Bulletin of Geophysics and Oceanography Vol. 67, n. 2, pp. 343-368; June 2026
DOI 10.4430/bgo00521

The new INGVterremoti Instagram channel: a first analysis on the impact data of communication

M. Pignone[1], G.P. Attolini[1], A. Coppotelli[2], C. Rossi[2], C. Meletti[1], C. Nostro[1], E. Casarotti[1] and A. Amato[1]

[1] *Istituto Nazionale di Geofisica e Vulcanologia, Italy*
[2] *Macroarea di Lettere e Filosofia, Università degli Studi Tor Vergata, Roma, Italy*

(Received: 18 July 2025; accepted: 4 December 2025; published online: 13 February 2026)

ABSTRACT Besides the Istituto di Geofisica e Vulcanologia's [the Italian National Institute of Geophysics and Volcanology] traditional web pages, since 2010 the INGV Earthquake Deparment (INGVterremoti) platform has been making information about Italy's ongoing seismicity and earthquake and tsunami research activities available to everyone, also through a series of web and social communication channels, such as Blog Wordpress, X (Twitter), Facebook, YouTube, apps for iPhone and Android, and StoryMaps. Lately, the new INGVterremoti Instagram channel has landed on the platform: it was launched on 27 September 2024 during the European Researchers' Night. The main task of this new social profile is to show the world of earthquakes and tsunamis through visual-based formats and contents so as to reach out and involve everyone, especially the new generations. The launch of the new Instagram channel is the result of several months of groundwork that brought together collaborators with a specific communication background and experts on natural hazard communication. The long planning and drafting work of a new editorial line led INGVterremoti to take on a new challenge: the communication of risk on a platform that is totally visual-based and mostly populated by a younger audience. In order to do so, it was necessary to develop a specific editorial plan that could identify and organise new content to share on the new account as well as new ways and means of publication. This paper will describe all the stages involved in the development of the INGVterremoti Instagram channel, as well as the results achieved during the first eight months of its activity.

Key words: earthquakes, Instagram, social media, INGVterremoti, communication, risk reduction.

1. The INGVterremoti multi-channel platform on the field of public and risk communication

As the complexity of public information environments increases, effective risk communication requires an even more careful development of messages, tools, and channels to properly inform the public and motivate it to adopt appropriate measures. The findings highlighted in the studies by Holmes *et al*. (2009) and Page *et al*. (2013) are evident in the public, risk, and emergency communication strategies that the Istituto Nazionale di Geofisica e Vulcanologia [the Italian National Institute of Geophysics and Volcanology, INGV], and more specifically its Earthquake Department (INGVterremoti), has been adopting since 2010. By dealing with seismic monitoring and surveillance throughout the Italian territory and tsunami warning for the National Civil Protection Service, it is called upon, in both ordinary and emergency situations, to communicate

scientifically reliable, timely, and authoritative information. As a public administration, it must do so according to the provisions of Law 150/2000 (https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2000-06-07;150), thus fostering a relationship of trust with citizens and promoting responsible behaviour. Slovic (2000) reminds us that, based on the asymmetry principle, it takes more effort and more time to build trust than to destroy it. Covello (2009) argues that the factors influencing trust differ under conditions of low or high public concern towards the risk in question: in the first case, the source's competence is more significant, while in the second, the ability to listen and demonstrate empathy is more important. However, other factors, such as honesty, transparency, and accountability, also influence trust. The institutional communicator, in charge of communicating phenomena such as earthquakes and tsunamis, must keep these factors in mind.

The creation of the INGVterremoti digital platform in 2010 addresses the needs mentioned thus far. Currently, this platform comprises a coordinated suite of web and social media channels, which are utilised both during seismic or tsunami emergencies and on a daily basis to promote scientific knowledge, monitoring and surveillance activities, and actions for prevention and public information (Pignone *et al*., 2022). Over time, the integration of these channels has evolved through the alignment with developments in technology and social media. The salient characteristics of each channel, reviewed below, serve as the starting point to address the question of why a new channel in 2024.

