

CRC 1502
DETECT

Newsletter



DETECT – CRC1502

**Kick-off for writing the
second phase proposal**

AGU Fall Meeting 2024

**A report by our attending
DETECT members**

Kick-off for writing the second phase proposal

No hibernation for DETECT – CRC1502 is entering the hot phase.

After a short breather at the turn of the year, DETECT is getting back to work with new energy.

Following many different brainstorming sessions and preliminary decisions, the project structure for phase 2 has now been set. The next few months will be dedicated to formulating project proposals, and bringing research collaborations and addressed regions into one big whole: the DETECT second phase proposal. The writing phase has officially begun with the **Kick-off Meeting** for Proposal Writing on 16 January, the first DETECT steering meeting of the New Year.



Despite icy temperatures in the Rhineland, the focus of this year's first and joint geodetic colloquium with DETECT on 9 January was on extreme droughts and floods in Africa with guest speaker **Prof. Andreas Fink** from KIT Karlsruhe: What are the causes of droughts and floods, and what are the pathways to improve early warning?

But now back to 2024 - a very productive year with at least 35 peer-reviewed publications involving DETECT scientists. Congratulations to all authors and: Let's keep up the good work in 2025!

Frank Ewert, PI in DETECT, was again awarded by CLARIVATE among the most highly cited researchers in the interdisciplinary category "cross-field": Congratulations also to Frank!

DETECT Speaker **Jürgen Kusche** has become member of the NASA/ESA interagency Mass Change and Geosciences International Constellation (MAGIC) Working Group: Congrats, Jürgen!

Furthermore, the DETECT scientists spared no distance and travelled all over the world: to Washington, Oaxaca, Vancouver, Reading and Rome, which were only some of the DETECT-attended and contributed conference venues in recent months. Read more about the events, our scientists' insights and impressions in this Newsletter edition.

But also on-site in Bonn, the annual **All Status Meeting** took place at the end of November for the first time as hybrid format, which was well received.



This newsletter edition introduces even three DETECT members who have taken on new positions:

Hana Mohammed, who was appointed coordinator for the cooperation with Africa as a central region of the upcoming research phase.

Julian Giles presents himself, challenges and motivation for his role as the new DETECT PostDoc representative.

And last but not least, the BIGS-LF Coordinator position has been filled by **Arnim Kuhn** since November 2024.

Read for yourselves: There is a lot going on, DETECT is tackling it!

Best wishes from the DETECT Coordination and Editorial Team,

Enjoy reading!

Sincerely,

Jürgen Kusche
Speaker

Silke Hüttel
Co-Speaker

Harry Vereecken
Co-Speaker

Frank Siegismund
Scientific Coordinator

Dorothee Berkle-Müller
Administrative Coordinator



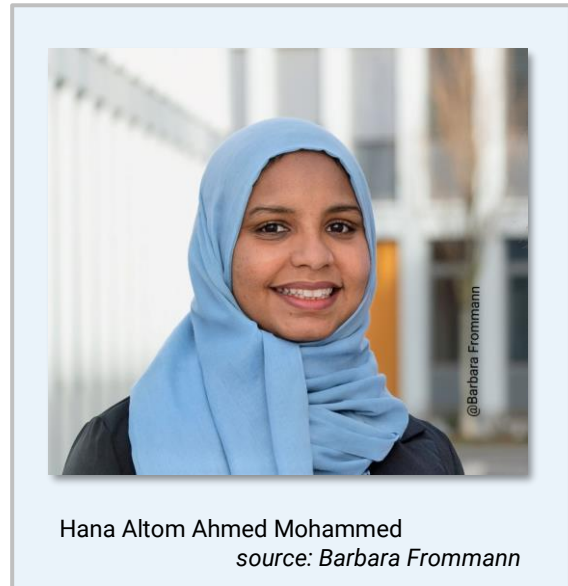
DETECT coordination staff

Introduction of Hana Altom A. Mohammed coordinating collaboration with Africa

My name is Hana Altom Ahmed Mohammed, and I have been coordinating the **CESOC** initiative at the University of Bonn for the past two years. My academic background in hydrology and water resources has provided me with a strong understanding of environmental systems and sustainable resource management. Joining DETECT presents a fantastic opportunity to apply my expertise within a dynamic team while learning and growing through collaboration with the team and new partners.

Taking on a supporting coordination role for DETECT is an exciting opportunity for me to further develop and broaden my skills. It allows me to engage with interdisciplinary teams and enhance my organizational abilities. My background in hydrology and water resources, including my work at the Hydraulic Research Centre (HRC) Sudan, aligns well with DETECT's focus, offering a unique chance to deepen my knowledge while contributing to impactful projects.

My involvement in supporting the coordination of DETECT's second phase, which targets regions in Africa, is particularly exciting. The challenge of fostering collaboration among new partners and supporting their efforts to apply DETECT's research in Africa is both inspiring and crucial. Strengthening these networks and



Hana Altom Ahmed Mohammed
source: Barbara Frommann

facilitating effective partnerships will be key to the success of this phase and to achieving long-term sustainability and impact.

On a personal level, my main challenge will be balancing the diverse responsibilities of this coordination role while continuously improving my skills. I aim to ensure effective communication and collaboration across teams, adapt to new challenges, and contribute meaningfully to DETECT's objectives. I look forward to working together for a successful and impactful collaboration.

Visiting Scientist

Dr. Lan Zhang

About Dr. Lan Zhang

Lan Zhang from the Institute of Earthquake Forecasting, China Earthquake Administration, has started a two-year guest stay within DETECT and the Institute of Geodesy and Geoinformation team.

Lan has a PhD from the University of Chinese Academy of Science. She will mainly work on inferring water cycle changes from time series of GNSS observations, in combination with advanced elastic loading models.



DETECT scientific representatives and board staff

Interview with Julian Giles

PostDoc subproject A04, PostDoc representative and DETECT Board Member

Julian, what was your motivation to assume this representative role?

My motivation comes from a desire to foster a stronger connection and improve communication between the postdocs and the board. As postdocs, we are in a unique position: we contribute significantly to the scientific output of the project but can sometimes feel removed from the decision-making processes that shape our work environment. By serving as a representative, I hope to ensure that the voices, concerns, and ideas of postdocs are heard and taken into account, as well as provide fast and clear communication to the postdocs about what is being discussed by the board.

What do you think is the most exciting challenge for DETECT's second phase?

For sure I think that the most exciting challenge moving forward is the scientific challenge. We have a diverse range of projects in DETECT. Each project has its own pace, challenges and goals and we need to be able to put everything together in a nice and attractive package that also takes into account the new common objectives for Phase 2. I am eager to actively participate in the shaping of the next proposal.

What do you consider beneficial from your participation in the monthly board meetings?

Participating in the monthly board meetings gives me valuable insight into the strategic direction and decision-making processes of DETECT. It's an opportunity to represent postdoc perspectives while building relationships with leadership and other board members. Additionally, this experience helps me develop skills in communication, advocacy, and collaborative decision-making, which are important for personal and career growth in academia.

