

NP Division Meeting

European Geosciences Union

Davide Faranda



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NP Division Meeting Agenda

- 1. Overview of the EGU 2025 General Assembly**
- 2. NP Division structure, New Governance and Activities**
- 3. Early Career Scientist Activities (by Mireia Ginesta)**
- 4. Awards and Medals**
- 5. Nonlinear Processes in Geophysics Journal (by Daniel Schertzer)**

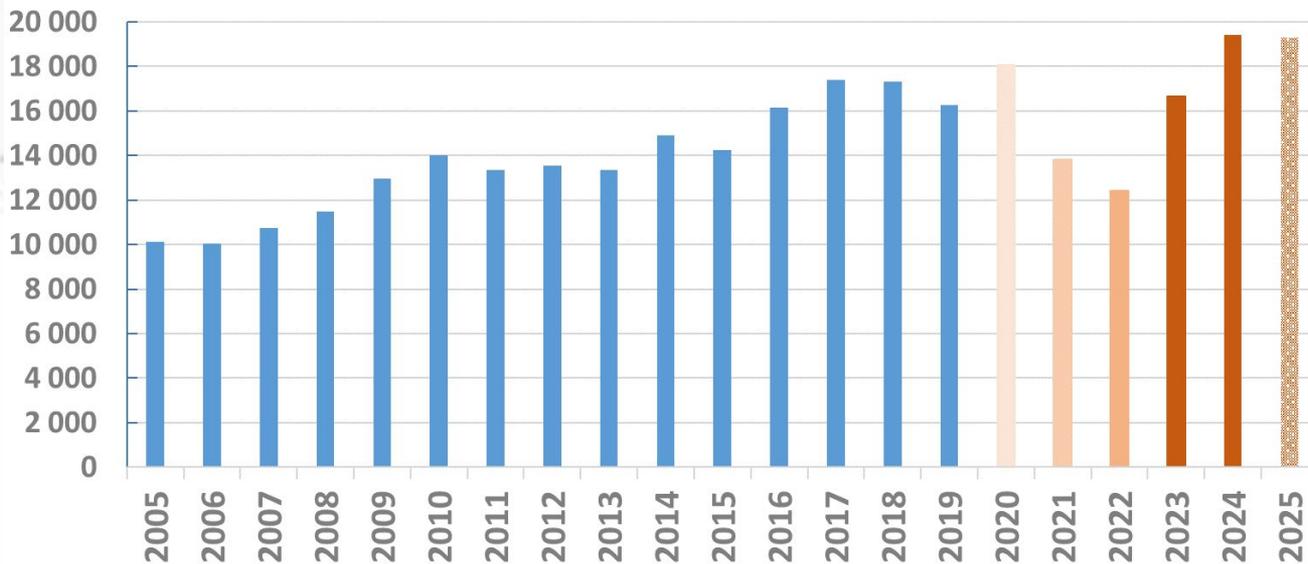
1. Overview of the EGU25 General Assembly

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EGU25 Abstract Submission Over Time



19,285 active scheduled abstracts in 2025

On-site only up to 2019

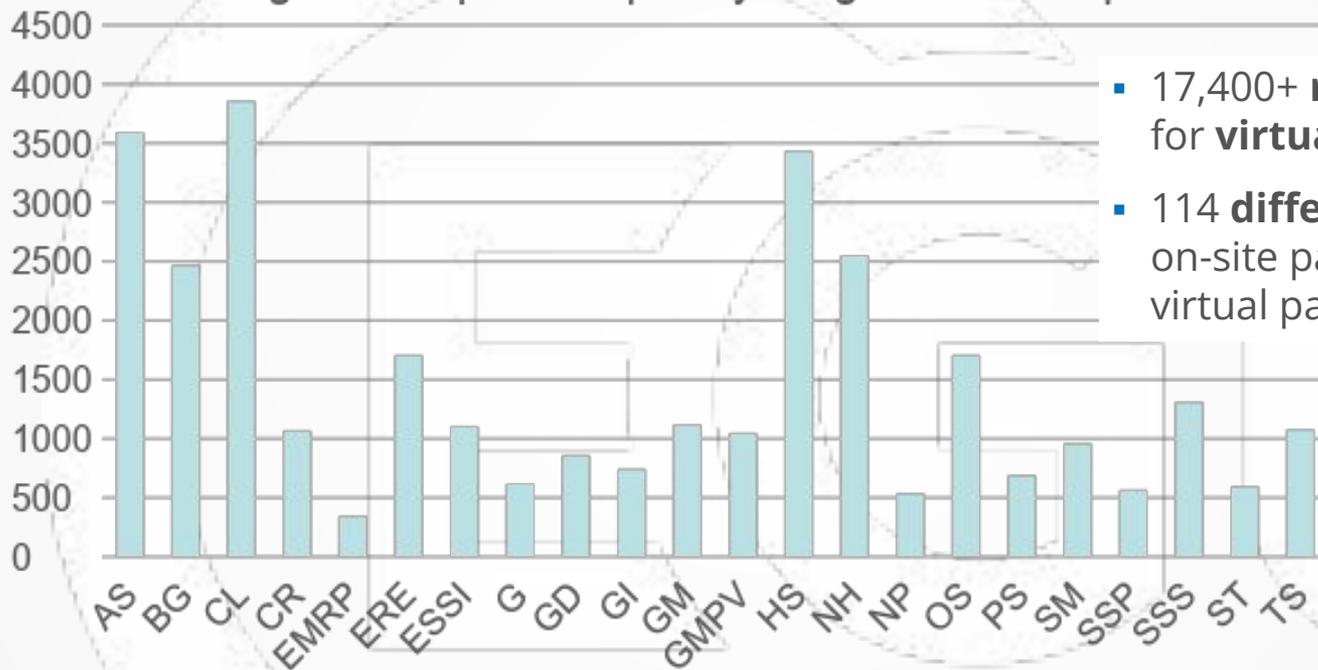
Online only

Hybrid orals only

Fully hybrid since 2023

(as of 16 April 2025)