In 2010 the INGVterremoti made its first moves on social platforms (Table 1). The X channel, which currently boasts over 325,000 followers, has established itself over time as the specialised social platform for citizens, media professionals, and international, national, and local authorities seeking the rapid communication of information regarding ongoing seismicity in Italy and worldwide. In the event of earthquakes, and particularly during major emergencies, the channel's posts are re-shared as an official source by the Italian Department of Civil Protection (of which INGV is a centre of competence), by the accounts of major national media outlets (such as Rainews and SkyTG24), and by the mayors and regional presidents of the affected areas.

The YouTube channel, now counting 16,500 subscribers, has garnered significant public interest (in its first year alone, it registered 600,000 total views) due to the publication of interviews, in-depth analyses, animations, simulations, and promotional videos (Amato *et al*., 2012). Since 2011, the platform has been enhanced with the INGVterremoti app for IOS and, later, also for Android. In 2012, during the seismic sequence in the Po Valley, the blog-magazine was launched on https://ingvterremoti.com/blog/ to provide quick updates on ongoing seismic sequences and insights into earthquakes in Italy and worldwide.

Over the years, the INGVterremoti blog-magazine has become a trusted and authoritative source of earthquake information, publishing articles, news, photos, and in-depth analyses, particularly on major earthquakes and significant seismic sequences. It also features special focuses on past earthquakes, monitoring activities, and the results of studies and scientific research conducted by INGV (Pignone *et al*., 2022). The publication of an article automatically triggers a notification to subscribers, who currently number 4,000 (source: WordPress statistics).

Since 2013, StoryMaps and the Facebook page have also been integrated into INGVterremoti's communication strategy. StoryMaps are web-based geographic information system applications specifically developed to disseminate information on recent and historical seismic and tsunamigenic events by combining textual narratives, imagery, and video content with georeferenced data retrieved from the INGV seismological and seismotectonic databases (Pignone, 2015a, 2015b).

The Facebook page, which currently engages a substantial audience of 270,000 followers, functions as a bidirectional communication interface with the public. This platform provides real-time updates on ongoing seismic activity, mirroring data availability on X. Furthermore, it serves as a repository for in-depth analyses and pertinent information concerning earthquakes and tsunamis, often linking to the INGVterremoti blog-magazine. The *Accadde oggi* [On this day] format is also regularly utilised to enhance both public comprehension of historical seismic events and risk awareness.

Table 1 - The INGVterremoti platform scheme, updated as of October 2025.

	YOUTUBE	X	MOBILE APPS	BLOG	FACEBOOK	STORYMAPS	INSTAGRAM
OBJECTIVE	February 2010	March 2010	March 2011	May 2012	May 2013	May 2013	September 2024
increase the level of information on earthquakes in Italy, as a basic step for seismic risk reduction	Visual seismic and tsunami information, bringing INGV as close as possible to citizens	Fast communication of seismic and tsunami information	Fast communication of seismic information tailored for mobile devices	Provide quick updates and in-depth scientific information (special reports during seismic sequences and emergencies)	Fast communication of seismic and tsunami information; interaction with public	Use of interactive maps and geographic information for seismic and tsunami storytelling	Visual seismic and tsunami storytelling through different formats
TARGET	General public	General public; media professionals; local and national authorities; scientific community	General public	General public; scientific community	General public	General public	General public; new generations
CONTENT	In-house short videos, including animations and interviews with INGV researchers	Automatic and revised earthquake parameters (location and magnitude), blog posts, quick comments	Automatic and revised earthquake parameters (location and magnitude), blog posts, maps, mobile interfaces for content of the INGV website	Articles about Italian and global seismicity, activities of INGV researchers, photo news, real time in-depth information during seismic sequences	Revised earthquake parameters (location and magnitude), blog posts, quick comments, replies to user comments	Cloud-Geographic information system applications that integrate digital maps, related contents and interaction features in the INGVterremoti gallery	Carousels, Stories, and Reels (including animations)
POPULARITY	16,700 subscribers	325,000+ followers	2,000,000 downloads	11,000,000 unique visitors	270,000+ followers	100,000+ views	7,117 followers
TOTAL ACTIVITY	148 videos	31,000+ tweets	4 releases for IOS and Android; the latest in 2024	~1,000 posts	20,000+ posts	30 story maps and dashboards	263 posts
NOTE	6,200,000+ total views	Awarded the most useful X account in Italy (2012)	Current rating 4+	23,400,000+ total views	Average daily post coverage 10,000+	Integration in INGVterremoti channels	Reels with more than 1,000 views

