

Preface to the volume “Novelties in solid Earth Geophysics”

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This 27th volume collects a selection of papers, particularly focusing on the novelties, presented during the 43rd annual national conference of the *Gruppo Nazionale di Geofisica della Terra Solida* (NGGTS), which was held in Bologna from 11 to 14 February 2025.

The NGGTS was established in 1978 as an offshoot of the Italian National Research Council (CNR) to promote, develop, and coordinate research in the field of solid Earth geophysics. The NGGTS comprised various sections: seismology, geodesy and gravimetry, geothermal research, crustal geophysics, mining and environmental geophysics, near-surface applications, as well as seismic exploration. In the past years, despite its limited budget, the NGGTS funded several research activities and sponsored multi-disciplinary projects, mainly dedicated to the study of the Earth's crust. About 500 researchers refer to the NGGTS and meet every year for a national conference: a point of reference in the life of Italian geophysics. Although the NGGTS institution was closed in December 2000, the NGGTS annual conference, sponsored by the National Institute of Oceanography and Applied Geophysics - OGS (OGS), continues to be held. A summary of the NGGTS structure and activities is described in a paper by Slejko (2020).

The NGGTS was governed by a committee composed of representatives from the CNR. In 2017, it changed its structure. A convention was underwritten by the legal representatives of the main entities that have always participated in the conference: the OGS, the CNR, the Department of Civil Protection, the ReLUIS Inter-University Consortium, the National Institute of Geophysics and Volcanology, and the Italian EAGE–SEG Section. Representatives of these bodies, then, took part in the works of the Scientific Technical Committee (STC). The OGS representative is the chairman of the STC. The STC governs the NGGTS, providing scientific and organisational guidance for the conference management and making key decisions on how to carry out tasks before and after the conference.

The NGGTS membership mailing list is also worth mentioning, with its more than 2,000 members. The NGGTS secretariat, which is based at the OGS, is responsible for disseminating key information regarding conferences, seminars, fellowships, and various other events that may be of interest to NGGTS members. This mailing list is a very powerful tool because it reaches almost every researcher and professor engaged in geophysics, seismology and, to some extent, volcanology.

The NGGTS annual conference, a recurring event for more than 40 years now (Table 1), is the spontaneous meeting point for all researchers who work, even in different roles, in geophysics, seismology, geology, and volcanology, as well as all the scientific branches that collaborate to improve our knowledge of the solid Earth. The participation in the NGGTS conferences has always been plentiful with more than 200 scientists, reaching the number of more than 600 in 1994, 2006, 2007, and 2019, when the conference venue was Rome (Fig. 1).

The NGGTS conference has always been about bringing scientists together and to encourage the geophysical scientific community to exchange ideas. The fundamental role of NGGTS as a “training ground for young scientists” should not be overlooked, and the NGGTS STC encourages the participation of young people in every way. It is often at NGGTS that young or aspiring researchers present their first work.

The traditional and unusual free participation means that the conference is also open to all young PhD students, fellows, contract researchers, and emerging researchers, who can participate in the conference by attending a scientific forum for the first time. Similarly, great attention is paid to the participation of the university component, both teachers and students, and for this reason the opportunity to attend a GNGTS conference in person is particularly important.

The COVID–19 pandemic, which started in Italy in February 2020, interrupted the organisation of the 2020 conference but it was decided not to give up on organising the successful yearly event in the future. For this reason, after the break in 2020, the 39th conference was held in streaming mode. Despite the absence of in-person participation, the 39th GNGTS conference still proved to be successful, and was, then, repeated and improved by the following edition organised in Trieste (Fig. 1b).

The nature of a free event for participants requires a significant financial commitment from the organisation coordinating the conference. Since the conference has been organised by the OGS, the availability of free facilities has always been sought. For many years the GNGTS was held at the CNR headquarters in Rome. In recent years, however, this location has become unavailable due to internal restructuring and, more recently, the minimum number of classrooms required to host the GNGTS was not available at the CNR headquarters. For these reasons, the STC of the GNGTS has been looking for suitable locations in a university environment.

