TRR 170 NEWSLETTER #7 03_2023

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Editorial

Dear Colleagues,

At the moment, we are all working intensively on our sub-projects and finalising the proposal for the third funding period. We are very busy preparing the evaluation in Berlin at the end of May/beginning of June.

The project leaders decided that in the possible 3rd funding period, the speaker university will be FU Berlin again (as in the first funding period). The coordination will remain in 2023 in Münster except for the organisation of the proposal and the evaluation. These activities will be taken over by Harry Becker, who is supported by Elfrun Lehmann.

As you already know, our coordinator Sabine Hunze will leave us at the end of March. We wish her all the best for her future career!

In the last weeks and months Lena Noack, Kai Wünnemann, and Randolph Röhlen have received important awards. Congratulations to the award winners!

We were really happy that our Summer School on 'Planetary Geodynamics' in Braunschweig took place. It was a very successful meeting with lots of scientific input and intense discussions between the TRR 170 members.

Please also note the schedule with important dates and add them to your calendar!

We hope you will enjoy reading the newsletter.

All the best and stay healthy!
Sabine Hunze & Harald Hiesinger

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Personnel

New Postdoc

Dr. Iris van Zelst (DLR/TU Berlin, Project A5)
iris.vanzelst@dlr.de
My research project focuses on radiative-transfer modelling of the steam atmosphere of the early Earth, but I am really more of an interior-planet kind of gal. I am interested in a large range of topics within (solid Earth / planet) seismology and geodynamics and have worked on everything from tsunamigenic earthquakes to subduction to the evolution of Venus (my favourite planet). I am quite interested in branching out into atmosphere modelling though, because I really enjoy learning new things! So far, it has been quite a steep learning curve! Outside of research, I somehow always manage to find a science angle in my hobbies, so if you want to see me do silly theatrical things with an academic twist, do check out my YouTube channel (www.youtube.com/irisvanzelst). I'm also quite keen on board and card games. So much so that I am currently developing my own: QUARTETnary - the educational card game about the geological time scale (www.quartetnary.com). I am also in a book club called BILBO (because I'm cool like that) which has been going strong for over 10 years now! So yeah, too many projects on too many things. Which reminds me - I should get back to work! See you around somewhere!

New PhD deputy representative

Julia M. Schmidt (FU Berlin, Project C6)
julia.schmidt@fu-berlin.de
Since I started my PhD studies in late 2018, my research interest lies in the field of modelling the interior evolution of rocky planets. Specifically, I model the redistribution of trace elements from the mantle to the surface and investigate how this affects the thermo-chemical evolution and crust formation of a planet. Because I studied geology for Bachelor's and Master's degree, I enjoy to link petrological, mineralogical, and numerical approaches. In my free time, I like to play board games, do some sports, and learn how to do art. As unfortunately Ann-Kathrin will leave us, I will pick up her position as one of the student's representatives. For the time I will be in this position, I hope to be able to continue the good communication between the PIs, other TRR board members, and PhD students in their place while learning more about the processes that keep a project like the TRR running.

Former Members

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

Scientific coordinator

Dr. Sabine Hunze (WWU Münster)
sabine.hunze@wwu.de
After more than three years as scientific coordinator, I am saying goodbye to TRR 170 as I will be taking up a new position at TU Dortmund at the beginning of April 2023.
I really enjoyed accompanying the TRR 170 and I had many opportunities in the field of activity in the area of science management.
I have had many exciting encounters with the members of TRR 170 and I would particularly like to highlight the very good cooperation with the project leaders, the challenging organisation of annual retreats and summer schools under corona conditions, the organisation of a GatherTown Meeting including a poster session and interactive and collaborative games, as well as the organisation of the film event 'Picture a Scientist' with a panel discussion in the 'Schloßtheater' cinema in Münster.
I wish the TRR members all the best and keep my fingers crossed that the 3rd funding period will be approved.

Fellows

Dr. Cécile Deligny (04-12/2022, FU Berlin, Harry Becker)

Cécile completed her work on Yamato type carbonaceous chondrites and moved on to a postdoc position with Martin Whitehouse's group at the Swedish Museum of Natural History in Stockholm.

