TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

› Editorial

Dear Colleagues,

The Corona pandemic has created an unprecedented situation, which not only affects all of us personally but also the way we do our research. We have, nevertheless, made great progress in many areas of TRR 170, and with this newsletter we want to share some of these recent developments. By now all positions have been filled and you will find contact information and an overview of scientific and other interests of the new members in this newsletter. Congratulations go to Csilla, Christian, and Markus for successfully defending their PhD. They have now moved on to new positions or continue their work as postdocs within TRR 170. We also welcome back Thomas Kruijer, who had already been involved in TRR 170 before leaving for a postdoc at Lawrence Livermore National Laboratory. Since September this year Thomas is Professor for Meteorite and Impact Research at the Museum für Naturkunde in Berlin, and he will be involved in TRR 170 more strongly again.

We are excited to announce the release of TRR 170's publication no. 100! This paper has been published in *Science Advances* and presents a much-improved estimate for the age of the Moon, one of the central topics of TRR 170. Fittingly, this paper is co-authored by several TRR 170 members from both Berlin and Münster. An additional seventeen TRR 170 papers have been published since we released our last newsletter, and again these papers nicely cover the topical breadth of TRR 170. You will find a list of these papers below and of course also on our webpage.

As you all know, due to the Corona crisis our Annual Meeting will be held virtually. Although we will not be able to meet in person, we will make sure that we maintain close interaction between Berlin and Münster and among all members of TRR 170. We will have regular virtual meetings within and among the three project areas, and we will also start our weekly TRR 170 seminars and colloquia. While they likely will all be virtual talks, they offer news ways of interacting because all of us can connect to these talks at the same time. As such, we are very optimistic that our virtual seminars will bring an entirely new experience of sharing and discussing our research.

We hope you will enjoy reading the newsletter.

All the best and stay healthy!

Sabine Hunze & Thorsten Kleine

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› Personnel

New PhD students

Irene Bernt (DLR, project C4, supervisor: Doris Breuer)
Irene.Bernt@dlr.de
The aim of my studies will be to improve the geodynamical model of the moon with special consideration given to the mixing of mantle components after the magma ocean phase and to the formation of melt. This topic combines what I was looking for: planetary science on the one hand, programming and numerical simulations on the other. As a physicist with interests in astrophysics, geoscience and chemistry, this interdisciplinary project is a welcome chance to combine these topics.
In my spare time I am interested in mindfulness, being in nature and I enjoy a good boardgame.

Sabine Dude (WWU, project C3, supervisor: Ulrich Hansen)
sabine.dude@uni-muenster.de
My main research interest is the thermo-chemical evolution of terrestrial planetary mantle and reservoir formation. The project I am working on aims to investigate and understand the origin of ^{182}W anomalies in terrestrial rocks. Our subproject focuses on the dynamical interaction of the core and mantle and its role in the formation of ULVZs at the CMB. To address this issue we perform high resolution numerical experiments on thermo-chemical mantle convection.

Barbara Giuri (WWU, project C6, supervisor: Harald Hiesinger)
gbarbara@uni-muenster.de
I believe my scientific career started in 2005 when I attended the NASA Astronaut training camp in Huntsville (Alabama, USA). I was fascinated by the magnitude of scientific knowledge and sense of discovery and exploration, that I pursued my BSc in Planetary Science with Astronomy in London (Uk) following an Msc in Geochemistry in the same institution. As a PhD student, the focus of my project will be producing a new inventory of impact basins on Mercury, as well as carrying out comparative studies of light plains on Mercury and the Moon. TRR 170 gave me the opportunity to continue my planetary career, in an interdisciplinary group and in an exciting new city, Muenster.
Despite all the science, I am also very fond of sports, Arts and Languages. I have been a competitive athlete all my live from dancing, martial arts and fitness modelling. I enjoy hand drawing, reading, keeping healthy and active, trying new activities and finding new hobbies!