And what do you see as your personal challenge in your different roles within DETECT?

My personal challenge lies in balancing the different responsibilities I have within DETECT. As a postdoc, my primary focus is on advancing research, while as a board representative, I need to ensure I effectively advocate for my peers and contribute to the administrative aspects of the project. Navigating these roles requires careful time management and the ability to switch perspectives, from the immediate needs of my research to the broader goals of the project.

About Julian Giles

Julian is a postdoctoral scientific researcher at the Meteorology Section, Institute of Geosciences, University of Bonn.

He studied Physics at the National University of Rosario and then completed his PhD in Atmospheric Science at the University of Buenos Aires, Argentina.

He moved from Argentina to Germany to work in DETECT and his research interests include precipitation, land-atmosphere interactions, atmospheric modeling and data analysis in Python.



[Researchgate](#)

[ORCID](#)

DETECT coordination staff

Introduction of Dr. Arnim Kuhn

scientific coordinator of the BIGS-Land and Food

I am a farmer by professional training, and after having worked on various farms for several years after high school, I studied agricultural sciences at the Universities of Bonn and Kiel. Back then I did not earn a Master's degree, but a diploma in agricultural engineering. I was then offered to do a PhD at the Centre for Development Research in Bonn, which I completed in the year 2000.

I have worked as a researcher in agricultural economics at the University of Bonn since 2001, with interspersed consultancy appointments in Russia and Ukraine, and research in various African countries. In November 2024 I was appointed scientific coordinator of the BIGS-Land and Food, the graduate school of the Faculty for Agriculture, Nutrition and Engineering of Bonn University.

Beyond employed work I am a dedicated runner, paddler, boat designer & builder, and choir singer.

My focus for the next year is to establish a functional digital environment for the students of the graduate school, and to define a broader joint curriculum.

The latter is not an easy task, as the disciplinary heterogeneity of BIGS-LF members hardly allows for a joint scientific curriculum, in contrast to graduate schools that focus on specific research areas.

I am very much looking forward to work with you – please do not hesitate to contact me when you have requests regarding your graduate studies.

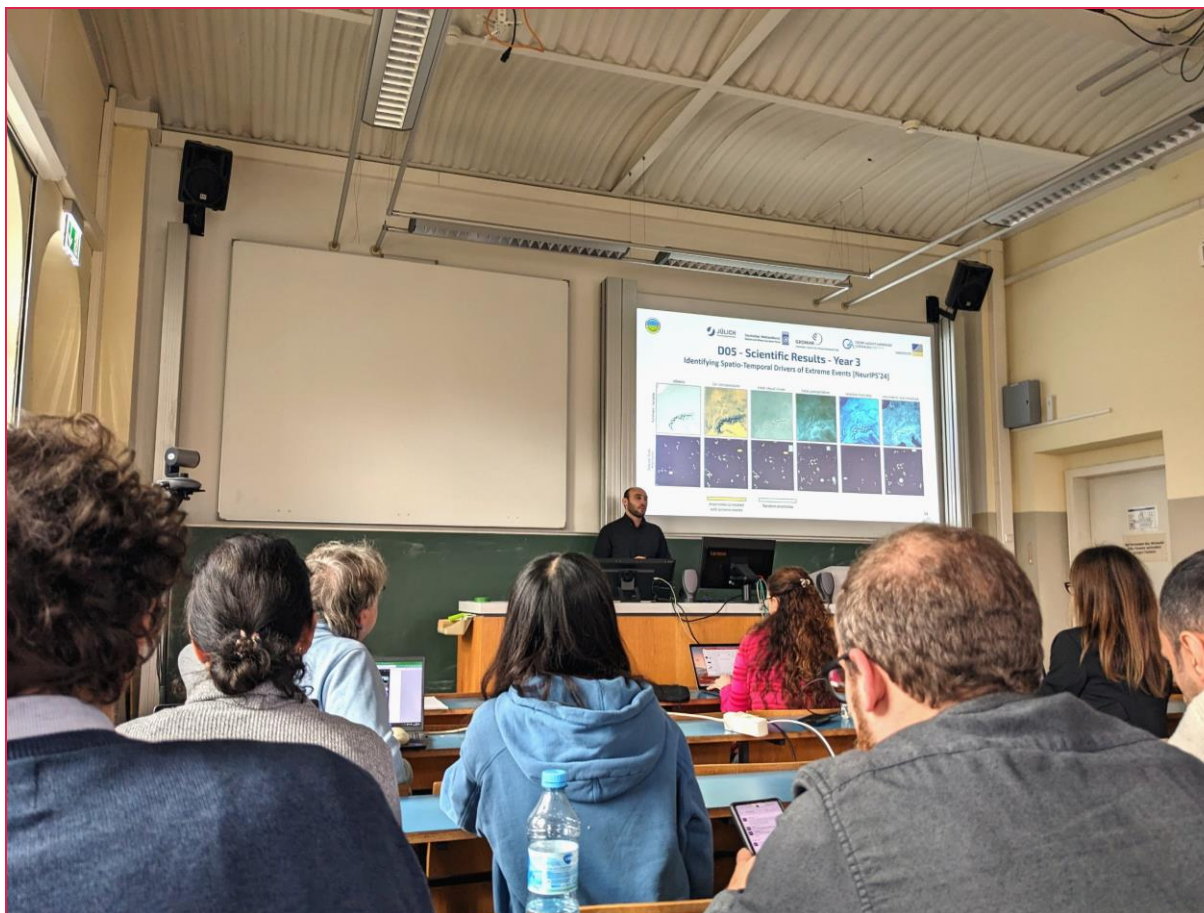
Dr. Arnim Kuhn

BIGS - Land and Food
Europabüro, Katzenburgweg 9
53115 Bonn
akuhn67@uni-bonn.de
+49 228 73-2159



3rd DETECT All-Status Meeting, 20-21 November 2024

by Dorothee Berkle-Müller



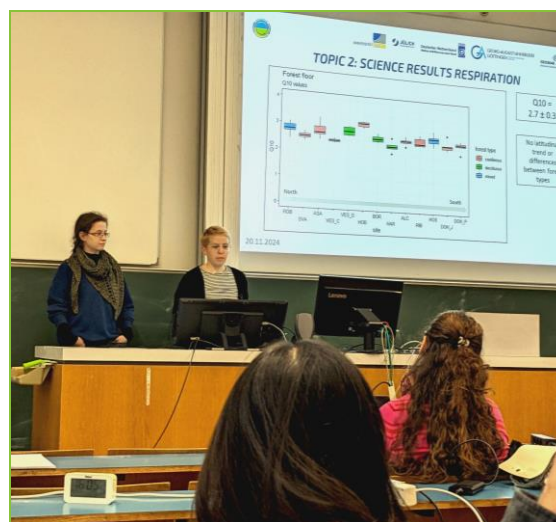
Presentation at the 3rd DETECT All Status Meeting

source: Nicolas Jennrich

The 2024 All Status Meeting of the CRC1502 DETECT took place on 20-21 November 2024 from lunch-to-lunch time for the first time as a hybrid format.

