

The Newsletter of the International Association of Sedimentologists

Issue 5, 2022



Dear IAS Members,

Welcome to your feature-packed May newsletter! In this issue we are thrilled to announce the recipients of the prestigious IAS **Sorby Medal**, **Johannes Walther Award**, **Sun Shu Prizes** (China and International) and **Early Career Scientist Award** for 2022. We remind you that registration is open for the **21st International Sedimentological Congress**, which will be a fully online meeting, and we have details of other IAS-sponsored conferences and workshops that have travel grants available for IAS Student Members to apply for. Applications are open for the **Fall 2022 Session IAS Research Grants**, for Master's students, PhD students, Early Career researchers, as well as for **Institutional Grants**, so there is no need to wait until the deadline to submit your proposal.

We include a report on the **8th International Summer School of Sedimentology** and on the Recent **Tidalites 2022** conference as well as a Postgraduate Research Grant report, and we continue to look for volunteers to run future International Meetings of Sedimentology and other thematic Sedimentology workshops or conferences.

We hope you find plenty of interest in this newsletter and are always happy to hear from you with any ideas or questions. Please get in touch via the website **contact form** and we will always try to respond quickly.

On behalf of the IAS Bureau,

Stephen Lokier, *General Secretary*

Contacting the IAS and accessing IAS Journals and services

We continue to have several instances of emails not getting through to IAS Members, including grant recipients. All official IAS emails come from an address ending in @sedimentologists.org so please ensure that your **spam / junk mail filters** are set to **permit emails from @sedimentologists.org**

To contact the IAS with any general questions please use the **online contact form** at the bottom of the web page and your message will either be answered or forwarded to the appropriate person.

Please also check that your **contact details** on your **IAS member profile** are up to date. It only takes a minute to check and refresh them!

Remember to get your free Member access to current and archive content in IAS Journals as well as IAS books over 5 years old you need to follow the link in your member profile to "online journals" (under "Services"), or to navigate directly **here**. Your profile, and the links to all services you access, your account details, payment receipts and so on, is accessed by clicking on your initials in the circle on the top right of the screen when you have logged in. For more guidance please see the item "Accessing IAS Journals and services" in last month's Newsletter. All past IAS Newsletters can be downloaded **here**.

IAS Awards 2022

The IAS proudly announces that the following Sedimentologists have been recognised and honoured by the Society. The Awards will be conferred in August during the 21st International Sedimentological Congress (online), the time and date of this will be announced closer to the event.

Sorby Medal

The Sorby Medal is the highest award of the International Association of Sedimentologists. It is awarded once every 4 years to scientists of eminent distinction in sedimentology. The 2022 recipient is **Professor Juergen Schieber** of Indiana University in the United States in particular recognition of his extensive research that has revolutionised our understanding of mud and shale sedimentology.

(A note about the coat from Juergen: The jacket is my "coat of many shales". My daughter made it for me, she designs and makes clothing and fashion in general. The coat is made from thin section images of shales I have worked on over time, starting in the Precambrian and working up to the Jurassic at least. And when I flip up the collar it reads: I am a geologist, I walk in eternity. My daughter and I obviously have a soft spot for Dr. Who (there is even an inside pocket for jelly babies). You can discern the Dr. Who connection from the title of my first paper on Martian mudstones: "Encounters with an Unearthly Mudstone").



Johannes Walther Award



This important award is given every two years to a scientist who is considered to have made a major impact in the field of sedimentology. The award for 2020 is being given to **Dr Neil Davies** of Cambridge University, UK, in recognition of his outstanding work on the interaction of biotas and sediments from the Precambrian to the Pleistocene.

Neil Davies, winner of the Johannes Walther Award, 2022

Sun Shu Research Prizes – China and International

These two biennial prizes are awarded by the IAS in collaboration with the China Association of Sedimentologists (CAS) to recognise outstanding scientists in the field of sedimentology. They honour the late Professor Sun Shu, a Chinese sedimentologist whose renown and success arose from his integration of sedimentological analysis into numerous research areas including tectonics, mineral resources and environmental sciences, including pioneering work on tectonosedimentary analysis of sedimentary basins.



The recipient of the ***Sun Shu China Prize*** for 2022 is **Professor Chenglin Gong** of the China University of Petroleum, Beijing, for his interdisciplinary and international work on process sedimentology in shallow marine and deep-water sedimentary environments. Chenglin uses outcrops as well as seismic and other subsurface data to understand shelf deltas, submarine canyons, deep-water sediment waves, unidirectionally migrating slope channels, submarine fans, mass-transport deposits and other phenomena related to the sedimentary growth of continental margins.

Chenglin Gong, winner of the Sun Shu Prize China, 2022

The ***Sun Shu International Prize*** for 2022 is awarded to **Dr Guillaume Suan** of Université Claude Bernard, Lyon 1, France. Guillaume integrates sedimentology, stratigraphy, palaeontology and geochemistry to study extreme palaeoenvironmental events such as the Toarcian oceanic anoxic event and the Palaeocene-Eocene Thermal Maximum. He has also developed the use of calcium isotopes as a novel proxy for changes in continental weathering.



Guillaume Suan, winner of the Sun Shu Prize International, 2022

Early Career Scientist Award



This award is given once every two years and celebrates the contributions and potential of outstanding early-career scientists working in any area of sedimentology. For 2022 the recipient is **Dr Theresa Nohl** of Friedrich-Alexander-University Erlangen-Nürnberg in Germany. Theresa works on the interface of sedimentology, diagenesis and cyclostratigraphy, including numerical modelling, on limestone-marl alterations in Palaeozoic to Neogene successions.

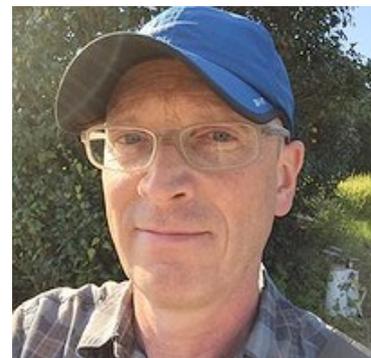
Response from Dr Nohl

“This was most surprising and I cannot express enough how grateful I am. Especially as a young postdoc, it is very encouraging to get this kind of feedback for my research. Therefore, I would like to thank the IAS for the award, the persons who recommended me for their effort, and all my collaboration partners and mentors for their support. I would further like to thank all those people who keep encouraging young postdocs such as me to proceed with their research ideas”.