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Valeria Montejo Melgarejo (TUB, project A4, supervisor: Jürgen Oberst)
v.montejomelgarejo@campus.tu-berlin.de
My research will focus on investigating the interior structure of lunar impact basins, using altimetry and gravity data from Lunar Reconnaissance Orbiter (LRO) and the GRAIL mission. I recently obtained my master's degree in Geodesy and Geoinformation Science at Technische Universität Berlin and during this time I developed an interest in planetary geodesy and did some studies about Phobos' surface, so I'm super excited to start with this project and be part of the TRR 170 program since I believe is a great opportunity to meet more people in the field and enhance my professional skills.
Apart from that I like photography as well as ice and roller skating, and I try to practice these as much as I can.

Astrid Oettting (WWU, project A2, supervisor: Harald Hiesinger)
aoetting@uni-muenster.de
My current research focuses on crater size-frequency distributions (CSFD) to improve the lunar production- and chronology functions. This allows a determination of the relative age of geological units on the Moon, which are then calibrated with absolute ages of lunar samples. By refitting existing CSFD data, a self-consistent dataset shall be created. My bachelor thesis at the DLR gave me first insights into planetary geology and aroused my fascination for this research field. I am pleased to pursue this interest through the TRR 170 project and I'm eager to deal with diverse planetary and geological issues. Besides that, I'm interested in polar science, glaciology and the geology and morphology below ice shelves, which was strengthened by my master thesis at AWI.

Randolph Röhlen (MfN, project C4, supervisor: Kai Wünnemann)
Randolph.Roehlen@mfn.berlin
The goal of my PhD project is to study the distribution of material after meteorite impacts. This will be done via computer simulations with the iSALE hydrocode, which I will further modify during my work. I have been interested in the analysis of physical problems with computational methods since my bachelor studies, and simulations have already played a central role in both my bachelor and master thesis in physics at the Universität Duisburg-Essen. I am also fascinated by astrophysics and planetology and am happy to have a chance to combine my interests in this project.
Apart from scientific topics I enjoy skiing, making music and reading.

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New professor

Thomas Kruijer (MfN)
Thomas.Kruijer@mfn.berlin
My research is aimed at understanding the accretion, differentiation, and earliest evolution of planets. To accomplish this, I apply novel isotopic tools to planetary materials to address diverse problems in early Solar System research. After completing my PhD at ETH Zürich (2013) I did research at the University of Münster and at Lawrence Livermore National Laboratory. Now I'm back in Germany and just started a professorship at the Museum für Naturkunde and the FU Berlin. I'm very excited about this new job and also about the opportunity to join the TRR 170 again. Within the context of this research program, I aim to utilize short-lived chronometers as well as nucleosynthetic signatures to reconstruct the timescales and mechanisms of planetary accretion on Earth, Mars, and the Moon.

New Postdoc

Claudia Stein (WWU, project C2, supervisor: Ulrich Hansen)
Stein@uni-muenster.de
My main scientific interest lies in the simulation of convective processes in the Earth and terrestrial planets. In the past I have developed numerical mantle convection models with complex rheologies to study mantle dynamics and tectonic processes. We found that the surface motion is closely linked to thermal and chemical structures in the deep mantle. The presence of long-lived compositional reservoirs in the lowermost mantle has a profound impact on the thermochemical evolution of the mantle. In my most recent work we analysed compositional heterogeneities, which are regarded as remnants of the magma ocean phase from Earth's accretion. The aim of this project is to better understand the settling of impact-delivered metal in the magma ocean phase.