The 41st GNGTS conference was held at the Belmeloro Campus of the University of Bologna in February 2023, instead of November as in the past, with the possibility of holding the conference within university structures during the teaching holidays. Attendance at the conference was also facilitated by the central location of the city of Bologna, a hub for the whole of central and northern Italy [see more details in Rebez and Slejko (2024b)].

The 42nd GNGTS conference was held at the University of Ferrara, in February 2024. For the type of conference that characterises the GNGTS, the venue of the University of Ferrara Campus proved to be very suitable, both in terms of space and logistics [see more details in Rebez and Slejko (2025b)].

Table 1 - Venues of the annual GNGTS national conferences.

Conference	Year(s)	Location	Local organising committee
1-26	1981-2007	Rome	La Sapienza University, Rome
27-28	2008-2009	Trieste	OGS, Trieste
29	2010	Prato	Istituto Geofisico Toscano, Prato
30	2011	Trieste	OGS, Trieste
31	2012	Potenza	Basilicata University, Potenza
32	2013	Trieste	OGS, Trieste
33	2014	Bologna	Emilia Romagna Region, Bologna
34	2015	Trieste	OGS, Trieste
35	2016	Lecce	CNR, Lecce
36	2017	Trieste	OGS, Trieste
37	2018	Bologna	Emilia Romagna Region, Bologna
38	2019	Rome	CNR, Roma
39	2021	In streaming	OGS, Trieste
40	2022	Trieste	OGS, Trieste
41	2023	Bologna	Bologna University
42	2024	Ferrara	Ferrara University

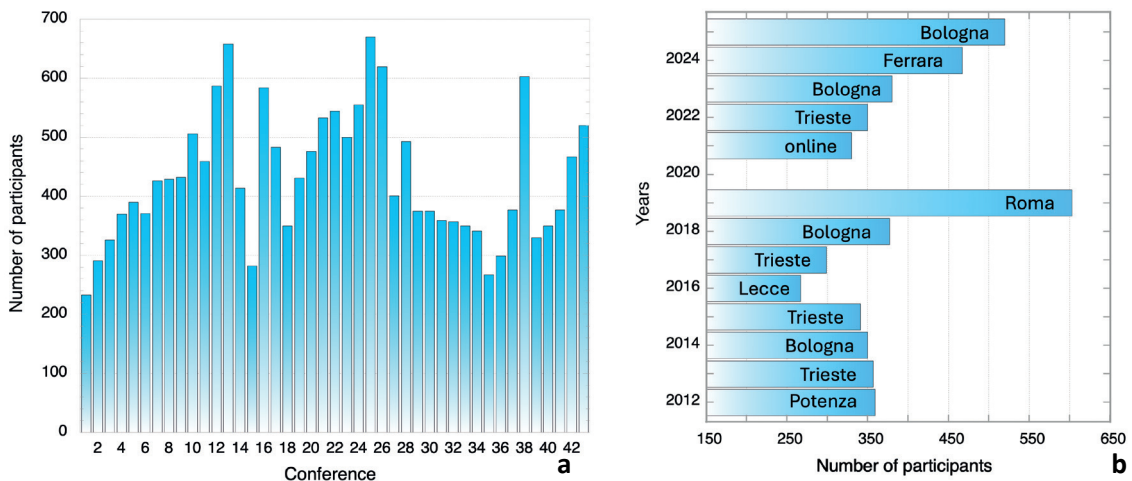


Fig. 1 - Number of participants at the GNGTS conferences: a) from the first to the last (43rd) edition; b) in the last editions (2012–2025), with related locations.