In parallel with the evolution of the INGVterremoti multi-channel digital platform, public sector communication has also evolved, particularly regarding social media. In recent years, social media have increasingly become a conduit for discursive practices on topics of general interest, fuelled by the multiple actors inhabiting these digital environments (citizens, associations, influencers, other institutions, etc.), thereby escalating communicative entropy and the difficulty in ensuring visibility for institutional streams (Ducci and Lovari, 2021). To address the mounting challenges posed by the social media landscape, the INGVterremoti team transitioned from an initial pioneering and enthusiastic phase of web and social media communication following the seismic sequence in the Emilia Po Valley, to a mature phase characterised by explicit planning and strategies.

Aligned with this direction is the collaboration with social science researchers established through the national project "Shakenetworks: the role of social media in emergency communication and the dissemination of seismological research", funded by the Italian Ministry of Education, University, and Research. This collaboration primarily focused on the automated communication of earthquake locations, but also highlighted the necessity of developing robust visual communication strategies and emphasising the growing importance of infographics (Comunello and Mulargia, 2018).

The process of expanding digital communication skills within the INGVterremoti team was further strengthened following the COVID-19 pandemic, which underscored the role of social media and digital services in institutional communication strategies, especially those potentially vulnerable (Lovari and Righetti 2020). Social media platforms have been shown by studies (Al-Dmour *et al*., 2020; Merchant and Lurie, 2020) to have played an essential role in the dissemination and acquisition of critical health information, by countering misinformation, connecting individuals to reliable sources, and reducing the spread of infection through awareness campaigns and the encouragement of behavioural change.

The pandemic also highlighted both the strengths and weaknesses of organisational structures and professional profiles across the public sector (Ducci and Lovari, 2021), emphasising the need to equip organisations with social and digital managers. In Italy, as early as 2020, a national working group — established for the reform of Law 150 within the framework of the fourth action plan for open government (Department of Public Administration, 2020) — produced a document in which the stakeholders recommended the consolidation and full recognition of the activities and skills involved in digital communication. A preliminary outcome was achieved in 2025 with the establishment of the role of social and digital manager in public administrations (Article 4 of Italian Legislative Decree 25/2025 converted into Law 69/2025).

The recognition of these new challenges led to the expansion of the INGVterremoti team, integrating members with specific competencies to meet the evolved communication needs. Several strategic decisions by INGVterremoti stemmed also from this context. First, in late 2019, the team began a collaboration with a specialised company that supported the three INGV departments in redesigning their scientific information blogs on earthquakes, volcanoes, and the environment (Pignone *et al*., 2020). Subsequently, in 2023, a research agreement was established with the Master's Degree in Information, Communication, and Publishing Sciences, part of the Department of Literary, Philosophical, and Art History Studies at the University of Rome Tor Vergata. This latter collaboration proved to be strategic in designing a new social media channel on Instagram.

2. A new channel for new goals

Instagram is one of the most popular social media platforms in the world. Launched in 2010 and acquired by Facebook in 2012, its nomenclature is a *portmanteau* of "instant" and "telegram", two words that inherently reflect its core functional characteristic: the immediate dissemination of visual information. Initially focused on customisable photographic content, the platform's utility has expanded to include short-form video creations, thereby, diversifying its multimedia capabilities.