Registration per Disciplinary Programme Group



- 17,400+ **registrations** (~8% for **virtual participation**)
- 114 **different countries** for on-site participation; 91 for virtual participation

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

(as of 16 April 2025)

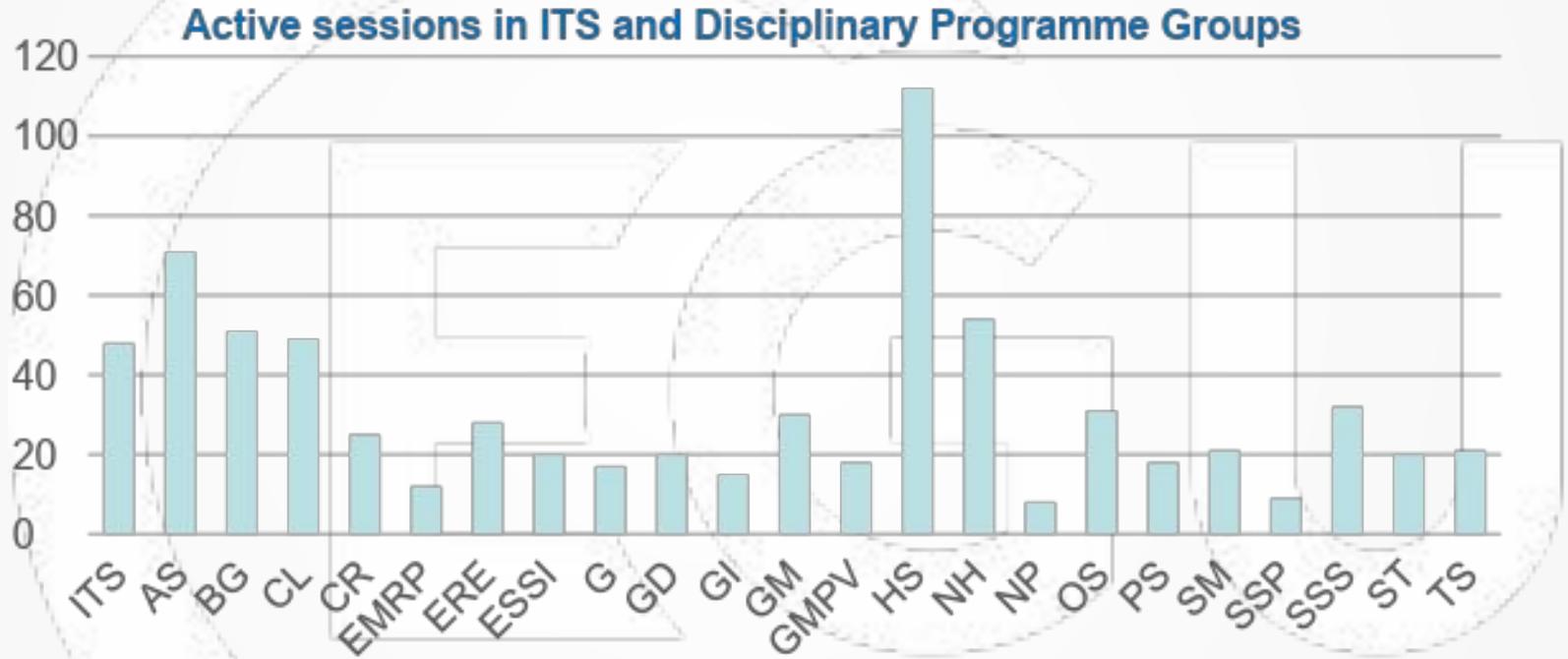
EGU25: numbers at a glance

- **1,099 active sessions** in total (+7% EGU24):
 - 730 disciplinary PG sessions, of which 48 are ITS sessions
 - 20 Education and Outreach Sessions (EOS), incl. GIFT workshops
 - 62 Short Courses + 2 Artist in Residence workshops
 - 39 Medal and Award Lectures
 - 9 Union Symposia and 9 Great Debates
 - 146 Townhall & Splinter meetings scheduled
- **ECS Networking, Science for Policy, and EDI Committee events**



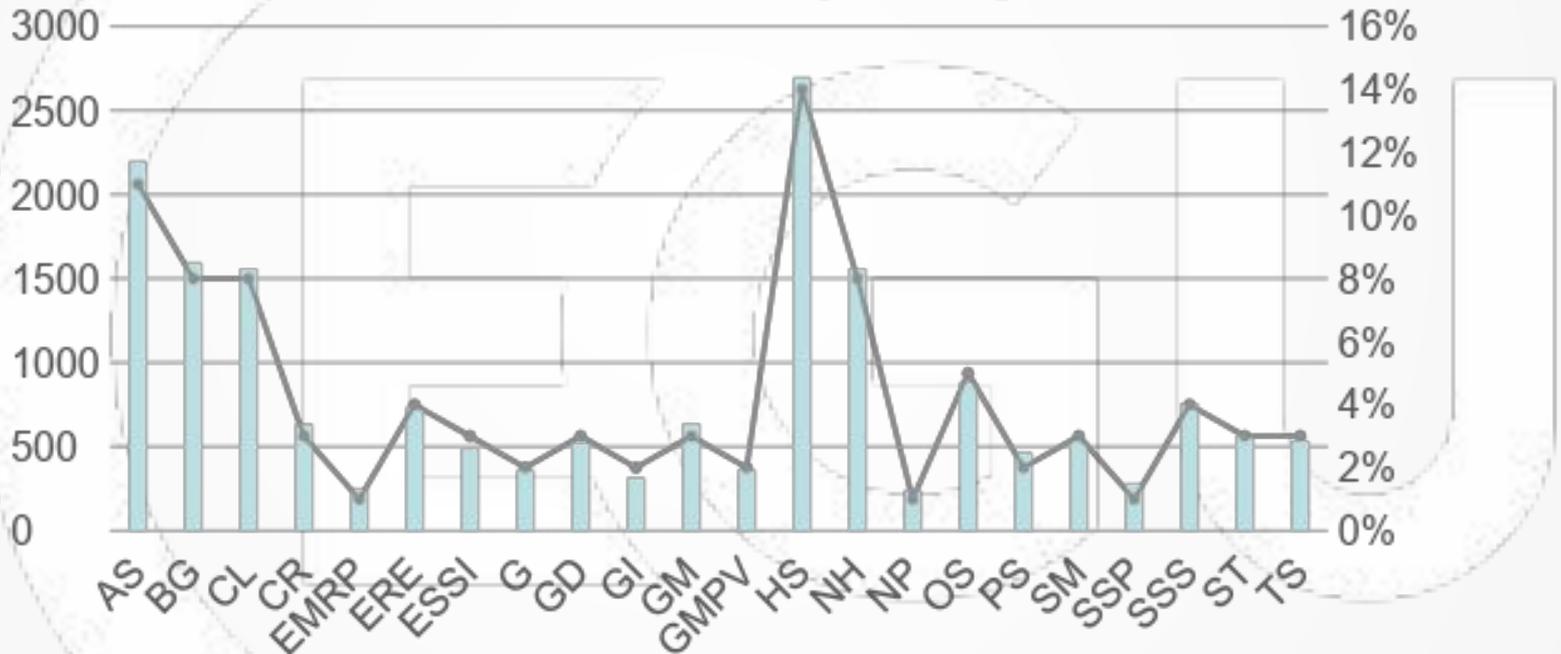
EGU23 oral presentation
Photo credit: Pfluegl 2023

