TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Editorial

Dear Colleagues,

since 01/01/2022 Harald Hiesinger is serving as the new spokesperson of the TRR. He is taking over from Thorsten Kleine, who will move to Göttingen as the new director of the Max-Planck Institut für Sonnensystemforschung. Congratulations, Thorsten and thank you for all your hard work!
Harry is looking forward to working very closely with all of you. In particular, it is high time to start with the preparations of the 3rd TRR phase, facing the challenges of many retired PIs, an imbalance in gender, age structure of PIs, and university/non-university members of the TRR.

A major focus of this newsletter is on changes in the status group of postdocs. We would like to welcome the new employees and we are hoping that the TRR will offer you a great network enabling first-class science.

We were really happy that our summer school in Nördlingen could take place in September. It was a very successful event that contributed to improving the communication between the doctoral students in the working groups and the locations in Münster and Berlin. Unfortunately, due to Corona, the annual retreat in Potsdam had to be canceled at short notice. Instead, a meeting of the project leaders and an online poster session for all TRR members took place.
As you can see, we are making the best of the situation and with this newsletter we would like to share some of the recent developments within TRR 170.

Our congratulations go to Lena Noack (FU Berlin) for the Farinella prize award to her and a presentation award at the meeting of European Astrobiology Network association (EANA) as well as Caroline Brachmann (DLR Berlin) for winning the poster award at the EANA meeting.

Please also note the schedule with some important dates, which you please add to your calendar!

We hope you will enjoy reading the newsletter.

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

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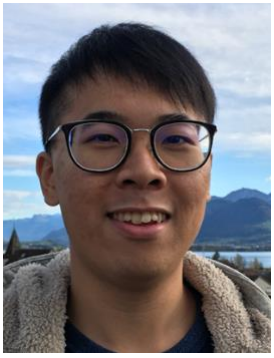
> Personnel

New Postdoc



Dr. Jason Woo (WWU, project Z)
man-yin.woo@oca.eu
Place of work: Observatoire de la Côte d'Azur Nice (Prof. Alessandro Morbidelli)
My major research interest is to apply high-resolution N-body simulations to study the formation process of the terrestrial planets. Since my PhD, I realised that relying on orbital dynamics alone is insufficient to solve this mystery. I am glad to be a part of the TRR-170 program to perform interdisciplinary research. This provides me with an opportunity to combine geochemistry with orbital dynamics to study planet formation. Currently I am involving isotopic data from meteorites to constraint formation models of the terrestrial planets. One of the major questions that I would like to answer is how Earth and Mars result in different isotopic compositions and accretion

Dr. Guillaume Florin (FU, project B1)
g.florin@fu-berlin.de
My research within the TRR-170 project consists in the study of lunar highland rocks and mare basalts through the scope of Zn-K-Cu stable isotope signature. The choice of these three elements relies on their different volatility and chemical characteristics (siderophile, chalcophile, and lithophile). The goal is to bring new insight to understand the origin of loss processes that affect volatile elements in the Moon.
Beside this project, I am also interested in elemental and isotopic fractionation of moderately volatile elements (e.g., Ge) during the formation and the evolution of metal phases in the protoplanetary disk, from condensation to accretion and planetesimals differentiation.

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Dr. Stamatis Flemetakis (WWU, project B7)
flemetak@uni-muenster.de
My research focuses on understanding the chemical evolution of the mantle using high-pressure and high-temperature experimental methods. In particular, my research was focused on the volatile budget of the mantle and its relation to magmatic differentiation processes. Different projects concerning this research theme involved the stability of hydrous mantle minerals, the distribution of volatile elements between mantle minerals and melts, partial melting modeling of volatile-bearing mantle sources, and transport of volatiles in the mantle. Goal is to understand the interaction of the Earth's mantle with other major reservoirs (continental crust, core) using volatiles as geochemical tracers.
Now, I will investigate experimentally and isotopically the degassing behaviour of moderately volatile elements (MVEs) from silicate melts and apply these results to planetary-scale degassing models.