Theresa Nohl, winner of the Early Career Scientist Award, 2022

Honorary Membership of the IAS

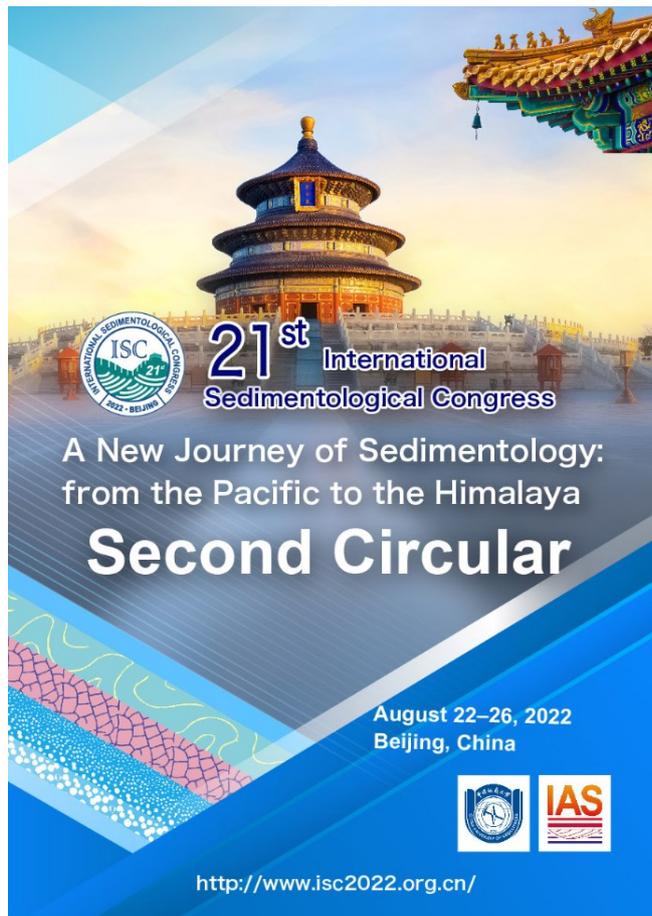
Honorary Memberships are awarded once every 4 years, at the International Sedimentological Congress, to distinguished sedimentologists who have played an important role in the affairs of the Association. The IAS Bureau have unanimously decided to award Honorary Membership in 2022 to **Professor Marc De Batist** of Gent University, Belgium, for his many and lasting contributions to the recent development of the IAS.



Marc de Batist, Honorary Member of the IAS for 2022

The IAS Bureau warmly congratulates each of these very worthy award recipients and wishes them every success in their continuing careers

The 21st International Sedimentological Congress



The **International Sedimentological Congress** or **ISC** is the flagship 4-yearly international conference of the IAS. The 21st ISC will be held in Beijing between the 22nd and 26th August 2022 and is now an online-only meeting with livestreamed sessions timed to optimize global access (20:00-24:00 GMT+8 / 13:00-17:00 CET / 07:00-11:00 EST). The second circular is available from [this link](#) and registration is open via the [conference website](#).

This promises to be an outstanding global showcase for the latest sedimentology research and the programme includes 11 scientific themes and 3 online short courses (*Sequence Stratigraphy: Principles and Applications*, *Quantitative analysis of bulk and clay mineralogy*, and *Sediment grains size trend analysis*) as well as 14 virtual field trips covering different aspects of China's spectacular and varied sedimentology.

Grants are available to support online participation by IAS Student Members and the **deadline for applications is 31st May**. Details are available [here](#) and applications can be made [here](#).

Can you help? We are urgently looking for **poster judges** for our **student and early career poster contests** at the ISC. If you are registered for the Congress and can assist with this, please use the [contact form](#) to let us know.

Call for volunteers – 1: International Summer School of Sedimentology



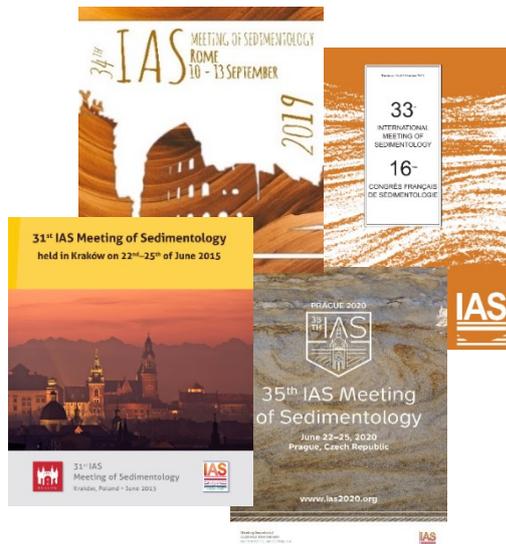
Roughly every 2 years since 2005, the IAS has run an International Summer School to give postgraduate students from across the globe the opportunity to meet, network, and study with expert leaders on new and exciting topics in an area of outstanding sedimentological importance. Although temporarily disrupted by the Covid pandemic the 2022 Summer School in Eleuthera Island, Bahamas, has recently concluded. Twenty-two students from 10 countries studied modern carbonate depositional systems, Pleistocene

limestones and karst processes – **see the report later in this Newsletter**. Past Summer Schools have taken place in Spain, Italy, Switzerland, Argentina and China.

We are looking for volunteers to propose future Summer Schools – we have received several offers and hope to be able to offer a different Summer School each year. The costs of running the School

are covered by the IAS, supported by a modest student registration fee, and student participants are eligible to apply for travel grants. The IAS can provide guidance on organisational requirements. If you are a Full IAS Member and would like to offer a Summer School in the next few years please get in touch via the [online contact form](#).

Call for volunteers – 2: International Meetings of Sedimentology



The IAS International Meetings of Sedimentology (IMS) are organized every year other than years when an International Sedimentological Congress occurs. These are **regional meetings of international significance**, where sedimentologists in the host country and region can showcase and discuss their work, collaborate with international colleagues and discuss and share the latest advances in sedimentological research. They offer themed sessions, oral and poster presentations, field trips and short courses, and encourage participation from early career scientists. Past IMS are listed [here](#) and IAS Members can download abstracts and field guides from many of them.

The next two IMS will be in **Dubrovnik, Croatia (12-17 June 2023)** and **Aberdeen, UK (24-27 June 2024)**. We are now seeking an IAS Full Members to propose

hosting the IMS for 2025, as well as those for 2027-2029. in their Institution. If this could be you, please let us know using the [online contact form](#) and a Bureau member will eagerly be in contact with you with more information.

Call for volunteers – 3: Regional Correspondents



Regional Correspondents play an important role in the IAS. They are Members who offer to be a representative between sedimentologists in their host region and the IAS. They inform the General Secretary of sedimentological activities, news and meetings in their country or region, help recruit new Members and encourage them to make the most of the benefits of IAS membership – such as alerting them to research and travel grant opportunities. Whilst it is a voluntary role it can be very rewarding to help establish and maintain a regional network of active professional sedimentologists. Regional Correspondents are appointed for 4 years with possible re-

appointment for one additional term. See map [here](#) for current countries with Regional Correspondents, and those which do not yet have a Regional Correspondent in place.

If you would like to volunteer as a future Regional Correspondent please use the [online contact form](#) to send us a brief statement explaining your suitability and motivation for this role in the context of your particular country or region. If you are shortlisted we will get back in touch with you for a few more details.

Call for Judith McKenzie Fieldwork Grant applications (Fall 2022 Session)

The **Judith McKenzie Field Work Award** aims to promote sedimentological fieldwork skills and observations for the newest generation of Earth Scientists – MSc Students.



Up to 5 grants of **€300 each** are awarded biannually to **IAS Student Members** who are **active MSc students**. Applications consist of a short grant proposal and budget (written by the student), CV, a signed letter of support from the student's supervisor, and proof of MSc student enrolment.