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Support Z project

Christian Jansen (WWU, project Z: TRR 170 homepage)
christian.jansen@uni-muenster.de
Since undergraduate studies at Goethe-University in Frankfurt my fascination for Solar System research grew and ultimately let me to move to Münster, planning to join the cosmochemistry and isotope geochemistry group at the Institute for Planetology (WWU), led by Thorsten Kleine. The project I'm currently working on involves collecting high-precision isotope data along with petrographic and mineralogical data of different components of primitive (chondritic) meteorites in order to improve our understanding of the extent, the timescales and the mechanisms of mixing and material transport within the protoplanetary accretion disk. Furthermore, I'm doing website management of the TRR 170 homepage. Apart from science, I'm passionate about plants and organic vegetable growing, I enjoy cooking (and eating) fresh food, and love to go surfing whenever there's an ocean nearby.

Completed doctorates

Csilla Orgel (FUB, project A3)
csilla@fu-berlin.de
Supervisors: Kai Wünnemann & Harry Hiesinger
Date of doctorate: August 18, 2020
Title: Early Bombardment History of the Inner Solar System and Links to Future Human and Robotic Exploration Missions to the Moon

Christian Maas (WWU, project)
christian.maas@uni-muenster.de
Supervisors: Ulrich Hansen & Christine Thomas
Date of doctorate: July 29, 2020
Title: On the effects of planetary rotation on the dynamics of a terrestrial magma ocean

Markus Patzek (WWU, project B5)
markus.patzek@uni-muenster.de
Supervisors: Addi Bischoff & Timm John
Date of doctorate: May 27, 2020
Title: Evidence for the existence of different aqueously-altered C1 parent bodies in the early Solar System

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› Fellowships

- **Ke Zhu**

Time period: 01.09.-31.12.2020
TRR 170 host: Harry Becker, FUB
Home university: Institut de Physique du Globe de Paris
Ke Zhu will work on a reconnaissance study of Cr isotope compositions of Archean rock samples from Greenland, South Africa and Australia. The work is supposed to test for the presence of isotopically anomalous Cr, in particular in the pre-3 Ga impact lithologies (spherule layers). The detection of deviations from the bulk silicate Earth composition or the absence of deviations might yield constraints on the compositional spectrum of late accreted material, one of the objectives in research area B and C. Ke has worked on Cr isotopic compositions of planetary materials in his doctoral work. He currently is funded by a Chinese fellowship.

- **Seema Kumari**

Time period: 01.09.-31.12.2020
TRR 170 host: Andreas Stracke, WWU
Home university: Indian Institute of Technology, Department of Earth Sciences, Kanpur, India
Seema Kumari is interested in the isotope geochemical development of the silicate earth. Currently she is working on an 'open-system (box)' model of the ^{182}Hf–^{182}W and ^{146}Sm–^{142}Nd isotope evolution of the early Earth to simulate the effects of late accretion and early Earth differentiation on the isotopic composition of distinct mantle reservoirs. As such, Seema's work fits nicely with the objectives of project area C, but also has implications for some aspects of project area B.

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› Publications (May – October 2020)

Del Genio, A.D., Brain, D., Noack, L., Schaefer, L. (2020): The Inner Solar System's Habitability Through Time, book chapter in Planetary Astrobiology, Eds. Victoria Meadows, Giada Arney, David J. Des Marais, Britney Schmidt, arxiv:1807.04776. DOI:10.2458/azu_uapress_9780816540068-ch016.

Flemetakis, S., Berndt, J., Klehabemme, S., Genske, F., Cadoux, A., Louvel M. & Rohrbach, A. (2020): An Improved Electron Microprobe Method for the Analysis of Halogens in Natural Silicate Glasses. Microscopy and Microanalysis, 1-10. https://doi.org/10.1017/S1431927620013495

Gleissner, P. & Becker, H. (2020): New constraints on the formation of lunar mafic impact melt breccias from S-Se-Te and highly siderophile elements. Meteoritics & Planetary Science. https://doi.org/10.1111/maps.13557

