

# Division on Nonlinear Processes in Geosciences

## NP Division meeting

### DM14

François G Schmitt

NP President

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16 April 2024



Each EGU Division, which represents a scientific area or discipline, holds its annual Division Meeting during the General Assembly.

Division Meetings are open to all General Assembly participants interested in NP topics.

**Agenda:**

1. NP Awards and medals and composition of the committees
2. News from the Council
3. NP activities at the EGU24; approval of a new science officer
4. NP Early career scientists activities (by Mireia Ginesta-Fernandez and Angel Garcia-Gago)
5. NP scientific affairs (by Davide Faranda)
6. NPG journal report and news (by NPG executive editors)



# Division on Nonlinear Processes in Geosciences

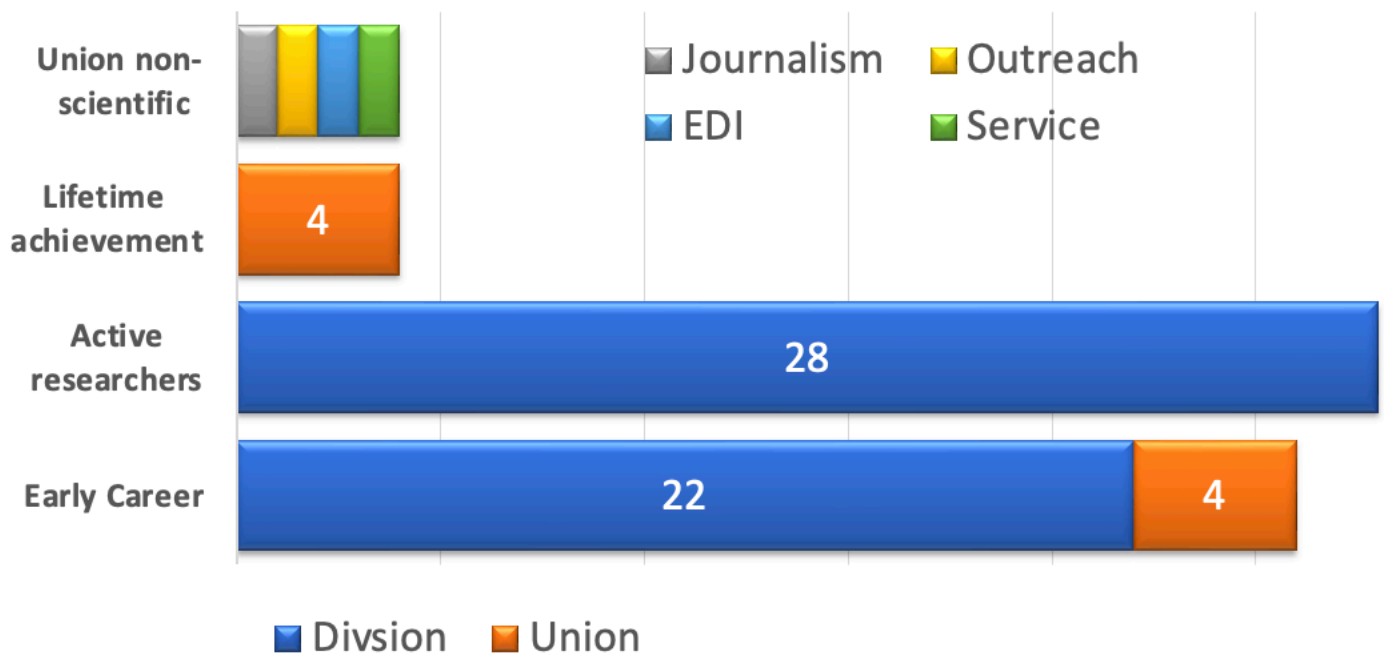
## **(1) Awards and medal**





# EGU awards & medals

## EGU features an extensive awards and medals programme on all career stages



- 4 **Union Awards** for services for the union, science journalism, outreach, and EDI
- 4 prestigious **Union Medals**, recognising excellence in scientific research
- 28 **Division Medals**, awarded for significant disciplinary contributions in Earth, planetary and space sciences
- 4 **Union** and 22 **Division Awards** for Outstanding Early Career Scientists





## How to become an awardee?

- **Nominations are exclusively by EGU members (no self nomination)\***
- Candidates do not need to be EGU members.
- Individual award and medal committees are then evaluating the nominations selecting the most deserving candidate based on **scientific achievements\*\***.

\* An exception is one award to promote excellence in journalism allowing nominations from non-members and self nominations

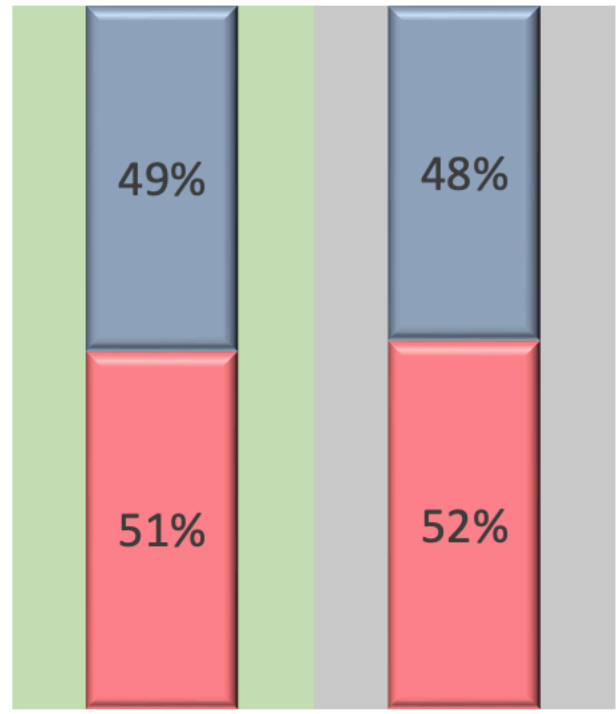
\*\* plus one medals each for journalism, outreach and service to the union





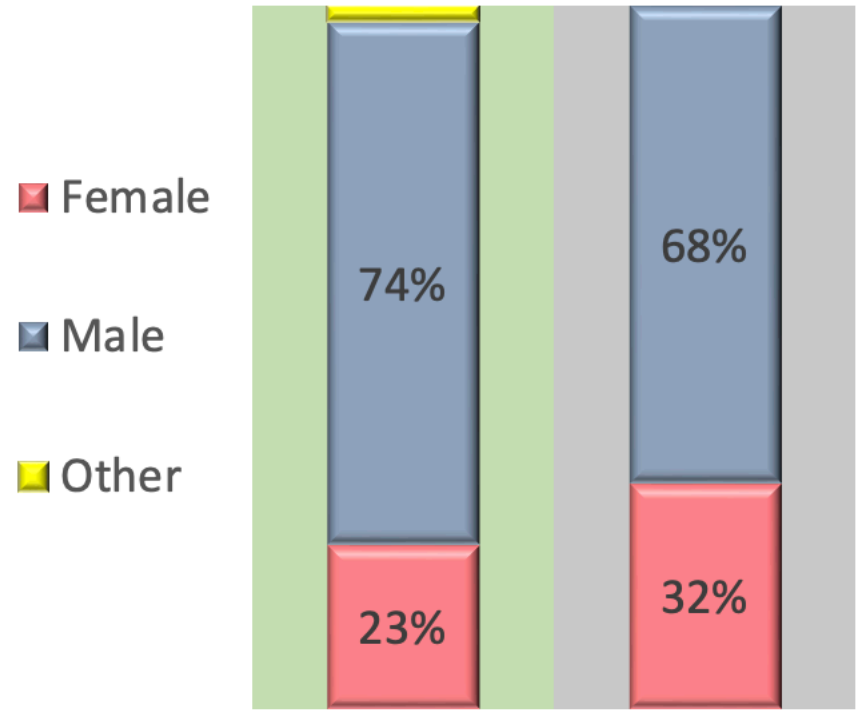
# EGU awards & medals

## Some statistics for the 2024 awards



Nominations      Awarded

• **Early Career Awards**



Nominations      Awarded

• **Union and Division awards**

### More information on awards

EOS3.1  
 Poster EGU24-1620  
**Equality of opportunities in geosciences: The EGU Awards Committee experience**  
 Wed, 17 Apr, 10:45–12:30  
 Hall X1 | X1.63

**Meet the chair of the Awards Committee**  
 Mon, 15 Apr, 17:30–18:00  
 EGU booth – Hall X2



# EGU awards & medals

## How to nominate

Where: <https://www.egu.eu/awards-medals/nominations/>

When: Deadline is **June 15 every year**

What is required:



	Division and Union medals	Outstanding Early Career Scientists Awards
Nomination letter	5000 characters (including spaces)	2500 characters (including spaces)
Curriculum Vitae	2 pages	1 page
Selected bibliography	2 pages	½ page
Supporting letters	3-5 5000 characters (including spaces)	None (multiple nominators possible)

**Nomination and supporting letters via on-line form**



## OSPP Awards 2023, NP division

### *Outstanding student and PhD candidate presentation*

OSPP awards are decided after votes by judges during GA or shortly after. They are given during the next GA. Usually we have 2 awards for the NP division.

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OUTSTANDING STUDENT AND PHD CANDIDATE PRESENTATION (OSPP) AWARDS 2023  
**Lucas Schmutz**

[Home](#) / [Awards & medals](#) / [Outstanding Student and PhD candidate Presentation \(OSPP\) Awards](#) / [2023](#) / [Lucas Schmutz](#)

### **NP** Nonlinear Processes in Geosciences

The 2023 Outstanding Student and PhD candidate Presentation (OSPP) Award is awarded to Lucas Schmutz for the poster/PICO entitled:

*A multivariate approach to combine general circulation models using graph cuts* (Schmutz, L.; Thao, S.; Vrac, M.; Mariethoz, G.)

Click [here](#) to download the poster/PICO file.

Lucas Schmutz is a PhD student at the Institute of Earth Surface Dynamics (IDYST) at the University of Lausanne, Switzerland. Under the supervision of Professor Gregoire Mariethoz, Lucas aims to enhance the reliability of climate projections by accounting for the local performance of global circulation models. His work focuses on novel statistical approaches to combine multiple models, aiming to preserve their spatial characteristics and the dependencies between variables. These innovations aim to produce more physically realistic and less biased climate projections, informing better local adaptation and mitigation strategies.



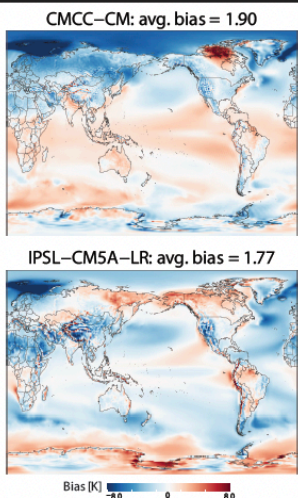
Lucas Schmutz



## Introduction

- GCMs exhibit biases and varying levels of performance
- These biases vary spatially
- Locations of strengths and weaknesses differ between models
- Multi-Model Ensembles (MME) combined with Multi-Model Mean (MMM) tend to smooth out individual model performances

Can we leverage this spatial variability to improve projections?



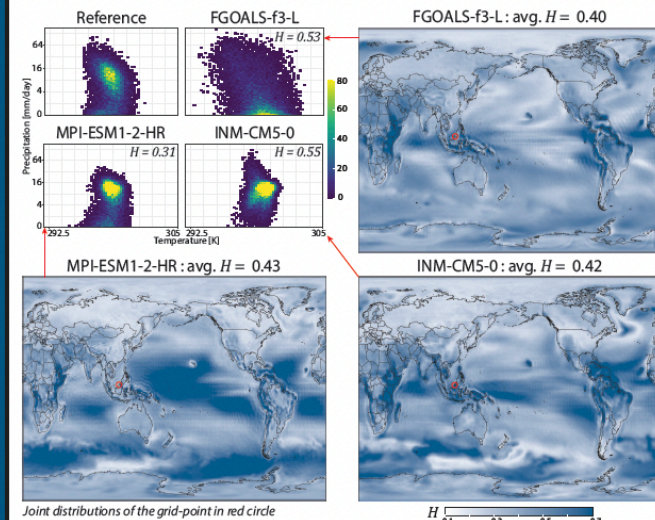
## Multivariate graph cut

What we noticed:

- Models display vastly different multivariate distributions
- The performance of each model varies spatially