More on: <https://www.egu25.eu/>



(as of 16 April 2025)

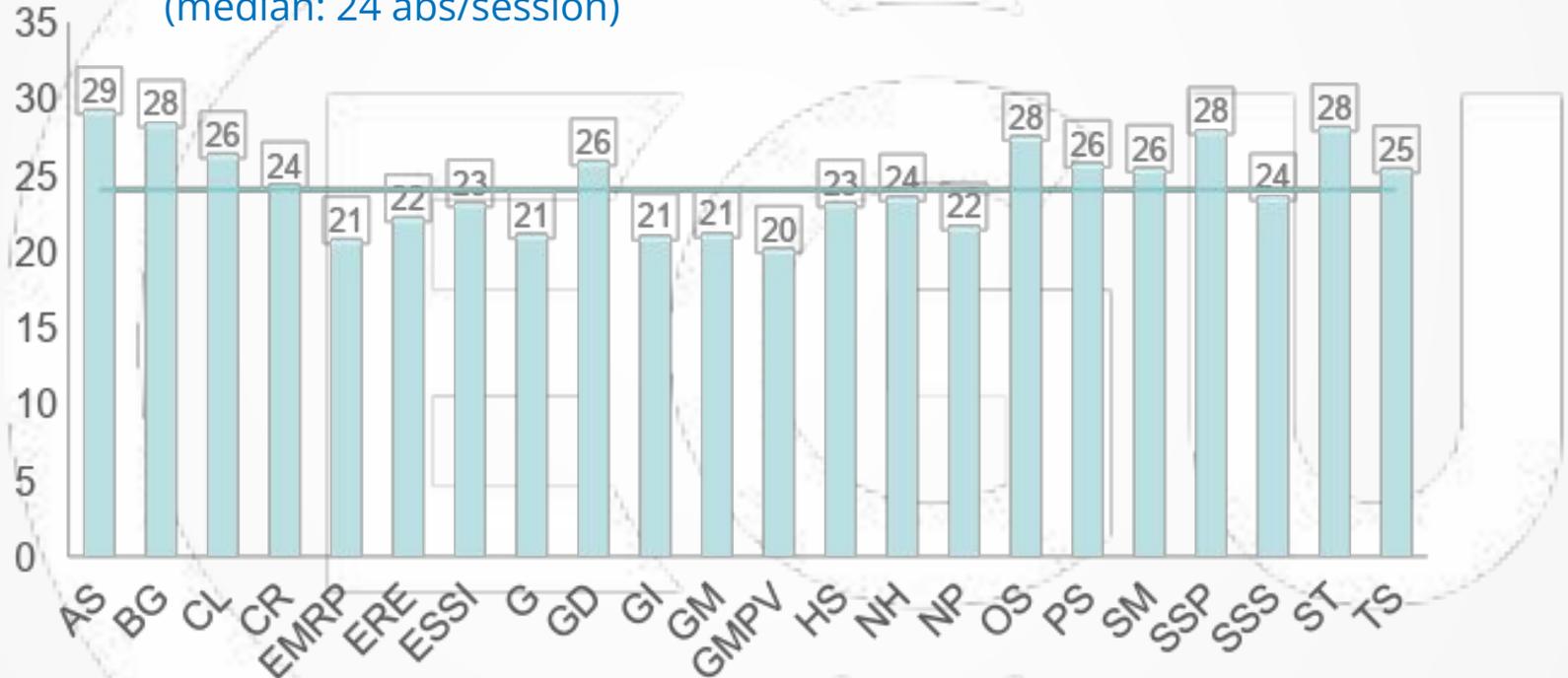
Abstracts in (lead) sessions per Programme Group (PG)



(as of 16 April 2025)

Abstracts per (lead) sessions per Programme Group (PG)

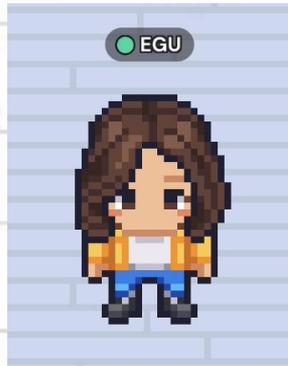
(median: 24 abs/session)



(as of 16 April 2025)

Join EGU25 online! Join the Virtual Posters

All the seats taken in a session? Missing a day for travel?



- Interactive 8-bit conference platform available to all EGU25 registered participants
- Used for **virtual posters** during timeblock 3, networking & more
- Custom design inspired by the Austria Center Vienna!