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Publications (September 2022-March 2023)

Archer, G.J., Budde, G., Worsham, E.A., Stracke, A., Jackson, M.G., and Kleine. T. (2023): Origin of 182W anomalies in ocean island basalts. Geochemistry, Geophysics, Geosystems, 24/2, e2022GC010688. https://doi.org/10.1029/2022GC010688

Bischoff, A., Patzek, M., Peters, S.T.M., Barrat, J.-A., Di Rocco, T., Pack, A., Ebert, S., Jansen, C.A., Kmieciak, K (2022): The chondrite breccia of Antonin (L4-5) – a new meteorite fall from Poland with a heterogeneous distribution of metal. Meteoritics & Planetary Science 57, 2127-142. https://doi.org/10.1016/j.gca.2022.10.036

Ebert, S., Nagashim, K., Bischoff, A., Bernd, J., Krotb, A.N. (2022): Mineralogy, petrology, and oxygen isotopic compositions of Aluminium-rich chondrules from unequilibrated ordinary and the Dar Al Gani 083 (CO3.1) chondrite. Geochim. Cosmochim. Acta. https://doi.org/10.1016/j.gca.2022.08.026

Flemetakis, S., Renggli, C., Pangritz, P., Berndt, J., Klemme, S. (2023): Evaporation of Boron from aluminoborosilicate melt. Journal of non-crystalline solids, SSRN. http://dx.doi.org/10.2139/ssrn.4356457

Johnston, S., Brandon, A.D., McLeod, C., Rankenburg, K., Becker, H., Copeland, P. (2022): Nd Isotope Variation Between The Earth-Moon System And Enstatite Chondrites Via Nebular Mixing. Nature, 611, 501-06. https://doi.org/10.1038/s41586-022-05265-0

Klemme, S., Genske, F., Sossi, P.A., Berndt, J., Renggli, C.J., Stracke, A. (2022): Cr stable isotope fractionation by evaporation from silicate melts. Chemical Geology, 610, 121096. https://doi.org/10.1016/j.chemgeo.2022.121096

Kruijer, T.S., Archer, G.A., and Kleine, T. (2021): No 182W evidence for early Moon formation. Nature Geoscience 14, 714-715. https://doi.org/10.1038/s41561-021-00820-2

Kusiak, M.A., Kovaleva, E., Vanderliek, D., Becker, H., Wilke, F., Schreiber, A., Wirth, R. (2022): Nano- and microstructures in lunar zircon from Apollo 15 and 16 impactites: implications for age interpretations. Contributions to Mineralogy and Petrology 177, 112. https://doi.org/10.1007/s00410-022-01977-8

Liu, T., Wünnemann, K., Michael, G. (2022): 3D-simulation of Lunar Megaregolith Evolution: Quantitative Constraints on Spatial Variation and Size of Fragment. EPSL, 597, 117817. https://doi.org/10.1016/j.epsl.2022.117817

Liu, T., Luther, R., Manske, L., Wünnemann, K. (2022): Melt Production and Ejection From Lunar Intermediate-Sized Impact Craters: Where Is the Molten Material Deposited? Journal of Geophysical Research: Planets, 127, e2022JE007264. https://doi.org/10.1029/2022JE007264

Mallik, A., Schwinger, S., Roy, A., Moitra, P. (2022): Controls on determining the bulk water content of the Moon. Meteoritics and Planetary Science, 57, 12, 2143-2157. https://doi.org/10.1111/maps.13921

Manske, L., Wünnemann, K., Kurosawa, K. (2022): Quantification of impact-induced melt production in numerical modelling revisited. JGR Planets 127, 12, e2022JE007426. https://doi.org/10.1029/2022JE007426

Peterson, L.D., Newcombe, M.E., Alexander, C.M. O'D., Wang J., Sarafian A.R., Bischoff A., Nielsen, S.G. (2023): The H2O content of the ureilite parent body. Meteoritics & Planetary Science 57, 1589-616. https://doi.org/10.1016/j.gca.2022.10.036

Render, J., Brennecka, G., Burkhardt, C., Kleine, T. (2022): Solar System evolution and terrestrial planet accretion determined by Zr isotopic signatures of meteorites. Earth and Planetary Science Letters, 595, 117748. https://doi.org/10.1016/j.epsl.2022.117748

Renggli, C.J., Hellmann, J.L., Burkhardt, C., Klemme, S., Berndt, J., Pangritz, P., Kleine, T. (2022): Tellurium isotope fractionation during evaporation from silicate melts. Geochimica et Cosmochimica Acta 338, 278-301. https://doi.org/10.1016/j.gca.2022.10.032