The 43rd GNGTS conference was held at the University of Bologna, at the Belmeloro Campus from 11 to 14 February 2025. It should be remembered that, both during preparations and during the event itself, the interest and collaboration of professors from the host university (when the venue is a university) play a fundamental role. This role of local organisers was perfectly fulfilled by Silvia Castellaro and Paolo Gasperini.

For the type of conference that characterises the GNGTS, the venue of the University of Bologna Belmeloro Campus proved to be most suitable, in terms of space and logistics (Fig. 2). The geographical position of the city of Bologna is very central and easily accessible from the main Italian cities and the position, close to the centre, encountered the favour of the many participants. The only remark was for the poster area which was not sufficiently large to accommodate the many posters (Fig. 3).

The total number of participants was 520 and the percentage of women was 37.5% (Table 2 and Figs. 4 and 5).



Fig. 2 - The General Assembly of the 2025 GNGTS conference.

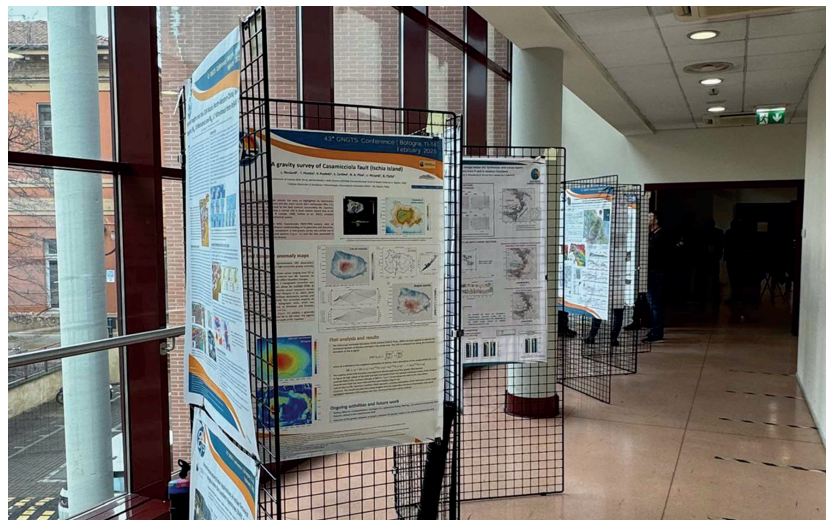


Fig. 3 - The poster area at the 2025 GNGTS conference.

Table 2 - Participation in the 42nd GNGTS conference.

Total number of participants	520
University	235
National Institute of Geophysics and Vulcanology - INGV	159
National Institute of Oceanography and Applied Geophysics - OGS	37
National Research Council - CNR	34
Others	55

Regarding the organisation of the conference and its potential impact on the environment, solutions were gradually introduced to reduce waste and limit the environmental footprint. Water bottles were not distributed, instead all participants were asked to bring their own to reduce the environmental impact. The use of paper was kept to a minimum and the conference programme was not printed but made available on the GNGTS website, accessible via computer or smartphone. At the end of the conference, all lanyards were collected and sanitised for future use.



Fig. 4 - The audience during one of the sessions of the 2025 GNGTS conference.

A fundamental part of the organisation of the GNGTS conference is the website, where all the information was available before and during the conference. The GNGTS website was also used as a repository for the proceedings of the last GNGTS conferences (<https://gngts.ogs.it>).

The 43rd GNGTS conference was organised considering three main topics, each collecting three different subjects, scheduled as nine sessions (Table 3). The first topic referred to geodynamics and seismology, the second to risk assessments, and the third to applied geophysics. All key information and abstracts were written in English to facilitate the understanding and participation of international researchers and students.

Table 3 - Topics of the 43rd GNGTS conference and titles of the sessions.