Contemporary data underscore Instagram's widespread adoption. In Italy, unique monthly users increased from 27.3 million in September 2020 to 33.8 million by September 2024, positioning it as the second most utilised social media platform among the actively engaged Italian population, following Facebook (AGCOM, 2024). Demographic analysis indicates that individuals aged 25–34 constitute the most active user group (https://www.statista.com/statistics/692373/instagram-users-by-gender-in-italy/). This extensive user engagement is further evidenced by an average monthly usage exceeding 15 hours per user, solidifying Instagram's pivotal role within the Italian digital ecosystem (Fig. 1).

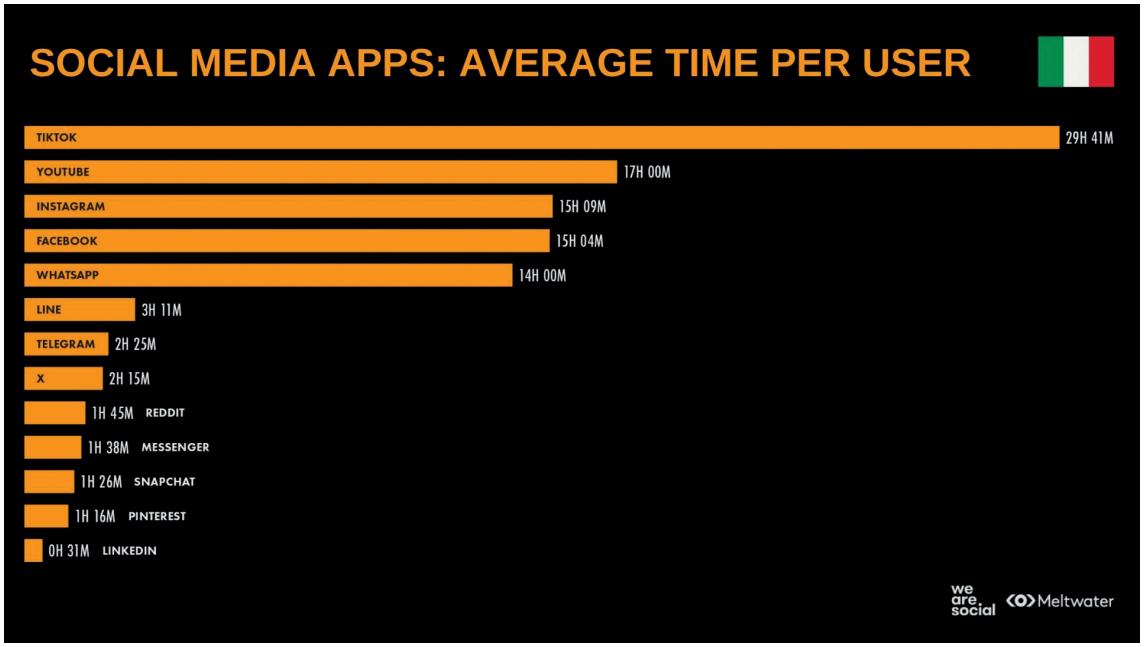

Fig. 1 - Average time spent onmain social media platforms in Italy per month. Data updated as of February 2025 (source: https://wearesocial.com/it).

In 2024, the INGVterremoti team recognised that reaching new generations required more than just attracting a small number of young citizens via their current digital platform channels: Facebook analytics, for instance, revealed that only 10% of its followers were within the 25–35 age bracket and a mere 1% were aged 18–24 (source: Meta). Therefore, it was crucial to be where these citizens were digitally active, as recommended by the best practices of PA Social, Italy's premier association for digital public communication and information (Di Costanzo and

Bonaventura, 2021). The INGVterremoti team, thus, decided to open an Instagram channel aimed at narrating the world of earthquakes to improve the effectiveness of "peace-time" communication among younger citizens, also in preparation for a possible emergency. The Sendai Framework for Disaster Risk Reduction 2015-2030 (UNDRR, 2015), adopted by the state members of the United Nations in 2015, draws the attention to an "all-of-society" approach to risk reduction. This includes younger citizens who must assume a proactive role. Their involvement can be considered a key strategy to enhance community resilience and to improve risk management. (Muzenda-Mudavanhu, 2016; Amri *et al*., 2018)