New Postdoc (Collaborator)

Dr. Ana Černok (FU Berlin, Harry Becker, project A1)
ana.cernok@gmail.com
My collaboration with the TRR 170 focuses on finding the sample evidence for the ancient bombardment history on the Moon. The lunar crater chronology is best established for the period 4–3 billion years ago (Ga), due to the availability of Apollo impact breccias. However, it remains poorly constrained for ages >3.9 Ga. Nevertheless, the growing modelling, remote sensing, and geochronological arguments advocate for increased impacting rate on the Moon much before ~3.8–3.9 Ga, casting into doubt the onset and duration of the classical Late Heavy Bombardment (LHB). The recent focus in determining precise impact ages has shifted to in situ dating of accessory minerals (phosphates, baddeleyite, zircon) which yielded a common occurrence of ~4.2–4.3 Ga ages across different Apollo landing sites, in addition to 3.91–3.94 Ga events, suggesting that several basin forming impacts occurred >4 Ga. In our further attempts, we will focus on refining the timing of these ancient basin-forming impacts by coordinated microstructural analyses and in situ U-Pb/Pb-Pb systematics of accessory minerals in Apollo 16 and 17 breccias. This approach has been demonstrated to yield robust data in support of the contextualized interpretation of the complex ages commonly overprinted by younger events (e.g., by Imbrium).

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Former Postdoc

Dr. Philipp Gleißner (FU Berlin, projects B1 and B8)
gleissner@zedat.fu-berlin.de
Philipp accepted a permanent position as a research scientist in the geochemistry group at Freie Universität Berlin.
My research interests are the magmatic differentiation of planetary bodies and the distribution of siderophile elements between different reservoirs. Within the TRR-170 my focus was in particular on chemical tracing of impactor material in lunar impactites and on the inventory of volatile metals in lunar magmatic rocks.
My new position at the Freie Universität Berlin involves lab management and teaching. Among other responsibilities I will oversee the new MC-ICP-MS facility at the Department of Earth Sciences. Together with other members of the geochemistry group we will develop techniques which enable us to contribute stable isotope data to the different research questions within the TRR (e.g., the behavior of moderately volatile elements like K, Cu, and Zn during nebula and planetary processes).

Dr. Emily Worsham
(WWU, project leader project B3)

Emily got a permanent position at Lawrence Livermore National Laboratory in Livermore, USA.

We wish her all the best for the future.

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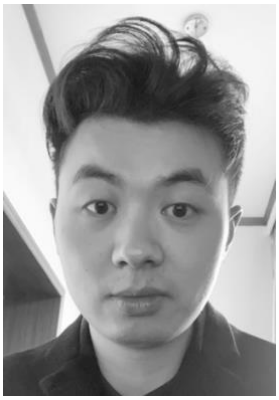
Fellowships

Dr. Martijn Klaver (WWU, Andreas Stracke, project C3)
klaverm@uni-muenster.de
Alexander von Humboldt fellow (February 2021-December 2022)
I am an isotope geochemist and petrologist with a keen interest in terrestrial magmatic processes. In particular, I am interested in crust-to-mantle-to-crust recycling and the exciting new angles novel isotopic systems offer to investigate these processes. I moved to Münster at the beginning of last year on a Humboldt postdoctoral fellowship and have recently joined TRR as a guest member.
My project in Münster focusses on the Ni isotope composition of oceanic basalts using a double spike analytical method I developed during my post-doc at the University of Bristol. Part of the project is an effort to quantify Ni isotope fractionation factors between olivine and silicate melt using 1-atm furnace experiments to synthesize olivine-melt pairs. In addition to this, I am collaborating on a project to determine the effect of melt composition on Ni–O bond lengths in silicate glasses using EXAFS and various other side projects involving the sources of lunar mafic volcanism, Ti-Zr isotope variations in magmatic processes, etc.