After an introduction by the speaker with an update on the status of preparations for phase 2 and on relevant CRC1502 coordination issues, all projects had the opportunity to report on their current status.

Central research question(s)/hypotheses of each project, including science results and tangible outputs and milestones were presented in brief pitch format by all project scientists. The new hybrid format was very well received and is to be established as a permanent format for all future DETECT All-Status Meetings.



3rd DETECT All Status Meeting

source: Nicolas Jennrich



DE-I-TECT

2024 Review

by Silke Hüttel and Dorothee Berkle-Müller

In 2024 we had 2 DE-I-TECT lectures with strong experts from DIVERSITY research.

In January 2024, Professor Marieke van den Brink from Radboud University in Nijmegen gave an online lecture about the difference between mentoring and sponsorship. See [Newsletter#8, page 9](#) for more information.

In October 2024, Professor Ute Klammer from University Duisburg Essen, visited us in Bonn and gave a talk about diversity in higher education and research.

Lessons we learnt is that diversity, often too narrow tied to women and men researchers, needs a broader view covering additional dimensions such as social background. This means that strategies to increase diversity need a cross-sectional perspective: research, teaching and studying, and overall strategic development.

We look forward to discussing our strategy for DE-I-TECT in phase 2 of the CRC.

DE-I-TECT offered in 2024 four empowerment, training and network competencies workshops with our new collaboration partner, Sabine Mariss, an expert in the fields of women and diversity empowerment.

In addition, a special individual coaching was offered for all DETECT members who self-identify as members of underrepresented groups, to strengthen them.

Furthermore DE-I-TECT was actively involved in the 2024 Girl's Day at University of Bonn

The earmarked funds, which are granted exclusively for measures and interventions complying with the [DFG's Equity and Diversity Concept](#), were spent in 2024 – besides for a.m. events - for active career promotion of DETECT scientists of the target group.

2025 Outlook

In 2025, the DE-I-TECT Team aims at expanding the offer on empowerment trainings and coachings, and will be once again involved in this year's Uni-Bonn Girl's Day.

Any comments on diversity, equity and inclusion in DETECT are welcome - we look forward to discussing with you.

[Silke Hüttel](#) and [Dorothee Berkle-Müller](#)

ECMWF Code for Earth Programme, May - September 2024

by Yikui Zhang, Till Fohrmann, Johannes Leonhardt, Mohamad Hakam Shams Eddin



Project photo of all participants at ECMWF Headquarter, Reading, UK

Source: ECMWF

The ECMWF Code for Earth project is a groundbreaking initiative aimed at advancing open-source software for Earth system science since 2018. Leveraging ECMWF's expertise in weather prediction, climate modeling, and atmospheric research, the project provides tools, libraries, and workflows to enable cutting-edge research and operational capabilities.

The project promotes collaboration among scientists, developers, and institutions worldwide, fostering innovation through shared resources and data. Key components include frameworks for large-scale data analysis, machine learning integration, and high-performance computing, designed to address pressing environmental challenges.

There were 13 teams selected by the programme committee for working on innovative projects this year. Luckily, one of these teams was formed by DETECT members.

DETECT contribution at ECMWF Code for Earth 24

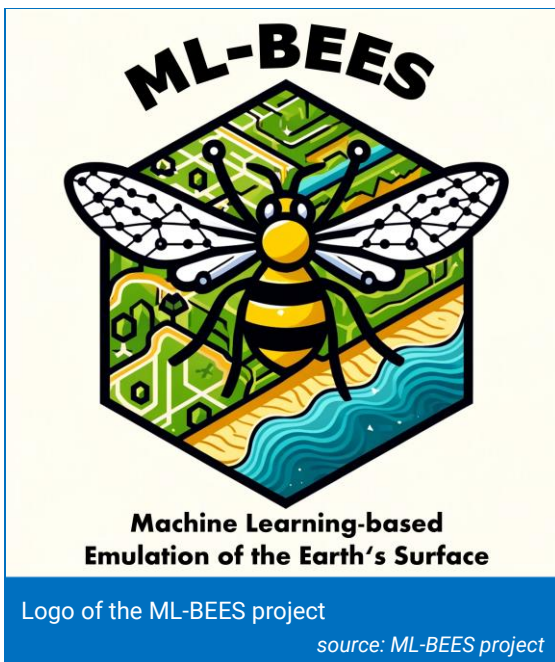
[ML-BEES: Developing Machine Learning-based Emulation of the Earth's Surface](#)

Yikui, Johannes, Hakam, and Till, four PhD students from the CRC project Clusters B and D worked together on a project titled "ML-BEES: Developing Machine Learning-based Emulation of the Earth's Surface".

Land surface models (LSMs) simulate critical Earth processes but are computationally

intensive. This study evaluates machine learning (ML) models—XGBoost, Multilayer Perceptrons (MLPs), Graph Neural Networks (GNNs), and the Mamba model as emulators for ECMWF’s ECLand LSM by developing a comprehensive evaluation framework. XGBoost delivers the highest accuracy in capturing discrete transitions, while the Mamba model excels in long-context modeling and the MLP shows the highest efficiency. However, all models face challenges in snow-dominated and water-dominated regions. Moreover, a deep ensemble approach using the UniMP model it reveals that ML-based emulators are reliable in most regions in terms of uncertainty.

Our findings demonstrate the potential of ML emulators to enhance LSM efficiency, though further work is needed to better evaluate aleatoric uncertainty and capture complex physical processes.



Invited visit and presentation in ECMWF headquarter in Reading, UK and Bonn, Germany

The final day of the programme was held on September 18, 2024. The group was invited to ECMWF headquarter in Reading, UK, to present the work and celebrate the finish of the project.



The final event was an intensive day with presentations from all 13 groups. It was also a nice opportunity for PhD students to communicate with experts from ECMWF in person and participants from different backgrounds. The successful completion of the project also brought a 5000-euro prize to the DETECT group.

Along with the final event, the group was also invited to visit the ECMWF office in Bonn, Germany. We had an insightful and fruitful discussion about the outlook of the project with our mentors.

In the end, we want to thank all of our mentors (Dr. Ewan Pinnington, Dr. Christoph Herbert, Dr. Peter Watson and many others) from European Centre for Medium-Range Weather Forecasts (ECMWF) in Reading and Bonn, as well as for the resources and funding from ECMWF Code For Earth 2024 Event.