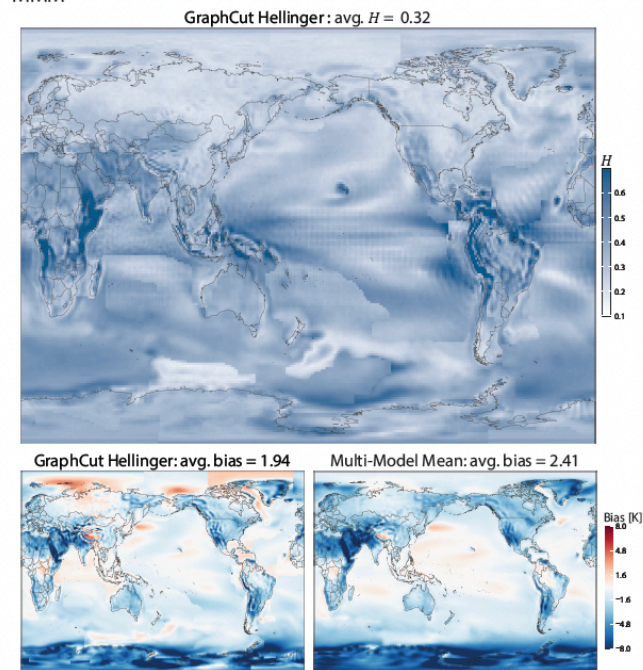
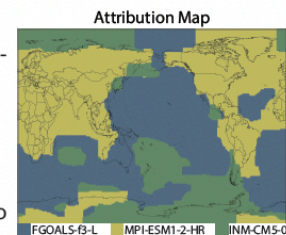
Updated Method:

- Use multi-decadal joint distribution of daily values
- Hellinger distance ( $H$ , min: 0, max: 1) replaces mean in cost function
- The selected model provides the joint distribution closest to reference
- Intervariable relationships are preserved



## Preliminary Results

- Test scenario demonstrates the potential of  $H$  as a cost parameter
- Resulting patchwork is coherent
- Chosen MME produces visible cuts and large patches
- Biases and  $H$  are reduced compared to MMM



## Univariate graph cut<sup>1</sup>

Method:

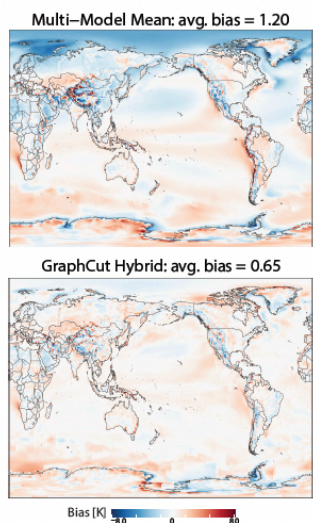
- Multi-decadal means used in the cost function
- Minimizes biases while avoiding spatial discontinuities

Result:

- Surpasses MMM and its weighted variants

Limitations:

- Distinct patchworks when optimizing for different variables
- Intervariable relationships are lost when different models are affected to a given grid-point
- Limited to a single variable



## Test Scenario

- Calibration period: 1985-1999
- Projection period: 2000-2014

Research questions:

- Is  $H$  an appropriate distance for the cost function?
- Can we outperform MMM?

## Dataset

Models from CMIP6

Reference: MIROC6

Models: FGOALS-f3-L  
 INM-CM5-0  
 MPI-ESM1-2-H

Variables: TAS & PR

## Future work

- Use ERA5 as reference
- Larger MME
- Randomized initialization of the graph cut optimization
- Bias correction before graph cut?

## Get in touch!

lucas.schmutz@unil.ch





# OSPP Awards 2023, NP division

## *Outstanding student and PhD candidate presentation*

OSPP awards are decided after votes by judges during GA or shortly after. They are given during the next GA. Usually we have 2 awards for the NP division.

OUTSTANDING STUDENT AND PHD CANDIDATE PRESENTATION (OSPP) AWARDS 2023

Jamie Mathews

[Home](#) / [Awards & medals](#) / [Outstanding Student and PhD candidate Presentation \(OSPP\) Awards](#) / [2023](#) / [Jamie Mathews](#)

Site search



**NP** Nonlinear Processes in Geosciences

The 2023 Outstanding Student and PhD candidate Presentation (OSPP) Award is awarded to Jamie Mathews for the poster/PICO entitled:

*How Oceans Create Extreme Temperatures* (Mathews, J.; Czaja, A.)

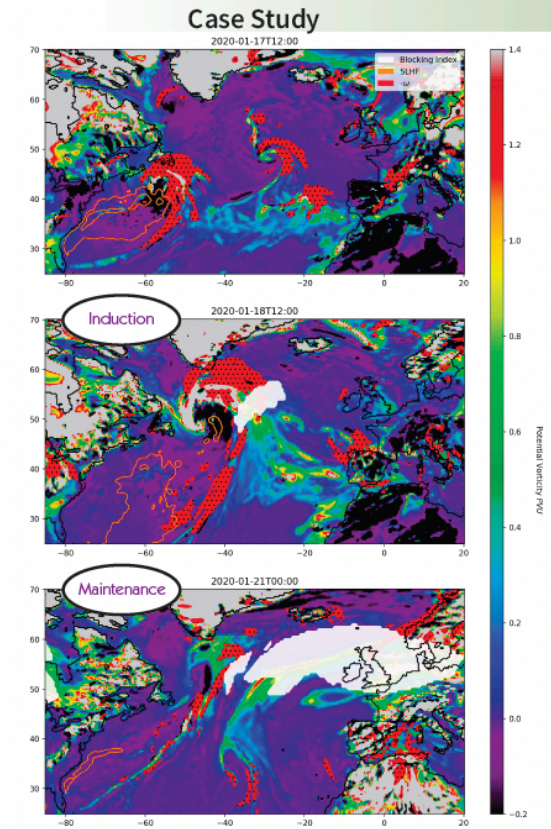
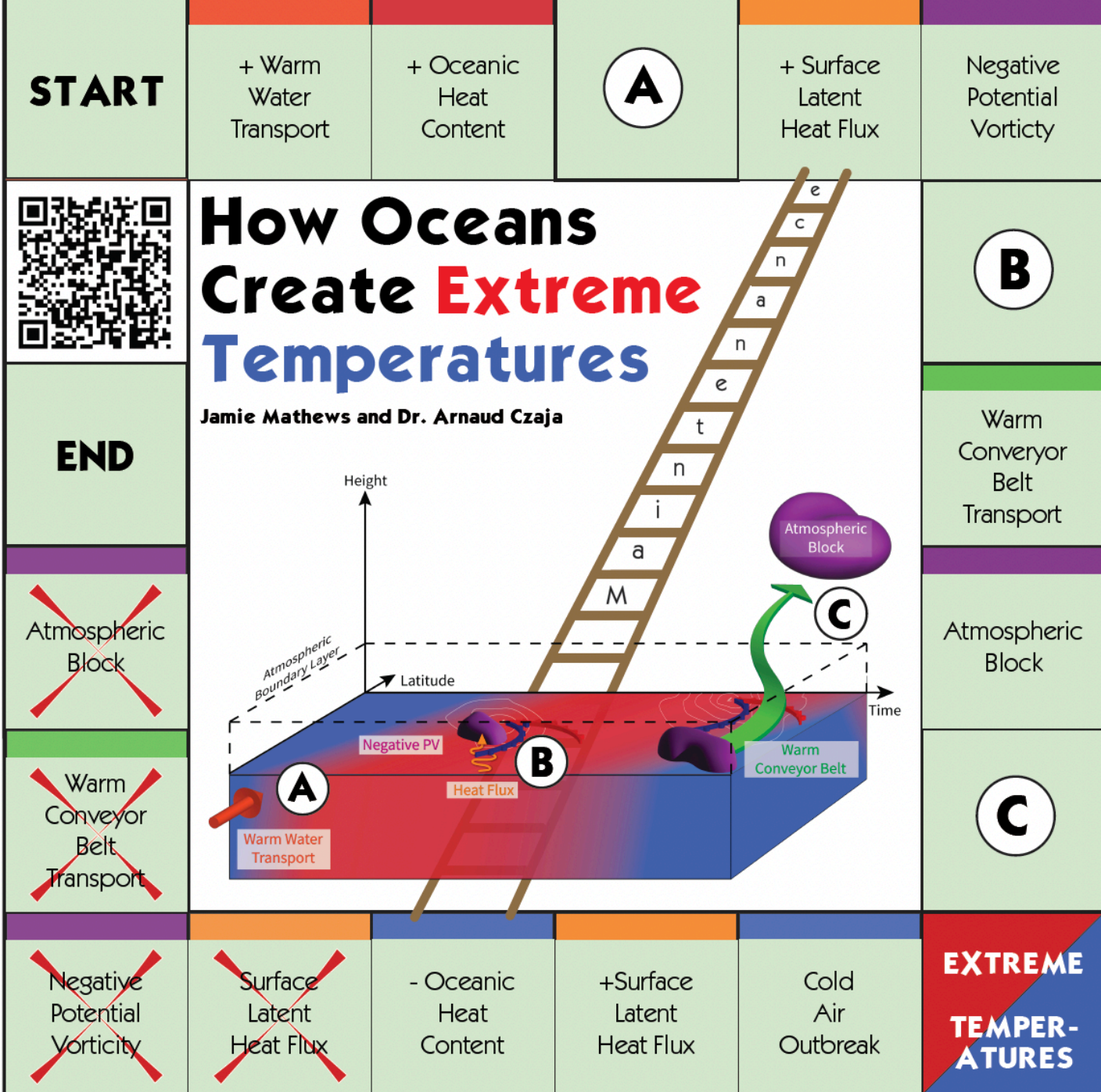
Click [here](#) to download the poster/PICO file.

Jamie Mathews is a PhD student at Imperial College London under the supervision of Dr. Arnaud Czaja and is part of the EDIPI project which is funded by the European Union's Horizon 2020 research and innovation programme under Marie Skłodowska-Curie grant No. 956396. His research focuses on the modulation of the jet stream, specifically a phenomenon known as atmospheric blocking, by the Gulf Stream. Atmospheric blocking is responsible for the generation of extreme temperatures and hence, any advancement in its prediction and theoretical understanding is vital for future forecasts and societal protection.



Jamie Mathews





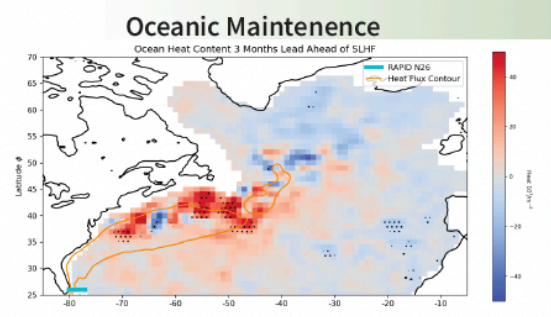
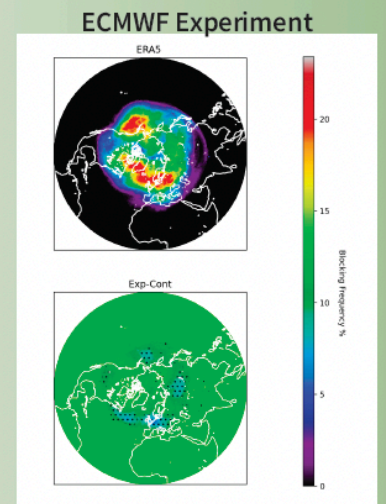
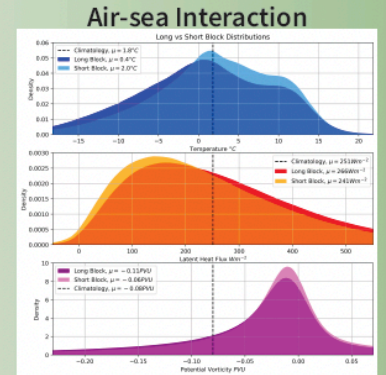
This presentation participates in OSPP



Vote!



Outstanding Student & PhD candidate Presentation contest



**Orders of Magnitude**

- O(1PVU) generated in the atmospheric boundary layer
- O(1PVU) transported to block

$$\Delta Q_{BL} = -2f \frac{\Delta t_A}{\Delta t_O} \frac{\Delta H_C}{C_A (\rho_{BL} h_{BL})^2}$$

$$\Delta Q_{Block} = \frac{2fg \Delta \theta_O \Delta t_A C_{OP} \rho_{HML}}{\Delta P_{Block} \Delta t_O C_{AP} h_{BL}}$$

# Awards and medal

## NP Division Lewis Fry Richardson Medal



This medal was established by the Nonlinear Processes in Geophysics Division in recognition of the scientific achievements of Lewis Fry Richardson.

It is awarded to scientists for their exceptional contributions to nonlinear geosciences in general.





## Awards and medal

### NP Division Lewis Fry Richardson Medal **2024**

The 2024 Lewis Fry Richardson Medal is awarded to Annick Pouquet for her outstanding contributions to the field of theoretical and computational turbulence in neutral and conducting fluids, in particular in magnetohydrodynamic (MHD) turbulence and dynamo theory.

Annick Pouquet's contributions to magnetohydrodynamics laid the ground for modern dynamo theory making her one of the leading scientists in this area over decades. She showed that turbulent flows can sustain dynamos and found the saturation mechanism. In particular, she pioneered studies of the role of helicity in geophysical and astrophysical flows. She predicted the existence of an inverse cascade of magnetic helicity in conducting fluids and formulated the concept of 'selective decay', meaning that the magnetic helicity decays slower than energy. Her manifold contributions to magnetohydrodynamics and turbulence theory have inspired a large body of works by other researchers in different areas like plasma astrophysics, space physics, solar physics and planetary dynamo theory demonstrating the broad impact of Pouquet's work.