Steenstra, E.S., Berndt, J., Rohrbach, A., Bullock, E.S., van Westrenen, W., S. Klemme, S., Walter , M.J. (2022): Partitioning of Ru, Pd, Ag, Re, Pt, Ir and Au between sulfide-, metal- and silicate liquid at highly reduced conditions: implications for terrestrial accretion and aubrite parent body evolution. Geochim. Cosmochim. Acta, 336, 15-32. https://doi.org/10.1016/j.gca.2022.08.021

Stein, C., Hansen, U. (2023): Formation of thermochemical heterogeneities by core-mantle interaction. JGR Solid Earth, 182/2, e2022JB025689. https://doi.org/10.1029/2022JB025689

Tissot, F.L.H., Collinet, M., Namur, O., Grove, T.L. (2022): The case for the angrite parent body as the archetypal first-generation planetesimal: Large, reduced and Mg-enriched. Geochim. Cosmochim. Acta 338, 278-301. https://doi.org/10.1016/j.gca.2022.09.031

Woo, J.M.Y., Brasser, R., Grimm, S.L., Stade, M.L., Stadel, J. (2022): The terrestrial planet formation paradox inferred from high-resolution N-body simulations. Icarus 371, 114692. https://doi.org/10.1016/j.icarus.2021.114692

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> INF project and database TRR170-DB

Data storage continues with recent contributions by Archer et al. (Replication Data for: Origin of 182W anomalies in ocean island basalts, https://doi.org/10.35003/YCUKOX) and Liu et al. (Replication Data for: The Timeline of Early Lunar Bombardment Constrained by the Evolving Compositions of Differently-Aged Melt, https://doi.org/10.35003/SYA4).

FU Berlin's library system has integrated TRR170-DB metadata into their system. When minor adjustments have been done, a life version will be released. The life version will make TRR 170 data sets findable through global search machines and information services.

TRR170-DB tools: Work continues on an orbit explorer tool to combine spatial and lunar analysis data, including data from TRR 170 projects. A metrics tool is set up to collect statistics about the use of the TRR170-DB repository. First versions of both tools will be available to the public at the DFG evaluation event in May 31/June1, 2023.

NFDI4Earth activities: Our proposal to set up a NFDI4Earth interest group (IG) on metadata standards for geochemical data was accepted. The IG is now meeting regularly since November 2022. Information on our work is available at the NFDI4Earth website (https://www.nfdi4earth.de/2participate/get-involved-by-interest-groups/ig-metadata-standards-for-geochemical-data).

Our contribution to the **Goldschmidt conference 2023** is 'Globally findable planetary data: The interdisciplinary TR170-DB Repository' by Elfrun Lehmann, Harry Becker, Tatjana Fritz, Florian Wille, Andreas Sabisch, Denise Sievers and Birgit Schlegel, Freie Universität Berlin (abstract ID 19261).

Training events will start over in fall since most TRR 170 members are now occupied by preparing the next TRR 170 funding period (2024-27) and the upcoming DFG evaluation in May/June.

Check back the TRR170-DB website for regular updates.

If you have any questions, please contact Elfrun Lehmann (elfrun.lehmann@fu-berlin.de) and Harry Becker (hbecker@fu-berlin.de).

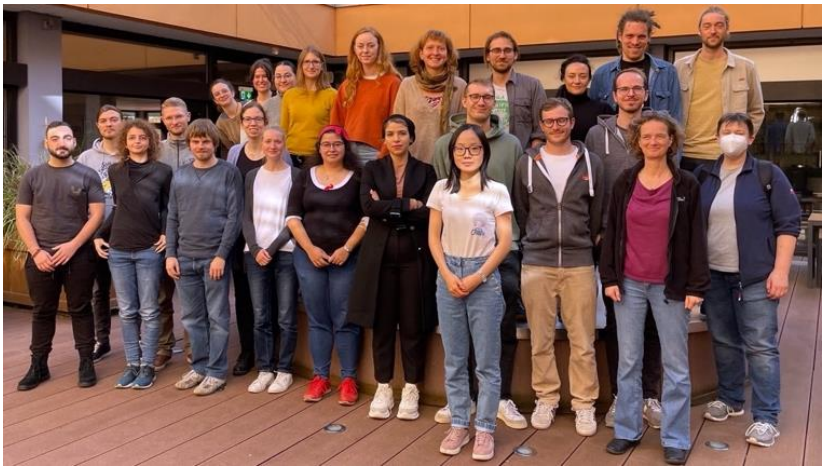
TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Activities

October 4-8, 2022

Summer School 2022 on 'Planetary Geodynamics'

The Summer School 2022 took place from October 4-8 in Braunschweig. The topic was 'Planetary Geodynamics' and covered a wide range of lectures on solar system, geochemistry and cosmochemistry, geodynamical processes and numerical modelling, thermo-chemical evolution of terrestrial planets, and composition and building materials of the terrestrial planets. In total, there were 2.5 days of programme including more than eleven hours of lectures and four hours of exercises.