Sess.	Title	Convenors
Topic 1 - SEISMICITY, VOLCANOES, DATA AND MODELS		
1.1	Earthquakes, active faults, and seismogenic and seismogenic processes: from field surveys to laboratory experiments	Paolo Galli (DPC) Angela Saraò (OGS) Stefano Solarino (INGV–GE) Simone Bello (UniCH)
1.2	The role of geofluids in earthquakes, volcanoes, and geothermal fields	Mimmo Palano (INGV) Francesca Forni (UniMI) Luigi Passarelli (INGV–BO)
1.3	Physical models for the solid Earth and integration between modelling and data of different nature	Anna Maria Marotta (UniMI) Carla Braitenberg (UniTS) Barbara Orecchio (UniME)
Topic 2 - DISASTER RISK ANALYSIS AND REDUCTION		
2.1	Earthquake and tsunami hazard: different return periods, different conceptual schemes and models in a continuum spectrum of time	Daniela Di Bucci (DPC) Dario Albarello (UniSI) Bruno Pace (UniCH)
2.2	Science and technology to support earthquake prevention and preparedness	Mauro Dolce (UniNA) Sara Sgobba (INGV) Maria Polese (UniNA)
2.3	Risk communication	Serena Tagliacozzo (IRPPS CNR) Valentina Rizzoli (Sapienza University, Rome)
Topic 3 - APPLIED GEOPHYSICS FOR ENERGY, ENVIRONMENT AND NEW TECHNOLOGIES		
3.1	Energy transition and resources	Vincenzo Lipari (OGS) Paolo Mazzuchelli (ARESYS) Erika Barison (OGS)
3.2	Near surface geophysics	Emanuele Forte (UniTS) Chiara Colombero (PoliTO) Michele Cercato (Sapienza University, Rome)
3.3	Theoretical and methodological development in applied geophysics	Andrea Tognarelli (UniPI) Luca Masnaghetti (SLB) Gianluca Fiandaca (UniMI)

The number of communications presented, as oral or poster, at the different sessions was in total 311 and they differed according to the relevance of the subjects treated (Table 4). Session 1.1, on earthquakes and faults, was, as also in the past, largely the theme of most interest with 67 notes; Session 2.2, on earthquake prevention and preparedness, was the most populated of Topic 2 with 49 notes, similarly to Session 3.2, on near surface geophysics.

Table 4 - Number of oral notes and posters for the various sessions.

Session	Oral	Poster	Total
1.1	44	23	67
1.2	31	8	39
1.3	17	12	29
			135
2.1	30	10	40
2.2	37	12	49
2.3	4	1	5
			94
3.1	9	4	13
3.2	32	17	49
3.3	16	4	20
			82
TOTAL	220	91	311

A noteworthy mention goes to the Licio Cernobori Geophysical Association (AGLC), established in memory of a dear colleague and friend who passed away prematurely 25 years ago, which, for the last 15 years, has awarded the best papers presented during the GNGTS conference. The three awards (one for each of the three themes of the conference), are co-financed by the Italian EAGE–SEG Section and by the Italian Geophysical Union (UGI). Since 2021, the candidates have presented their work in preview to the evaluators one week before the conference in an online workshop (the Young Researchers Workshop) so as to hold the award ceremony during the GNGTS General Assembly (Fig. 6).

This year, the winners were:

- 1) for theme 1 “Seismicity, volcanoes, data and models”, Francesco Zuccarello, for the work “Towards autonomous lava flow simulations using the Markov Chain Monte Carlo paradigm”;
- 2) for theme 2 “Disaster risk analysis and reduction”, Nicla Lamarucciola with the work “Estimation of the fundamental period of infilled RC framed buildings at different design limit states”;
- 3) for theme 3 “Applied geophysics for energy, environment and new technologies”, Luigi Bianco, for the work “Joint inversion of potential fields data and seismic images”.

Special mentions also went to Irene Menichelli for the presentation “Dynamics and structure of the Adria subduction zone: insights from seismic imaging and analogue modelling”, to Davide Zaccagnino for the work “Reconciling laboratory, small and large fault frictional properties”, to Roberta Di Chicco for the paper “Taxonomy of masonry building aggregates for seismic risk analysis: parametric fragility study on a prototype within a minor historical area”, and to Guido Penta de Peppo for the presentation “Petrophysical coupling seismic refraction, resistivity and time-domain induced polarisation tomographic data for imaging of coastal aquifers”.