Successful applicants also get a year's free IAS membership upon reception of a link to their completed Master's dissertation.

Submission of applications is via the **IAS website**, where guidelines and application forms are available.

The deadline for the Fall 2022 Session is **30th September 2022 at 24h00 CET (UTC+1)**.

Call for Post-Doctoral Research Grant applications (Fall 2022 Session)



Photo credit: Andrés Bilmes

IAS Post-Doctoral Research Grants provide seed funding to help **Early-Career Post-Doctoral Researchers** who are **Full Members of IAS** to establish a proof of concept, to support applications to national research funding bodies, or to fund areas of a project that were not included in the original project scope. Applicants must have secured their Ph.D. within the previous 7 years, and not have previously received an IAS Post-Doctoral Grant.

Up to 4 grants, each **of up to €2,500**, are awarded biannually. The application involves submission of a research proposal, CV, itemised budget, and a letter of support from the researcher's supervisor, line manager or Head of School.

Applications must be submitted via the **IAS website** where guidelines and application forms can be found. The deadline for the Fall 2022 Session is **30th September 2022 at 24h00 CET (UTC+1)**.

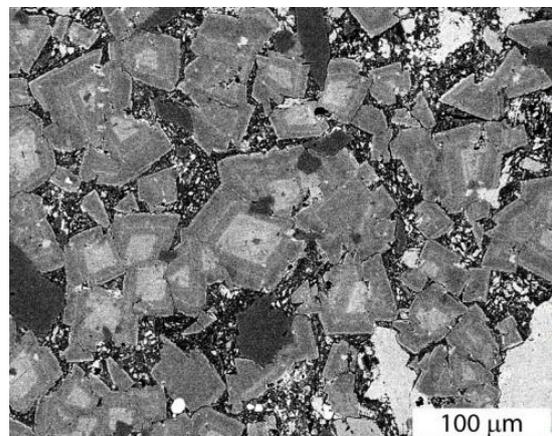


Photo credit: Rute Coimbra

Call for Post-Graduate Research Grant applications (Fall 2022 Session)



Photo credit: Michiel Arts

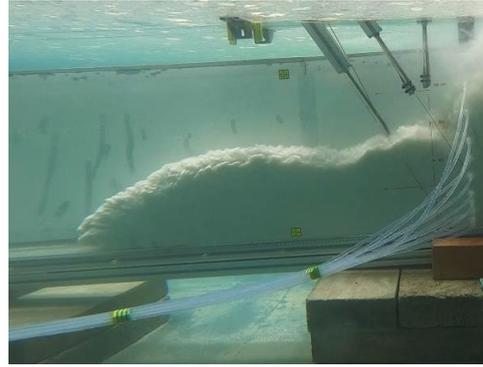


Photo credit: Marijke de Vet

Up to **10 research grants**, each of **up to €1,000**, are awarded biannually to **IAS Post-Graduate Student Members**. This grant scheme is designed to support PhD students in their studies and research. Grants can be used to (co-) finance fieldwork, acquisition and analysis of data, visits to other institutes to use specialized facilities, etc.

Applications involve a short research proposal, CV, proposed budget and the PhD supervisor's supporting recommendation. They must be submitted via the **IAS website** where guidelines and application forms can be found.

The deadline for the Fall 2022 Session is **30st September 2022 at 24h00 Brussels Time CET (UTC+1)**.

Call for Institutional Grant applications (Fall 2022 Session)



Twice a year, IAS awards a capacity-building **Institutional Grant** to assist Earth Science departments in countries with lower-income and lower-middle-income economies in acquiring sedimentological equipment for teaching and research, and/or tools that can be used by all geology students. Grants are **up to a maximum of 10,000 Euro**,

and the grant application should clearly demonstrate how the grant will increase the recipient's capacity to teach sedimentology at undergraduate level in a sustainable way.

Guidelines for applications can be found **here** along with the list of eligible countries. Applications must be from active IAS Members and submitted via the **IAS website**. The deadline for the Fall 2022 Session is **30th September 2022 at 24h00 CET (UTC+1)**.

Sponsored IAS Memberships - Reminder

IAS offers a number of 1-year **Sponsored Full Memberships** under the **Friendship Scheme** to sedimentologists in low- to middle-income countries who find it difficult to meet the annual fees. Sponsored members receive all benefits of full membership, including access to our online journals. These sponsorships **do not automatically renew** so fresh applications need to be made for 2022 even for those who benefitted from a sponsored membership in 2021.

Applicants for Sponsored Membership need to set up a user account on the IAS website and then apply through the link provided. A brief supporting statement (< 2500 characters) should address:

1. Why the applicant would like to be an IAS Member
2. Why they are applying for sponsored membership
3. How their current and future work as a sedimentologist will benefit from IAS membership

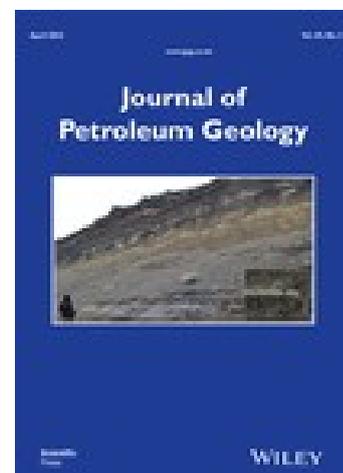
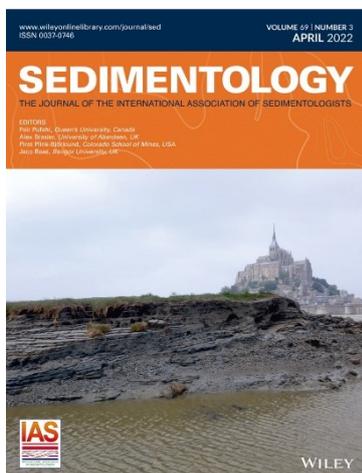
Note students can apply for Sponsored Memberships but as these are Full Memberships the recipients will not be eligible to apply for student research grants or travel grants. To avail of these it is necessary to join the IAS as a Student Member, which only costs 10 Euro for a year.

NEW Print-on-Demand service for IAS Journals

The IAS is now publishing all of its journals (Sedimentology, Basin Research and The Depositional Record) online only. For non-members the latest issues of Sedimentology and Basin Research can be found via the links below, but IAS Members should follow the instructions on the previous page to get full access to the journal content.

However, the IAS Bureau recognised that some Members may still wish to receive **print copies** of **Sedimentology**, **Basin Research** and/or the **Journal of Petroleum Geology**. This option is now available as a print-on-demand service via a personal subscription through the publisher, Wiley. IAS Members receive a substantial discount on the standard commercial rate. The discounted subscription is for print copies of an entire volume of the journal (every issue in the current year) and will need to be re-purchased at the start of every year for which Members wish to receive print copies.

Instructions on how to set this up for each journal can be found on the members sections of IAS website [here](#) under the heading "Print-on-Demand Services". Please note that it administered by Wiley (not by the IAS) and any problems or questions should be addressed to their support team.