Participants of the TRR 170 Summer School in Braunschweig.

In the afternoon of the second day, the PhD students and some interested postdocs went on an excursion to the planetarium in Wolfsburg organized by the PhD representatives Jonas Schneider and Ann-Kathrin Krämer. Two lectures were held in the planetarium and the event was very well received by the participants.

Participants of the excursion of the doctoral students and postdocs to the planetarium in Wolfsburg.

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Gender Activities

January 19, 2023

'Women in Science' series #3

In the TRR 170 colloquium **Prof. Dr. Carmen Sanchez-Valle** (Institut für Mineralogie, WWU Münster) gave a hybrid lecture on 'Mobility of carbonate melts within the deep carbon cycle'. In this presentation, Prof. Sanchez-Valle provided an overview of our recent efforts to determine the mobility of carbonate-rich melts in the upper mantle and their associated geodynamic signatures.

Prof. Sanchez-Valle is a professor at WWU since 2014 and has been working in France, USA, and Switzerland before she came to Münster.

After the lecture and a subsequent discussion, we continued with an informal gathering where we talked with Carmen about her scientific career, her life with a small child combined with the tasks as a professor and insights about her work-life balance.

Despite sound problems and recalcitrant technology, the event was well attended.

Many thanks to Thomas Haber who was responsible for organizing this session.

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Outreach

August 16, 2022

Barringer Award to Kai Wünnemann

The Meteoritical Society honours Prof. Dr. **Kai Wünnemann**, Head of the Department Solar System, Impacts and Meteorites at the Museum für Naturkunde Berlin, and Prof. Dr. Gareth Collins, Professor at Imperial College London, for their outstanding scientific achievements in the field of mathematical modelling of meteorite craters. The Barringer Award ceremony took place on 15 August during the annual meeting of the Meteoritical Society.

The **Barringer Award** is one of the most important scientific awards given in the field of impact and crater research. Prof. Dr. Kai Wünnemann and Prof. Dr. Gareth Collins join the ranks of distinguished Barringer Award winners for their outstanding and fundamental advances in numerical modelling of impact craters and shock phenomena. 'This is a great recognition of the many years of research by Prof. Dr. Kai Wünnemann and his British colleague and I warmly congratulate them on this outstanding award,' announced Prof. Johannes Vogel, Director General at the Museum für Naturkunde Berlin.

Due to these far-reaching contributions to the field of impact research, Prof. Dr. Kai Wünnemann and Prof. Dr. Gareth Collins were selected by the Barringer Award selection committee from among numerous nominees for this year's award.

The two scientists have made a significant contribution to scientific progress in impact and meteorite research through their innovative advancements of the simulation code iSALE. With the help of the shock physics code iSALE, which is freely accessible to researchers worldwide, comprehensive simulations of impact processes are made possible, which take into account the force effects, materiality, porosity as well as the three-dimensionality of impact objects. (…)
'I am honoured to have been selected for the Barringer Award together with Gareth Collins,' explains Prof. Dr. Kai Wünnemann. 'But of course, the recognition is not only for me, but for the numerous young scientists who have contributed to iSALE and continue to work on improvements.'

For further information see
https://www.museumfuernaturkunde.berlin/de/presse/pressemitteilungen/meteoritical-society-ehrt-kai-wuennemann-und-gareth-collins-mit-dem

January 31, 2023

ERC Consolidator Grant to Lena Noack

Professor Dr. **Lena Noack** from the Institute of Geological Sciences at Freie Universität Berlin has been selected for an ERC Consolidator Grant by the European Research Council.

The planetary scientist will receive over 1.99 million Euros over the course of five years to carry out her research project "DIVerse Exoplanet Redox State Estimations – DIVERSE." In her research she will address the diversity of rocky planets (the planetary siblings of Earth, Mars, and Venus) in other solar systems.