Annick Pouquet



Lecture given this evening,  
Room -2.91, 19:00

### NP Division Early Career Scientist Outstanding Award

An Early Career Scientist (ECS) is a student, a PhD candidate, or a practising scientist who received their highest certificate (e.g. BSc, MSc or PhD) **within the past seven years**. The seven-year period can be extended to allow for periods when the scientist was not working in science because of, but not limited to, caring and/or parental responsibilities, disability, personal illness, community obligations or national service.

For the purpose of the awards the nominee should satisfy one of the **above criteria by 1 January of the year** when the award is presented.

<https://www.egu.eu/awards-medals/ecs-definition/>

### NP Division Early Career Scientist Outstanding Award

The NP Division Outstanding Early Career Scientist Awards recognises scientific achievement made by an Early Career Scientist in the fields covered by the NP division.

Candidates for each division's Outstanding Early Career Scientist Award are first chosen by the relevant division president, who forwards the most outstanding candidate to the Chair of EGU's Awards Committee.

Four candidates are then selected by Council to receive the Union-level Arne Richter Awards for Outstanding Early Career Scientists. The remaining candidates are awarded by the relevant division.



## NP Division Outstanding Early Career Scientist Award 2024

### **NP** Nonlinear Processes in Geosciences

The 2024 Division Outstanding Early Career Scientist Award is awarded to Simone Benella for his many original contributions in the field of stochastic processes, advancing the understanding space plasma dynamics.

Simone Benella, a very active early career scientist, specialises in the field of nonlinear processes in space physics. His research focuses on various aspects, such as studying space plasmas, investigating large-scale solar wind structures, turbulence, cosmic ray propagation, solar energetic particle events, and space weather.

Benella's academic journey started with a degree course in theoretical physics, where he specialised in statistical mechanics. During this time, he conducted a thesis on the topic of self-organised criticality. In this context, he planned and analyzed the results of a sandpile model, studying its evolution on different types of networks.



Simone Benella



Lecture given this evening,  
Room -2.91, 19:40

Division president, vice-president, and science officers

<b>President</b>	François Schmitt <a href="#">✉</a>
<b>Deputy President</b>	Reik Donner <a href="#">✉</a>
<b>Programme Group Chair</b>	François Schmitt <a href="#">✉</a>
<b>Science Officers</b>	Tommaso Alberti <a href="#">✉</a> NP1: Mathematics of Planet Earth
	Christian Franzke <a href="#">✉</a> NP2: Dynamical Systems Approaches to Problems in the Geosciences
	Ioulia Tchiguirinskaia <a href="#">✉</a> NP3: Scales, Scaling and Nonlinear Variability
	Reik Donner <a href="#">✉</a> NP4: Time Series and Big Data Methods
	Olivier Talagrand <a href="#">✉</a> NP5: Predictability
	Yuliya Troitskaya <a href="#">✉</a> NP6: Turbulence, Transport and Diffusion
	Julien Touboul <a href="#">✉</a> NP7: Nonlinear Waves
	Henk Dijkstra <a href="#">✉</a> NP8: Emergent Phenomena in Geosciences

# NP Medal and Award committees functioning

1. Read all CVs and letters of support;
2. Discuss informally the different merits of the candidates;
3. Anonymous vote.

**Conflict of interest:** Any EGU award or medal is selected through a rigorous assessment of the candidates and their merits. The EGU Council, the award and medal committee members, and the Union and division officers are committed to soliciting the nomination of deserving individuals by avoiding conflicts of interest.

Awards and medals committee members should declare at the beginning of the selection procedure if they have any personal and/or professional relationship with any candidate, including:

- Known family relationship as spouse, child, sibling, or parent.
- Business or professional partnership.
- **Past or present association as thesis advisor or thesis student.**
- **Collaboration on a project, a book, article, report, or paper within the last 5 years**, and 10 years if a substantial number of co-publications are involved.
- Co-editing of a journal, compendium, or conference proceedings within the last 48 months.
- Having had **substantial collaboration during their professional career.**
- **Current employment at the same institution.**
- Previous employment at the same institution within the last 12 months.
- Being considered for employment at the institution.
- Being involved in any office, governing board membership, or relevant committee chairpersonship in the same institution.
- Having received an honorarium and/or award from the same institution in the past 24 months.



Previous Richardson medal committee (until April 2024)

**Ulrike Feudel (2022, chair)**

**Ekaterina Didenkulova**

Bérengère Dubrulle (2021)

**Valerio Lucarini (2020)**

Angelo Vulpiani (2023)

members that  
have reached  
the term

- Annick Pouquet (Richardson laureate 2024), being previously chair of the medal committee, cannot join again the committee
- Need of two new members

Research professor (Directeur de recherche) at CNRS  
Ecole Normale Supérieure de Lyon, France

## Climate and statistical mechanics

The Climate and Statistical Mechanics group at ENS de Lyon aims at

- Studying climate dynamics phenomena, specifically related to turbulence, climate extremes, and large scale dynamics of atmospheres and oceans.
- Developing algorithms aimed at computing rare events in complex dynamical systems, like climate dynamics or turbulent flows, based on large deviation theory and statistical mechanics.
- Studying fundamental questions in statistical mechanics and dynamical systems theory, often using large deviation theory, bridging from mathematical physics to modeling and applications



Freddy Bouchet

**Summary of research record:** 72 original publications in peer-reviewed journals. 3 review articles. 1 edited book. 5 book chapters.

**Invited talks in international conferences and schools: 97 (51 since 2016) (in the fields of statistical physics, climate, and applied mathematics).** 7 seminars in USA labs in 2016 only (Toronto, Boston, Courant (2), Columbia, Brown U., Chicago U., AGU in San Francisco). 18 research lectures in schools (10 since 2016). 98 seminars with competitive selections or in labs abroad (USA, Japan, Europe, India, and so on).

*Plenary speaker at the SIAM annual meeting in 2016 at Boston, USA (the world reference conference in applied mathematics).* Invited talks at APS, ICTAM, and APS-DFD in 2021.

[Link to a detailed CV with complete lists of publications, responsibilities, and involvements](#)

**Main scientific interests:** Climate dynamics, climate extreme events, statistical physics, large deviation theory and rare event simulation, kinetic theory, turbulence and statistical mechanics.



Senior researcher of Marine and River System Modeling Department  
Institute of Mathematical Machine and System Problems  
National Academy of Sciences of Ukraine  
Kyiv, Ukraine

Research interests:

Environmental fluid dynamics, coastal engineering, computational fluid dynamics, waves in solids, oceanography, ocean mixing, climate education, mathematics education



Kateryna Terletska

EGU-related activities  
NP and NH divisions

2017, 2018, 2019, 2020 **Convener of the session** NH5.6/NP7.4/OS5.5 “*Extreme Internal Wave Events: Generation, Transformation, Breaking and Interaction with the Bottom Topography*” European Geosciences Union General Assembly (Natural Hazards division)

<http://meetingorganizer.copernicus.org/EGU2017/session/26707>

<http://meetingorganizer.copernicus.org/EGU2018/session/26707>

<https://meetingorganizer.copernicus.org/EGU2019/session/32493>

<https://meetingorganizer.copernicus.org/EGU2020/session/34851>

2021, 2022 **co-convener of the session** NP “*Extreme Internal Wave Events: Generation, Transformation, Breaking and Interaction with the Bottom Topography*” European Geosciences Union General Assembly

2023 **co-convener of the session** NP “[Turbulence, wave-currents interactions and other nonlinear physical processes in lakes and oceans](#)”

**Editor of special issue** 2018 “Extreme internal wave events” in Nonlinear Processes in Geophysics (NPG) journal

<https://www.nonlinear-processes-in-geophysics.net/index.html>

**Editor of special issue** 2021 “Nonlinear internal waves” in Nonlinear Processes in Geophysics (NPG) journal

[https://npg.copernicus.org/articles/special\\_issue1139.html](https://npg.copernicus.org/articles/special_issue1139.html)

**Editor of special issue** 2023 “Turbulence, wave-current interactions, and other nonlinear physical processes in lakes and oceans” in Nonlinear Processes in Geophysics (NPG) journal

[https://npg.copernicus.org/articles/special\\_issue1273.html](https://npg.copernicus.org/articles/special_issue1273.html)

**Social Media Coordinator of Natural Hazard Division** of European Geosciences Union (2019-2023) <https://www.egu.eu/nh/structure/>

# Richardson medal committee

Previous Richardson medal committee (until April 2024)

**Ulrike Feudel (2022, chair)**  
**Ekaterina Didenkulova**  
Bérengère Dubrulle (2021)  
**Valerio Lucarini (2020)**  
Angelo Vulpiani (2023)

members that  
have reached  
the term

→  
new members

New Richardson medal committee

**Ulrike Feudel (2022, chair)**  
*Freddy Bouchet*  
Bérengère Dubrulle (2021)  
*Kateryna Terletska*  
Angelo Vulpiani (2023)

*New members proposed, needs approval  
of the participants to the Division Meeting*

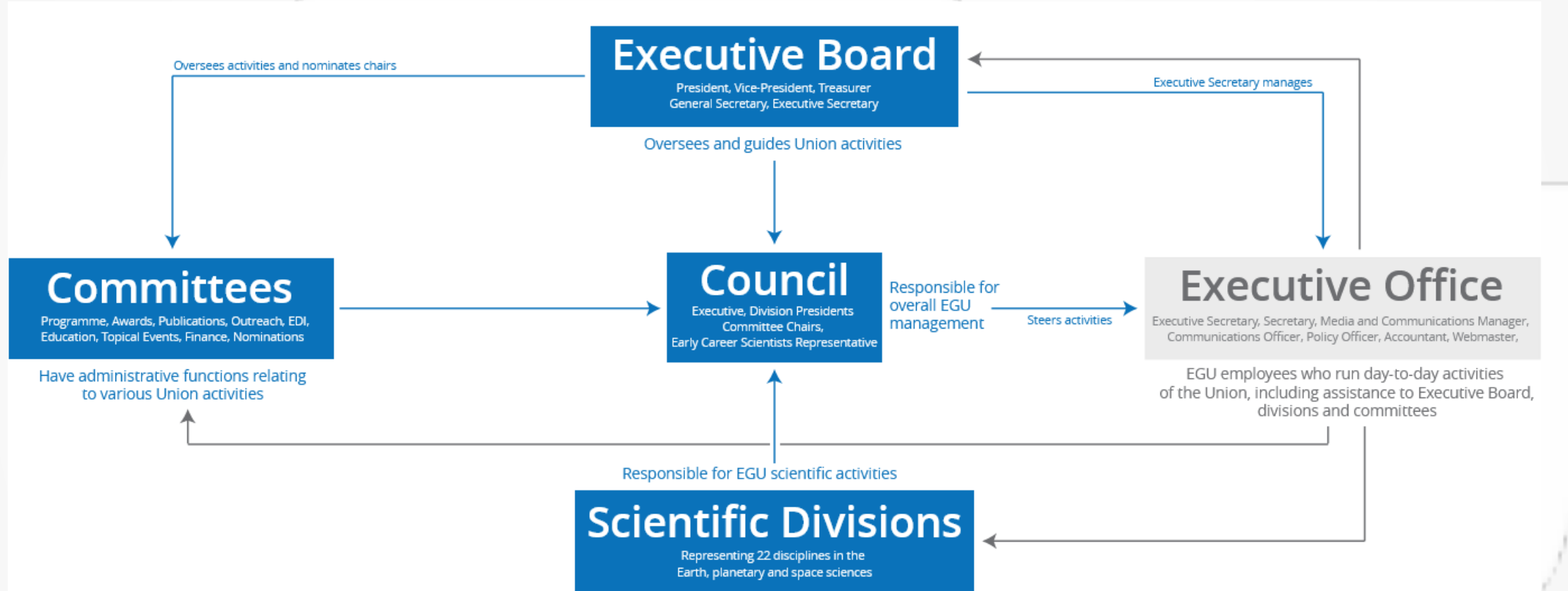
# Division on Nonlinear Processes in Geosciences

## **(3) News from the council**

Slides prepared by the chairs of the EGU Programme Committee



# The EGU Structure



## EGU24: News from the EGU Programme Committee

- **EGU Programme Committee** has **two Co-chairs**, appointed by the EGU Council. They are supported by an **Events Manager** staff member from EGU office
- **Programme Committee**: comprised of **General Positions** (Executive Board, Conference Organizer, PC Co-chairs), and **Programme Group Chairs** (25 Programme Groups reflecting the 22 EGU Divisions with their science officers, and SC, ITS, EOS programmes)
- **Our goal**: to offer a reliable, **hybrid** format of the General Assembly with flexibility to respond to any emerging needs, as **inclusive** and **environmentally friendly** as possible, while responding to the main **scientific challenges of geosciences worldwide**