Participants' Report – 8th International Summer School of Sedimentology



Caribbean sun scorched the gunnels of our three motorboats as we donned snorkels, masks, and fins. We jumped into the ocean, our feet landing on ooid sands three feet beneath the waves. The ooid shoal stretched in all directions: kilometers of half-millimeter carbonate spherules formed by the Bahamian tides that twice daily swept across the bank. Eager to see the shoal up close, we dove into the blue-green water.

Organized by Professor Peter Swart and Dr. Chelsea Pederson and led by Professors Swart and Gregor Eberli from the University of Miami and Monica Arienzo from Desert Research Institute, the International Association of Sedimentologists' 2022 Summer School in The Bahamas attracted twenty-two graduate students from across the globe. Some of us study deep time sedimentology: mud mounds 500 million years old; diagenetic mechanisms underlying zebra dolomite; the likelihood that the rock record would preserve sediment produced by past glaciations. Others of us study sea level: eustasy's influence on ~30-million-year-old carbonate platforms in Spain; beach rocks as valuable but complicated recorders of relative sea level; sea level changes caused by Bahamian carbonate deposition and erosion.



Hailing from research universities across Europe, South Africa, and both Americas, we gathered on Eleuthera Island, The Bahamas, to study carbonate sedimentology. The week-long program in early May set its base camp at The Island School, an immersive educational organization that hosts students from Pre-K to PhD in learning experiences lasting weeks to months. Nestled near the

southwestern tip of the island, the place is a marvel: full of cheerful students, engaged staff, and innovative approaches to sustainable living.

By day, we crisscrossed Eleuthera to observe sedimentary processes at work. We visited strata dating from the Last Interglacial, a time of higher global mean sea level whose subtidal stratigraphic remnants outcrop meters above present sea level. We spelunked deep into Hatchet Bay Cave, clambering past 150+ year old graffiti to reach depths where to proceed meant wading chest-deep through flooded chambers. We explored Gully Hole, a Blue Hole containing mesmerizing jellyfish and a tidal channel bringing in saltwater from the ocean. Scooping acrid mud from a hypersaline lake, we marveled at microbial mats in myriad colors and squirmed as extracellular polymeric substances – a.k.a. microbe goo – dripped through our fingers.

By night, we learned about sedimentology from world-class geoscientists who have spent decades understanding carbonates in the Bahamas. Peter Swart, an expert on carbonate geochemistry, taught us about the isotopic and diagenetic processes at work in the Bahamas. With Gregor Eberli, an authority on stratigraphy, we learned the tectonic history of the Caribbean and the features that distinguish carbonate



sequence stratigraphy from its siliciclastic analogue. From Monica Arienzo, we learned how she extracted past and present climate signals from Bahamian speleothems. And in the week's culmination, we divided into subgroups, performed novel research on the carbonate systems we had visited, and presented our results to each other.



To graduate students reading this, we give the IAS summer school experience our highest recommendation. Not only did we have fruitful scientific discussions with our trip leaders; we built bonds with fellow students over topics ranging from research ideas, future collaborations and proposals, and where in the world to meet next. To other IAS community members, we appreciate your support for IAS, which made this transformative experience

possible. And to the summer school organizers, a heartfelt thanks for planning this adventure, executing it smoothly, and sharing your knowledge with such kindness, motivation, and excitement.

Roger Creel (Lamont Doherty Earth Observatory) and Scarlett Hsia (University of Texas at Austin)

Tidalites 2022 – Conference Report



The 10th International Congress of Tidal Sedimentology, held in Matera, Italy from May 3rd to 5th has been successfully concluded! The presence of more than 200 in-person participants plus a number of online attendances has proved the burning need to come back to make science in person, taking advantage of the characteristic beauty of the city of Matera, in southern Italy!

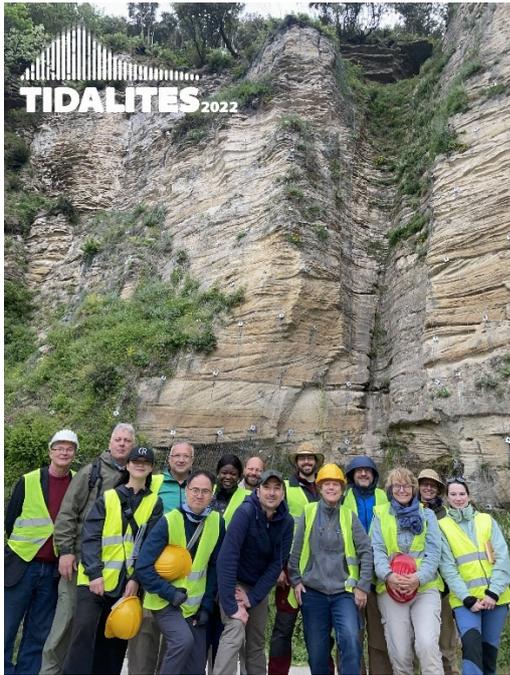


Despite the complexity of the hybrid modality, all the congress activities have been performed on perfect time! 5 keynote speakers have shown the most recent advancement in the role of the Tidal Sedimentology for optimizing conventional and renewable energies, safeguard of the coastal environment and effect of climate changes on tides, the three macro-subjects of Tidalites 2022. These talks opened many scientific sessions that have hosted 50 oral and poster presenters, from 18 countries. They have introduced the last

breakthrough research in the field of Tidal Dynamics and Sedimentology of modern and ancient environments, posing the basis for new frontiers of investigations and insights on tidal systems. More than 15 early-career researchers have competed for the best oral and poster presentation, being awarded by an evaluation committee during an unforgettable gala dinner in one of the most characteristic hypogea places of the ancient Matera.

Tidalites 2022 has been preceded and followed by field trips in the areas of the Messina Strait, Bonifacio and Siderno, in southern Italy. Outstanding Neogene-to-Quaternary outcrop sections have revealed the tidal dynamics of ancient sea straits and have stimulated fruitful discussions and new ideas for interpreting tidal processes and products in these fascinating systems.





During these days, the Tidalites International Steering Committees has opened the call for submitting proposals for the venue of the next Tidalites conference in 2026 and has designated the new chair of the group in the person of Sergio G. Longhitano, University of Basilicata, Italy. Starting from Tidalites 2022, the community of researchers with interest in Tidal Dynamics and Sedimentology will be represented in an official webpage that will be announced soon. The new site aims at delivering news on 'tidal' scientific sessions at the next international meetings, courses, field activities, workshops and seminars, with the major goal of stimulating the growth of the group and cooperation, along with providing even more opportunities for researchers at the beginning of their scientific career.

Sergio Longhitano, University of Basilicata.

Calling all photographers!

We would love to receive more photographs of IAS members in the field viewing or working on spectacular sedimentological outcrops or environments, both for the website refresh due later this year and for IAS publicity materials at conferences. Please make sure you have the permission of any people who are recognisable in the photographs and we will need an explanatory sentence or two so we know where the photograph was taken, by whom, and what it shows. If you have any suitable photographs please let us know using the website [contact form](#) and we will get back to you. Thank you to those who have already responded!