Due to its inherent characteristics, Instagram is an ideal channel for cultivating daily engagement with younger audiences. It facilitates the dissemination of scientifically validated information through an empathetic tone that directly involves citizens. Through Reels, Stories, Direct Messages, and Posts, this platform makes it possible to capture attention, instantly convey messages, receive rapid feedback, stimulate conversations on relevant topics, and, most importantly, promote positive changes in citizen behaviour. Instagram's operational velocity is, thus, its defining characteristic. Users typically engage in rapid content consumption, either by scrolling through their feed or swiping through stories, until compelling content captures their attention. This behaviour results in an average viewing time and, consequently, content engagement of just a few seconds.

Starting from 2020, after the COVID-19 pandemic, Instagram played a key role in the field of public-sector communication. According to Elhersh *et al*. (2024), on the basis of the best practices that emerged worldwide, such as those employed by the Gulf Cooperation Council, future strategies regarding Instagram use for risk communication during health crises (or of other kinds) should give priority to the enhancement of interactive involvement, collaboration with influencers, and information adaptation to cultural nuances of each territory. Other studies (Mello *et al*., 2023) show that, during COVID-19, the World Health Organization and the Centres for Disease Control and Prevention underutilised the most powerful and attractive Instagram functionality: images.

Therefore, establishing a presence on Instagram has represented a significant step in INGVterremoti's communication strategy. Specifically, it has necessitated the adoption of innovative communication approaches to render complex content accessible, clear, and engaging for a broader audience.

It has also been made possible by integrating digital communication specialists into the INGVterremoti team, composed of researchers and technologists with expertise in Earth sciences and natural phenomena. Within the research agreement with the University of Rome Tor Vergata aforementioned, faculty members, interns, and scholarship recipients have, thus, been involved in the development of both the communication plan and editorial plan, as well as in the management of the Instagram channel.

3. Planning and social strategy

Delivering certified and accurate information is never a spontaneous process (AA.VV., 2022). This principle extends unequivocally to social media. Consequently, the preparatory phase, preceding the launch of the INGVterremoti Instagram channel, has involved:

1. intensive research and benchmarking;
2. strategic planning;
3. development of the channel's launch strategy.

However, the user-centred design (UCD) approach, partly theorised by Donald Norman (Norman and Draper, 1986), has not been adopted during the process. This has led to the exclusion of two UCD key elements: the active participation of citizens in the channel's design development and the systematic analysis of their needs for realising user-centred solutions (Norman and Draper, 1986). The following sections describe in detail the methodology, tools, and results of the three phases.

1) Benchmarking. This analytical work has proved instrumental in mapping the communication strategies of other institutions on Instagram and has constituted one of the essential preparatory phases for the definition of the strategic planning. Specifically, the analysis has extended to both national and international institutions involved in risk communication and scientific outreach. It has also been conducted on an observational basis, as the necessary metrics to provide further detail were unavailable (Table 2). The following presents the institutions, their missions, and the main aspects observed on their Instagram profiles. The analysis has also included the other INGV Instagram profiles. In particular, the institute's social media communication is structured as follows: the institutional profiles, administered by the press office, are complemented by dedicated profiles for scientific outreach and communication concerning INGV's monitoring and surveillance services which are, then, managed by INGVterremoti, the Volcano Department (INGVvulcani), and Environment Department (INGVambiente) (Table 3). Useful points have emerged from this analysis. As evidenced by these tables some institutions have successfully built an extremely solid community over time. The reasons for this success are various. For instance, in the case of INGVvulcani, real time information concerning Italian volcanoes, enriched with high-impact images and videos, proves crucial for attracting public attention and interest (De Lucia, 2025). Conversely, other entities, such as the Istituto Superiore di Sanità [the Italian National Institute of Health, ISS], the Istituto Superiore per la Protezione e la Ricerca Ambientale [the Italian Institute for Environmental Protection and Research, ISPRA], and the United States Geological Survey (USGS) sustain interest through constant engagement, leveraging interactive content, contests, and surveys to specifically address newer generations. These institutions also capitalise on public interest by developing in-depth contents on current events or highly topical issues. Furthermore, as it is common across most of these channels, detailed contents illustrating the fieldwork of scientists and technicians through their faces and voices represent effective tools for closing the gap and strengthening the bond between institutions and citizens, e.g. in the Centro Internazionale in Monitoraggio Ambientale [the Italian International Centre for Environmental Monitoring, CIMA], the Istituto Nazionale di Fisica Nucleare [the Italian National Institute for Nuclear Physics, INFN], and USGS. Additionally, a tendency to establish a solid network of collaborations with other organisations or influential figures, often through the creation of collaborative content [such as the Ocean Mondays format by the Intergovernmental Oceanographic Commission (IOC)] is observed. Lastly, significant importance is attached to the use of impactful visual content such as image posts or reels (ISPRA, IOC, and INGVvulcani).