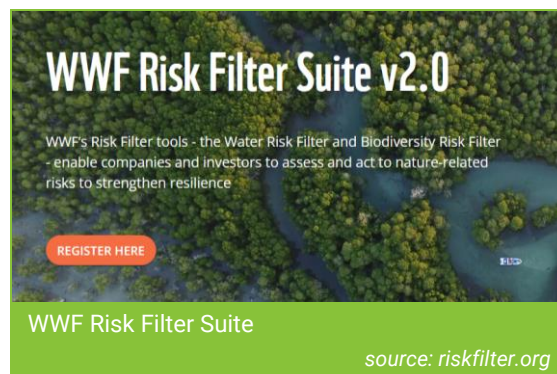
Integration into WWF Risk Filter Suite

by Jürgen Kusche

The global monthly maps of groundwater storage change at 50km resolution, developed at the University of Bonn by assimilating GRACE and GRACE-FO data into a global hydrological model (Gerdener et al., 2023), have been integrated by the World Wildlife Fund into their latest update of the [WWF Risk Filter Suite](#) (RFS).

The WWF RFS offers free, online and spatially explicit tools that enable thousands of corporate and financial institutions to assess and act on nature-related risks – water and biodiversity – to strengthen resilience. The development of the groundwater data set and its impact in risk

assessment will be presented at the ESA Living Planet Conference in Vienna, 2025.



Cameroon Advanced Measurements for Enhanced Observations of Water Levels using Affordable GNSS-IR and Sentinel-3 & 6 Technology (CAMEO-WAGST)

Dr. Makan Karegar, a member of DETECT sub-project B01, has recently secured funding for a project under the EO Africa Research and Development Facility, supported by the European Space Agency.

The project, titled "[Cameroon Advanced Measurements for Enhanced Observations of Water Levels using Affordable GNSS-IR and Sentinel-3 & 6 Technology \(CAMEO-WAGST\)](#)", involves collaboration with an African Co-PI, Dr. Loudi Yap from the National Institute of Cartography (NIC) in Cameroon.

Through this project, eight [Raspberry Pi Reflector](#) units will be deployed at strategic locations in Cameroon to enhance water level monitoring infrastructure and validate satellite altimetry data from Sentinel-3 and Sentinel-6.

The project includes intensive fieldwork and a visit by Dr. Karegar to train personnel at the NIC in Cameroon. This training will focus on establishing a sustainable framework for continued work after the project's completion and

exploring potential collaborations in the second phase of SFB1502 for Africa.

The CAMEO-WAGST project also involves Prof. Jürgen Kusche and PhD student Jiaming Chen.



Makan Karegar

source: Makan Karegar

AGU Fall Meeting 2024 conference report

by Stefan Poll and Klaus Goergen



Meeting venue, Walter E. Washington Convention Center, main entrance as seen from the corner of 9th street and Mt. Vernon Place.

source: S. Poll

The **American Geophysical Union (AGU) annual Fall Meeting** in December is one of the largest gatherings of scientists and researchers in the world, bringing together regularly more than 20,000 experts from various disciplines of Earth sciences, geosciences, and geophysics, and space sciences with a big portion focusing on hydrology and atmospheric sciences. The AGU Fall Meeting always provides a great platform for discussing the latest scientific findings, developments, innovations, and challenges across numerous areas of geophysical research. The “theme” of the 2024 meeting in Washington D.C. was “What’s next for science”, dedicated to “how we approach research, data, collaboration, and societal impact in an increasingly interconnected world” (AGU 2024). Overarching goals of the meeting were (i) to make Earth and space science data more accessible, interoperable, and impactful, (ii) to expand interdisciplinary collaborations, and (iii) to promote leadership in data stewardship and software innovation (AGU 2024).

Several colleagues from the Geoverbund ABC/J region were at AGU; members of the CRC 1502 DETECT from Forschungszentrum Jülich on-site were Stefan Kollet, Harrie-Jan Hendricks-Franssen, Visakh Sivaprasad, Stefan Poll and Klaus Goergen. In invited presentations Stefan Kollet emphasized “[The Missing Component in Earth System Models: Prognostic Groundwater Modeling from the Continental to Global Scale](#)” in the session “Regional Groundwater Quality,

Availability, and Sustainability: Advances, Methods, and Approaches” while Harrie-Jan Hendricks-Franssen presented “[Multivariate data assimilation with integrated terrestrial system models: new advances to improve subsurface characterization and prospects to improve estimation of land-atmosphere exchange fluxes](#)” in the “Advances in Data Assimilation/Fusion for Understanding and Forecasting Terrestrial and Subsurface Water Cycles” session. Visakh

Sivaprasad presented “[Enhancing Long-Term Surface Soil Moisture Retrievals Using Con-vLSTM2D and Conv2D Models](#)” in the “Advancements in Remote Sensing, Hydrologic Modeling, Data Assimilation, and Machine Learning for Terrestrial Water Cycle” session. Stefan Poll gave a talk about “[The new version of the Terrestrial Systems Modeling Platform \(TSMP2\) based on ICON, eCLM, and ParFlow](#)” in the session “Improving Representation of Processes in Earth System Models for Weather and Climate to Address Systematic Biases” and Klaus Goergen presented “[Prognostic ParFlow integrated hydrologic model applications at stakeholder-scale over central Europe](#)” in the session “Hydrometeorologic Extremes: Prediction, Simulation, and Change”. In line with DETECT’s research agenda, our contributions addressed the terrestrial water cycle, individual process representations, and improvements in Earth system modelling. Here’s a summary of the talks from Goergen and Poll.

On the morning of the first conference day Goergen et al. presented a study that demonstrated the prognostic capabilities of the integrated hydrologic model ParFlow in simulating the devastating Eifel-Ardenne 2021 flood event and how ParFlow simulations might be used to further explore the underlying processes. In its water resources setup at sub-km resolution, ParFlow could capture the July 2021 flood event’s magnitude and timing remarkably well, without additional calibration or tuning. It shows that – depending on the preconditioning of the catchments under investigation – a considerable proportion of the precipitation could still be buffered by the subsurface.

The presentation was in stark contrast to several presentations that use lumped hydrologic models which need to undergo an extensive tuning and calibration stage before production use. It also became obvious that the integrated hydrologic models, where the subsurface 3D hydrodynamics and 2D surface dynamics are treated in a continuum approach, by design, cover many processes – such as the redistribution of surface and groundwater, streamflow aquifer interactions, ponding or flowing water in convergence zones, the evolution of river networks, km-scale heterogeneity, hillslope processes, to name a few – that otherwise need complex development and implementation.



The Grand Lobby of Walter E. Washington Convention Center just inside of Mt. Vernon Place main entrance as seen from level 3. AGU 2024 saw more than 25,000 participants.

Source: Klaus Goergen

On Wednesday, Stefan Poll et al. introduced the new version of the Terrestrial Systems Modeling Platform (TSMP2) that enables the simulation of interactions and feedbacks from the groundwater to the top of the atmosphere. TSMP2 will be the main model system in the DETECT phase 2. TSMP2 consists of ICON, eCLM5, and ParFlow linked with each other through the OASIS3-MCT coupler. TSMP2 improves upon previous modeling frameworks, namely TSMP1, by enhancing the coupling between atmospheric dynamics, land surface processes, and the hydrological feedbacks. This integration is particularly valuable for improving water cycle predictions in regions experiencing significant climatic variability, such as areas with frequent droughts or extreme rainfall events. Poll et al. highlighted the potential of fully coupled models, such as TSMP2, in providing more accurate representations of the closed terrestrial water cycle, including groundwater storage, which is still, in most cases, poorly represented in traditional climate models. Additionally, the platform’s ability to run efficiently at high spatial resolutions allows for the exploration of localized hydrological processes that are critical for water management and planning.