Maria-Helena  
Ramos

PROGRAMME COMMITTEE  
CO-CHAIR



Athanasios Nenes

PROGRAMME COMMITTEE  
CO-CHAIR



Jane Roussak

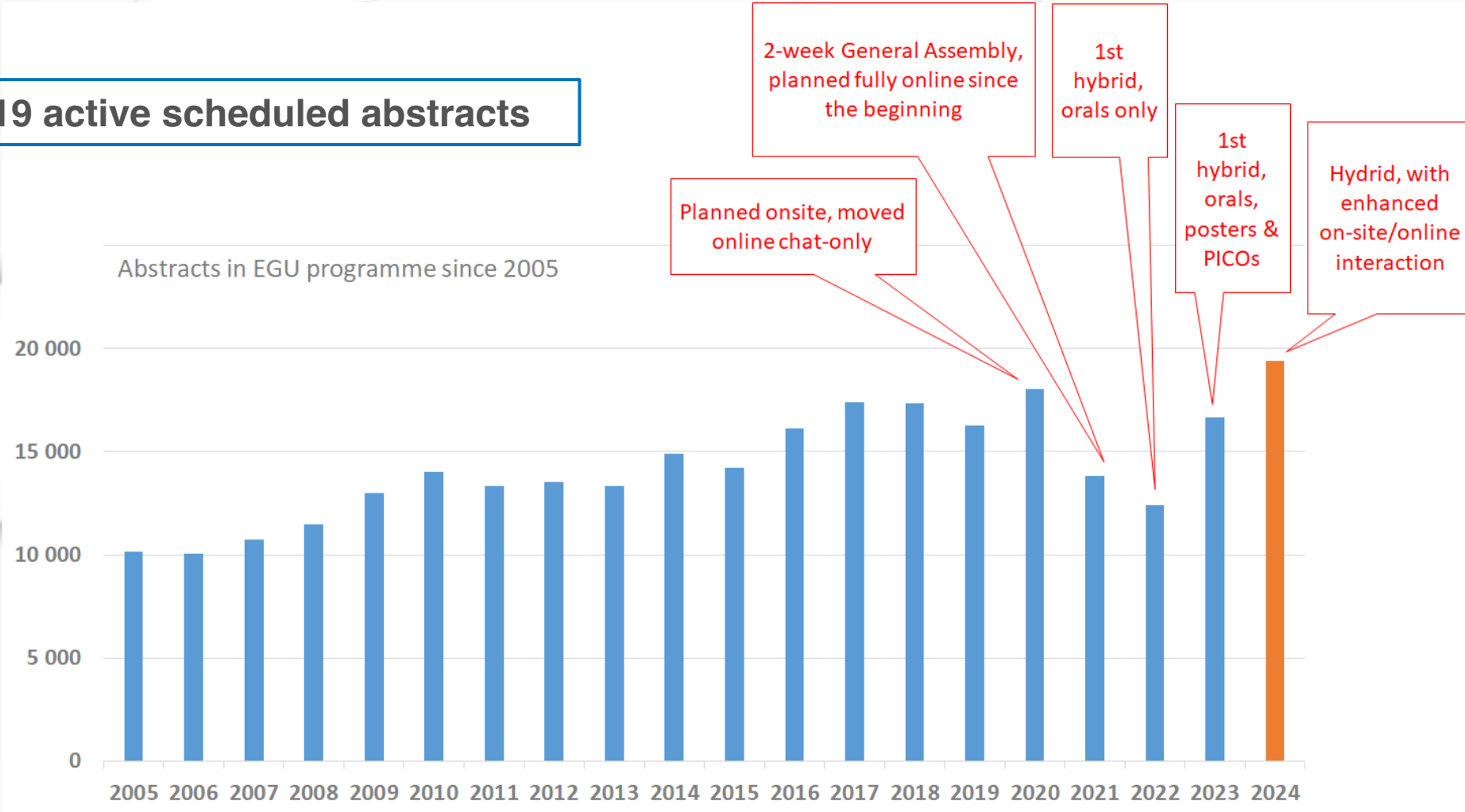
EVENTS MANAGER

[https://egu24.eu/about/programme\\_committee\\_composition.html](https://egu24.eu/about/programme_committee_composition.html)

## EGU24: numbers at a glance

(as of 29 March 2024)

**19,319 active scheduled abstracts**





## EGU24: numbers at a glance (as of 4 April 2024)

- 19,319 active scheduled abstracts
- 16.746 paid registrations (8% for virtual participation)
- 50% of virtual participants benefited from free registration (Undergraduate/master students & Low- & lower-middle income countries)
- 37% of on-site participants and 52% of virtual participants are **PhD candidates, Master or Undergraduate students**
- 2% of on-site participants and 24% of virtual participants are from **Low & Lower-middle income countries**
- **Gender** (Female / Male / Non-binary): On-site (39% / 58% / 0%) & Virtual (42% / 54% / 1%)
- 112 **different countries** for on-site participation; 90 for virtual participation

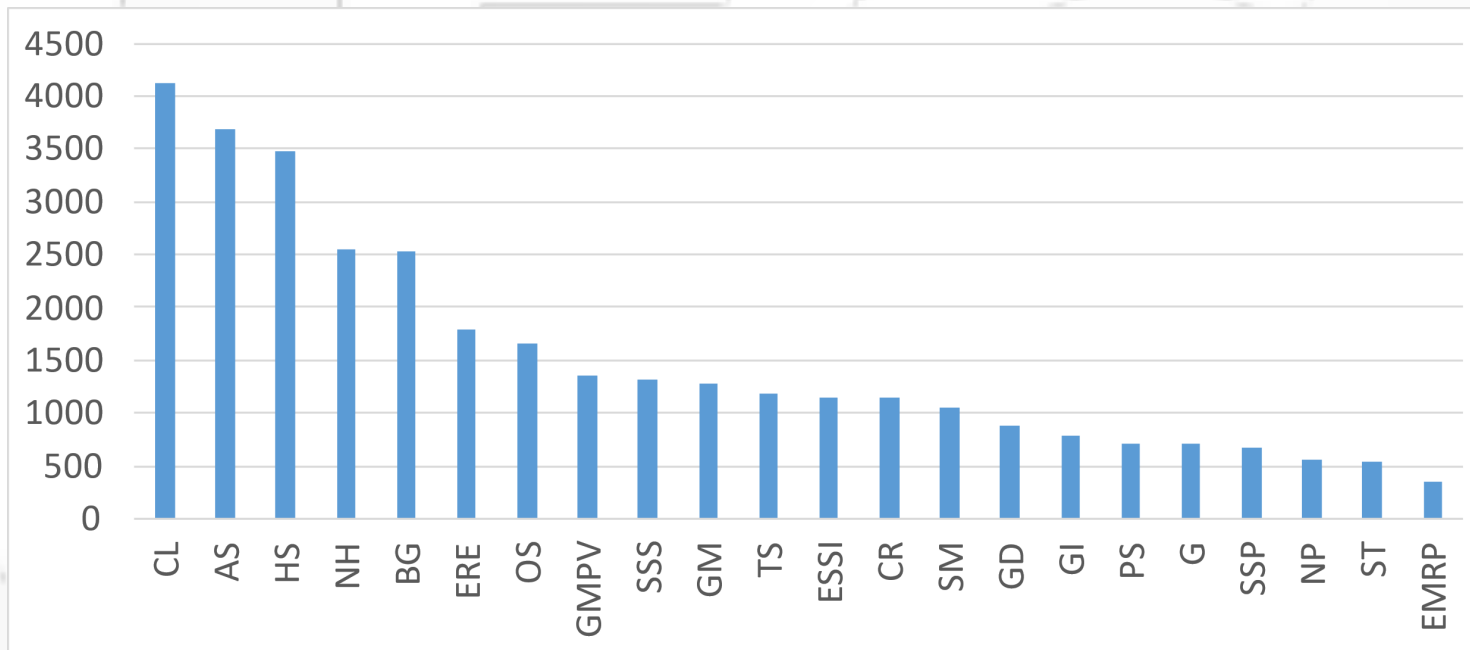


EGU23 main entrance  
Photo credit: Pfluegl 2023

## EGU24: numbers at a glance (as of 4 April 2024)

### EGU Division/PG affiliation of paid registrations

(note: a participant can choose more than one division of affiliation)



## EGU24: numbers at a glance (as of 29 March 2024)

- **1,025 active sessions** (+11% EGU23):
  - 675 division-led sessions, of which 42 are ITS sessions
  - 17 Education and Outreach Sessions (EOS) + GIFT workshop
  - 61 Short Courses + 2 Artist in Residence workshops
  - 39 Medal and Award Lectures
  - 6 Union Symposia and 10 Great Debates
  - 152 Townhall & Splinter meetings scheduled
- **ECS Networking, Science for Policy, and EDI Committee events**