This year, the GNGTS General Assembly also hosted the ceremony for the Premio Mucciarelli, a Master degree thesis award in geophysics and seismic engineering, in memory of Marco Mucciarelli, professor at the Basilicata University and past director of the Seismologic Research Centre of OGS (Fig. 7). The award went to Albachiara Brindisi for the thesis “Caratterizzazione e monitoraggio sismico dei vulcani di fango di Nirano (MO)”, to Valeria Fedeli for the thesis “A



Fig. 5 - Award ceremony of the Licio Cernobori Geophysical Association (AGLC).

new dynamic slip node formulation for the representation of ‘continuous discontinuities’ in geodynamic numerical models”, and to Alessandro Tursi for the thesis “Protezione sismica di un capannone industriale prefabbricato in c.a. a due piani con smorzatori fluido viscosi”.

Before the General Assembly, the STC organised a two-hour morning session, in which the coordinators of the main projects, financed by the National Recovery and Resilience Plan (PNRR) and related to the GNGTS topics, presented their projects, with a perspective of the post-PNRR activity (Fig. 8).

Moreover, on the morning of the first day of the conference, the same premises hosted the 4th Workshop of the DEI (Diversity, Equity, Inclusion) department of the Italian Geological Society, both in presence and online, with the voices of various women working in geosciences in Italy (see Fig. 9 for the programme).

Since 1997, peer-reviewed proceedings of the national conferences have been published in special volumes and on CD-ROMs, mainly in Italian. These documents are also available at the GNGTS website: <https://gngts.ogs.it>. Since 2000, with exception of years from 2012 to 2015, when the volumes of the proceedings of the conference were printed, it was decided to publish selected papers from the GNGTS conferences in an international geophysical journal [the Bulletin of Geophysics and Oceanography (BGO), formerly Bollettino di Geofisica Teorica ed Applicata (BGTA)], also in order to achieve a broader dissemination of the GNGTS activities for an international audience.

Over the years, multidisciplinary and single-theme volumes have been issued (Table 5). The multidisciplinary volumes, which make up most of the published volumes, generally presented one paper from each of the sessions of the GNGTS conference. In this case, all three broad



Fig. 6 - Award ceremony of the Marco Mucciarelli Master thesis award.

43rd NATIONAL CONFERENCE
 GRUPPO NAZIONALE DI GEOFISICA DELLA TERRA SOLIDA
 NATIONAL GROUP FOR SOLID EARTH GEOPHYSICS
 FEBRUARY 13 - PNRR EVENT

ROOM B
 An outlook on some of the principal projects / partnership
Giuliana Rossi (OGS), Daniela Di Bucci (DPC), Angelo Masi (ReLUISt), Massimiliano Moscatelli (CNR), Claudia Piromallo (INGV), Andrea Tognarelli (EAGE-SEG), Paolo Gasperini (UniBO)

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09:00 GeoSciences IR
 A Research Infrastructure for the Italian Geological Surveys Network
L. Guerrieri

09:15 ITINERIS:
 Italian Integrated Environmental Research Infrastructures System *V. Lapenna*
V. Lapenna

09:30 MEET:
 Monitoring Earth's Evolution and Tectonics
G. Selvaggi

09:45 RETURN:
 Multi-Risk sciEnce for resilienT commUnities under a changiNg climate (extended partnership)
D. Calcaterra

10:00 ICSC-HPC:
 National Research Centre in High Performance Computing, Big Data and Quantum Computing
F. Casarotti

10:15 Space It Up: *ISI* Ministero dell'Università e della Ricerca
 Enhancing space technology for space exploration and exploitation for the planet Earth
F. Buongiorno

10:30 COFFEE BREAK

Fig. 7 - The flyer of the PNRR event, organised by the GNGTS STC.