The Depositional Record – Online and Open Access



The Depositional Record is now indexed in the Emerging Sources Citation Index and its initial impact factor (0.92) is sure to grow rapidly given the excellent standard of papers being published. The IAS continues to pay the APC for all papers accepted in the journal.

The Depositional Record welcomes high quality articles from across the field of Sedimentology from Modern to Ancient. It is a journal of **biological, physical and geochemical sedimentary processes**, and welcomes articles that emphasise the application of sedimentary processes to the study of diverse and interdisciplinary topics, for example (but not limited to) paleoclimate, changes in the chemical environment, ocean acidification, extra-terrestrial sedimentology, and the application of genetic methods to understanding sedimentological processes. **Submit your paper today!**

The Carbonate Forum 2022

The Carbonate Forum is an online conference sponsored by IAS and hosted by [Seds Online](#) that offers presentations exclusively to early career researchers in all aspects of carbonate sedimentology. The first Carbonate Forum took place in 2020, and is now an annual event that attracts speakers from across the world and is largely also chaired by early career researchers. This year's event took place on 10th May 2022, with 14 speakers from 8 different countries. Presenters ranged from MSc and 1st year PhD students to post-doctoral researchers and covered topics ranging from numerical forward modelling of microbialite mound formation, to the kinetic similarities between carbonate dissolution and kerogen thermal decomposition. There were also lots of more traditional outcrop studies and seismic studies.

A key aim of the Carbonate Forum is to allow a diverse range of carbonate researchers to debate the topics presented, and the level of questions and discussion was as stimulating and engaging as ever. With over 200 registrations for the meeting, the researchers were able to share their work with a wide audience; by keeping talks to 12 minutes and allowing 8 minutes discussion for questions there was plenty of time for discussion. This year's meeting included a report from the first Carbonate Forum fieldtrip, to the Jurassic Coast of the UK, which ran a few days before the conference in Dorset (see below). This is a model we hope to replicate in subsequent years, hopefully with trips running on different continents.

Cathy Hollis, University of Manchester and Fiona Whitaker, University of Bristol

The Carbonate Forum 2022 fieldtrip – *Local Rocks for Global People*



Just prior to the online conference on 8th May 2022 the Carbonate Forum also organised its first fieldtrip, along the Dorset Jurassic Coast in southern England, led by Arnaud Gallois and Peter Burgess. They guided a group of nine Earth Scientists at PhD, postdoctoral, lecturer and professional levels to locations on the Isle of Portland, at Lulworth

Cove's "Fossil Forest" (photo above) and at Mupe Bay (photo below).

The main objectives were to consider the geometry of and the controls on formation of the mounded microbialites found in the lowermost beds of the Upper Jurassic to Lower Cretaceous Purbeck Limestone Group and to better understand the most likely origins if a carbonate breccia unit within the upper part of the Purbeck Group, locally known as the



Broken Beds. As ever with outcrop geology, limited data makes single-interpretation conclusions difficult but also as ever, there was very lively discussion and debate on what observations of the strata might reasonably mean in terms of genetic processes.

Arnaud Gallois, Royal Holloway University and Peter Burgess, University of Liverpool

Call for members of the IAS Early Career Scientists Committee

The IAS Early Career Scientists Committee is seeking new members! To apply, send a letter of introduction and a 2-page CV to [Tracy Frank](#) by June 15, 2022.

The **Early Career Scientists Committee** (ECSC) comprises early career scientists who represent the upcoming generation of sedimentologists, ensuring that their voice is heard in the IAS. An Early Career Scientist (ECS) is a scientist with no more than 7 years of full-time experience since completing their Ph.D. (excluding periods of parental or other care leave).

ECSC members are active in sedimentological research as demonstrated by their publication record (minimum 3 research articles in peer-reviewed publications). The committee organizes activities for ECSs at IAS meetings and oversees the **Post-Doctoral Grants Scheme**.

IAS Grant Reports

All recipients of IAS Grants provide a short illustrated report of the work they have carried out using the funds, and in most cases also present their research at an IAS conference. **Post-Doctoral** or **Post-Graduate** grant reports are also included in Newsletters and posted on the IAS website [here](#).



Follow the IAS on Social Media

Follow the IAS on [Facebook](#), [Twitter](#), [WeChat](#) and [LinkedIn](#) to keep up to date with all of the latest news, announcements and happenings.

[@sedimentology](#) and IAS沉积学之家



All the IAS Journals are also active on Twitter. Stay up to date on the latest news and papers in [@sedimentology](#) by following the IAS journals: [@JSedimentology](#), [@DepositRecord](#), [@BasinResearch](#).

Forthcoming Meetings with IAS Support

The following meetings for 2022 have been granted IAS sponsorship. Details can be found on the linked websites ([click on the images](#)) and where **Student Travel Grants** are still available the guidelines and application forms can be found on the **IAS website**. The application procedure requires submitting a short letter of motivation and proof of enrolment as a PhD student, together with some specific details about location and travel distance.



EGU General Assembly 2022

Vienna (Austria)

23 – 27 May 2022

Registration closed – if you are attending please visit the **IAS at booth 9** in the Exhibition Hall and say hello



Mini-S4 Summer School on Speleothem Science

Innsbruck (Austria)

15 – 16 July 2022

IAS Travel Grant closing date: 31 May 2022.



Climate Change, the Karst Record (KR9)

Innsbruck (Austria)

18 – 20 July 2022

Registration deadline: 31 May 2022



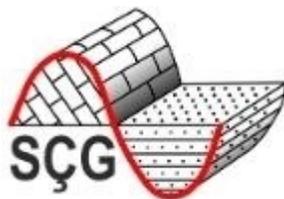
3rd School on Diagenesis of Siliciclastic Sediments

Erlangen (Germany)

22 – 26 August 2022

Registration Deadline: 01 June 2022

IAS Travel Grant closing date: 01 June 2022.



Turkish Sedimentology Working Group 2022

Trabzon (Turkey)

01 – 04 September 2022

Registration Deadline: **30 June 2022**



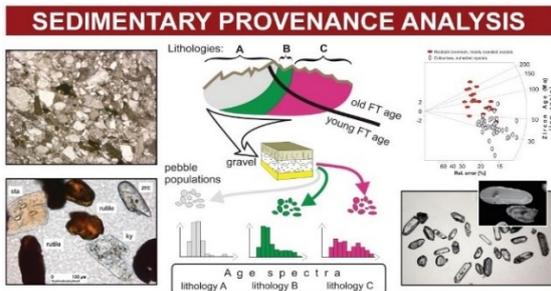
Particulate Gravity Currents in the Environment

Aberdeen (UK)

02 -04 September 2022

Abstract Deadline: 01 June 2022

IAS Travel Grant closing date: 30 June 2022



10th Sedimentary Provenance Analysis Short Course

Göttingen (Germany)

05 – 09 September 2022

Registration Deadline: 15 May 2022

IAS Travel Grant closing date: 03 July 2022.



Joint Congress of the Italian Geological Society and the Italian Society of Mineralogy and Petrology – Geosciences for a Sustainable Future

Turin (Italy)

19 – 21 September 2022

Abstract deadline: 06 May 2022

Registration deadline: 09 September 2022

IAS Travel Grant closing date: 01 July 2022.