Grenfell, J.G., Leconte, J., Forget, F., Godolt, M., Carrión-González, O., Noack, L., Tian, F., Rauer, H., Gaillard, F., Bolmont, E., Charnay, B., Turbet, M. (2020): Possible Atmospheric Diversity of Low Mass Exoplanets – Some Central Aspects. Space Sci Rev, 216:98. doi: 10.1007/s11214-020-00716-4

Hellmann, J.L., Hopp, T., Burkhardt, C. & Kleine, T. (2020): Origin of volatile depletions among carbonaceous chondrites. Earth and Planetary Science Letters, 547, 116508. https://doi.org/10.1016/j.epsl.2020.116508

Iqbal, W., Hiesinger, H., van der Bogert, C. H. (2020): Geological mapping and chronology of the lunar landing sites: Apollo 12. Icarus, Vol. 352, 113991. https://doi.org/10.1016/j.icarus.2020.113991

Kleine, T., Budde, G., Burkhardt, C., Kruijer, T.S., Worsham, E.A., Morbidelli, A. & Nimmo, F. (2020): The non-carbonaceous-carbonaceous meteorite dichotomy. Space Science Reviews, 216, 55. doi.org/10.1007/s11214-020-00675-w

Lentfort, S., Bischoff, A., Ebert, S. & Patzek, M. (2020): Classification of CM chondrite breccias – implications for the evaluation of samples from the OSIRIS REx and Hayabusa 2 missions. Meteoritics and Planetary Science, 55. https://doi.org/10.1111/maps.13486

Matthes, M., Van Orman, J.A. & Kleine, T. (2020): Closure temperature of the Pd-Ag system and the crystallization and cooling history of IIIAB iron meteorites. Geochimica and Cosmochimica Acta, 285, p. 193-206. https://doi.org/10.1016/j.gca.2020.07.009

Maurice, M., Tosi, N., Schwinger, S., Breuer, D. & Kleine, T. (2020): A long-lived magma ocean on a young Moon. Science Advances, 6, 28. DOI: 10.1126/sciadv.aba8949

Orgel, C., Fassett, C. I., Michael, G., Riedel, C., van der Bogert, C. H., & Hiesinger, H. (2020): Re-examination of the population, stratigraphy, and sequence of mercurian basins: Implications for Mercury's early impact history and comparison with the Moon. Journal of Geophysical Research: Planets, 125, 8. https://doi.org/10.1029/2019JE006212

Ortenzi, G., Noack, L., Sohl, F., Guimond, C.M., Grenfell, J.L., Dorn, C., Schmidt, J.M., Vulpius, S., Katyal, N., Kitzmann, D. & Rauer, H. (2020): Mantle redox state drives outgassing chemistry and atmosphere composition of rocky planets. Scientific Reports, 10, 10907. https://doi.org/10.1038/s41598-020-67751-7

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Renggli, C. J. & Klemme, S. (2020): Experimental constraints on metal transport in fumarolic gases. Journal of Volcanology and Geothermal Research, 400, 106929. https://doi.org/10.1016/j.jvolgeores.2020.106929

Spitzer, F., Burkhardt, C., Budde, G., Kruijer, T.S., Morbidelli, A. & Kleine, T. (2020): Isotopic evolution of the inner Solar System inferred from molybdenum isotopes in meteorites. Astrophysical Journal Letters, 898, L2. DOI:10.3847/2041-8213/ab9e6a

Steenstra, E.S., Kelderman, E., Berndt, J., Klemme, S., Bullock, E.S. & van Westrenen, W. (2020): Highly reduced accretion of the Earth by large impactors? Evidence from elemental partitioning between sulfide liquids and silicate melts at highly reduced conditions. Geochimica et Cosmochimica Acta, 286, 248–268. https://doi.org/10.1016/j.gca.2020.07.002

Stein, C., Mertens, M. & Hansen, U. (2020): A numerical study of thermal and chemical structures at the core-mantle boundary. Earth. Planet. Sci. Lett., 548, 116498. https://doi.org/10.1016/j.epsl.2020.116498