VPS19 | Poster session ESSI/GI/NP virtual posters I

[Posters virtual](#) | Attendance Tue, 29 Apr, 14:00–15:45 (CEST) | Display Tue, 29 Apr, 08:30–18:00 | vPoster spot 4

VPS20 | Poster session ESSI/GI/NP virtual posters II

[Posters virtual](#) | Attendance Fri, 02 May, 14:00–15:45 (CEST) | Display Fri, 02 May, 08:30–18:00 | vPoster spot 4



Union Symposium

**Engaging Communities in Hazard Risk
and Disaster Management: Striking a
Balance Between Top-Down and
Bottom-Up Approaches**

**Friday 2 May, 10:45–12:15 CEST
Room E1**

#EGU25



Great Debate

**How should the global geoscience
community respond to attacks
on science?**

**Friday 2 May, 16:15–18:00 CEST
Room E1**

#EGU25

The EGU online

#EGU25



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The EGU blogs

GeoLog

The Union's official blog - geolog.egu.eu

blogs.egu.eu

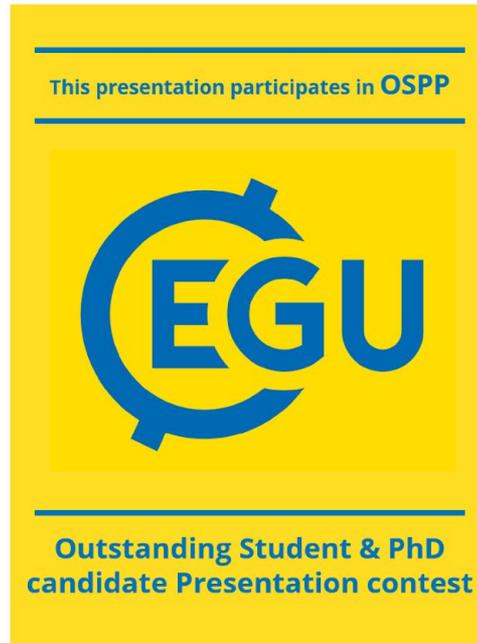
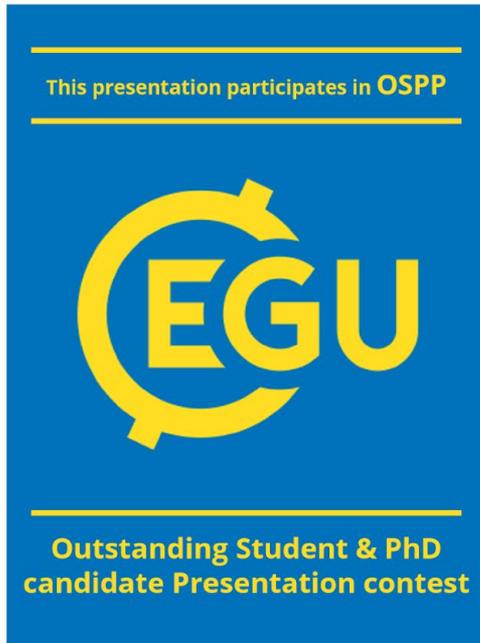
EGU Division blogs

The latest news, events, activities and research from EGU's 22 Divisions - blogs.egu.eu/division



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Outstanding Student and PhD-candidate Presentations (OSPP) are now open for judging!



If you are an OSPP judge,
look for the logos on OSPP
presentations and submit
your assessment today!

Special Activity Fund 2026

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Site search



The Special Activity Fund 2026 (SAF) is **open to applications for high-profile, 'out-of-the-box' not-for-profit activities with high visibility and large impact**, for which no funding sources in the ordinary annual EGU e.V. budget are suited and/or can be created. See [here](#) for information about EGU funding sources for training schools and topical meetings.

In principle, applications could amount to 20-25 k€, but more ambitious projects could also be considered if duly justified.

Eligibility criteria

The main applicant must currently be an EGU member. To be eligible all activities should take place in the calendar year 2026. Applications should not be aimed at financing solely research activities, any kind of activism nor at funding of personal expenses of any kind (like travel support to attend scientific meetings, etc.). Proposals therefore:

- should be related to and contribute to EGU's [goals and mission](#);
- should comply with EGU's [principles on equality, diversity and inclusivity](#);
- should comply with EGU's [code of conduct](#)
- should have a high visibility and large impact;
- should be specific and well-justified;
- could target, e.g., not-for-profit activities of, and for, under-represented or less-well-resourced communities, with a wide geographical spread that will enhance EGU's visibility;
- do not need to suggest activities directly related to the General Assembly;
- could be proposed by EGU members, Divisions, Committees and Working Groups;
- should be submitted in compliance with the digital format provided by the EGU Office.

2. NP Division Structure and Activities

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NP Division

NP Division consists of 777 members:

532 MR, 201 MS, 3 MX =< Far from Gender Balance

NP President: Davide Faranda

NP Deputy President: Francois Schmitt (Need for a New Deputy
President in one year)

ECS Representative: Mireia Ginesta-Fernandez

NP Division Structure

<p>Science Officers</p>	<p>Tommaso Alberti ✉ NP1: Mathematics of Planet Earth</p> <p>Christian Franzke ✉ NP2: Dynamical Systems Approaches to Problems in the Geosciences</p> <p>Ioulia Tchiguirinskaia ✉ NP3: Scales, Scaling and Nonlinear Variability</p> <p>Reik Donner ✉ NP4: Time Series and Big Data Methods</p> <p>Olivier Talagrand ✉ NP5: Predictability</p> <p>Jezabel Curbelo ✉ NP6: Turbulence, Transport and Diffusion</p> <p>Julien Touboul ✉ NP7: Nonlinear Waves</p> <p>Henk Dijkstra ✉ NP8: Emergent Phenomena in Geosciences</p>
<p>OSPP Co-ordinator</p>	<p>- Valerio Lembo, Vera Melinda Galfi</p>
<p>Publications</p>	<p>Daniel Schertzer ✉</p>
<p>Scientific Affairs</p>	<p>David Paranda ✉</p>