18th Congress of the French Association of Sedimentologists

Brest (France)

28 – 30 September 2022

Abstract deadline: 15 June 2022

IAS Travel Grant closing date: 15 July 2022.



International Association of Limnogeology and International Paleolimnological Association (IAL-IPA) Joint Meeting: Lakes as Memories of the Landscape

Bariloche (Argentina)

27 November – 1 December 2022

Early registration deadline: 17 June 2022

Abstract deadline: 22 July 2022

IAS Travel Grant closing date: 22 July 2022.

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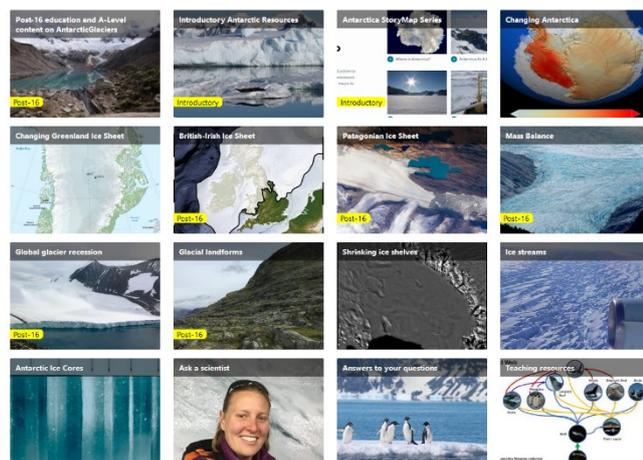


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The nature of autogenic processes in an avalanching rice pile

IAS Postgraduate Grant Report (2020 – Session 1)

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1. Introduction

Strata offers a vast and unique database for inferring paleo-environmental change. The nature of clastic strata over short time scales ($<10^3$ years, Foreman and Straub (2017)) is generated by multiple processes internal to sedimentary systems, such as bedform migration and channel movements. Over much longer timescales ($>10^5$ years, Foreman and Straub (2017)), the nature of strata (i.e. sedimentary architecture), is set by allogenic forcing. However, many important natural processes occur on intermediate timescales (10^3 to 10^5 years, Foreman and Straub (2017)), which is between the timescales of distinctively autogenic and allogenic deposition. The assertion that strata will contain evidence of environmental signals (e.g. climatic shifts, tectonic uplift or eustatic sea level changes) is ambiguous, as strata can also store signals of autogenic processes, that overprint and replace (shred) allogenic signals prior to long term stratigraphic storage.

Previous work (e.g. Jerolmack and Paola 2010, Toby et al. 2019) has focused on quantifying the thresholds for signal preservation across both the landscape and stratigraphy. Firstly, Jerolmack and Paola (2010) focused on signal propagation across the Earth's surface using a rice pile model. Due to the environmental conditions in the laboratory, Jerolmack and Paola were unable to run a physical rice pile experiment. Using this system, they highlight that even under pure autogenic conditions, system output fluctuates over a wide range of scales. From this, they generated a timescale T_x , which is a duration associated with the saturation of variability and marks the boundary between autogenic and allogenic timescales. Using this timescale, they explored signal preservation by imposing a variety of signals onto the model and identified that signals with a period greater than T_x were preserved in the output, whereas signals with a period less than T_x were shredded. Toby et al. (2019) built on this, and applied it to stratigraphy using an experimental delta. 4 different types of signals were imposed onto this system, and their presence was quantified using volume change across the delta surface. From this work, a time dependant magnitude threshold was proposed, allowing differentiation of surface and stratigraphic signal preservation, as well as signal shredding.

However, to establish the likelihood that strata will contain allogenic signals, we must now focus on autogenic processes to understand how a landscape promotes or inhibits environmental signal propagation. The overall aim of this work is to understand and characterise the nature of autogenic processes in sedimentary systems, by understanding their internal dynamics over a range of timescales. The spectral geometry of the flux measurements measured from granular systems allows the structure of autogenic processes to be determined, and the key timescales governing these. At present, we lack the ability to predict characteristic distribution shapes for sediment transport systems, and whether autogenic sedimentation in different systems shows universality. Improving our understanding of the character of autogenic sedimentation is necessary to build improved statistical tests to discriminate cyclic signals from autogenic cyclicity.

2. Methodology

An experimental approach was undertaken to complete the aims of this work, and we utilised a physical rice pile. The rice pile acts as a whole sedimentary system, where input rate can be user controlled, the transfer and storage of sediment analysed in the form of rice build-up and avalanches, and the output (efflux) measured.

The rice pile was built in the Sediment Dynamics Laboratory at Tulane University. The rice pile is composed of 2 glass sheets, creating a container with dimensions of 0.39x0.39x0.02m (figure 1). The rice pile is fed by a sediment feeder, allowing grains to be input at any user-defined rate. Efflux was measured using an Ohaus EX12002 balance, with an accuracy and precision of 0.1 grams, and a maximum mass of 12kg. Mass data was recorded from the balance at approximately 1 second intervals over the experimental run. Videos were taken of the rice pile during the run using a GoPro Hero 7, positioned in portrait mode approximately 0.4m in front of the rice pile. Accelerometer data was taken to monitor room noise over the duration of the experiments using the phyphox application on iPad. This records x, y and z accelerations at approximately 0.05 measurements per second, reported to two significant digits of acceleration with SI units.



Figure 1: The rice pile set-up. Glass sheets separated by plywood blocks to create a container for the rice. Rice fed into the system at a defined input rate from the sediment feeder above. Rice can efflux from the system at any time onto the balance below.

3. Preliminary Results

3.1. Confirming dynamics using acceleration data

To ensure the dynamics we observed in the rice pile were inherent to the system and not due to external noise, we measured acceleration data of the room, the room and sediment feeder when turned on, but with no rice flux, and a full experiment run (figure 2).

From figure 2, it is evident that the accelerations of the room, and the room and sediment feeder are consistently less than that of the full rice pile experiment, indicating that the extra acceleration is caused by the rice pile itself. This confirms that the avalanches we see in the rice pile are inherent to the system and not caused by external vibrations, allowing us to interpret the behaviours we see as that true to the rice pile.

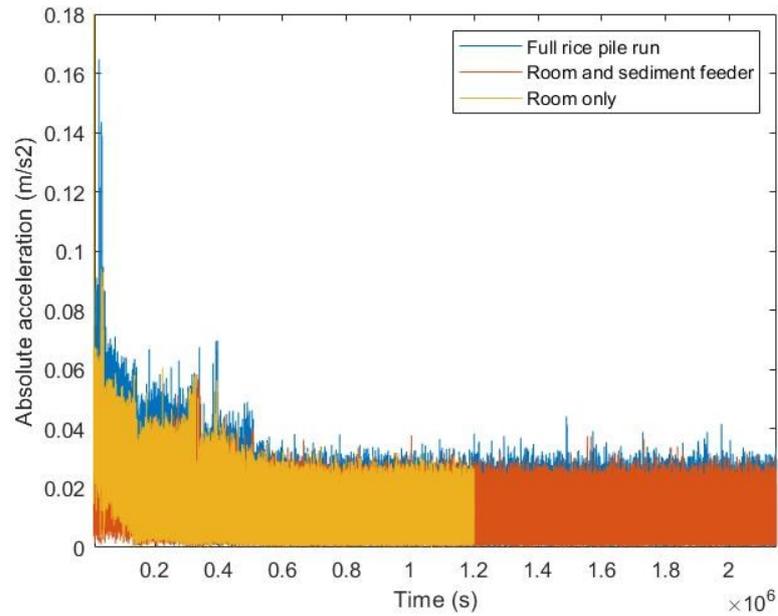


Figure 2: Acceleration data for the three different environments, showing that the failures evident in the rice pile are inherent, and not caused by external noise.