Divisione Diversità, Equità, Inclusione – PanGEA



Organizzazione della giornata

Orario	Durata	Intervento
10:00	40'	Saluti di apertura e inquadramento della giornata (in presenza) Cristina Demaria , Delegata EDI del Rettore dell'Università di Bologna Arcangelo Francesco Violo , Presidente del Consiglio Nazionale dei Geologi Giuliana Rossi , Presidente del Comitato tecnico-scientifico GNGTS Daniela Di Bucci , Coordinatrice della Divisione DEI-PanGEA
10:40	15'	Key note a invito (in presenza) Lucia Marinangeli , Università di Chieti "Gabriele D'Annunzio" - Esplorazione dei pianeti: il ruolo delle geologhe a livello nazionale e internazionale
10:55	15'	Key note a invito (online) Claudia Agnini* , Università di Padova, Dipartimento di Geoscienze – Donne e Geoscienze: I Percorsi nella Carriera Accademica Italiana e le Sfide per il Futuro * vincitrice del Premio Marianna Panciatichi Ximenes d'Aragona 2024, destinato a riconoscere l'eccellenza di una geoscientista, con speciale attenzione all'interazione multidisciplinare e alle collaborazioni internazionali https://www.socgeol.it/N6281/premio-marianna-panciatichi-ximenes-d-aragona-2024.html
11:10	30'	Dialogo (in presenza e online) L'evoluzione dell'attività di ricerca delle geoscientiste sulle navi oceanografiche: una conversazione con Enrico Bonatti di Chiara Amadori e Paola Vannucchi
11:40	10'	Presentazione (in presenza) M. Filomena Loreto, Camilla Palmiotto et alii – Le campagne oceanografiche condotte da un gruppo di ricercatrici dell'ISMAR-CNR
11:50	15'	Key note a invito (in presenza) Giovanna Amedei e Federica Ravasi , Presidenti dell'Ordine dei Geologi della Puglia e della Lombardia – Leadership al femminile: l'esperienza delle geologhe Presidenti negli Ordini regionali
12:05	15'	Presentazione (in presenza) Valentina Casolini , consigliera del Consiglio Nazionale dei Geologi – Il mercato professionale dei geologi: analisi del divario di genere e prospettive future
	35'	Discussione generale e prospettive per l'anno di lavoro
12:55	5'	Conclusioni

Ai geologi partecipanti saranno riconosciuti 2 CFP

Fig. 8 - Programme of the 4th workshop of the DEI (Diversity, Equity, Inclusion) department of the Italian Geological Society.

themes, i.e. geodynamics, seismic characterisation of the territory, and applied geophysics, have been documented by a set of papers. Conversely, the five thematic issues published to this day, presented papers from a single GNGTS session that was of particular interest in the year of presentation. In this way, one BGTA volume was dedicated to the 2009 L'Aquila earthquake (Amato *et al.*, 2011), another to the GNGTS session concerning earthquake forecasting and hazard assessment (Albarello and Meletti, 2012), a third to the international session on the seismic hazard of the critical facilities (Grimaz and Slejko, 2014), a fourth referred to the session about science, technology, and communication to support seismic prevention (Dolce and Martelli, 2019), and a fifth focused on energy, related risks, and cascade effects (Martelli and Masi, 2021).

Table 5 - The special issues of the BGTA/BGO dedicated to selected papers from the GNGTS conferences.