2) Strategic planning. This has involved the development of the communication plan and editorial plan. The former has established the objectives and target audience, while the latter has defined the formats and their publication frequency. Given the predominantly visual nature of Instagram, a substantial portion of this phase has also focused on graphics and multimedia integration, carried out in close collaboration with the INGV Graphics and Images Laboratory. This has been essential to ensure structured, clear, and engaging communication and to respect the visual identity of INGV, specifically INGVterremoti. Furthermore, support tools for graphics,

Table 2 - Key features of the Instagram channels of the selected institutions. Data updated as of October 2025 (source: Meta).

Institution	Mission	Instagram channel	Launch	Followers	Following	Main features
Centro Internazionale in Monitoraggio Ambientale [the Italian International Centre for Environmental Monitoring, CIMA] foundation	Research, forecasting, prevention of risks related to climate change and natural hazards (such as floods and wildfires)	@fondazionecima	2023	1,751	262	• Data, research findings, and in-depth analyses of natural phenomena (floods and wildfires) • In-depth contents on current topics • Features showcasing the faces and voices of researchers • Extensive network with other organisations, institutions, and media outlets • Collaborative formats, such as *Lessico del Rischio* (The lexicon of risk) • Youth-oriented formats, such as the *Memento Calendar* • Relatively limited community
Istituto Superiore per la Protezione e la Ricerca Ambientale [the Italian Institute for Environmental Protection and Research, ISPRA]	Research, monitoring, and inventory activities on various environmental topics	@ispra_ambiente	2017	15,300	345	• Promotion of events • In-depth contents on current topics and institution's activities • Substantial engagement and interaction with the community • Interactive formats, such as *ObiettivoNatura* [Nature in focus] • Posts and Reels with compelling images
Istituto Superiore di Sanità [the Italian National Institute of Health, ISS]	Biomedical and public health research and protection	@iss_social	2020	39,300	40	• Scientific outreach and health education (information on healthy lifestyles, vaccinations, infectious diseases, etc.) • Promotion of events, surveys and contests primarily targeting younger generations • Predominance of Image posts format over Reels
Istituto Nazionale di Fisica Nucleare [the Italian National Institute for Nuclear Physics, INFN]	Scientific research in the field of nuclear physics	@infn_insights	2017	24,000	572	• Research and field activities carried out by scientists and technicians • Vast community • Solid network of institutions and organisations • Features showcasing the faces and voices of researchers • Formats for popularising physics, such as Reels on the podcast *Risonanze. Dialoghi oltre la fisica* (Resonances. Dialogues beyond physics)
CNR-Istituto di Scienze Marine [the Institute of Marine Sciences of the National Research Council, CNR-ISMAR]	Interdisciplinary scientific activity in thematic areas (such as physical oceanography)	@cnr_ismar	2017	2,449	392	• Dissemination of marine research results • In-depth information on field activities • Relatively limited community
Istituto di Geologia Ambientale e Geoingegneria [Institute of Environmental Geology and Geoengineering IGAG]	Research on the dynamics and evolution of the Earth system, geo-environmental risks, geomaterials, and subsurface resources	@cnr_igag	2021	771	25	• Promotion of events • In-depth contents on research activities • Limited following and an underdeveloped visual identity
UNESCO Intergovernmental Oceanographic Commission (IOC)	Coordination of both global oceanographic programs and services and warning and mitigation systems for sea hazards (such as tsunami warnings)	@ioc_unesco	2017	27,400	412	• Promotion of projects, activities, and results of local and global initiatives • Strong visual identity with impactful images and Reels on the marine world • Formats in collaboration with notable figures, such as *Ocean Mondays*
USGS (United States Geological Survey)	Monitoring and research on earthquakes, volcanoes, landslides, floods, and tsunamis	@usgs	2011	350,000	108	• Scientific outreach on Earth sciences and natural hazards • In-depth contents on current topics • Features showcasing the faces and voices of researchers • Youth-oriented communication through Reels and Posts • Post and Reels with compelling images