*Around 2/3 of sessions are scientific sessions and 1/3 other activities*

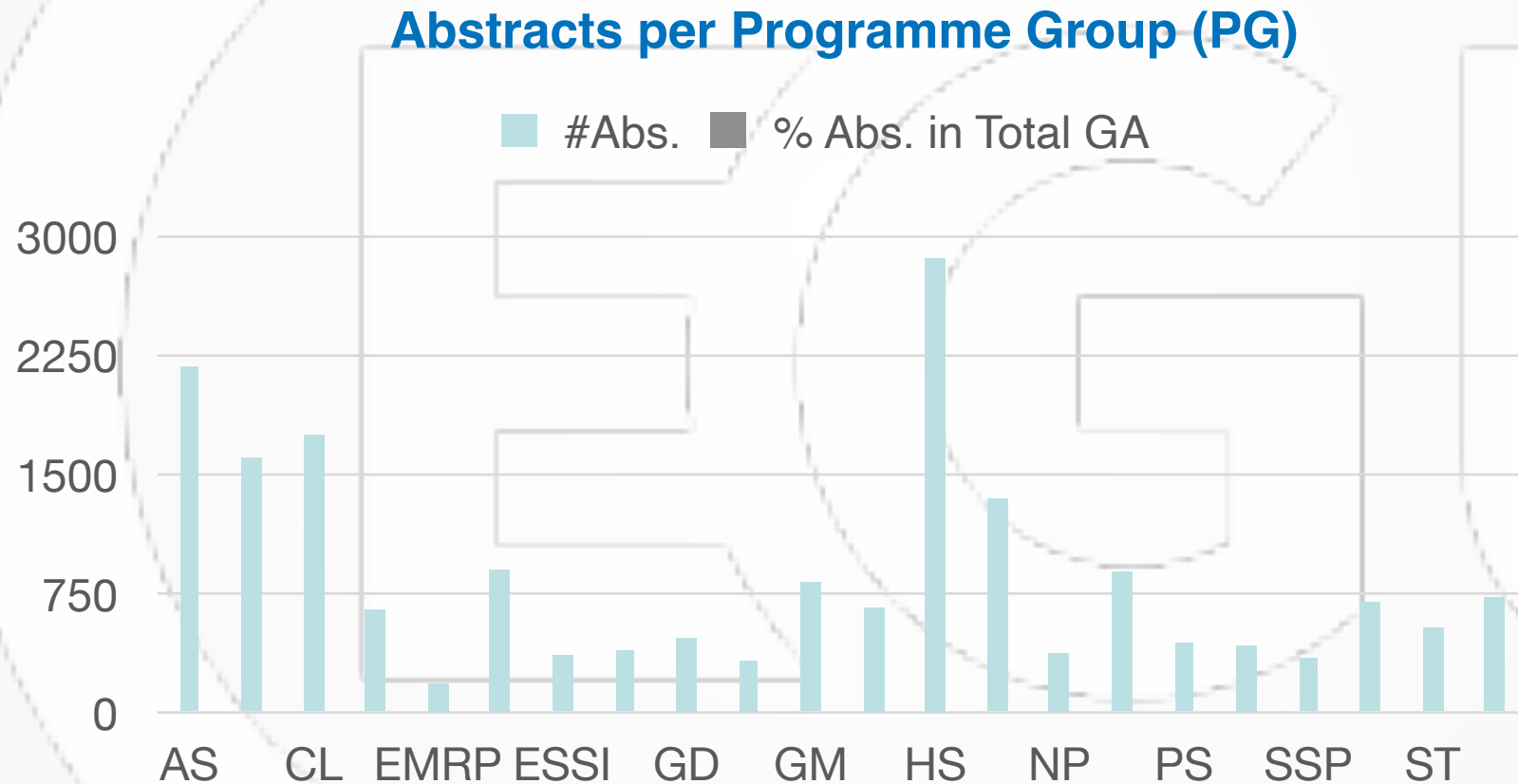


EGU23 oral presentation  
Photo credit: Pfluegl 2023

More on: <https://www.egu24.eu/>



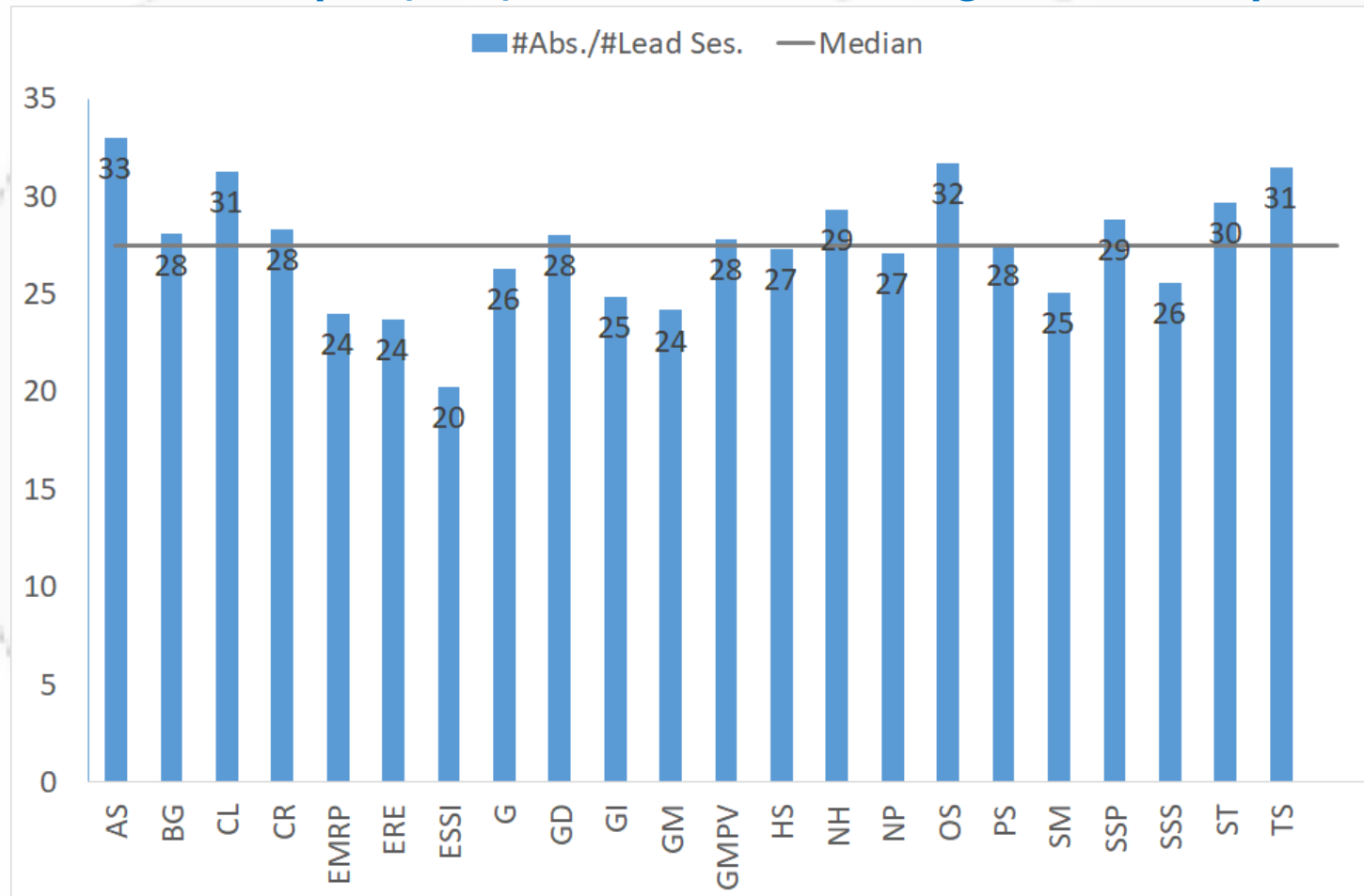
## EGU24: numbers at a glance



(as of 24 March 2024)

## EGU24: numbers at a glance

### Abstracts per (lead) session in each Programme Group



(as of 24 March 2024)



# Union Symposia

different topics during all the  
week

#EGU24





# Great Debates

different topics during all the  
week

**#EGU24**





# **EGU Award & Medal Celebration**

**Wednesday 17 April,  
17:30-19:30 CEST**

**#EGU24**

**Room E1**



# Head on over to the EGU Booth!

- Learn about EGU activities
- Meet members of the EGU Council & Committees
- Cast your vote for the photo competition
- Browse through EGU merchandise... and more!





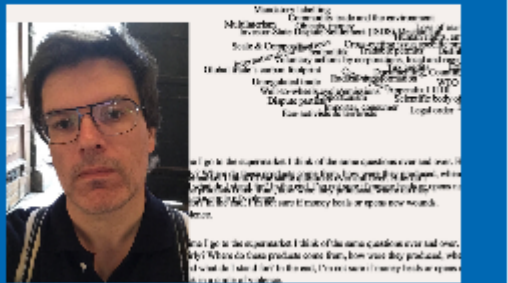
# Art-Science offerings at EGU24

## EGU24 Artists in Residence

visit their booths in Foyer D!

Ilias Tsagas

Poet



Lucía Pérez-Díaz

Illustrator




Mon, Tues, Thurs & Fri  
18:00-20:00 in room E1

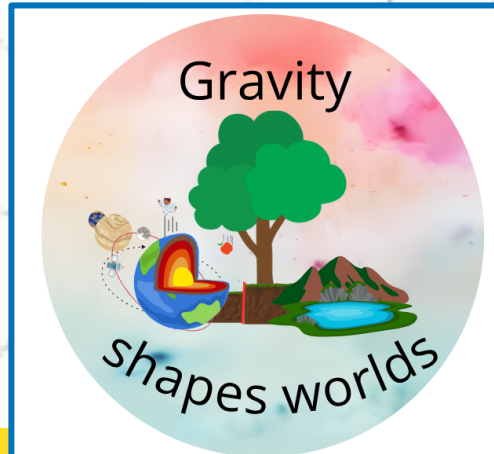
Art-Science sessions at EGU24:



## EGU24 artists raising awareness of EDI in the Geosciences

learn more at their booth in Hall X2!

**Nkosingiphile Mazibuko**  
Iziko Museums of South Africa



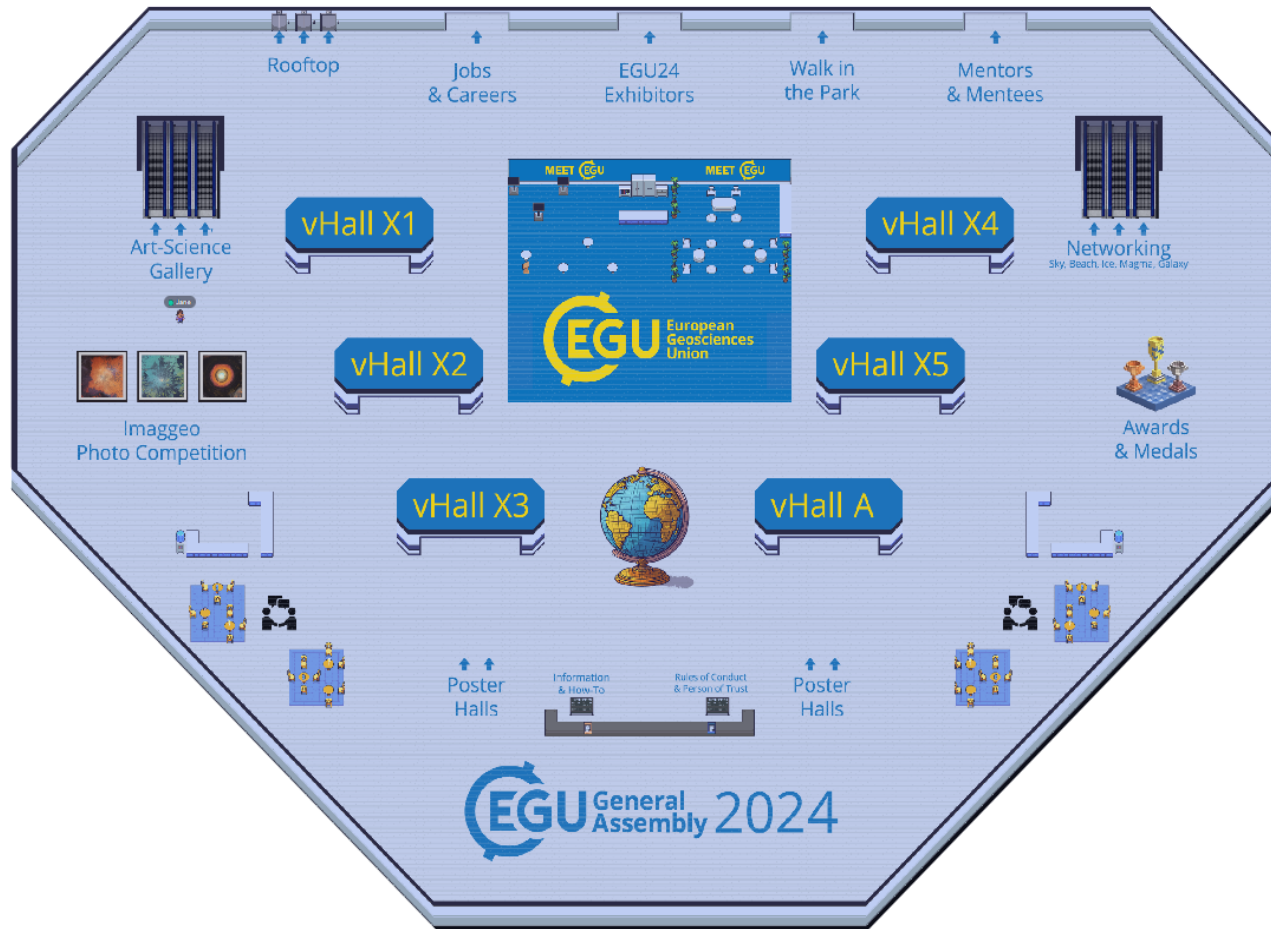
## Childcare Art Exposition



growing gallery located in entrance of Hall X1

Divisions represented:  
G, GD, PS

# Stop by the EGU24 Gather.Town!



- Spatial video-conferencing platform available to all EGU24 registered participants
- Used for **virtual posters** during timeblock 3, networking & more
- Custom design inspired by the Austria Center Vienna!



## Training schools



Photo credit: [V. De Micco, 2024](#)

The EGU provides **financial support** to training school organisers in order to facilitate participation of early career scientists and/or to support the quality of the school through field trips or by inviting exceptional lecturers.

Learn more at  
[www.egu.eu/meetings/training-schools](http://www.egu.eu/meetings/training-schools)





## Union Awards - Outreach

The EGU has several awards celebrating excellent practices that complement purely scientific achievements:

- **Angela Croome Award** for Earth, space and planetary sciences journalism
- **Champion(s) for Equality, Diversity and Inclusion Award** for significant contributions in advancing the values of EDI in the geoscience community
- **Katia and Maurice Krafft Award** for Geoscience outreach and engagement

Please **consider nominating** your colleagues / journalists you have worked with who may be worthy recipients of these awards. Attend the Award Lectures to see the excellent practice being celebrated this year.

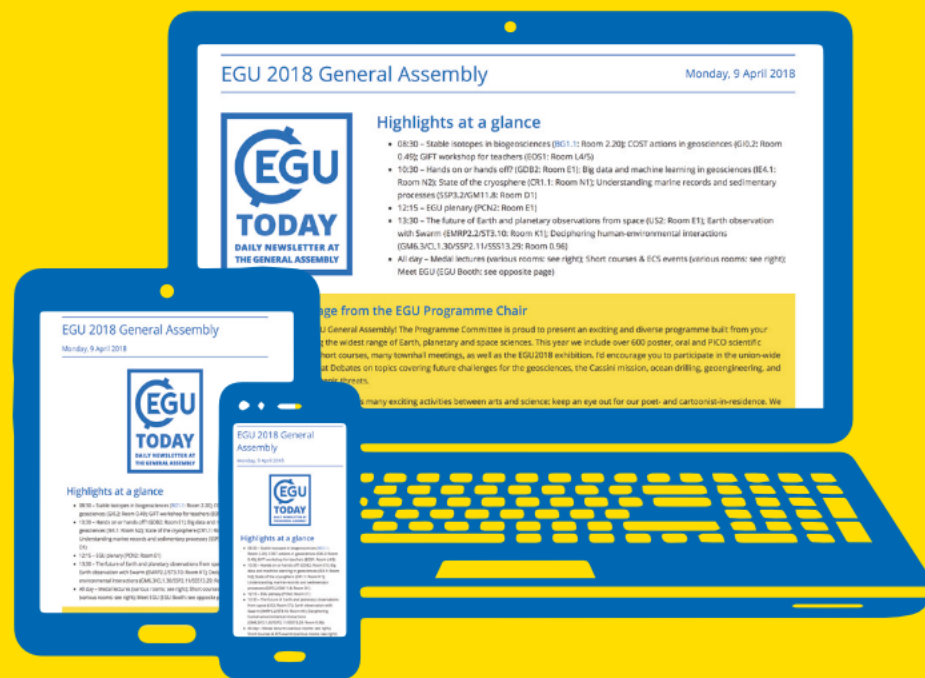


## The Daily Newsletter at the General Assembly

# EGU TODAY IS NOW DIGITAL!



[www.egu.eu](http://www.egu.eu) | [info@egu.eu](mailto:info@egu.eu)



All issues of the newsletter  
will be made available at

[www.egu.eu/egutoday/](http://www.egu.eu/egutoday/)

through the conference app  
and on screens inside the ACV.

# Did you know the EGU has a monthly newsletter?



[www.egu.eu](http://www.egu.eu) | [info@egu.eu](mailto:info@egu.eu)



The email newsletter  
informs EGU members about

- EGU NEWS AND BLOGS
- GENERAL ASSEMBLY UPDATES
- HIGHLIGHTS FROM EGU JOURNALS
- JOBS AND MEETINGS

and much more!