Dr. Ke Zhu (FU, Harry Becker, project A1)
Alexander von Humboldt fellow (April 2021 to March 2022)
A former TRR 170 fellow (2020) and postdoc is now Alexander von Humboldt fellow with Harry Becker's group at Freie Universität Berlin

Since my PhD, I used Cr isotope measurements which valuably include a stable isotope ratio (53Cr/52Cr, to study processes), a radiogenic daughter of 53Mn (53Cr, to study timing) and nucleosynthetic anomalies 54Cr (to study stellar origin). I combine these three approaches by using both TIMS and MC-ICPMS, unspiked (radiogenic and nucleosynthetic anomalies) and double spiked (stable isotopes). During my Humboldt Postdoc Fellowship in Free University Berlin, I continue the application of Cr isotopes in planetary science, and meantime, I expand my research interests to other isotope systems, e.g., Ni, Ca, Mg and K. I am also trying to know about the terrestrial samples, e.g., tektites, iron banner formations and basalts.
Aside from my scientific works, I enjoy traveling, gym, cooking, and meeting friends in parties.

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Dr. Mathias Schannor (FU, Harry Becker, project B1)
m.schannor@gmail.com

My research project aims to characterize the thallium isotope composition of ancient terrestrial rocks. Thallium is a volatile and siderophile element and I intend to use its isotopic composition in early Earth samples to test models of the origin of the volatile element depletion in the Earth.
Before joining TRR 170 I worked as a postdoc in Helen Williams' group at the Department of Earth Sciences, University of Cambridge, UK, applying novel stable isotope systems (thallium, molybdenum) to questions concerning early Earth geodynamics and continental crust formation.
In 2018, I completed my PhD in Earth Sciences (advisor Cristiano Lana) at the Departamento de Geologia, Universidade Federal de Ouro Preto, Brazil. My PhD project focused on reconstructing orogenies by combining thermodynamic modelling and in-situ U-Pb geochronology.

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> Publications (November 2021-January 2022)

Bischoff, A., Storz, J., Barrat, J.-A., Heinlein, D., Jull, A. J. T., Merchel, S., Pack, A. & Rugel, G.: Blaubeuren, Cloppenburg, and Machtenstein - three recently recognized H-group chondrite finds in Germany with distinct terrestrial ages and weathering effects (2022): Meteoritics & Planetary Science 57, 136-153. DOI: 10.1111/maps.13779.

Burkhardt, C., Spitzer, F., Morbidelli, A., Budde, G., Render, J.H., Kruijer, T.S. & Kleine, T. (2021): Terrestrial planet formation from lost inner solar system material. Science Advances 7, eabj7601. https://doi.org/10.1126/sciadv.abj7601

Collinet, C., Plesa, A.-C., Grove, T.L., Schwinger, S., Ruedas, T. & Breuer, D. (2021): MAGMARS: a melting model for the Martian mantle and FeO-rich peridotite. JGR-Planets, 126, 12. https://doi.org/10.1029/2021JE006985

Guimond, C., Noack, L., Ortenzi, G. & Sohl, F. (2021): Low volcanic outgassing rates for a stagnant lid Archean Earth with graphite-saturated magmas. Physics of the Earth and Planetary Interiors, 320, 106788. https://doi.org/10.1016/j.pepi.2021.106788

Hopp, T., Dauphas, Spitzer, F., Burkhardt, C. & Kleine, T. (2021): Earth's accretion inferred from iron isotopic anomalies of supernova nuclear statistical equilibrium origin. Earth and Planetary Science Letters 577, 117245. https://doi.org/10.1016/j.epsl.2021.117245

Kreielkamp, P., Stein, C. & Hansen, U. (2022): LLSVPs of primordial origin: Implications for the evolution of plate tectonics. Earth and Planetary Science Letters, 579, 117357. https://doi.org/10.1016/j.epsl.2021.117357

Lompa, T., Wünnemann, K., Wahl, D., Padovan, S., & Miljković, K. (2021): Numerical investigation of lunar basin formation constrained by gravity signature. Journal of Geophysical Research: Planets, 126, e2021JE00690.
https://doi.org/10.1029/2021JE006908