3.2. Dynamics and timescales in the rice pile

Firstly, we ran an experiment with a constant input rate of 0.196 grams/second, to understand the baseline dynamics of the system.

The internal dynamics of the rice pile are composed of avalanches over a wide range of scales, from periods of no efflux to substantial failure events in excess of 40 grams/second (figure 3). This highlights the stochastic internal dynamics operating in the rice pile, as even under pure autogenic conditions, the output fluctuates over a range of scales.

The power spectra of the efflux show a tripartite geometry. Over short time scales, we have increasing power with time, indicating temporal correlation in efflux rate, known as red noise. Over intermediate time scales, we see a plateau in spectral power, indicating there is no correlation in efflux rate, known as white noise. Finally, over long-time scales, we have decreasing power with time, indicating anti-correlation in deposition rates, known as blue noise.

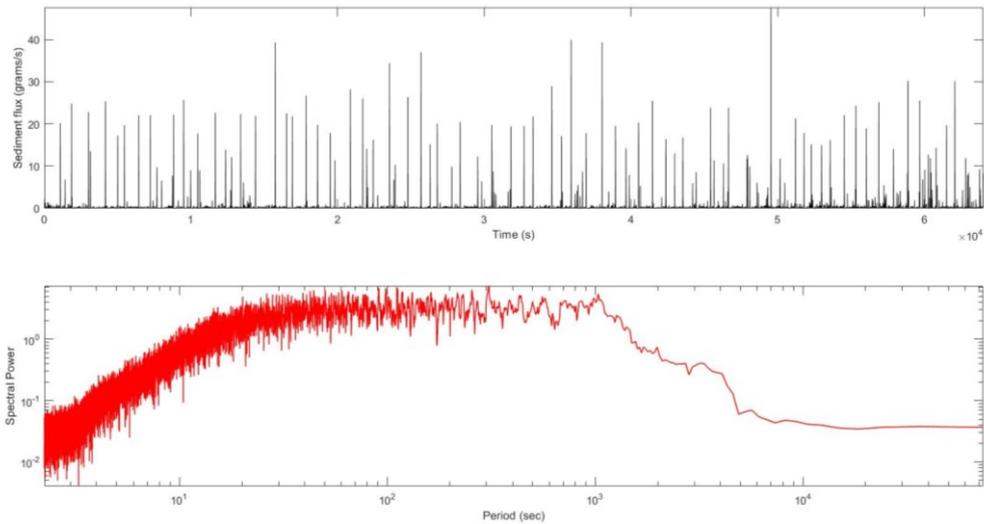


Figure 3: Top: Efflux per second from the rice pile. Bottom: Power spectra of the efflux from the rice pile showing tripartite geometry

The transitions between the different noise regions in the spectra mark 2 key timescales in the rice pile. The first timescale, marking the end of the red noise, is evident at approximately 15 seconds, and the second timescale, marking the end of the white noise, is evident at approximately 1000 seconds. We label these Tx and Tl respectively (figure 4).

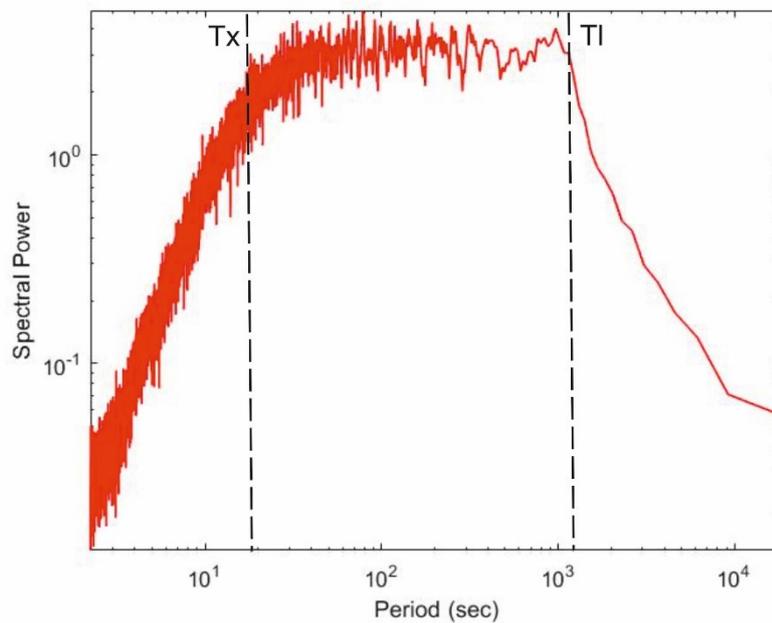


Figure 4: Power spectra from the 0.196 grams/sec constant experiment with the dashed lines representing the 2 key timescales of Tx and Tl

To understand Tx and what this timescale denotes, we analysed the duration of large avalanche events in the rice pile. Avalanches in the rice pile do not occur instantaneously, but are recorded over a short

time window (figure 5). The duration of the longest avalanche in this experiment is approximately 15 seconds, aligning with the spectral estimation of T_x .

To understand TI, we analysed the time required to regrade the mass of sediment lost in the largest avalanche event. To do this, we used an adapted version of the T_x equation given by Jerolmack and Paola (2010): $TI = M_{max}/Q_{in}$, where M_{max} is the maximum efflux over a 10 second sliding window and Q_{in} is the input rate. We used this equation to calculate a theoretical TI, and compared this to TI measured from the power spectra (figure 6). We find that measured and theoretical TI values are comparable, and that TI decreases with increasing input rate.

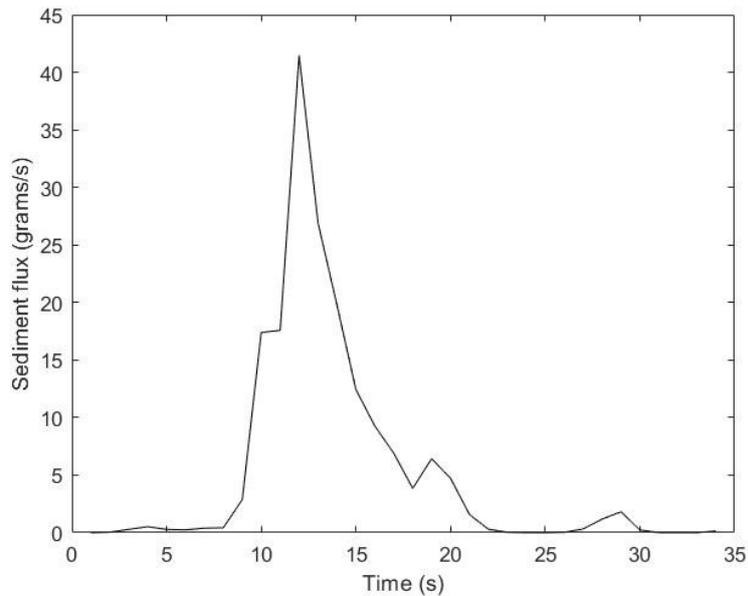


Figure 5: Mass efflux for the largest avalanche event in the rice pile for the 0.196 grams/sec constant experiment, showing how the avalanches are not instantaneous.