[www.egu.eu/newsletter](http://www.egu.eu/newsletter)





# Open Access Publications



- Open Access Journals
- Interactive Public Peer Review



[www.egu.eu/publications](http://www.egu.eu/publications)



A scenic landscape featuring a waterfall cascading over rocks into a pool of water. The background shows a wide, flat expanse, possibly a dry lake bed or a vast plain, under a cloudy sky. A large, bright yellow speech bubble is overlaid on the right side of the image, containing the text 'Please Give Us Feedback!'.

**Please  
Give Us  
Feedback!**

**[egu24.eu/feedback](https://egu24.eu/feedback)**

# Division on Nonlinear Processes in Geosciences

## **(4) NP activities at EGU24**



# NP – Nonlinear Processes in Geosciences


Programme Group Chairs: François G. Schmitt , Reik Donner 

- NP1 – Mathematics of Planet Earth
- NP2 – Dynamical Systems Approaches to Problems in the Geosciences
- NP3 – Scales, Scaling and Nonlinear Variability
- NP4 – Time Series and Big Data Methods
- NP5 – Predictability
- NP6 – Turbulence, Transport and Diffusion
- NP7 – Nonlinear Waves
- NP8 – Emergent Phenomena in the Geosciences

MAL27-NP

**Lewis Fry Richardson Medal Lecture by Annick Pouquet and NP Division Outstanding ECS Award Lecture by Simone Benella**



Convener: François G. Schmitt 

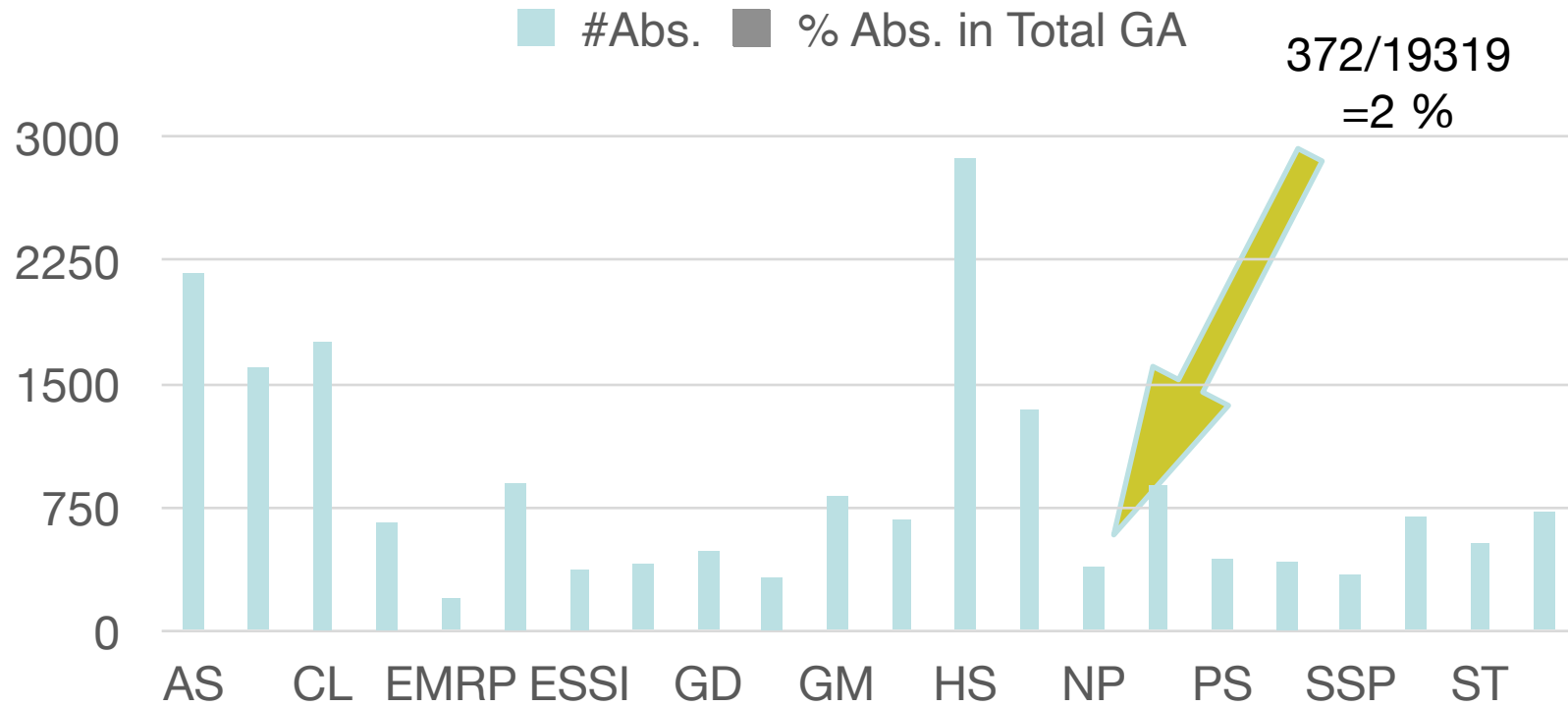
▶ Orals  | Tue, 16 Apr, 19:00–20:00 (CEST)  Room -2.91

DM14

**Division meeting for Nonlinear Processes in Geosciences (NP)**

Convener: François G. Schmitt 

 Tue, 16 Apr, 12:45–13:45 (CEST)  Room -2.16



NP is among the small divisions  
(but not the smallest)

Thanks to all NP conveners for the organization, and to participants for display materials

## PG abstract statistics

Active scheduled	<b>All</b>	915
Granted supports	None: ECSTS:	913 (100%) 0 (0%)
Presentations	Orals:	447 (49%)
	Posters on site:	406 (44%)
	Posters virtual:	29 (3%)
	PICO:	33 (4%)
Author identification specifics	ECS:	541 (59%)

Active scheduled	<b>NP lead</b>	372
Granted supports	None: ECSTS:	370 (99%) 0 (0%)
Presentations	Orals:	180 (48%)
	Posters on site:	164 (44%)
	Posters virtual:	16 (4%)
	PICO:	12 (3%)
Author identification specifics	ECS:	216 (58%)

## NP leading and co-organized sessions

	Abstracts	Sessions
<b>NP lead</b>	372	11
<b>Co-organised by NP</b>	543	19
<b>ITS associated with NP</b>	92	3
<b>total</b>	1007	33

+92 abstracts in the 3 ITS NP sessions

5% of abstracts

5% of sessions (total 675)

NP lead: **2 %** of all abstracts

NP lead+ ITS NP session: **464** abstracts **2.4%** of all abstracts

NP lead + NP co-organizing+ITS NP: **5.2%** of all abstracts








## ITS1 – Digital Geosciences

ITS1.5/NP8.6 **EDI** 








**Urban Geo-sciences: modelling and monitoring complex urban systems; from the state of the art to planning challenges** ▶

Co-organized by ERE6

Convener: Maider Llaguno-Munitxa  | Co-conveners: Tim Kearsley , Francesco La Vigna , Danlu Cai <sup>ECS</sup> , Daniel Schertzer , Gabriele Manoli , Ting Sun 

ITS1.11/NP4.2 **EDI** 

**Many shades of causality analysis in Earth Sciences: Methods, challenges and applications** ▶

Convener: Milan Palus  | Co-conveners: Aditi Kathpalia , Marlene Kretschmer <sup>ECS</sup> , Evgenia Galytska <sup>ECS</sup> , Rebecca Herman <sup>ECS</sup> , Fernando Iglesias-Suarez <sup>ECS</sup> , Stéphane Vannitsem 

## ITS2 – Impacts of Climate and Weather in an Inter-and Transdisciplinary context

## ITS3 – Environment and Society in Geosciences

## ITS4 – Risk, Resilience and Adaptation

*NP lead in 3 ITS sessions*

ITS4.3/NP1.2

**Tipping Points in the Earth System** ▶

Convener: Niklas Boers  | Co-conveners: Ricarda Winkelmann , Anna von der Heydt , Timothy Lenton 

## ITS5 – General ITS sessions

# NP division structure

<https://www.egu.eu/np/structure/>



<b>President</b>	François Schmitt ✉
<b>Deputy President</b>	Reik Donner ✉
<b>Programme Group Chair</b>	François Schmitt ✉
<b>Science Officers</b>	Tommaso Alberti ✉ NP1: Mathematics of Planet Earth
	Christian Franzke ✉ NP2: Dynamical Systems Approaches to Problems in the Geosciences
	Ioulia Tchiguirinskaia ✉ NP3: Scales, Scaling and Nonlinear Variability
	Reik Donner ✉ NP4: Time Series and Big Data Methods
	Olivier Talagrand ✉ NP5: Predictability
	<b>Yuliya Troitskaya ✉</b> NP6: Turbulence, Transport and Diffusion
	Julien Touboul ✉ NP7: Nonlinear Waves
	Henk Dijkstra ✉ NP8: Emergent Phenomena in Geosciences

No activity no response for a long time  
Replacement proposed (after a call among NP6 conveners: **Jezebel Curbelo**)

<b>Publications</b>	Daniel Schertzer ✉
<b>Scientific Affairs</b>	Davide Faranda ✉
<b>ECS Representative</b>	Mireia Ginesta ✉
<b>Webmaster</b>	Auguste Gires ✉

## Jezebel Curbelo



[Universitat Politècnica de Catalunya - Departament de Matemàtiques](#)

[IMTech. Institute of Mathematics of UPC-BarcelonaTech](#)

[Centre de Recerca Matemàtica](#)

ETSEIB. Escola Tècnica Superior d'Enginyeria Industrial de Barcelona  
AVDA. DIAGONAL, 647,  
EDIFICI H. Office: 3.35  
08028 BARCELONA  
SPAIN

E-mail: [jezebel.curbelo\[at\]upc.edu](mailto:jezebel.curbelo[at]upc.edu)

Co-convener of NP6.3 at EGU24  
Editor of NPG

## Election of the new NP division president

Present term: for 2021-2025 (F. Schmitt). Already two terms: no third term.

Two candidates, election in fall 2023.

Davide Faranda elected new NP division president.



Davide Faranda

CNRS Research professor  
LSCE, Paris

Year	EGU 2023 - EGU 2024	EGU 2024 - EGU 2025	EGU 2025 - EGU 2026	EGU 2026 - EGU 2027
NP president	Francois Schmitt	Francois Schmitt	Davide Faranda	Davide Faranda
NP deputy president	Reik Donner	Davide Faranda	François Schmitt	?

« president elect »

previous president is  
deputy-president during  
one year



# Division on Nonlinear Processes in Geosciences

## **(4) NP Early Career Scientists activities**

by Mireia Ginesta-Fernandez (ECS representative, NP division)  
and Angel Garcia-Gago (ECS deputy representative)



## Early Career Scientists activities

ECS Representative: Mireia Ginesta

Deputy ECS Representative: Angel Garcia-Gago



# Updates from last GA – Blog

<https://blogs.egu.eu/divisions/np/>

## NEWS

Bridging Science and Society: FutureMed's Transdisciplinary Approach to Tackling Climate Change in the Mediterranean

Davide Faranda · November 10, 2023

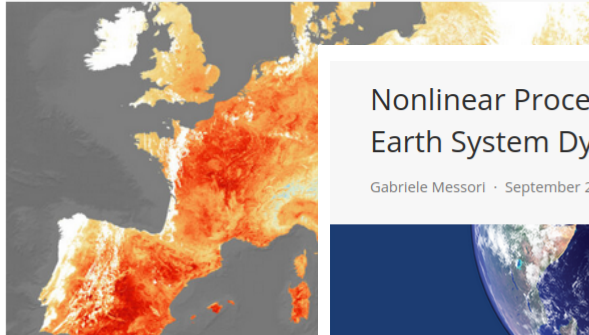


Group Picture taken during the first meeting of the COST Action Future Med in Bruxelles on October 6th 2023

## ECS SpotLight

ECS SpotLight: The link between European warm-temperature extremes and atmospheric persistence

Emma Holmberg · September 11, 2023



## Sites of interest

Nonlinear Processes in Earth System Dynamics

Gabriele Messori · September 27, 2023



Earth System Dynamics

[www.earth-system-dynamics.net](http://www.earth-system-dynamics.net)

ClimaMeter: Putting Extreme Weather in Climate Perspective

Davide Faranda · September 21, 2023



## NP Interviews

Interviews with Women in Nonlinear Processes in Geosciences: Exploring Inspiration and Challenges

Mirela Ginesta-Fernandez · February 11, 2024 · EGU Divisions, Nonlinear Processes in Geosciences, Outreach, Science Communication, Uncategorized · No Comments

- Prof. Bérengère DUBRULLE**  
 "I am working on devising new models of turbulence, that are capable of (i) capturing extreme events and spontaneous bifurcations and (ii) run in sober conditions, that is using low memory and low CPU"


- Dr. Vera Melinda GALFI**  
 "My research focuses on weather and climate extreme events and the related atmospheric circulation anomalies"


- Dr. Giorgia DI CAPUA**  
 "I work with large-scale atmospheric circulation dynamics and causal discovery tools. In particular I study tropical extra-tropical teleconnections between mid-latitude wave trains and the Indian summer monsoon"