Climate intervention, previously called geo-engineering, was an interesting [topic throughout the conference](#) with dedicated sessions and a prominent panel ([Frontiers of Geophysics Plenary Panel, Youtube.com](#)). These events were in the context of the October 2024-released AGU report on the [Ethical Framework Principles for Climate Intervention Research](#). On top of complicated interaction and feedback mechanisms triggered by climate intervention measures – which are already ongoing –, ethical questions arise, such as who is controlling climate intervention, and in which context and with what motivation may it be used. Another prominent topic was on the new NASA Surface Water and Ocean Topography (SWOT) satellite mission, [where many new research results, data products, and application showcases were presented](#).

The AGU Fall Meeting 2024 provided as usual a valuable opportunity for networking. Of special interest to us was the connection, e.g., to the North American ParFlow community and the Community Land Model (CLM) colleagues. With the CLM community discussions were on the integration of land surface and hydrological

processes. Participants from the CLM community shared insights into improving land-atmosphere interaction, focusing on advancements in representing soil moisture dynamics and vegetation processes within climate simulations. In parallel, hydrologists working with integrated models such as ParFlow discussed the challenges and innovations in simulating subsurface water flow and groundwater dynamics. These interactions underscored the importance of interdisciplinary collaboration in advancing the understanding of the terrestrial water cycle, highlighting how both the land surface and hydrology communities are working together. Presentations on Earth system modelling also emphasized once more the importance of combining climate, land surface, and hydrological models to improve our understanding of the complex interactions that drive the terrestrial water cycle. The discussions around these models also underscored the critical role of model predictions in tackling future water-related challenges and act as a basis for effective water management strategies, more informed decision-making under a changing climate.

Joint Geodetic Colloquium with CRC1502 DETECT at University of Bonn

by Prof. Dr. Andreas Fink



Prof. Dr. Andreas Fink

source: Magali Hauser / KIT

Prof. Dr. Andreas Fink, from University of Karlsruhe, Institute of Technology (KIT), Institute for Meteorology and Climate Research (IMKTRO) visited the University of Bonn on 9 January 2025

for a joint colloquium of Institute for Geodesy and Geoinformation and Collaborative Research Centre 1502 DETECT to talk about recent extreme droughts and floods in Africa, the causes and pathways to improve early warning.

The Greater Horn of Africa has been stricken by a series of extreme droughts, but also floods in the recent decades. Debilitating floods also affected the Sahel in recent years, including 2024, and parts of southern Africa had one of their driest rain seasons in decades in 2023/2024.

In this talk the potential causes of these hydro-meteorological extremes and novel opportunities to improve early warning by providing more accurate forecasts of these events were discussed.

Advancing Climate-Smart Landscape Configurations: Insights from the 5th Open Science Meeting

by Marco Ferro

The 5th Open Science Meeting, organised by the Global Land Programme (GLP), took place in Oaxaca, Mexico, from 4 to 8 November. Under the theme "Pathways to Sustainable and Just Land Systems", the event brought together experts to discuss innovative approaches to sustainable land use and governance. Representing the DETECT project, Marco Ferro, a PhD student in subproject A06, presented his research on the role of landscape configuration in climate regulation.



Early afternoon view from one of the ICTP's Adriatico Guesthouse lecture rooms towards the Adriatic Sea.

source: Marco Ferro

Ferro's work addresses a pressing question: how does the spatial arrangement of land cover influence climate processes? While the effects of land cover composition – e.g., the proportions of different land cover types – on climate have been well documented, the role of configuration has been less thoroughly studied. Ferro's research fills this gap by examining how changes in land cover configuration affect biophysical processes, such as energy and water cycling, and ultimately the local temperature. To conduct the analysis, Ferro uses advanced modeling tools developed in DETECT.

He employed the Terrestrial System Modeling Platform (TSMP) including atmospheric and land models to simulate different land cover scenarios. His simulations provided critical insights into the climate signals generated by different configurations under different conditions, including dry, wet, and average years. This research shows that landscape configuration has a significant impact on climate processes, with distinct seasonal patterns emerging in response to spatial arrangements of land cover.

These findings underscore the importance of considering both composition and configuration in climate-smart landscape management, providing valuable insights for policymakers.

The choice of Oaxaca as the venue added a unique dimension to the conference. Known for its vibrant culture, rich biodiversity and stunning landscapes, the region exemplifies the complex interactions between natural systems and human activities. As a microcosm of global land system challenges, Oaxaca provided an inspiring backdrop for discussions on pathways to sustainable and equitable land systems.

The 38th Annual Conference on Neural Information Processing Systems, Dec 10 – 15, 2024, Vancouver, Canada

by Mohamad Hakam Shams Eddin



NeurIPS 2024, Vancouver Convention Center, Canada.

Source: Mohamad Hakam Shams Eddin

The Neural Information Processing Systems (NeurIPS) is a primary conference on machine learning and artificial intelligence that is held every December. Over the years, NeurIPS became a multi-track interdisciplinary conference for fields like computer vision, neuroscience, cognitive science, and reinforcement learning.

This year, the conference invited various talks covering topics such as the new Long Short-Term Memory (xLSTM) by Sepp Hochreiter, Visual Intelligence by Fei-Fei Li, and Schrödinger Bridges by Arnaud Doucet. There were 4037 papers accepted by the programme committee for presentation at NeurIPS Main Track this year. Luckily, one of them was a paper of DETECT subproject D05.

DETECT D05 paper at NeurIPS 24

Mohamad Hakam Shams Eddin, a PhD student from the CRC project D05 presented a paper titled "Identifying Spatio-Temporal Drivers of Extreme Events".

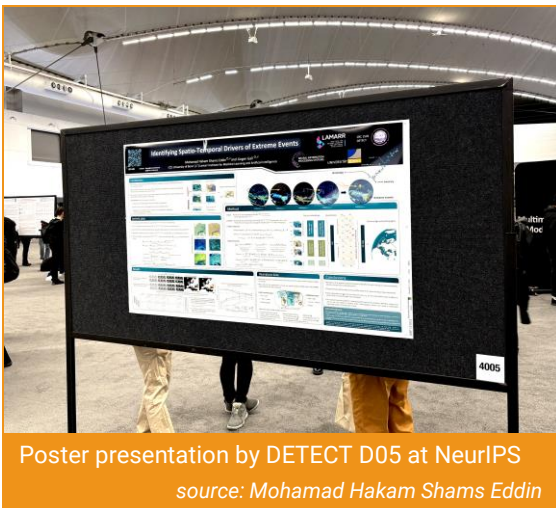
The paper assumed that there exist precursor drivers, primarily as anomalies in assimilated land surface and atmospheric data, for every observable impact of extremes. Based on this assumption, the paper introduced a novel deep learning model (IDE) to predict spatio-temporal extreme impacts along with their spatio-temporal drivers in the climate state variables.