Schmidt, J.M. & Noack, L. (2021): Parametrising a Model of Clinopyroxene/Melt Partition Coefficients for Sodium to Higher Upper Mantle Pressures, GEOprocessing 2021. https://www.thinkmind.org/index.php?view=article&articleid=geoprocessing_2021_1_50_30041

Spitzer, F., Burkhardt, C., Nimmo, F. & Kleine, T. (2021): Nucleosynthetic Pt isotope anomalies and the Hf-W chronology of core formation in inner and outer solar system planetesimals. Earth and Planetary Science 576, 117211. https://doi.org/10.1016/j.epsl.2021.117211

Spitzer, F., Burkhardt, C., Pape, J. & Kleine, T. (2021): Collisional mixing between inner and outer solar system planetesimals inferred from the Nedagolla iron meteorite. Meteoritics and Planetary Science. arXiv:2109.04224

Vanderliek, D.M., Becker, H. & Rocholl, A. (2021): Impact-related crystallization and modification of small zircons in Apollo 15 and 16 impactites at 4.2 Ga. EPSL 576, 117216. https://doi.org/10.1016/j.epsl.2021.117216

Worsham, E. & Kleine, T. (2021): Late accretionary history of the Earth and Moon preserved in lunar impactites. Science Advances 7,44. https://doi.org/10.1126/sciadv.abh2837

Zhu, K., Moynier, F., O'D. Alexander, C.M., Davidson, J., Schrader, D.L., Zhu, J.-M., Wu, G.-L., Schiller, M., Bizzarro, M. & Becker, H. (2021): Chromium stable isotope panorama of chondrites and implications for Earth early accretion. The Astrophysical Journal, 923:94. https://doi.org/10.3847/1538-4357/ac2570

Zhu, K., Moynier, F., Schiller, M., Becker, H., Barrat, J.-A. & Bizzarro, M. (2021): Tracing the origin and core formation of the enstatite achondrite parent bodies using Cr isotopes. Geochimica et Cosmochimica Acta 308, 256-272. https://doi.org/10.1016/j.gca.2021.05.053

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> INF project and database TRR170-DB

TRR170-DB tool: Recently, we added a new advanced search tool to the TRR170-DB repository, the data explorer. The graphical user interface (GUI) allows users to search for specific information associated with archives, datasets, and files and provides a listing of summary statistics.

Survey: We have emailed a survey on research data management to TRR 170 members and researchers at other planetary institutions. We want to learn how researchers in the planetary community manage and share their data and whether they are aware of tools and guidelines that would support them.

Training: We would like to help you get the most from our training opportunities. That's why we will email a questionnaire to TRR 170 PhD students and postdocs in February. Here, you can specify your interests and needs related to research data management and the TRR170-DB repository.

Contributions to this year's LPSC and EGU conferences discuss the life cycle of FAIR planetary data from archive to publication and data management for diverse planetary data archived in TRR170-DB.

Check back the TRR170-DB website for regular updates.

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

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> Gender Activities

November 25, 2021

Film 'Picture a Scientist' followed by a panel discussion in Münster

A joined gender measurement from TRR 170 and the department of Geosciences (FB 14) at WWU Münster took place, in which we saw the film "Picture a Scientist" at the Schloßtheater Münster. This activity targeted those interested from all areas of the geosciences department (FB 14, WWU Münster).
With 75 participants (students, employees, and a few professors), the participation was gratifyingly high. After the very impressive and dreadful film, the viewers were able to exchange views on our own dismay at an exciting podium.

The film showed impressively and well-founded how discrimination against women is represented at universities around the world today and which battles have already been fought. At first it became clear that many experiences are only the tip of the iceberg of a non-discriminatory scientific enterprise. The astonishment that something like this is even possible in the context of a university became clear in the subsequent discussion. The intersectional discrimination against women was particularly emphasized. With every further shot in the film, subtle vulnerabilities were made clear to us, which are hardly avoidable due to dependencies in science.