Candidate for the Scientific Affairs Officer: Valerio Lembo

Valerio Lembo, CNR-ISAC, Italy, permanent researcher since 2020

Previously: Postdoc at CEN Uni-Hamburg, Germany, 2016-2020



Roles:

- member of CMIP7 Model Benchmarking Task Team (WCRP)
- coordinator of inter-institute WG on “Science of Climate and Climate Change”, DTA-CNR

Research interests: 18 papers, 2 public datasets, 4 GitHub repositories

- thermodynamics of the climate system and its diagnosis in climate models
- energy budgets and transports in the general circulation of the atmosphere
- linear response theory and asymptotic response
- extremes and attribution
- transfer of knowledge between senior and early career researchers

New NP Division Activities

- **Regular Meetings** with NP officers, ECS and whoever is interested in contributing to NP <= Which Frequency?
- **Working group** to decide the possible trajectory of the division (change of scope/name, change of subdivisions, publication strategy) <= Need Volunteers
- **NP Officers back to back with ECS Scientists**

NP Division New Activities

EDI



Title: Historical background and future perspectives on Equity, Diversity and Inclusion in Geosciences

When: Spring/Summer 2026

Where: Bruxelles

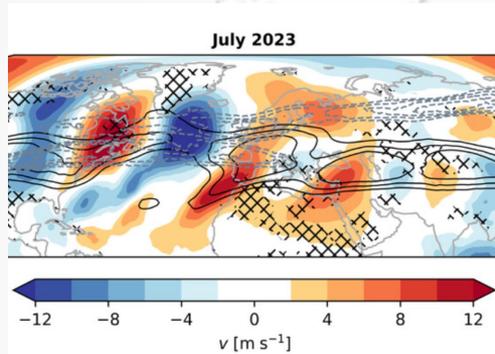
Proponents: Tommaso Alberti, Lesley De Cruz, Davide Faranda, Christian Franzke, Vera Melinda Galfi, Valerio Lembo

Aims:

- giving a historical perspectives of lecturers that played an outstanding role in the process.
- facilitate debate between ECRs and scientists at other stages of their career, to reflect on the state-of-the-art, main gaps to be covered, how to address dangers of the current situation;

Financial support for topical events (training event) asked to EGU for 2026.

NP Division New Activities



Title: Dynamics of Rossby waves, compound extremes and their impacts

When: 19-26 January 2026 (TBC)

Where: Amsterdam

Proponents: Simona Bordoni, Daniela Domeisen, Vera Melinda Galfi, Valerio Lembo, Jacopo Riboldi

Aims:

- review scientific advancements and identify outstanding challenges and opportunities at the crossroads of dynamics, compound extreme events and impacts;
- bring together different communities working on complementary topics;

Financial support through DynVar APARC Activity; further support very welcome!!

3. Early Career Scientists

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ECS Representative activities

EGU BLOG (5 posts 2024–2025)

NP Interview the
incoming Nonlinear
Processes in Geosciences
Division President:
Davide Faranda

Mireia Ginesta · April 21, 2025



The incoming NP Division President Davide Faranda.

NP Interview the
outcoming Nonlinear
Processes in Geosciences
Division President:
François Schmitt

Mireia Ginesta · April 21, 2025



The outcoming NP Division President François Schmitt.

Today's NP Interviews hosts the outcoming NP Division President François Schmitt. François has a PhD degree from Université Pierre et Marie Curie in Paris (1993), in atmospheric turbulence, and an Habilitation de-

SECTIONS

NP Blog of the month
ECS Spotlight
News

... and many more!

ECS Representative activities

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... and many more!

You have
something
interesting!
Share it with
the community



ECS Representative activities

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NP Interview the incoming Nonlinear Processes in Geosciences Division President: Davide Faranda

Mireia Ginesta · April 21, 2025

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You have something interesting!
Share it with the community



SOCIAL MEDIA

Transitioning towards BlueSky...
coming soon!



egu25_np

ECS Representative activities

OTHER ACTIVITIES

 **EDI Committee, promoting equity, diversity, and inclusion in our field** → **visit us in the Booth!** (other WG include Outreach Communication, Life-Career Wellness, Career Jobs)

Webinars (e.g. Addressing vulnerabilities in the field work)

Short courses

ECS Representative activities

OTHER ACTIVITIES

 **EDI Committee, promoting equity, diversity, and inclusion in our field** → **visit us in the Booth!** (other WG include Outreach Communication, Life-Career Wellness, Career Jobs)

Webinars (e.g. Addressing vulnerabilities in the field work)

Short courses

→ **More people joining the ECS Reps team; stay tuned!**



4. Awards and Medal

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Awards and Medals

EGU Awards & Medals: Recognise outstanding research in Earth, planetary, and space sciences; foster next-generation geoscientists.

Union Medals: Honour lifetime or exceptional contributions; includes our Richardson Medal

Early Career Recognition: Arne Richter Awards and Division Outstanding Early Career Scientist Awards highlight emerging talent.

OSPP Competition: Outstanding Student and PhD candidate Presentation (OSPP) Awards. Thanks Valerio Lembo Melinda Galfi

LEWIS FRY RICHARDSON MEDAL 2025

LEWIS FRY RICHARDSON MEDAL 2025

Vincenzo Carbone

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Site search



The 2025 Lewis Fry Richardson Medal is awarded to Vincenzo Carbone for outstanding contributions to the study of turbulence in magnetohydrodynamics, particularly in the solar wind and space plasmas, as well as its impact on the Earth's magnetosphere and climate.

Vincenzo Carbone contributed pioneering studies of magnetohydrodynamic (MHD) turbulence of the solar wind and space plasma. One of his major achievements was the introduction of an MHD cascade model which fitted observed scaling laws and revealed the multifractal structure of fully developed MHD turbulence. In addition, he developed a number of MHD turbulence shell models which were able to explain several relevant phenomena in solar physics, such as the anisotropy of the turbulent cascade in the solar wind, the statistical properties of solar flares, and the evolution of MHD turbulence in the magnetic loops of the solar corona. His comprehensive studies of the solar wind led to the book "Turbulence of the solar wind" and the review "The solar wind as a turbulence laboratory" which are considered as milestones by researchers in this field.