The European Research Council awards **ERC Consolidator Grants** to promising scientists and scholars who completed their doctorates between seven and twelve years ago and now find themselves in the "consolidation phase" of their academic careers.

The James Webb Space Telescope and upcoming Ariel space telescope have opened up new exciting prospects in observational astronomy, making it possible to study exoplanetary atmospheres in greater depth. Planetary scientist Lena Noack is now planning on making use of the opportunities unlocked by these new technologies: 'Many studies on exoplanets tend to focus on biosignatures. For example, the presence of specific atmospheric gases can only be explained by the existence of life on Earth. However, in order to prevent misinterpretations, we first have to gain a better understanding of the potential spectrum of abiotic atmospheres – which also includes evaluating the possibility that life could exist there some day. Not all planets resemble Earth. There could be completely different types of rocky planets out there,' Noack explains.

For further details see
https://www.fu-berlin.de/en/presse/informationen/fup/2023/fup_23-017-erc-consolidator-grant-planetologie/index.html

January 30, 2023

Wiley Awards 2022 to Randolph Röhlen

Every year at the annual meeting of the Meteoritical Society a few of the top oral presentations by student members are selected for awards. One of the five Wiley Award recipients for outstanding presentations in 2022 is **Randolph Röhlen** (Museum fur Naturkunde Berlin) for his talk 'Core or Mantle? Breakup of Asteroid Cores During Impact in the Late Accretion Phase'.

For further details see: https://meteoritical.org/news/2022-mckay-and-wiley-awards-announced

February 1, 2023

Astronauts will be acting as field researchers again

Harald Hiesinger talks about the European Space Agency's "PANGAEA" training programme and about his job as a course instructor.

In a few years' time, men want to return to the Moon. Astronauts are to take part in Artemis missions, planning and carrying out geological expeditions on the surface of the Moon. With the aim of providing the best possible preparation for these tasks, the European Space Agency (ESA) set up PANGAEA (Planetary ANalogue Geological and Astrobiological Exercise for Astronauts). Since 2016, astronauts from, so far, three space agencies have been provided with the essential knowledge and competences in field geology required for exploring the Moon.

Kathrin Kottke spoke to Dr. Harald Hiesinger, PANGAEA course instructor and Professor of Geological Planetology at the University of Münster, about the training programme and the role of geological field research on the Moon.

Why is this scientific training important?

astronaut Alexander Gerst holding a rock core in his hands, a sample extracted by drilling from the subsurface of the Nördlinger Ries crater.

There are lots of astronauts with a scientific background, but only a few with experience in geological field research. But for future manned missions to the Moon and to Mars, we will need astronauts who can investigate the surface in complex geological surroundings. PANGAEA includes a number of courses which deal with topics relating to the geological and astrobiological exploration of planets and which provide participants with specialist scientific knowledge.

ESA

Read the whole interview:
https://www.uni-muenster.de/news/view.php?cmdid=13129&lang=en

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Upcoming events

2023			
April 3	Submission of Proposal	TRR 170 (3rd funding period)	ALL
May 31 + June 1	DFG Evaluation	TRR 170 (3rd funding period)	ALL
July	Writing workshop (for own papers)	TRR 170 workshop (replacement for the 3rd summer school)	PhD students
Sept	Status Reports (annual scientific report of subprojects)	TRR 170 members	ALL
Sept/Oct	Annual Retreat	TRR 170 members	ALL

Upcoming international conferences which cover aspects of TRR 170

The Woodland, TX, USA
March 11-15, 2023

EGU General Assembly 2023

Vienna, Austria
April 23-28, 2023

GOLDSCHMIDT 2023
LYON
9-14 JULY

The Meteoritical Society

Los Angeles
August 13-18, 2023

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Impressum

Editor:
Institut für Planetologie
Westfälische Wilhelms-Universität Münster
Wilhelm-Klemm-Straße 10
48149 Münster
Mail: trr170@uni-muenster.de
Web: www.trr170-lateaccretion.de

Editorial staff:
Sabine Hunze (Scientific Coordinator TRR 170)
Phone: (02 51) 83 – 3 90 81
Mail: shunz_01@uni-muenster.de

Photos:
Logo: Bianca Schewe (bdsign)
Photos: van Zelst, Schmidt (p.2), Hunze, Deligny (p.3), Hunze (p.7), Sanchez-Valle (p.8), Wünnemann (p. 9), Noack (p. 10), Röhlen, ESA / V. Crobu (p.11)