No.	Conference - year	Editor(s) (year)	Title	BGTA/BGO vol./issue
1	19-2000	Slejko (2002a)	Advances in Solid Earth Geophysics	43/1-2
2	20-2001	Slejko (2002b)	More about Solid Earth Geophysics	43/3-4
3	21-2002	Marcellini <i>et al.</i> (2004)	More about regional and local seismic hazard in Italy	45/4
4	22-2003	Slejko and Rebez (2005)	A step forward in Solid Earth Geophysics	46/2-3
5	23-2004	Slejko and Rebez (2006)	New insights into Solid Earth Geophysics	47/1-2
6	24-2005	Slejko (2007)	Solid Earth Geophysics: a bit of this and a bit of that	48/2
7	25-2006	Slejko (2008)	Carlo Morelli's mission and passion: Geophysics	49/2
8	26-2007	Slejko (2009)	Pieces of Geophysics	50/2
9	27-2008	Slejko (2010)	Novelties in Geophysics	51/2-3
10	28-2009	Albarello and Slejko (2011a)	Geophysical research in Italy	52/2
11	28-2009	Amato <i>et al.</i> (2011)	The 2009 L'Aquila earthquake: geophysical insights from the 28 th GNGTS congress	52/3
12	28-2009	Albarello and Slejko (2011b)	Geophysics for prospecting, monitoring, and hazard assessment	52/4
13	28-2009	Albarello and Meletti (2012)	Earthquake forecasting and hazard assessment	53/1
14	29-2010	Cardarelli and Slejko (2012)	A little bit of Geophysics	53/3
15	29-2010	Rossi and Slejko (2012)	The Earth, its phenomena, and some related methods	53/4
16	30-2011	Grimaz and Slejko (2014)	Geophysics and critical facilities	55/1
17	35-2016	Persico and Slejko (2017)	Recent multi-topic geophysical investigations	58/4
18	36-2017	Dolce and Martelli (2019)	Science, technology and communication to support seismic prevention	60/2
19	36-2017	Rossi and Slejko (2020)	Geophysical solutions in environmental and natural hazard fields	61/1
20	37-2018	Volpi and Slejko (2020)	Geophysical approaches for subsurface investigation: Italian case studies	61/3
21	37/38-2018/2019	Martelli and Masi (2021)	Energy, related risks and cascade effects	62/2
22	38-2019	Rebez and Slejko (2021)	One small step to further our knowledge of the solid Earth	62/4
23	39-2021	Rebez and Slejko (2022)	Italian Geophysics today	63/4
24	40-2022	Rebez and Slejko (2023)	Exploring the solid Earth: novel geophysics and seismology	64/4
25	41-2023	Rebez and Slejko (2024a)	Improving Geophysics for a better future	65/2
26	42-2024	Rebez and Slejko (2025a)	Geophysics for the future of the Planet	66/2

The present volume consists of ten of the 311 papers presented, orally or as posters, during the 43rd GNGTS national conference. The topics treated in this volume represent almost all subjects of the conference and cover several themes of solid Earth geophysics, such as seismology, seismic risk, risk communication, and exploration geophysics. These topics present specific studies conducted in the Italian territory that also provide important insights into the subsurface geological/geophysical structure and on the role of surficial geology in seismic risk assessment.

The first paper in this volume, by Baranello *et al.* (2026) addresses the updating of a group of $M_w \geq 5$ earthquakes that affected Carnia and the Friulian Prealps (north-eastern Italy) in the 18th century (1700, 1776, 1788, 1789, and 1794). The revision of these earthquakes led to a consistent increase in the number of affected localities, enabling a significant re-evaluation of the maximum intensities for two events (1776 and 1789), and confirming Tramonti as the epicentre for the latter. The paper is therefore an important contribution to the re-evaluation of seismic hazard in the area.

A multidisciplinary palaeoseismological investigation into the possible relationship between the March 1638 $M_w \sim 7$ earthquake in Calabria (southern Italy) and the Sant'Eufemia Fault is described in the second paper of the volume by Galli *et al.* (2026). The research concluded that both this fault and the Lakes Fault ruptured in close succession not only in 1638, but also around 700 A.D., suggesting a possible recurrence interval of around 1,000 years.