Vincenzo Carbone

DIVISION OUTSTANDING EARLY CAREER SCIENTIST AWARD

DIVISION OUTSTANDING EARLY CAREER SCIENTIST AWARDS 2025

Johannes Jakob Lohmann

[Home](#) / [Awards & medals](#) / [Division Outstanding Early Career Scientist Awards](#) / [2025](#) / Johannes Jakob Lohmann



NP Nonlinear Processes in Geosciences

The 2025 Division Outstanding Early Career Scientist Award is awarded to Johannes Jakob Lohmann for important contributions to our understanding of non-linear climate dynamics during the last glacial period.

By innovative time series analyses of ice core records, Johannes Jakob Lohmann showed that the occurrence of abrupt climate changes comprises intrinsically deterministic dynamics modulated by slowly varying external forcing, but also a concrete stochastic driver. His work bridges long-held opposing views, and brings us closer to a definite understanding of these most puzzling abrupt changes. He has in recent years made significant advances in the theoretical understanding of multi-stability and tipping points in the climate as a chaotic, heterogeneous, and non-autonomous complex system. With an emphasis on the Atlantic ocean's circulation, he showed that a complicated form of rate-induced tipping can occur, which may lead to a loss of predictability of the future climate state. By creative use of climate models and a deep understanding of dynamical systems, he presented an unusually deep view into the complicated bifurcation structure of the climate system, including its unstable states, which are very much underexplored. The knowledge he showed can hold the key to predicting different types of tipping points.



Johannes Jakob Lohmann

2024 NP OUTSTANDING STUDENT POSTER PRESENTATION

OUTSTANDING STUDENT AND PHD CANDIDATE PRESENTATION (OSPP) AWARDS 2024

Abdallah Aoude

[Home](#) / [Awards & medals](#) / [Outstanding Student and PhD candidate Presentation \(OSPP\) Awards](#) / [2024](#) / [Abdallah Aoude](#)



NP Nonlinear Processes in Geosciences

The 2024 Outstanding Student and PhD candidate Presentation (OSPP) Award is awarded to Abdallah Aoude for the poster/PICO entitled:

Design of a new laboratory earthquake experiment (Aoude, A.; Stefanou, I.; Semblat, J.-F.; Rubino, V.)

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

Abdallah Aoude is a PhD candidate at Ecole Centrale de Nantes, France. His research focuses on the experimental design of earthquake control strategies, specifically through the development and design of analogue fault systems to study and test earthquake nucleation and control. At EGU24, Abdallah presented a new experiment that simulates earthquake-like events in the laboratory. This experiment is designed to implement and test existing control theories to prevent instabilities and achieve controlled slip rates, while also enabling the study of earthquake nucleation and rupture propagation.



Abdallah Aoude

2024 NP OUTSTANDING STUDENT POSTER PRESENTATION



Design of new laboratory earthquake experiment

Abdallah Aoude¹, Ioannis Stefanou¹, Jean-Francois Semblat², Vito Rubino¹

¹Nantes Université, Ecole Centrale Nantes, CNRS, Institut de Recherche en Génie Civil et Mécanique (GeM), UMR 6183, F-44000 Nantes, France
²ENSTA-Paris, Institute of Mechanical Sciences and Industrial Applications
 abdallah.aoude@ec-nantes.fr, ioannis.stefanou@ec-nantes.fr, jean-francois.semlat@ensta-paris.fr, vito.rubino@ec-nantes.fr



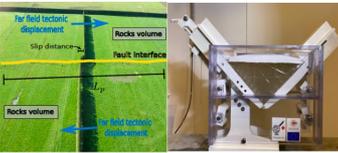
1-Context

Human activities can induce seismicity by injecting fluids into the Earth's crust, as observed in geothermal operations. Recently, it has been demonstrated that controlling the pressure of the injected fluids can mitigate earthquakes. These mitigation strategies are designed using the mathematical theory of control [1-4].

In this study, we present a new experimental setup designed to test the mathematical theory of control. It consists of an analog fault surrounded by an elastic material, enabling us to study slip propagation.

2-Laboratory experiment: Scaling laws

The design is based on scaling rules used to downscale instabilities of earthquakes from natural faults (prototypes) to laboratory (models).



Physical quantities	Non-dimensional ratio
Δr shear stress drop	$\lambda_{\Delta r} = \frac{(\Delta r)_m}{(\Delta r)_p}$
l slip distance	$\lambda_l = \frac{l_m}{l_p}$
l length scale	$\lambda_l = \frac{l_m}{l_p}$
v_s shear wave velocity	$\lambda_{v_s} = \frac{(v_s)_m}{(v_s)_p}$
C shear modulus	$\lambda_C = \frac{C_m}{C_p}$

$$\lambda_{\Delta r} = \frac{\lambda_C \Delta \lambda}{\lambda_l}$$

$$\lambda_l = \frac{\lambda_C}{\lambda_{v_s}}$$

$$\lambda_l = \frac{\lambda_C}{\lambda_{v_s}}$$

$$\lambda_C = \frac{\mu_m}{\mu_p}$$

$\lambda_C = \frac{\text{model elastic modulus}}{\text{prototype elastic modulus}}$

3-Technical constraints and scenarios

Reference parameters: $G_p = 30 \text{ GPa}$ ($\Delta \tau_p = 3 \text{ MPa}$) $l_p^{max} = 0.2 \text{ m}$
 Typical shear stress drop for an earthquake $\Delta \tau_p = 3.07 \text{ MPa}$ Desired fault length in the laboratory