- Dr. Meriem KROUMA**  
 "I am a Postdoctoral researcher at Uppsala University. I work mainly on the predictability of compound extreme climate events"


- Anupama K XAVIER**  
 "I'm currently studying the predictability of blocking events in an idealized land-atmosphere coupled model at the Royal Meteorological Institute of Belgium, utilizing tools like Lyapunov exponents"

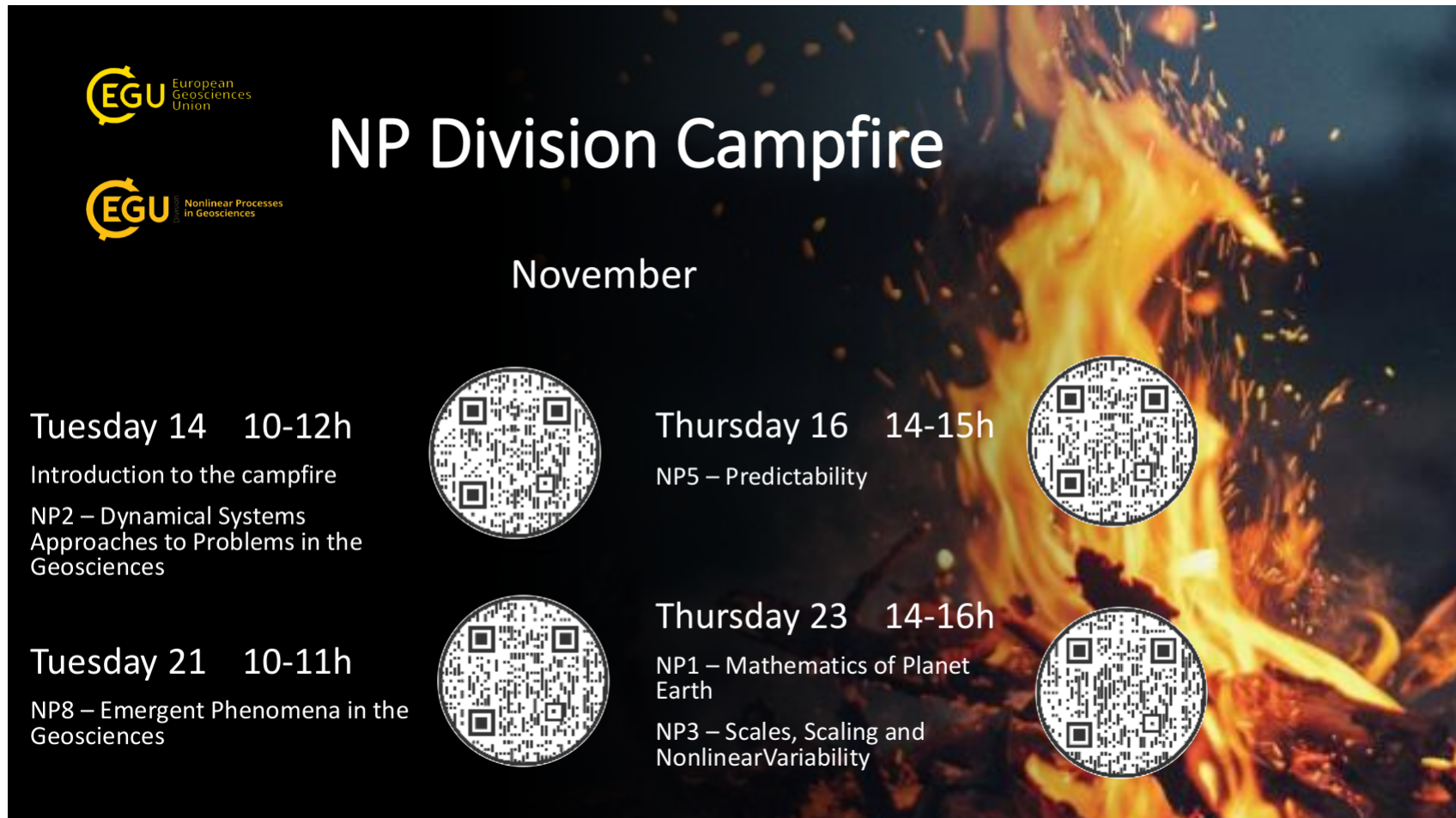


**Posting frequency: 1 post per month**



# Updates from last GA – Campfires

## NP Campfires 2023



The poster features a background image of a campfire with bright orange and yellow flames and rising smoke. In the top left corner, there are two logos: the EGU European Geosciences Union logo and the EGU Nonlinear Processes in Geosciences logo. The main title 'NP Division Campfire' is centered in a large white font, with 'November' centered below it. The schedule is organized into four quadrants, each containing a date, time, topic, and a circular QR code.

**EGU** European Geosciences Union

**EGU** Nonlinear Processes in Geosciences

# NP Division Campfire

## November

**Tuesday 14 10-12h**  
Introduction to the campfire  
NP2 – Dynamical Systems  
Approaches to Problems in the Geosciences

**Tuesday 21 10-11h**  
NP8 – Emergent Phenomena in the Geosciences

**Thursday 16 14-15h**  
NP5 – Predictability

**Thursday 23 14-16h**  
NP1 – Mathematics of Planet Earth  
NP3 – Scales, Scaling and Nonlinear Variability

# Updates from last GA – EGUsphere

- preprints in the domain of Earth, Space, and Planetary sciences in a diverse, inclusive, and systematic collection of contributions



The EGU interactive community platform

[Home](#) [ABSTRACTS & PRESENTATIONS](#) [PREPRINTS](#) [ABOUT](#) [Share](#)



**APPLY AS MODERATOR**

## FOLLOW US ON SOCIAL MEDIA



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[https://www.instagram.com/egu\\_np/](https://www.instagram.com/egu_np/)



JOIN OUR team of ECS to manage social media, blog, campfires, EGU-related activities

New ideas are more than welcome



# Division on Nonlinear Processes in Geosciences

## **(5) NP Scientific Affairs**

by Davide Faranda (NP Scientific Affairs officer)

# NP Scientific Affairs

The EGU NP blog is open for your contributions!

## Nonlinear Processes in Geosciences

### Interviews with Women in Nonlinear Processes in Geosciences: Exploring Inspiration and Challenges

Mireia Ginesta-Fernandez · February 11, 2024

**Prof. Bérengère DUBRULLE**  
"I am working on devising new models of subinertia, that are capable of (i) capturing extreme events and spontaneous bifurcations and (ii) run in sober conditions, that is using low memory and low CPU"

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**Anupama K. XAVIER**  
"I'm currently studying the predictability of blocking events in an idealized land-atmosphere coupled model at the Royal Meteorological Institute of Belgium, utilizing tools like Lyapunov exponents"

Brief description of their current research.

In celebration of Women in Science day, we delve into the experiences and insights of five accomplished women scientists in the field of Nonlinear Processes in Geosciences: Prof. Bérengère Dubrulle, Dr. Vera Melinda Galfi, Dr. Giorgia di Capua, Dr. Meriem Krouma, and Anupama K Xavier. Through a series of interviews, these women share their journeys, addressing challenges faced as women in science, ... [\[Read More\]](#)

### Bridging Mathematics and Climate Science: the AMS MRC programme for June-July 2024

Davide Faranda · November 27, 2023



The American Mathematical Society's Mathematics Research Communities (MRC) continues to be a beacon for early-career mathematicians seeking professional development. This esteemed program offers opportunities to hone collaborative research skills, cultivate networks within active research domains, and benefit from mentorship by leaders in the field. As part of the MRC initiative, the upcoming conf ... [\[Read More\]](#)

with  
SIAM, APS and AGU  
colleagues Ongoing  
Brainstorming

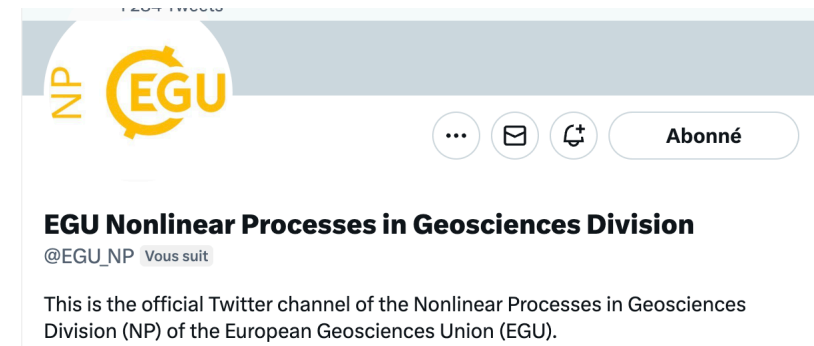
Please do not forget  
to fill-up your OSPP Commitments

### How does a judge form look?

Your evaluation form per assigned abstract can be accessed from the table above and should be opened once you have evaluation criteria and comment boxes are as follows:

Scientific content	0 very poor   5 average   8 very good   10 outstanding
Correctness of methods and information	
Significance of the work	
Originality and creativity of the approach	
Conclusions supported by data and analysis	
Author's knowledge of the subject matter and comprehension of prior research in the field	
Presentation technique	0 very poor   5 average   8 very good   10 outstanding
Organization and logical structure	

Join the EGU NP Social Media. @EGU\_NP



EGU NP

**EGU Nonlinear Processes in Geosciences Division**  
@EGU\_NP · Vous suit

This is the official Twitter channel of the Nonlinear Processes in Geosciences Division (NP) of the European Geosciences Union (EGU).

## **(6) NPG journal reports and news**

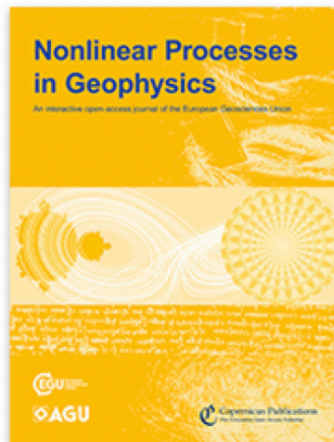
by Daniel Schertzer (executive editor)





Home

Search



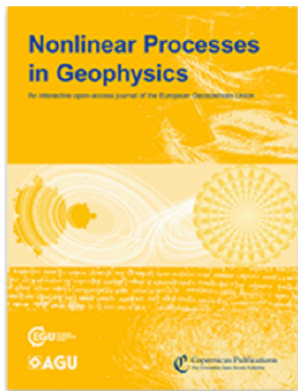
Executive editors: Christian Franzke, Ana M. Mancho, Daniel Schertzer, Olivier Talagrand & Stéphane Vannitsem

eISSN: NPG 1607-7946, NPGD 2198-5634

Nonlinear Processes in Geophysics (NPG) is an international, inter-/trans-disciplinary, non-profit journal devoted to breaking the deadlocks often faced by standard approaches in Earth and space sciences. It therefore solicits disruptive and innovative concepts and methodologies, as well as original applications of these to address the ubiquitous complexity in geoscience systems, and in interacting social and biological systems. Such systems are nonlinear, with responses strongly non-proportional to perturbations, and show an associated extreme variability across scales.

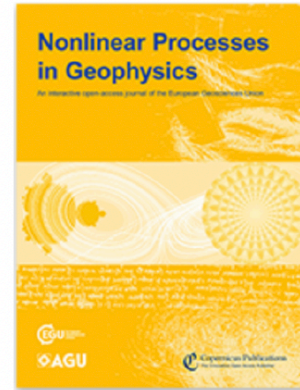
All sections of NPG are more than ever eager to deal with big data and artificial intelligence with new

# Improving NPG



- NPG: the open-access journal of innovative concepts and methodologies in geosciences
  - Nonlinear Processes in Geophysics (NPG) is an international, inter-/trans-disciplinary, non-profit journal devoted to breaking the deadlocks often faced by standard approaches in Earth and space sciences. It therefore solicits disruptive and innovative concepts and methodologies, as well as original applications of these to address the ubiquitous complexity in geoscience systems, and in interacting social and biological systems. Such systems are nonlinear, with responses strongly non-proportional to perturbations, and show an associated extreme variability across scales.
  - All sections of NPG are more than ever eager to deal with big data and artificial intelligence with new sensing, analysis, and simulation technologies. These **encompass approaches ranging from data-driven research to mathematical physics.**
  - NPG is published by the EGU and is a partner journal of the AGU. It is open-access with a public discussion stage to ensure a more objective review process. NPG maintains sections for research articles, review articles, comments and replies, book reviews, and fast-track NPG Letters. NPG Letters are short papers with a strong impact. Authors are strongly encouraged to consider publishing in this section.