Gentili *et al.* (2026) present the results of the application of the Next Strong Related Earthquake (NESTORE) approach, using the NESTOREv1.0 software, to sequences from Greece, Italy, western Slovenia, California, and Japan. The comparison between the various sequences confirmed the capability of a specific feature, even shortly after the main shock, to discriminate between Clusters A (where the mainshock and strongest aftershock differ by ≤ 1 unit) and B (larger difference), and its overall importance in near-real-time applications.

The paper by Figlioli *et al.* (2026) focuses on the analysis of seismicity recorded between 2020 and 2024 in the Reykjanes Peninsula (Iceland), during the seismic and volcanic crisis following centuries of relative quiescence. The results reveal systematic temporal and spatial patterns of seismicity and, in particular, of the b -value during magmatic episodes, providing indirect constraints on evolving stress conditions.

The study by Brunelli *et al.* (2026) examines the relationship between V_{s30} and a comprehensive set of topographic and lithological proxies across Italy, utilising a dataset comprising approximately 15,000 V_s profiles distributed across Italy compiled from seismic microzonation studies, regional databases, and the Italian ACcelerometric Archive (ITACA).

Cito *et al.* (2026) provide an updated analysis of recent earthquakes recorded at Campi Flegrei (southern Italy) between January and late September 2025 from a structural engineering perspective. The results show that the impact is negligible for code-conforming reinforced concrete structures, while the unreinforced masonry structures considered exhibit plastic behaviour at 1.5 km for almost all events, and at 2.5 km for the $M_d = 4.6$ event.

The critical subject of natural hazard communication through Instagram, a visual-based platform mostly used by a young audience, is addressed by Pignone *et al.* (2026). The paper describes the various stages in the development of the INGV-terremoti Instagram channel and critically evaluates the results achieved in the first eight months, as well as the difficulties and challenges that this new form of communication presents, balancing the enhancement of scientific efficacy with the preservation of reliability and transparency.

The paper by Barzaghi *et al.* (2026) presents the main steps taken towards the realisation of a new reference network for absolute gravity in Italy, aligned with the highest levels of precision and accuracy, following the resolutions approved by the International Association of Geodesy

during its 2015 general assembly. Still under construction, the renewed absolute gravity network will enable the determination of temporal variations in the long-term and long-wavelength gravity field in Italy.

Berti *et al.* (2026) introduce a novel Bayesian Amplitude-versus-Angle (AVA) inversion framework that integrates annealed Stein variational gradient descent with discrete cosine transform compression of the model space. The proposed integrated approach offers significant computational efficiency and improved uncertainty quantification, resulting in a powerful and efficient solution for probabilistic AVA inversion.

The last paper of this volume (Ligas *et al.*, 2026) presents a novel method to improve seismic imaging from post-stack data by integrating image focusing into full-waveform inversion (FWI). The authors include minimum entropy velocity analysis as a cost function within FWI, evaluating subsurface models based on the focusing quality of reverse time migration images using the minimum entropy norm.

We wish to thank the convenors of the GNGTS sessions, who selected the papers for this volume, and Majid Bagheri, Simone Bello, Martina Capponi, Ina Cecić, Giovanna Chiodo, Susanna Falsaperla, Vassilios Grigoriadis, Qiang Guo, Amir Ismail, Giovanna Laurenzano, Lucia Luzi, Neslihan Ocağolu Gökaşan, Eleftheria Papadimitriou, Mimmo Palano, Stefano Parolai, Alessandro Rebez, Valentina Rizzoli, Serena Tagliacozzo, Matteo Taroni, and Nikos Theodoulidis, who participated in the reviewing process of the papers.

This volume is dedicated to the cherished memory of Gianfranco Renner, seismologist at OGS who participated in numerous GNGTS conferences as author and speaker. Moreover, he contributed for many years to the editorial management of the BGTA/BGO. Gianfranco passed away while we were closing the present volume, leaving us deeply saddened for the loss of a loved colleague and friend.

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