Click to read the paper:

[Identifying Spatio-Temporal Drivers of Extreme Events](#)



The main application of this study within DETECT is to quantify the impact of anthropogenic drivers on anomalous events and to identify potential drivers of anomalies such as land- and water-use changes and greenhouse gas-induced climate change.



Workshop on Tackling Climate Change with Machine Learning 24

As part of NeurIPS the annual workshop “[Tackling Climate Change with Machine Learning](#)” was held on Dec 15, 2024. The workshop offered early-career scientists the opportunity to present and discuss their work with machine learning researchers and experts in the climate fields. This is appealing especially for PhD students since they can receive feedback on their works in an early stage of the research.



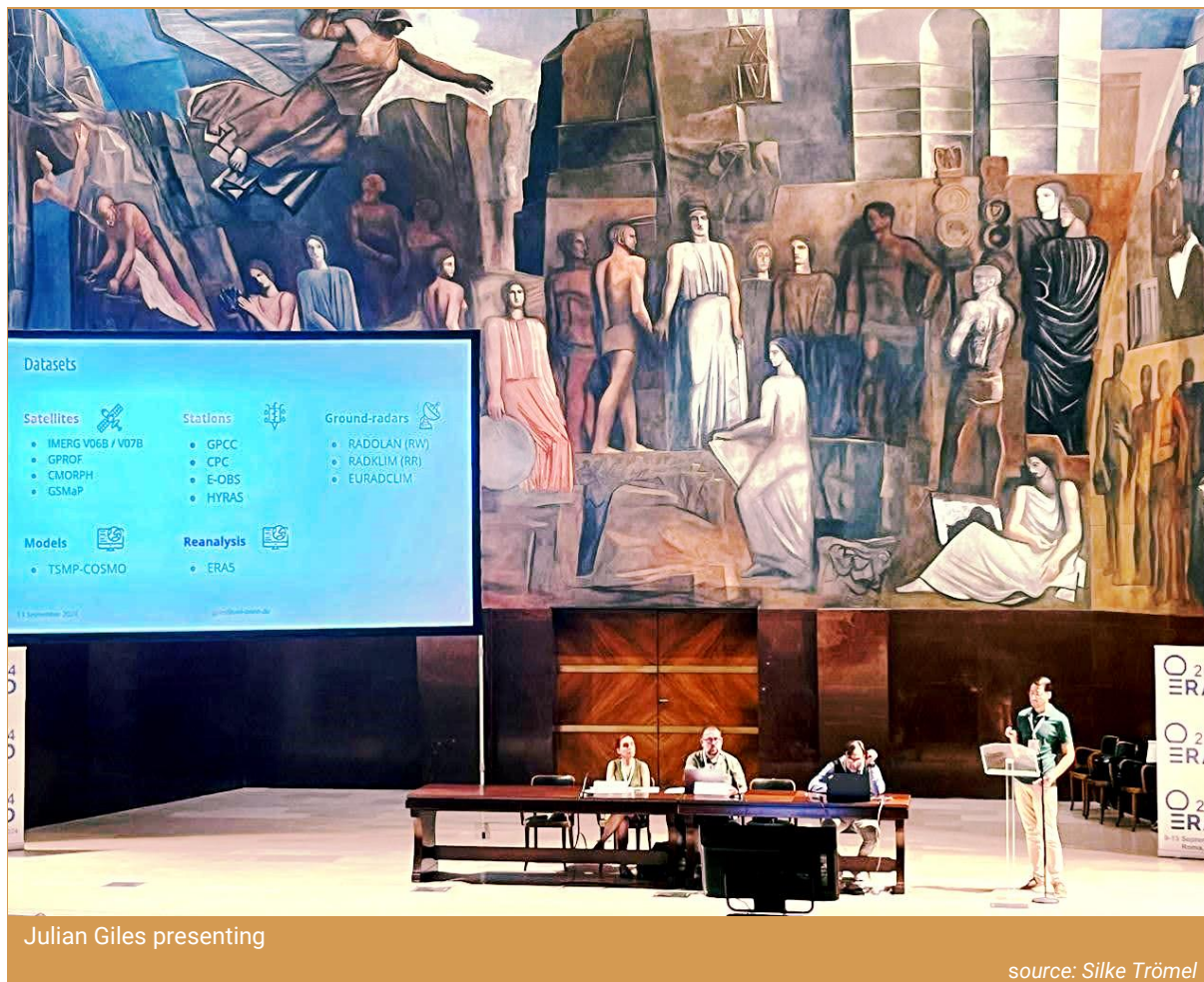
The workshop welcomed short papers on machine learning techniques to address climate mitigation and resilience including topics like agriculture and food, disaster management, and Earth science.

The keynote talks and panels discussed two main aspects; (a) The advantages and disadvantages of large deep learning models in relation to climate effect (large language and vision models), (b) How to design datasets and benchmarks across climate-relevant fields and what are the differences to other machine learning benchmarks.

Along with the main conference and poster sessions, I enjoyed attending this workshop and particularly the keynote by Dr. Esther Rolf on [Mosaiks](#) and location embedding with satellite imagery.

12th European conference on RADar in meteorology and hydrology (ERAD 2024), Rome, Italy

by Julian Giles



Julian Giles presenting

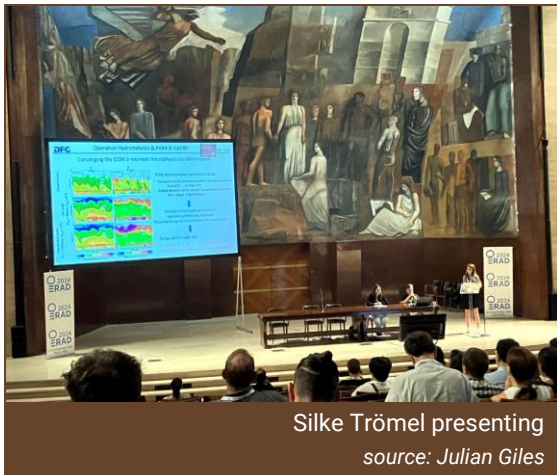
source: Silke Trömel

From 9 to 13 September, the 12th European conference on RADar in meteorology and hydrology (ERAD 2024) was held in Rome, organized by the Institute of Atmospheric Sciences and Climate of the National Research Council of Italy (CNR-ISAC) and Sapienza University of Rome. More than 400 participants from different countries and diverse sectors of society (universities, industry, national weather services, etc.) joined the event to share and discuss the latest advancements in the fields of radar meteorology and hydrology.

One day ahead of the conference, four parallel short training courses were offered for young scientists. Julian Alberto Giles, PostDoc researcher from DETECT's project A04, contributed as instructor to the course "Open Radar – Open Source Software Tools for Radar Data Processing", which presented introductory hands-on lessons of open-source packages for processing weather-radar data.