Tappe, S., Budde, G., Stracke, A., Wilson, A. & Kleine, T. (2020): The tungsten-182 record of kimberlites above the African LLSVP. Earth and Planetary Science Letters, 547, 116473. https://doi.org/10.1016/j.epsl.2020.116473

Visser, R., John, T., Whitehouse, M.J., Patzek, M. & Bischoff, A. (2020): A short-lived ^{26}Al induced hydrothermal alteration event in the outer solar system: Constraints from Mn/Cr ages of carbonates. Earth and Planetary Science Letters, 547, 116440. https://doi.org/10.1016/j.epsl.2020.116440

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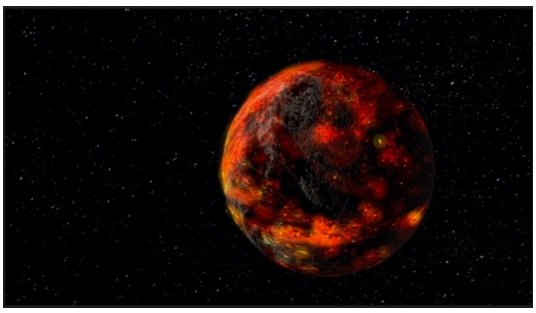
› Outreach

The Moon is younger than previously thought



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Planetologists from Berlin and Münster: Moon formed 4.425 billion years ago / Publication in "Science Advances"

The Moon formed a little later than previously assumed. When a Mars-sized protoplanet was destroyed in a collision with the young Earth, a new body was created from the debris ejected during this catastrophe – the Moon.

Planetologists at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) and the University of Münster have used a new numerical model to reconstruct the time at which the event occurred – 4.425 billion years ago.
The previous assumptions about the formation of the Moon were based on an age of 4.51 billion years – that is 85 million years earlier than the new calculations reveal. “This is the first time that the age of the Moon can be directly linked to an event that occurred at the very end of the Earth's formation, namely the final segregation of Earth's core,” says Thorsten Kleine from the Institute of Planetology at Münster University. The study has been published in the scientific journal “Science Advances”.

Continuation of the article see:
https://www.uni-muenster.de/news/view.php?cmdid=11131&lang=en

Original publication:
M. Maurice, N. Tosi, S. Schwinger, D. Breuer, T. Kleine (2020). A long-lived magma ocean on a young Moon. Science Advances; DOI: 10.1126/sciadv.aba8949

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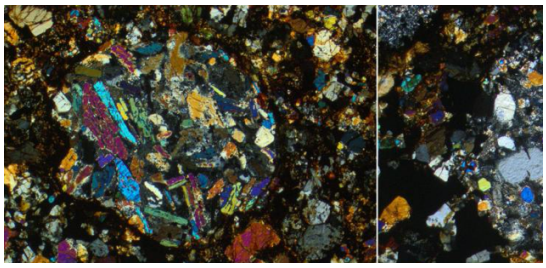
Größter Steinmeteorit Deutschlands gefunden

Forscher der Universität Münster bestätigen: „Blaubeuren“ ist das Ergebnis einer kosmischen Kollision