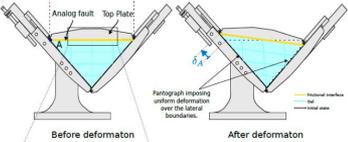
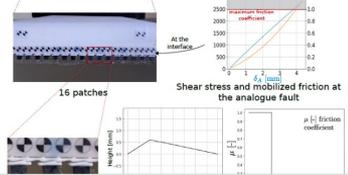
Constraints: $G_m = 8000 \text{ Pa}$ (properties of the material selected to reduce the time scale)
 $(\Delta \tau)_m = 1000 \text{ Pa}$ Shear stress drop needed at the analogue fault

Scenario 1: Maximum earthquake magnitude $M_w = 4$ (using empirical equations, $l_p^{max} = 1100 \text{ m}$)
 $\lambda_l = \frac{l_m}{l_p} = 1.2 \cdot 10^{-4}$
 Minimum slip time estimation: $t_m^{min} = 100 \text{ ms}$

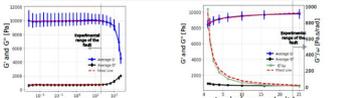
Scenario 2: Maximum Earthquake magnitude $M_w = 2$ (using empirical equations, $l_p^{max} = 110 \text{ m}$)
 $l_m^{max} = \lambda_l l_p = 0.02 \text{ m}$
 Minimum slip time estimation: $t_m^{min} = 100 \text{ ms}$

4-Earthquake mechanical apparatus

Assuming the gel is incompressible, the system has a single degree of freedom, which is chosen to be the position of point A.

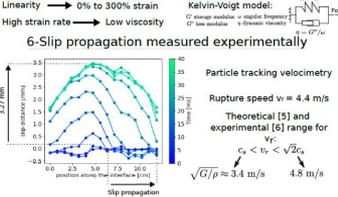
5-Rheology of the gel



Linearity \rightarrow 0% to 300% strain
 High strain rate \rightarrow Low viscosity

Kelvin-Voigt model:
 C_T spring modulus \rightarrow analogue modulus
 C_V viscoelastic \rightarrow dynamic viscosity
 C_T / ν

6-Slip propagation measured experimentally



Particle tracking velocimetry
 Rupture speed $v_r = 4.4 \text{ m/s}$
 Theoretical $[\delta]$ and experimental $[\delta]$ range for v_r
 $c_s < v_r < \sqrt{2} c_s$
 $\sqrt{G'/\rho} \approx 3.4 \text{ m/s}$ 4.8 m/s

7-Conclusions and perspectives

A new laboratory earthquake experiment is designed, composed of an analogue fault surrounded by elastic media. Deforming the analog rock increases the shear stress at the interface, thus allowing instabilities to take place. The slip measured using particle tracking velocimetry propagates at a speed between c_s^0 and $\sqrt{2} c_s^0$, as expected. Next step: adjust the effective stress over the analogue fault using control theory [1-4], to avoid instabilities and achieve controlled slip rates.

References

[1] Stefanou, Ioannis. "Controlling anthropogenic and natural seismicity: insights from active stabilization of the spring-slider model." *Journal of Geophysical Research: Solid Earth* 124, no. 8 (2019): 6768-6802. doi: 10.1029/2018JB016117

[2] Stefanou, Ioannis, and Geogorg Tziavos. "Preventing instabilities and inducing controlled, slow slip in frictionally unstable systems." *Journal of Geophysical Research: Solid Earth* 127, 7 (2022): e2022JB024410. doi: 10.1029/2022JB024410

[3] Tziavos, Geogorg, Ioannis Stefanou, and Vito Rubino. "Controlling earthquakes (EQs) in the laboratory using permanent fault stimulating technique." PhD thesis, Ecole centrale de Nantes (2023). doi: 10.21203/rs.3.rs-2691742/v1

[4] Constantinou, D., Tziavos, G., Stefanou, I., & Plevani, F. (2022). Earthquake Control: An Emerging Application for Seismic Control. Theory and Experimental Aspects. *181 Transactions on Control Systems Technology*. doi: 10.1109/TST.2022.3242432

[5] Wang, W., Liu, C., & Heesels, A. J. (1998). Interfacial crack growth in bi-material interface: an investigation of crack face contact. *Journal of the Mechanics and Physics of Solids*, 46(11), 2233-2258. [https://doi.org/10.1016/S0020-7179\(98\)00248-0](https://doi.org/10.1016/S0020-7179(98)00248-0)

[6] Campillo, M. (2011). Ultrafast ultrasonic imaging of an rupture. *Earthquake Letters*, 36(3), 590-601. doi: 10.1007/s00526-011-0101-0

of the European Research Council (ERC) under the


Demander à l'Assistant IA

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NP Division Award Committee

Members

Ulrike Feudel (Chair)

Angelo Vulpiani

Bérengère Dubrulle => should have been replaced by Vincenzo Carbone

Freddy Bouchet

Kateryna Terletska

NP Division Award Committee <= New member decision

Members

Ulrike Feudel (Chair)

Angelo Vulpiani

Isabel Pedroso de Lima

Freddy Bouchet

Kateryna Terletska

NP Division Award Committee <= New member decision



Isabel Pedroso de Lima

Present positions: Associate Professor with Habilitation at the University of Coimbra (Portugal); Senior researcher at MARE – Marine and Environmental Research Centre / ARNET – Aquatic Research Network, Portugal; Coordinator of the MSc in Environmental Engineering, and Co-coordinator of the BSc and PhD in Environmental Engineering at the University of Coimbra.