After a short break, a panel discussion started, which was moderated confidently and competently by Jana Jansen (Berlin). Dr. Azadeh Akbari Kharazi (PostDoc from the Working Group Political Geography/ Social Geography at the Institute for Geography, Expert in Feminist Geography), Dr. Corinna Lenhardt (Personal Assistant to the Vice Rector for Research and the Vice Rector for Strategic Personnel Development at the University of Münster), and the Vice Dean for Personnel and Finance (FB 14) Dr. Torsten Prinz discussed the content of the film. In particular, existing offers of the University of Münster and questions of diversity were raised in this context. In the course of the discussion, our students impressed with their gender-sensitive knowledge and critical speech.

Many thanks to the moderator, all members of the panel, and the organization team Sabine Hunze, Patrica Göbel. Le-Lina Kettner, and Madeleine Supper!

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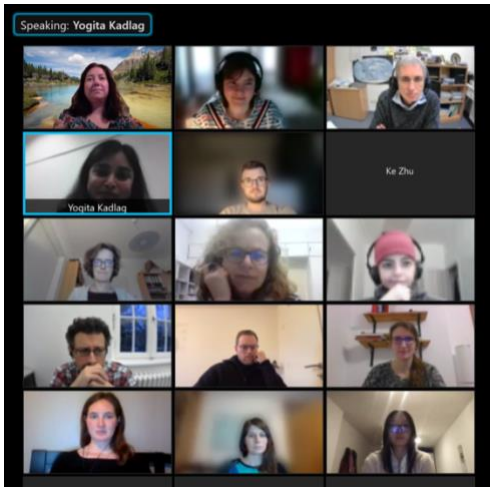
January 3, 2022
'Women in Science'

Recently, the gender board members started a new regular series called 'Women in Science'. In this series we want to talk to female scientists from our scientific community about their experiences in relation to the compatibility of the scientific profession and starting a family, as well as other challenges that scientists meet in their professional and private lives. The exchange takes place directly after the researcher's scientific talk in the TRR-170 seminar. The target group of this format are all (male and female) PhD students and postdocs.

Our first event of this series took place on Monday, January 3, 2022, with Dr. Yogita Kadlag (Uni Bern) and almost 20 interested people took part in this event.

Yogita Kadlag

We talked with Yogita about her scientific experience and background, her CV and personal information, and focused on her scientific career having a family (her son was born in 2017 during her first postdoc position). This included questions about time management, work-family balance, and specific tasks, such as participation in conferences and talks, while having a baby.



We are happy with the start of this series and are looking forward to our next guests. We encourage all TRR students and postdocs to participate in the upcoming exchange.

Many thanks to Tomke for moderating the event and collecting many questions.

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> Activities

September 20-23, 2021

TRR 170 Summer School Nördlingen

In September our first TRR 170 Summer School of this funding period could finally take place in Nördlingen. Under strict safety requirements and a detailed corona hygiene concept, the PhD students and some interested postdocs from Münster and Berlin made their way to Nördlingen. Because of the current conditions, only an internal event could take place, i.e., the participants and speakers were mainly from the TRR 170. A total of 30 people took part in the summer school.

The topic of the summer school was 'Impact processes in the solar system', led by Kai Wünnemann and Harry Hiesinger. The program was very diverse: at the beginning there was a two-day block course with lectures on the topics 'Impact processes in the Solar System' (Thomas Kruijer, MFN Berlin), 'Principles of shock waves' and 'Impact cratering' (Kai Wünnemann), ' Impactites' (Christopher Hamann, MFN Berlin), 'Impact ages' (Thomas Haber), 'Geochemical tracing' (Philipp Gleißner), and 'Dating on planetary surfaces' (Harald Hiesinger). The latter included an exercise on crater size-frequency distribution measurements for age dating.

Participants of the TRR 170 summer school in Nördlingen

On the third and fourth day, the group was divided: one subgroup went into the field to explore the Nördlinger Ries, the other group did exercises on microscopy of impact rocks under the guidance of Markus Patzek (WWU Münster) and Christopher Hamann (MfN Berlin) at the Zentrum für Rieskrater- und Impaktforschung (ZERIN) Nördlingen (RieskarterMuseum). Overall, particularly positive was the very good cooperation between the doctoral students from Münster and Berlin.