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Der Zufall schlägt auch in der Wissenschaft gelegentlich die verrücktesten Kapriolen. Ein Hausbesitzer stößt 1989 beim Ausheben eines Kabelgrabens auf seinem Grundstück im schwäbischen Blaubeuren mit dem Spaten auf einen Stein von 28 mal 25 mal 20 Zentimeter Größe.
Aus einem halben Meter Tiefe lupft er ihn an die Oberfläche, der Stein kommt ihm dabei ungewöhnlich schwer vor. Mit einem Magneten stellt der Finder fest, dass der Stein eisenhaltig ist. Danach liegt der kantige Brocken jahrzehntelang im Garten. Auf die Idee, dass es sich um einen Besucher aus dem Weltall handeln könnte, kommt der Gartenbesitzer allerdings erst 31 Jahre später und meldet seinen Fund im Januar 2020 beim Institut für Planetenforschung des Deutschen Zentrums für Luft- und Raumfahrt (DLR). Nach ersten Analysen folgt die wissenschaftliche Sensation: Bei dem Fundstück handelt es sich um einen Steinmeteoriten – mit einer Masse von mehr als 30 Kilogramm der größte, der je in Deutschland gefunden wurde. Am 7. Juli bestätigte nun die Meteoritical Society, die internationale Organisation der Meteoritenforscher, den Fund als anerkannten Meteoriten. Nach seinem Fundort, dem mittelalterlichen Städtchen Blaubeuren 17 Kilometer westlich von Ulm, trägt der Meteorit den offiziellen Namen „Blaubeuren“.

Fortsetzung des Artikels unter:
https://www.uni-muenster.de/news/view.php?cmdid=11140&lang=de

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Individuelle Herausforderungen und Chancen (von Kathrin Kottke)

Was bedeutet die Corona-Pandemie für die Forschung?
Einblicke in die Arbeit eines Sonderforschungsbereichs

Mit der späten Wachstumsgeschichte der terrestrischen Planeten beschäftigt sich der Sonderforschungsbereich/Transregio (SFB/TRR) 170. Die meisten Mitarbeiter arbeiten in heimischen Büros. Einige Wissenschaftler müssen allerdings die Laborversuche im Blick behalten. „Viele Versuche folgen bestimmten zeitlichen Abfolgen, bei denen wir keine Unterbrechungen zulassen können. Das hätte enorme Auswirkungen auf unsere bisherige Forschung“, erläutert SFB/TRR-Sprecher Prof. Dr. Thorsten Kleine.
Um den Kontakt zwischen den Kollegen weitgehend zu reduzieren, halten sich immer nur zwei Personen gleichzeitig im Labor auf. Die Zeiten legen die Wissenschaftler über einen Online-Kalender fest. „Das klappt bislang ausgezeichnet, und meine Mitarbeiter koordinieren sich sehr selbstständig“, sagt Thorsten Kleine.
Das gilt beispielsweise auch für die Doktoranden Jonas Schneider und Fridolin Spitzer. Beide haben bereits in der Arbeitsgruppe Kosmochemie und Isotopengeochemie am Institut für Planetologie ihre Masterarbeit geschrieben. „Wir sind gut eingearbeitet und kennen uns im Labor aus, daher können wir relativ selbstständig forschen“, sagt Jonas Schneider. Allerdings gäbe es einige Versuchsabläufe, die neu gelernt werden müssen. „Eigentlich sollte ein Kollege mir eine neue Methodik beibringen. Das fällt vorerst aus, da die Arbeitsschritte sehr detailliert überprüft werden müssen. Da kämen wir uns zu nah“, sagt Fridolin Spitzer.
Eine große Herausforderung ist aktuell die Betreuung von Studierenden, die ihre Masterarbeit anfertigen und Unterstützung im Labor benötigen. „Vor allem die Arbeiten an den Massenspektrometern werden hintenangestellt“, erklärt Thorsten Kleine. „Wir hoffen sehr, dass sich die Situation in ein paar Wochen wieder entspannt. Im Notfall müssen die Betreuer die Messungen durchführen. Das würde den Lernerfolg der Studierenden allerdings schmälern.“
Problematisch seien auch die Einstellung und Einarbeitung von neuen Mitarbeitern sowie die Planung für die integrierte Graduiertenschule des TRR 170, die Anfang September stattfinden soll. „Bisher halten wir an dem Termin fest, da wir es für wichtig halten, möglichst früh mit der Basisausbildung der Doktoranden anzufangen. Falls wir die Summer School nicht durchführen können, hoffen wir darauf, dass wir die Fördergelder ins nächste Jahr übertragen können“, erläutert Thorsten Kleine. Trotz aller Schwierigkeiten hat die Situation für den Planetologen auch etwas Positives: „Ich habe Zeit, liegen gebliebene Projekte zu bearbeiten. Allerdings geht auch das nur langsam voran, da zumindest an den Vormittagen der Hausunterricht meiner Kinder Zeit braucht.“