At ERAD 2024, Julian presented the progress made in the A04 project with an oral presentation entitled "Mapping Rain: Navigating the Maze of Precipitation Datasets Across Europe". The presentation compared several precipita-

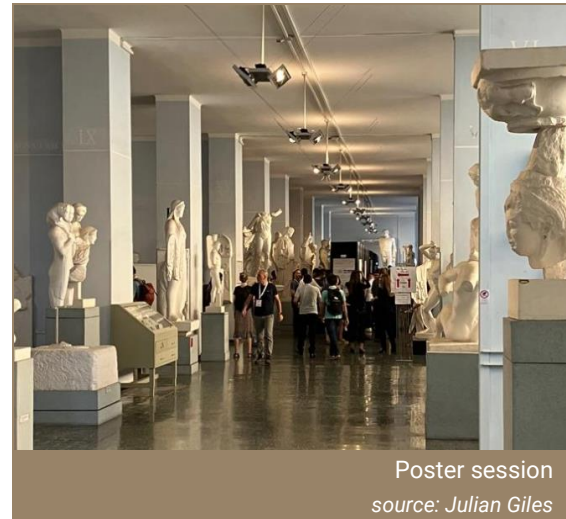
tion databases from different kinds of estimates (satellites, rain gauges, ground radars and models). "It was my first time presenting in such a large room with so many people! I was a bit nervous but the presentation went very well and I received several questions from the audience. It is definitely fulfilling to know that I was able to get the attention of others and communicate my results effectively." Julian says. The presentation is freely accessible [here](#) for anyone interested.



Silke Trömel presenting
source: Julian Giles

Silke Trömel, PI of project A04, also participated in the conference. She chaired Session 3 “Radar hydrometeorological applications IV Data Assimilation” and gave a keynote presentation titled “Polarimetric Radar Observations Meet Atmospheric Modelling (PROM) - A Research Initiative in Germany”, where she gave an overview on the DFG funded [Special Priority Programme](#). Many results from PROM set the basis for the theoretical framework and techniques that are used within A04 and there is constant collaboration between A04 and PROM. The presentation can be freely accessed [here](#).

The poster session was particularly interesting since it was place inside the university's Museo dell'arte classica, so we were surrounded by sculptures! All-in-all the conference was a great experience to get new insights in the latest developments in radar meteorology, foster collaboration, share moments with colleagues and visit the unique city of Rome.



Poster session
source: Julian Giles

Frank Ewert, PI in DETECT, was again awarded by CLARIVATE among the most highly cited researchers in the interdisciplinary category “cross-field”



Each researcher selected has authored multiple Highly Cited Papers™ which rank in the top 1% by citations for their field(s) and publication year in the Web of Science™ over the past decade.

However, citation activity is not the sole selection indicator. This list, based on citation activity is then refined using qualitative analysis and expert judgment as we observe for evidence of community-wide recognition from an international and wide-ranging network of citing authors.

Of the world's population of scientists and social scientists, Highly Cited Researchers are 1 in 1,000.

More info [here](#).

Satellite observations indicate regionally misleading wetting and drying trends in CMIP6

Joint paper by Jürgen Kusche and Stephanie Fiedler

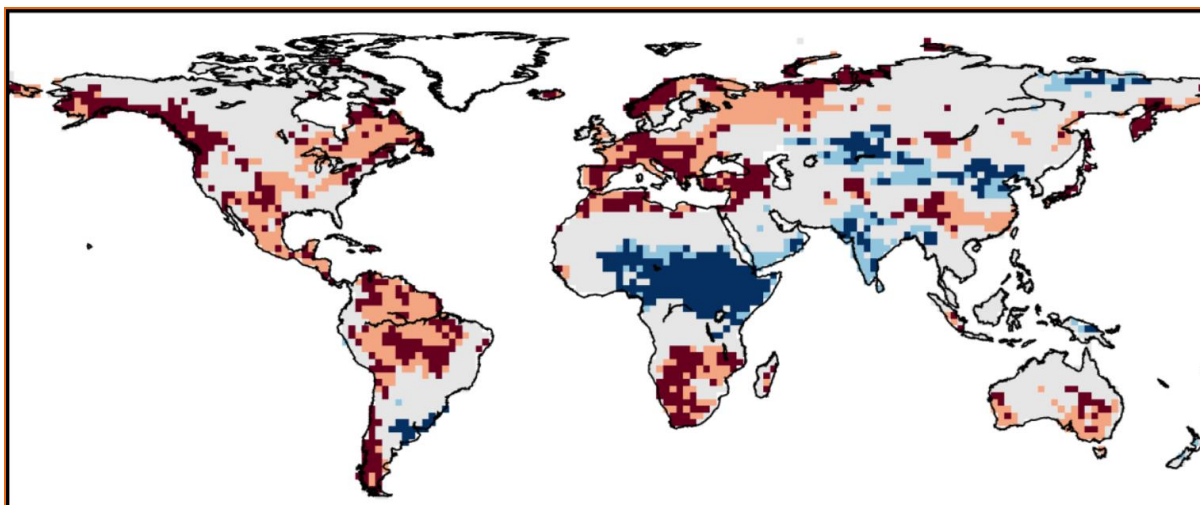
Jensen et al. (2024), including DETECT PIs Stephanie Fiedler and Jürgen Kusche, evaluate trends in terrestrial water storage over 1950–2100 in CMIP6 climate models against a new global reanalysis from assimilating GRACE and GRACE-FO satellite observations into a hydrological model.

To account for the different timescales of model simulation and satellite data availability, they identified regions in which the influence of interannual variability is small and observed trends may be considered as representative for longer periods.

The study revealed distinct biases in drying and wetting trends in the CMIP6 models for several world regions. For example, it identified high

model consensus for drying in the Amazon, however disagreeing with the observed wetting. In contrast, other regions show a high consensus of models and observations, suggesting qualitatively correctly simulated trends e.g. for the Mediterranean and parts of Central Africa, two hotspots of climate change which are relevant in DETECT.

A lesson is thus that a high model agreement, even across various different Earth system models, might still falsely indicate a robust trend in water storage if it is not assessed against available observations. This also underscores the importance of maintaining an adequate observational capacity for measuring water storage change for climate change assessments.



Drying (red) and wetting (blue): Regions of high consensus across 17 CMIP6 models; dark means agreement with GRACE/-FO, light means disagreement with GRACE/-FO in sign of trend



CRC1502 Travel Regulations

Update and complete switch to the digital travel self-services at University of Bonn

The recent switch of the University of Bonn Head Office to the exclusive use of [digital travel self-service for business trips](#) (affecting UBN employees only) has also some impact on our internal [CRC1502 Travel Regulations](#).

Please thoroughly read the updated instructions.

The CRC1502 Travel Regulations provide

- all information on our internal CRC1502 Travel Regulations, applicable forms and
- [digital travel self service](#), which is now **mandatory for all UBN employees**.

