendy Sharples, Klaus Goergen, Jessica Keune and Anne Springer

P32 Large-eddy simulation of a stratocumulus-topped arctic boundary layer

Robert Rauterkus, Cedrick Ansorge, Yaping Shao and Ulrich Löhnert

P33 Large eddy simulation of catchment scale circulations

Cunbo Han, Slavko Brdar and Stefan Kollet

P34 European extreme events simulations with the fully coupled TerrSysMP

Carina Furusho, Stefan Kollet, Klaus Görger, Jessica Keune and Ketan Kulkarni

P35 Effects of surface properties and land-atmosphere coupling on water cycle representation in a convection permitting RCM ensemble

Klaus Goergen, Sebastian Knist and Stefan Kollet

P36 Simulation of Shallow-Water Flows on General Terrain

Elena Bachini, Ilaria Fent and Mario Putti

P37 Incorporating a root water uptake model based on the hydraulic architecture approach in terrestrial systems simulations

Mauro Sulis, Valentin Couvreur, Jan Vanderborght, Ivonne Trebs, Jessica Keune, Prabhakar Shrestha, Harry Vereecken, Clemens Simmer and Stefan J. Kollet

P38 Effect of biopores on simulated root growth and leaf area index in a field scale crop model

Cho Miltin Mboh, Thuy Huu Nguyen, Matthias Langensiepen and Frank Ewert

P39 Parameter sensitivity analysis of a root architecture model: field scale simulation of root systems and virtual field sampling

Shehan Morandage, Andrea Schnepf, Jan Vanderborght, Daniel Leitner, Mathieu Javaux and Harry Vereecken

P40 Investigation of anisotropy in induced polarization signatures of maize root-soil continuum: a virtual rhizotron study

Sathyanarayan Rao, Solomon Ehosioko, Andreas Kemna, Frédéric Nguyen, Sarah Garré and Mathieu Javaux

P41 Accounting for seasonal isotopic patterns of forest canopy intercepted precipitation in streamflow modeling

Michael Stockinger, Andreas Lücke, Harry Vereecken and Heye Bogena

P42 Understanding how interception and transpiration of trees influence water resources using modeling, observations and data assimilation for an open woodland in China

Mengna Li

P43 Water-Energy-Plant Interactions in Cold Regions

Yijian Zeng