Many thanks for their kind support to the regional geologist Gisela Pösges (Geopark Ries) and the director of the RiesKraterMuseum Nördlingen Prof. Dr. Stefan Hölzl.

From left: Seminar room, microscopy in ZERIN building, and outcrop during field trip at Nördlinger Ries.

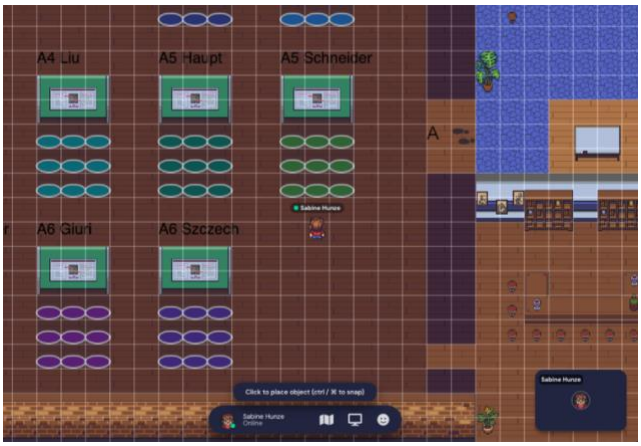
December 15, 2021

Online poster session in gather.town

Meet in small groups? Would you like to chat with someone for a moment or have a more detailed scientific exchange with colleagues? Discuss a poster together? All of this was partly neglected during Corona. On video conferencing platforms (such as zoom) you often meet in larger groups in which a few talks and the majority listen. The platform gather.town enables the exchange in the digital space. After creating a personal avatar, one can walk through the rooms, receive audio and video from other people (by approaching their avatars), try out interactive objects (such as poster overview, program), and play games.

Personal avatar.

Due to the current Corona situation, we could not meet in person at our annual retreat 2021. Instead, we organized a meeting with gather.town where we held a poster session and with scientific discussions. A total of 40 participants took part and studied the 33 posters in two-hour time frame.



TRR 170 meeting room in gather town and the poster hall of section A in detail.

After the poster session there was a Christmas party with own cookies and drinks with the possibility to talk and play games, such as ‘codenames’ and the planet quiz. Congratulations to Thomas Wiesehöfer who solved the quiz with the most correct answers.

Many thanks for the great support to Lena Noack!

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> Outreach

September 20, 2021

Farinella Prize awarded to Lena Noack

Lena Noack

Prof Lena Noack has been awarded (jointly with Prof Diana Valencia) the 2021 Paolo Farinella Prize for significant contributions in our understanding of the interior structure and dynamics of terrestrial and super-Earth exoplanets. Their work is critical to assess the habitability potential of exoplanets and to determine how 'Earth-like' a small exoplanet is.

Prof Noack said: 'I am very honoured to receive this prize alongside Diana Valencia. The research field of rocky exoplanets is still a young field, and the topic being selected for this year's prize in honour of Paolo Farinella is an important recognition.'

The annual prize was established in 2010 to honour the memory of the Italian scientist Paolo Farinella (1953-2000) and, each year, it acknowledges an outstanding researcher not older than 47 years (the age at which Farinella died) who has achieved important results in one of Farinella's fields of work. The winner of the prize is selected each year on the basis of his/her overall research results in a chosen field, among candidates with international and interdisciplinary collaborations.

For further details see:
https://www.europlanet-society.org/2021-farinella-prize-awarded-to-diana-valencia-and-lena-noack/

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September 2021

EANA21 Outstanding Paper Award to Caroline Brachmann and EANA 20th Anniversary Presentation Award to Lena Noack

The year 2021 was a special year - celebrating the 20th anniversary of EANA. Next to the EANA21 Outstanding Paper Award, at EANA21 several awards were given for the different types of virtual, scientific presentations. The prices were donated by the publishers Springer and Mary Ann Liebert, by Agência Espacial Portuguesa - Portugal Space, as well as by UNICAM SISTEMAS ANALÍTICOS.