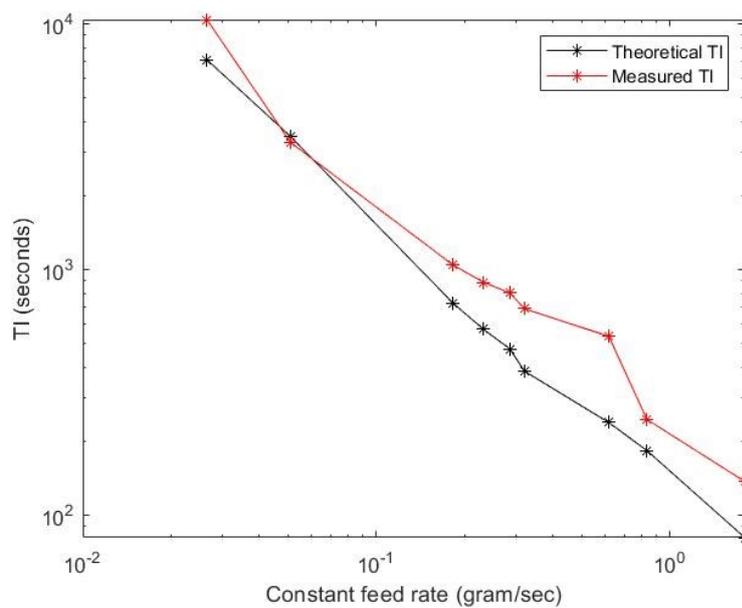


Figure 6: A comparison of measured and calculated TI values.

3.3. Changing feed rates

We then ran a suite of constant input rate experiments, gradually increasing the input rate to understand whether variations in input rate changed the autogenic dynamics within the rice pile.

From the power spectra in figure 7, it is evident that all the spectra maintain their tripartite geometry with increasing input rate. All the spectra show red noise increasing to T_x , where the T_x timescale seems to be constant for all feed rates. However, as the input rate increases, the length of the white noise, and therefore T_I , decreases. Despite the feed rate increasing, the avalanche dynamics in the rice pile show the same heavy-tailed distribution (figure 8), showing that the internal dynamics operate in the same manner throughout.

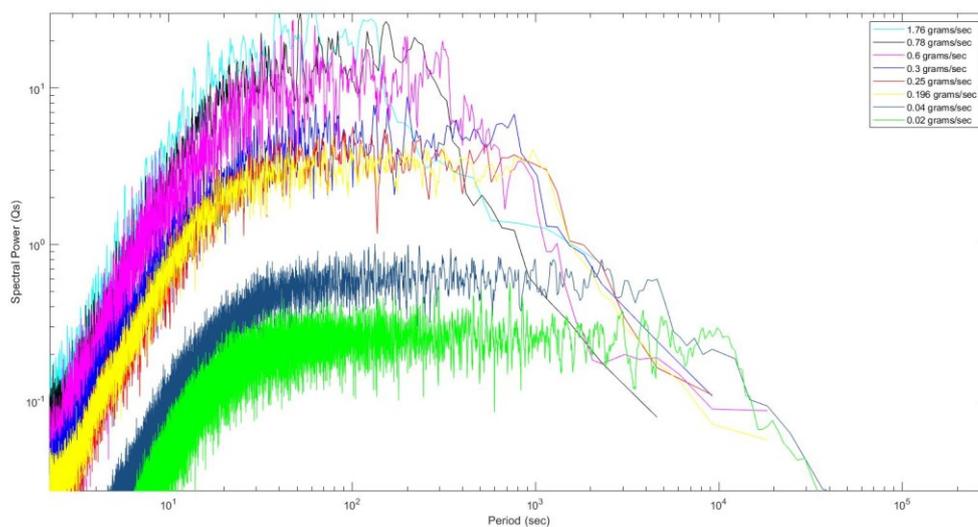


Figure 7: Power spectra from all constant feed rate experiments

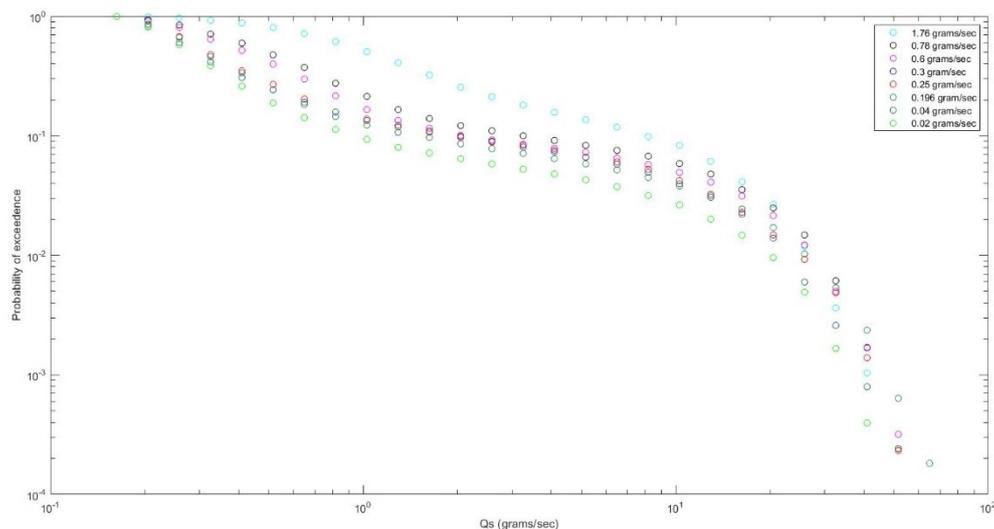


Figure 8: Probability of exceedance plot for the avalanche dynamics in the rice pile for all the constant feed rate experiments. All the experiments show a heavy-tailed distribution

4. References

Jerolmack, D.J. and Paola, C., 2010. Shredding of environmental signals by sediment transport. *Geophysical Research Letters*, 37(19).

Foreman, B.Z. and Straub, K.M., 2017. Autogenic geomorphic processes determine the resolution and fidelity of terrestrial paleoclimate records. *Science advances*, 3(9), p.e1700683.

Toby, S.C., Duller, R.A., De Angelis, S. and Straub, K.M., 2019. A stratigraphic framework for the preservation and shredding of environmental signals. *Geophysical Research Letters*, 46(11), pp.5837-5845.