Dieser Artikel stammt aus der Unizeitung der WWU Münster wissen|leben Nr. 3, Mai 2020.
https://www.uni-muenster.de/news/view.php?cmdid=11004

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› TRR 170 database TRR170-DB

The INF subproject of TRR 170 manages data products and publications of the TRR 170 projects in its database **TRR170-DB**. Storing your data in TRR170-DB will provide you with several benefits:

- Since June 2020, we are assigning DOIs (digital object identifier) to our data products through DataCite. DataCite is a global non-profit organization that provides DOIs for research publications, data and other research outputs. A DOI allows finding and making available research data and associated metadata to a science community.
- When your data get published, we will provide you with a permanent data DOI and it will be easy for others to refer to and cite your data. Such data may also include large supplementary or auxiliary data sets (raw data, images) that cannot be accommodated by publishers.
- TRR170-DB provides safe storage for your data and finally, yet importantly, you meet DFG grant requirements by depositing your research data in TRR170-DB.
- DFG and many journals require researchers to deposit “replication datasets” in a database or repository. Replication data sets are complete data sets that help others to evaluate your data. We help you to meet this requirement by supporting you to deposit your complete datasets (including supplementary and metadata) in an accessible format (e.g., cvs, txt, xlsx, docx…).
- When you submit a paper for publication, some journals require a private URL (not accessible by unauthorized parties) so that reviewers have access to all relevant data under review. We can provide such a private URL.

For more information see the ***TRR170-DB home page*** and ***Why and how to use TRR170-DB***.

DFG Research Data Guidelines

DFG updated and significantly expanded their Research Data Guidelines for ‘Safeguarding Good Research Practice’. Please make yourself familiar with the ***Code of Conduct***. We will help you to meet in particular guidelines no. **12 and 13** on ’Documentation’ and ‘Providing public access to research results‘.

Copdess - Coalition for Publishing Data in the Earth and Space Sciences

We are part of Copdess, a coalition of publishers and data facilities involved in publishing data in the Earth and Space Sciences. Copdess supports the FAIR Data Project that aims for making research data more **f**indable, **a**ccessible, **i**nteroperable, and **r**eusable. For more information see ***here***.

If you have any questions related to TRR170-DB or to your data in general, please contact Elfrun Lehmann (Elfrun.lehmann@fu-berlin.de) or Harry Becker (hbecker@zedat.fu-berlin.de).

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› Events

Due to the Corona crisis most meetings, workshops, and conferences will be held virtually. Important upcoming TRR 170 events are:

- General assembly of all TRR 170 members: November 19, 2020 from 3 PM to 5 PM
- Small meetings for the three project areas A, B, and C, which will be held either in person or virtually. These will take place in late October/early November and are organized by Harry Becker (A); Emily Worsham & Christoph Burkhardt (B); and Doris Breuer & Kai Wünnemann (C)
- Virtual TRR 170 seminars and colloquia, which will start with the beginning of the teaching term on November 2. The exact dates and times are to be determined and will partly depend on in which time zone the speakers are

The first TRR 170 Summer School, which was originally planned for September this year, had to be postponed to the next year. The current plan is to have the Summer School from May 5-8, 2021 in a conference hotel in Bingen/Rhein. We still hope that this Summer School can be a in-person meeting again. The second Summer School is scheduled for September 2021.

The next upcoming international conferences which cover aspects of TRR 170 are the AGU Fall meeting (December 1-17, 2020) and the Lunar and Planetary Science Conference (March 15-19, 2021). Both will be held virtually.

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› Impressum

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