It is a tradition of EANA (European Astrobiology Network Association) to award prizes for the best posters presented by students and young scientists at the annual workshops. A distinguished team of astrobiologists evaluate the posters based on the scientific and presentation quality.


European Astrobiology Network Association

EANA 2021 Poster Award

This certificate is proudly presented to the poster

Modelling the composition of volcanic gases on young terrestrial planets in the C-H-O-N-S system

by

Caroline Brachmann, Lena Noack, and Frank Sohl

EANA 2021 – virtual meeting
September 7-10, 2021

Prof. Dr. Barbara Cavalazzi
EANA President

EANA 2021 Poster Award to Caroline Brachmann


Caroline Brachmann

EANA21 also awarded the best scientific presentations from all oral presentations. The winners were awarded by EANA's President Barbara Cavalazzi during the closing session.


European Astrobiology Network Association

EANA 2021 Presentation Award

This certificate is proudly presented to the presentation

Can plate tectonics lead to observational traces in (exo-)planetary atmospheres?

by
Lena Noack

EANA 2021 – virtual meeting
September 7-10, 2021

Prof. Dr. Barbara Cavalazzi
EANA President

EANA 2021 Presentation Award to Lena Noack


Lena Noack

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September 21, 2021

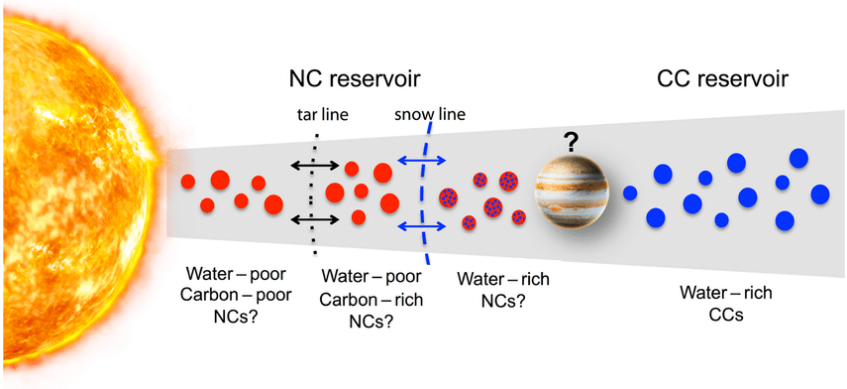
MISFIT METEORITE SHEDS LIGHT ON SOLAR SYSTEM HISTORY

BY: JURE JAPELJ

Scientists have discovered the first meteorite that does not fall into one of two fundamental groups. The meteorite provides a unique glimpse into the era of asteroid formation and migration.

A fireball embellished the night sky over India on January 23, 1870. Accompanied by a thunderous detonation, the fiery mass crashed in the village of Nedagolla with enough force to leave the bystanders stunned. The impact left behind a bit over 4 kilograms of cosmic rock — the Nedagolla meteorite. The meteorite would be just another one among thousands found on Earth if it weren't for its unusual composition. Researchers have long tried to understand its origin, and now they might have solved the mystery. In a recent study scientists found that the Nedagolla meteorite is a product of a collision between two asteroids of distinct origin. Its unique history opens up a new window into the research of the early stages of solar system formation.

Meteorites are time capsules that illuminate the era of planet formation. The solar system formed from a cloud of interstellar gas and dust that collapsed under its own gravity. Particles within the resulting protoplanetary disk collided and stuck, forming ever larger planetesimals, which became the parent bodies of the meteorites found on Earth. Meteorites come in different flavors. Depending on whether iron or silicates dominate, meteorites are traditionally classified as iron, stony, or stony-iron. Composition also depends on whether the meteorites originate from bodies that underwent melting, or whether the parent body was unmelted and therefore more pristine.