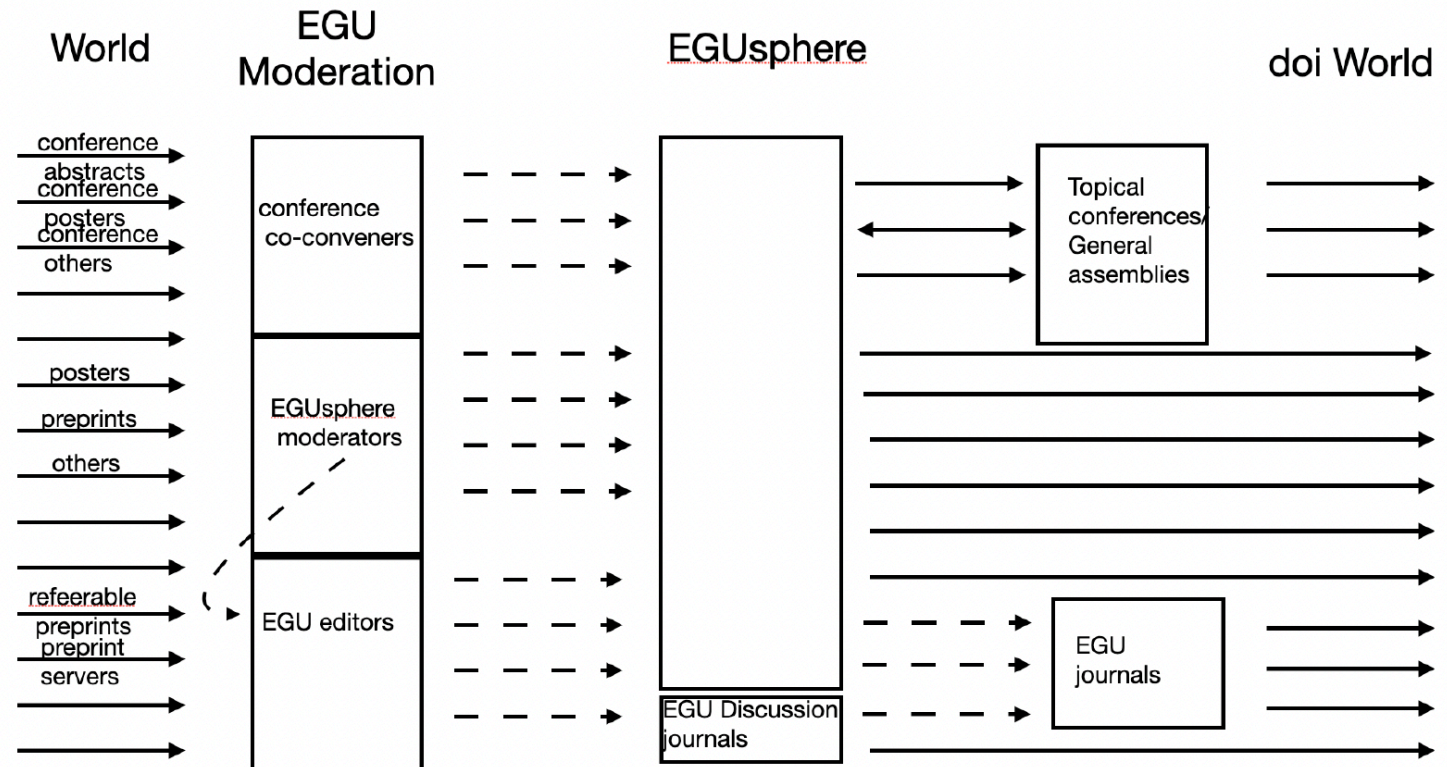




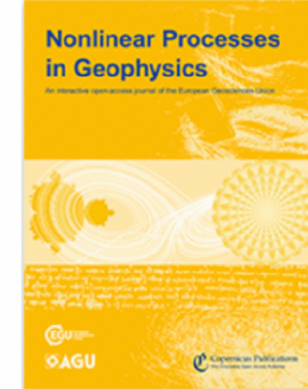
## EGUsphere

- is an interactive community platform and pre-print server for the EGU
- holds pre-print publications, but also abstracts and uploaded presentations from the EGU General Assembly and other EGU meetings (e.g. Conference Series)
- is accessible at <https://www.egusphere.net>

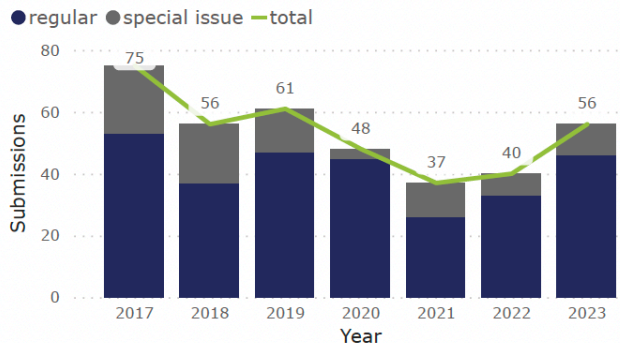
## Do we keep two submission channels?



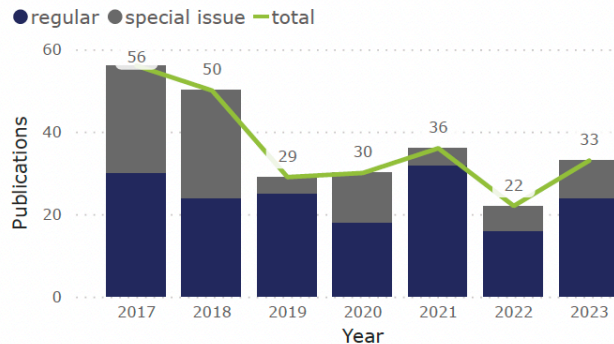




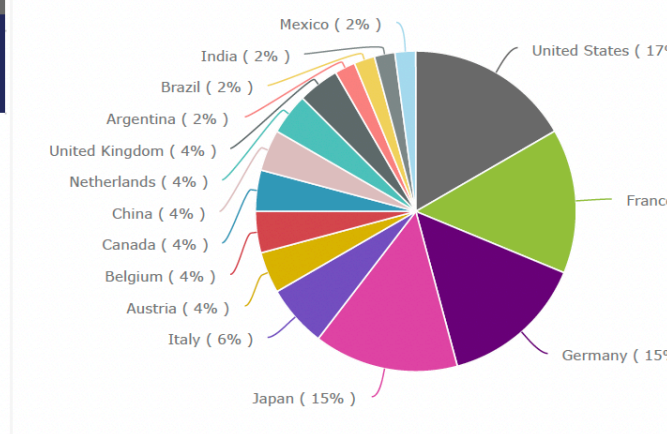
Manuscripts submitted by year of submission



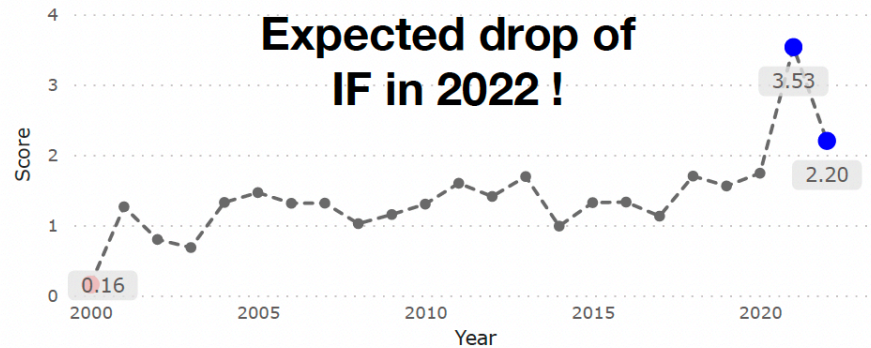
Articles published by year of publication



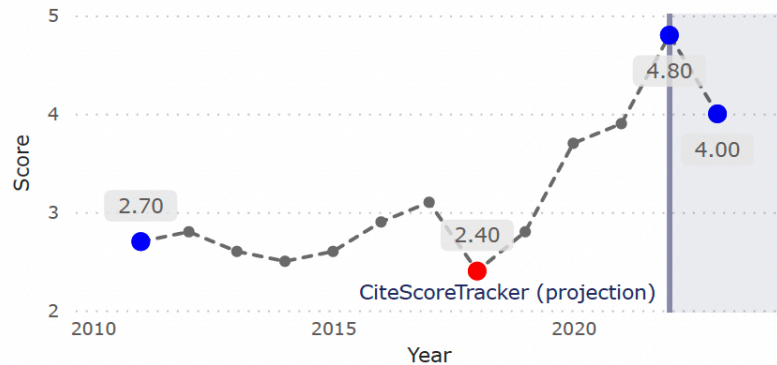
Share of publications (report year)



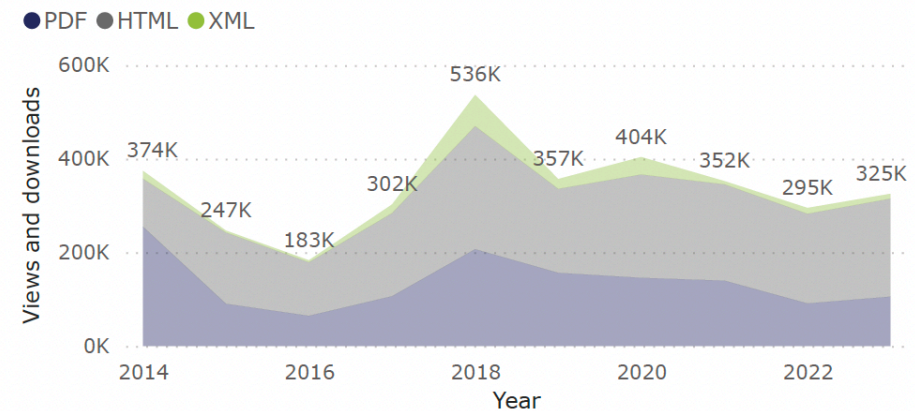
JIF (Clarivate)



CiteScore (Elsevier)



Views and downloads by year and filetype (article + preprint)



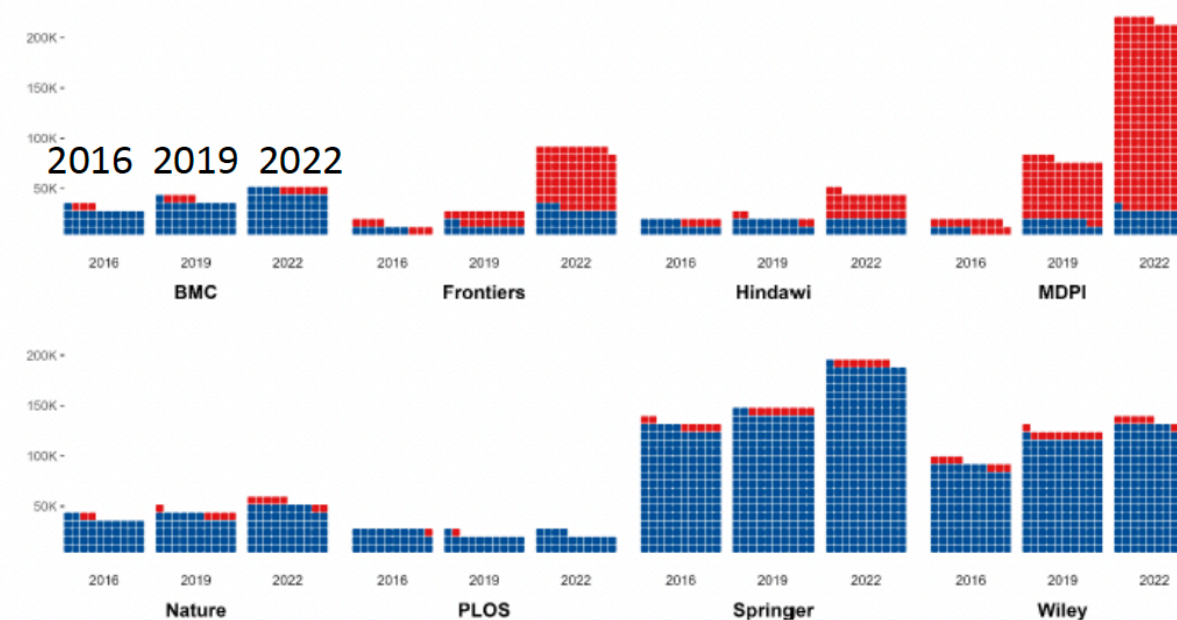
- Towards “diamond open access”?
- present APC scheme: 77/93 €/page for Latex/Word and APC waivers  $\approx$  10% of the previous year's page budget
  - > 3 flat rates in € + reductions: disadvantaged country reduction (50%) + IA /EGU membership (10%) + APC waivers,
  - e.g. NPG Letters: **810€/405€/0€** (-10%) !!



# Innovations

Number of papers published in **regular** vs **special** issues, 2016-22

One square = 800 articles



Source: data scraped from the publisher's webs  
Note: Special issues are called Collections at PLOS and Topics at Frontiers. For MDPI Collections, Sections and Topics not show

- Introduction of “collections”: complements/substitutes to SIs
  - partly against predatory publishers
- co-reviewing: senior + junior reviewers
  - EGU Peer Review training 2024
- 6 new NPG editors and a new executive editor



Simply, and resolutely, nonlinear!

*Thank you* very much  
for a great **30** years.

**Journal Reception**  
**Tuesday 20:00–21:00**  
**Room -2.97** ■

# Conclusion

- EGU journals are transparent, not-for-profit, international, scientific journal dedicated to the publication and public discussion of studies investigating Earth's system.