@ Uni-Bonn-employees: Please note, that paper applications will no longer be processed after 31 January 2025.

The relevant adaptation of the DETECT internal websites is currently work in progress.

In case you need to apply for travel funds or read the applicable regulations on any other travel issue, please only refer to the [SCIEBO Travel Regulations](#) and the instructions and forms posted there until further notice.

University of Bonn - open access publishing

Dear DETECT Community at University of Bonn,

DETECT provides a subsidy to support publications with DETECT acknowledgement. Before you apply for this subsidy, please inform yourself about the new open access policy, which was adopted at the University of Bonn in December 2024:

Free access to your publications via open access publishing increases the visibility of your research results! The University of Bonn (UB) has therefore made agreements with some publishers that allow you to publish free of charge or at least at a discount.

On December 6, 2024, UB has now adopted an Open Access Policy, which makes a recommendation for Open Access and guidelines for the granting of rights by authors to publishers. A publication fund has been set up from which publication costs can be paid after an application has been submitted, following the rules of the DFG. Take advantage of this offer! You can find more information [here](#).



© CCO

Recent and Upcoming Events

European Association of Agricultural Economists
celebrating its 50th anniversary
26th – 29th August 2025
**Food system transformation
in challenging times**



The XVIII EAAE Congress will take place in Bonn from 26th – 29th August 2025

Venue:

Lecture halls (Hörsaalzentrum) at Friedrich-Hirzebruch-Allee 5, 53115 Bonn
on the **Poppelsdorf Campus**.

For more information please refer to:
[EAAE 2025](#)

EGU General Assembly 27th April – 2nd May 2025
**European Geosciences Union (EGU)
General Assembly**



The EGU General Assembly 2025 brings together geoscientists from all over the world to one meeting covering all disciplines of the Earth, planetary, and space sciences. The EGU aims to provide a forum where scientists, especially early career researchers, can present their work and discuss their ideas with experts in all fields of geoscience.

Please read more [here](#).

ESA LIVING PLANET SYMPOSIUM
23th – 27th JUNE 2025

**From Observation to Climate Action and
Sustainability for Earth**



Held every three years, ESA's Living Planet Symposia provide a forum to present and discuss the latest scientific

findings and applications based on satellite data, and to review the contribution that data and technologies have made and could further make in addressing environmental and societal challenges. The symposium will showcase innovative products, services, missions and initiatives, with the overarching goal of demonstrating how science, society, policy-making, businesses and the economy can all benefit from observations made from space.

With the climate crisis intensifying, the Living Planet Symposium 2025 (LPS25) emphasises transitioning from 'observation to climate action and sustainability for Earth'.

During the five-day event, diverse communities united by a common interest in exploiting Earth observation data will gather together at the Austria Center Vienna, creating a unique opportunity to meet and network with space enthusiasts from a wide range of sectors.

Read more [here](#).

8th – 12th September 2025
EMS Annual Meeting 2025



The next EMS Annual Meeting 2025 will be held from 8 to 12 September 2025 at the Cankarjev dom congress center of Ljubljana, Slovenia.

Read more about EMS [here](#).

Recent and Upcoming Events**10th – 14th March 2025****International Spring School NEROGRAV**

The spring school “New Refined Observations of Climate Change from Spaceborne Gravity Missions (NEROGRAV)” will educate on March 10-14, 2025, in Neustadt an der Weinstrasse, Germany, a group of 31 Ph.D. students and junior scientists in state-of-the-art GRACE and GRACE-FO data processing (e.g. spherical harmonic analysis, filtering /de-striping, global / regional analysis of grid data) and applications of mass transport data in Earth system sciences related with the global water cycle, the oceans, or the cryosphere.

A look into the future of satellite gravimetry missions completes the program. Lectures and practicals will be given by members of the DFG (German Research Foundation) funded Research Group NEROGRAV and other external key experts.

The planned program, prerequisites for the participation and further information including a flyer are available [here](#).

16th-21th March 2025 in Bonn, Germany**PrePEP conference 2025**

University of Bonn, main building

copyright: Volker Lannert / University of Bonn

The international conference on ‘**Precipitation Processes - Estimation and Prediction (PrePEP)**’ to be held **16-21 March 2025 in Bonn, Germany**, will bring together scientists contributing with new approaches to improve the monitoring, understanding, nowcasting and prediction of precipitation processes. This includes advancements in integrated multi-sensor observations, their exploitation for parameterization developments, classical or AI-based Nowcasting techniques, microphysical retrieval development, data assimilation, the blending with numerical weather prediction, hydrological flood forecasts and warning strategies.

Please visit the conference website [here](#) for more information.



Activities within DETECT

DETECT Land & Climate Seminar	Mondays at 10:15 (zoom-link)
...planning for the 2025 summer semester is currently in progress...	

Events scheduled for 2025

Please enter in your calendar!

13 May 2025

1st African-European Workshop on Land Surface and Climate Change in Bonn

26 June 2025

DETECT Lecture

Invited lecturer: Bayani Cardenas

Read more:

[Birdsall-Dreiss and LaMoreaux Lecture](#)

All-cluster meetings scheduled for 2025/26

Please enter in your calendar!

14–15 May 2025

Retreat at Hotel Vier-Jahreszeiten in Bad Breisig

4 June 2025

General Assembly, online

26 - 27 November 2025

Status meeting Bonn hybrid

21 – 22 January 2026

DETECT II: On-site Evaluation by DFG

Other announcements

Jürgen Kusche appointed to "MAGIC working group"

Jürgen Kusche has been invited to become a member of the NASA/ESA interagency Mass Change and Geosciences International Constellation (MAGIC) Working Group.

The MAGIC Working Group will take the lead in supporting NASA and ESA during the development and implementation of a joint MAGIC sci-

ence and applications plan.

The Mass Change and Geosciences International Constellation is the jointly developed concept for collaboration on the NASA/DLR GRACE-C and ESA Next-Generation Gravity Mission (NGGM) staggered deployment of two satellite pairs.

Publications

...are published on our website

<https://www.sfb1502.de>



UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386



UNIVERSITÄT **BONN**



GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN IN PUBLICA COMMODA
SEIT 1737



JÜLICH
Forschungszentrum

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



Impressum

Publisher

Collaborative Research Centre (SFB)
1502 - DETECT

Contact

Collaborative Research Centre (SFB)
1502 – DETECT
Kekuléstr. 39a
53115 Bonn
+49 228 73-60585

siegismund@geod.uni-bonn.de

dberklem@uni-bonn.de

<https://www.sfb1502.de>

Editors

Frank Siegismund
Dorothee Berkle-Müller

Graphic design and layout

[Polywebster](#)

SFB1502 – DETECT is a Collaborative Research Center run by the University of Bonn and participating institutions FZ Jülich, the Universities of Heidelberg and Göttingen, and the DWD, and funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – SFB 1502/1-2022 - 450058266.