A schematic view of the protoplanetary disk in the first few million years after its formation. The NC (red) and CC (blue) planetesimals formed in the inner and outer disk, respectively. The growing Jupiter might have separated the two classes.
Bermingham et al. 2020

For further details see:
https://skyandtelescope.org/astronomy-news/misfit-meteorite-solar-system-origins/
Meteoritics & Planetary Science

December 12, 2021

Stardust and Life Carrier: What Meteorites Tell Us

ZDF Planet e. Documentation.

Meteorites fall over Germany more often than you think. But very few sky stones are found. The fireballs can tell a lot about the history of the Earth.

Addi Bischoff working at the microscope and in the field.

Referring to the meteorite fall from Flensburg (2019) and a suspected and calculated fall from Dortmund (2020), the documentary deals with many aspects of meteorite research. The importance of meteorite research is shown exemplarily on the discovery and measurement of the oldest carbonates in the solar system in the Flensburg meteorite (C1). The film also illustrates the catastrophic dimensions of possible meteorite impacts on Earth. The search for meteorites and the commercial interest in "stardust" occupy a large area of this documentation.

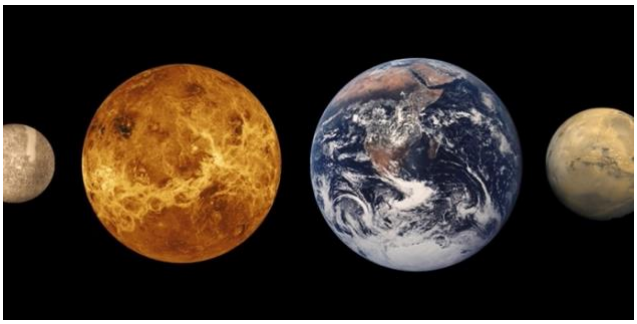
The link to the documentation:
https://www.zdf.de/dokumentation/planet-e/planet-e-sternenstaub-und-lebensbringer-100.html

December 22, 2021

Earth and Mars were formed from inner Solar System material

International research team investigated the isotopic composition of rocky planets in the inner Solar System

Earth and Mars were formed from material that largely originated in the inner Solar System; only a few percent of the building blocks of these two planets originated beyond Jupiter's orbit. A group of researchers led by the University of Münster (Germany) report these findings in the journal “Science Advances”. They present the most comprehensive comparison to date of the isotopic composition of Earth, Mars and pristine building material from the inner and outer Solar System. Some of this material is today still found largely unaltered in meteorites.



The four terrestrial planets: Mercury, Venus, Earth and
Mars (NASA/Lunar and Planetary Institute)

The results of the study have far-reaching consequences for our understanding of the process that formed the planets Mercury, Venus, Earth, and Mars. The theory postulating that the four rocky planets grew to their present size by accumulating millimetre-sized dust pebbles from the outer Solar System is not tenable.

For further details please read:
https://www.uni-muenster.de/news/view.php?cmdid=12266&lang=en

TRR 170
LATE ACCRETION
ONTO TERRESTRIAL PLANETS

> Upcoming events

2022			
February 10 (half day)	Workshop online	Intermediate Leadership II *Frohnen (impulsplus)*	Postdocs
March 21+23+25 (3x half day)	Workshop online	Scientific Writing *Klebensberger & Föll (NaWiK)*	PhD students
May 12	Gender activity online	'Women in Science' series *Veronique Dehant*	ALL
May **4-6**	Annual Retreat **Potsdam**	TRR 170 Annual Retreat	ALL
June 6-10 (1 day)	Workshop online	Writing in English *Celeste Brennecka*	PhD students
September	Summer School #2 NN	Summer School #2	PhDs & postdocs

Upcoming international conferences which cover aspects of TRR 170	
LUNAR AND PLANETARY SCIENCE CONFERENCE	March 7-11, 2022 Houston, Texas
EUROPEAN LUNAR SYMPOSIUM	May 24-26, 2022 virtual
EGU General Assembly 2022	May 22-27, 2022 Vienna, Austria

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> Impressum

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