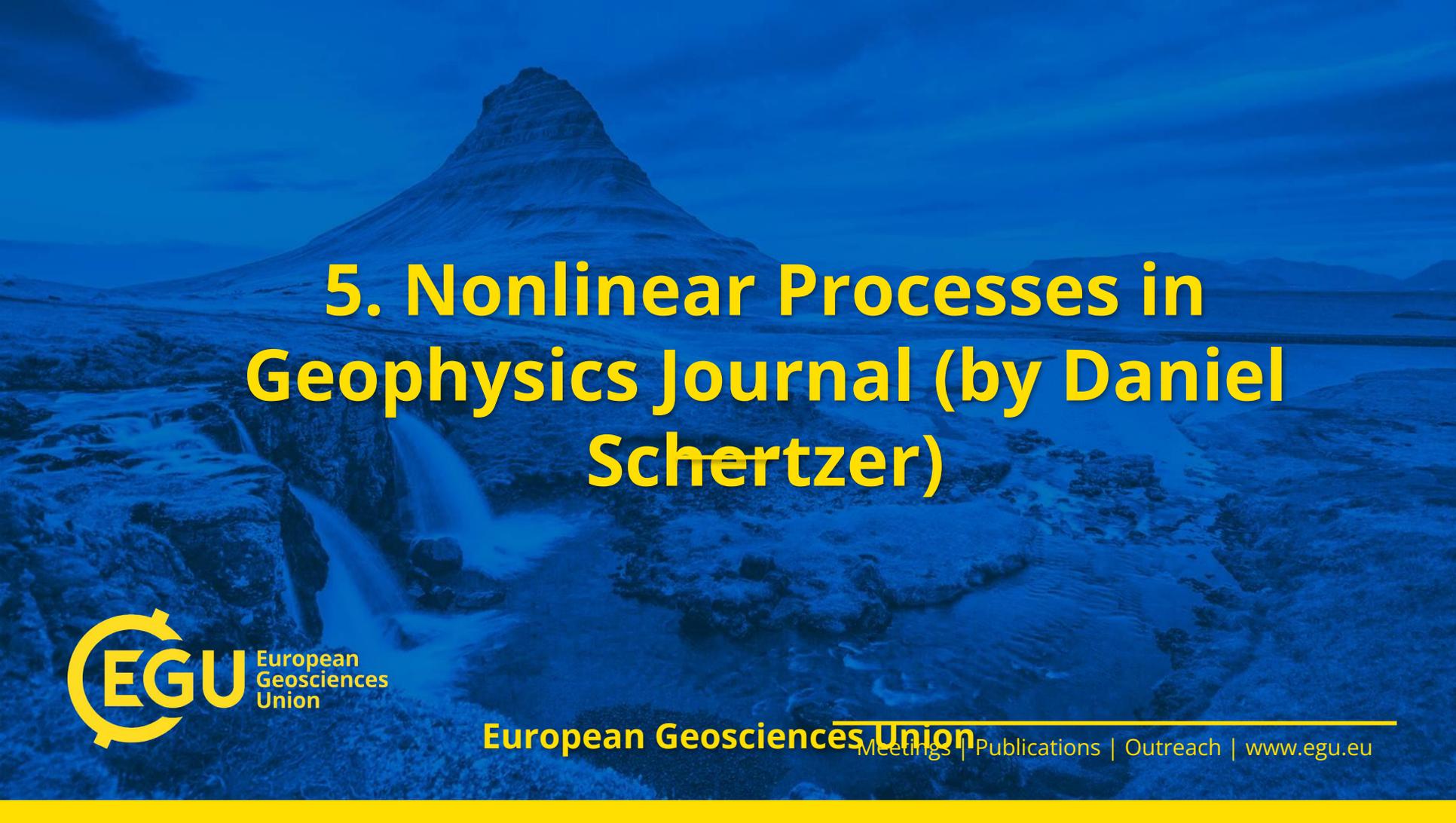
Office address: Department of Civil Engineering, Faculty of Science and Technology, University of Coimbra, Rua Luis Reis Santos, 3030-788 Coimbra, Portugal

Email address: iplima@uc.pt

CV at: <https://www.cienciavitae.pt/portal/en/5318-1CBB-F894>

HOW TO BECOME AN AWARDEE?

- Nominations are exclusively by EGU members (no self nomination)
=> **deadline June 15 2025**
- 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**.
- **** plus one medals each for journalism, outreach and service to the union**



5. Nonlinear Processes in Geophysics Journal (by Daniel Schertzer)



European Geosciences Union

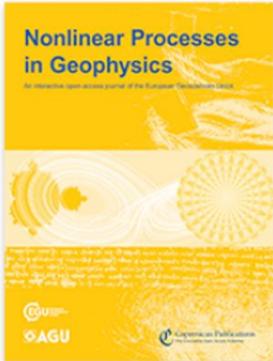
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ARTICLE LEVEL METRICS



MODERATE ARTICLE PROCESSING CHARGES



FINANCIAL SUPPORT

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

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 sensing, analysis, and simulation technologies. These encompass approaches ranging from data-driven research to mathematical physics.

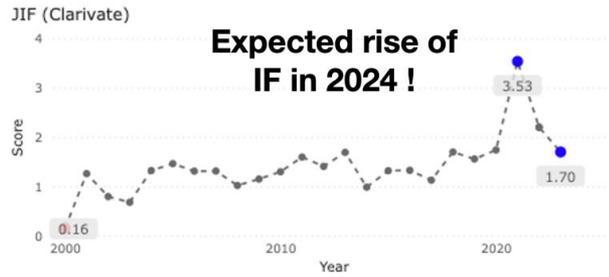
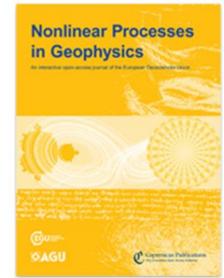
Improving NPG

- **NPG: the open-access journal of innovative concepts and methodologies in geosciences**

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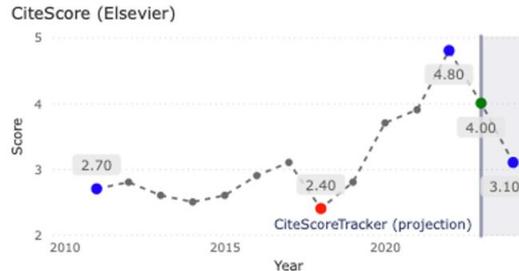
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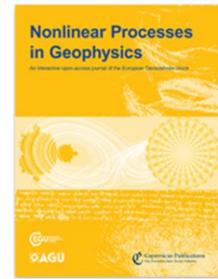
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