Table 3 - Key features of the other INGV Instagram channels. Data updated as of October 2025 (source: Meta).

Institution	Mission	Instagram channel	Launch	Followers	Following	Main features
Istituto Nazionale di Geofisica e Vulcanologia [Italian National Institute of Geophysics and Volcanology, INGV]	Research and monitoring activities on earthquakes, volcanoes, and environment	@ingv_press	2016	9,554	37	• Promotion of events, activities, research findings, and institutional news
Dipartimento Ambiente di INGV [INGV Environment Department, INGVambiente]	Scientific outreach on environmental and Earth system topics	@ingvambiente	2018	11,300	81	• Interdisciplinary approach to topics related to Earth science • Contents aimed at general dissemination • Predominance of carousels and static images over Reels • No features showcasing the faces and voices of researchers
Dipartimento Vulcani di INGV [Volcano Department, INGVvulcani]	Monitoring and research on Italian volcanoes	@ingvulcani	2019	31,500	41	• Publication of weekly monitoring bulletins • Updates during eruptive events • Sharing of images and videos of volcanic landscapes and eruptions

video, and content processing have been utilised, all of which form part of the regular toolset employed by the INGVterremoti team: Table 4 summarises the main points of this stage.

Table 4 - Key points of the INGVterremoti Instagram channel strategic planning.

Element	Key points	Tools employed
Communication plan	• Benchmarking • Objectives • Target	• Google Workspace • Canva
Editorial plan	• Contents and formats • Publication frequency • Useful strategies	• Suite Drive • Google Sheets • Canva
Visual and multimedia identity and contents	• Legible typographic fonts • Specific templates • Distinctive colour palettes (orange or light blue) • Dynamic animations • Use of earthquake pictograms • Synchronised auditory components • Optimisation of images and videos	• Canva • CapCut and Filmora • Google Workspace

3) Channel launch strategy. Following the conceptualisation and design phase, a targeted and multichannel communication campaign was developed to promote the channel's launch, which officially debuted on 27 September 2024, coinciding with the European Researchers' Night, an important annual scientific event (https://marie-sklodowska-curie-actions.ec.europa.eu/actions/msca-citizens/join-a-celebration-of-science). For this occasion, an offline strategy, involving the development of promotional materials such as flyers, was also implemented: Table 5 details the main features of the campaign.

Table 5 - Key points of the INGVterremoti Instagram channel launch campaign.

Date	From 2-Aug-2024 to 27-Sept-2024
Strategy	Online (and offline)
INGVterremoti channels	Instagram, Facebook, X (ex-Twitter), Blog-magazine
Objectives	Instagram community growth Enhancing engagement Stimulating curiosity Cultivating a sense of exclusivity
Contents	*Coming soon and Spoiler Alert* Reels and Image posts Instagram live broadcasts from Pisa and L'Aquila Promotional flyers (offline) Promotional articles

The integration of digital and offline promotional strategies enabled the attainment of a broader audience, facilitating the expansion of the INGVterremoti Instagram channel (Fig. 2).

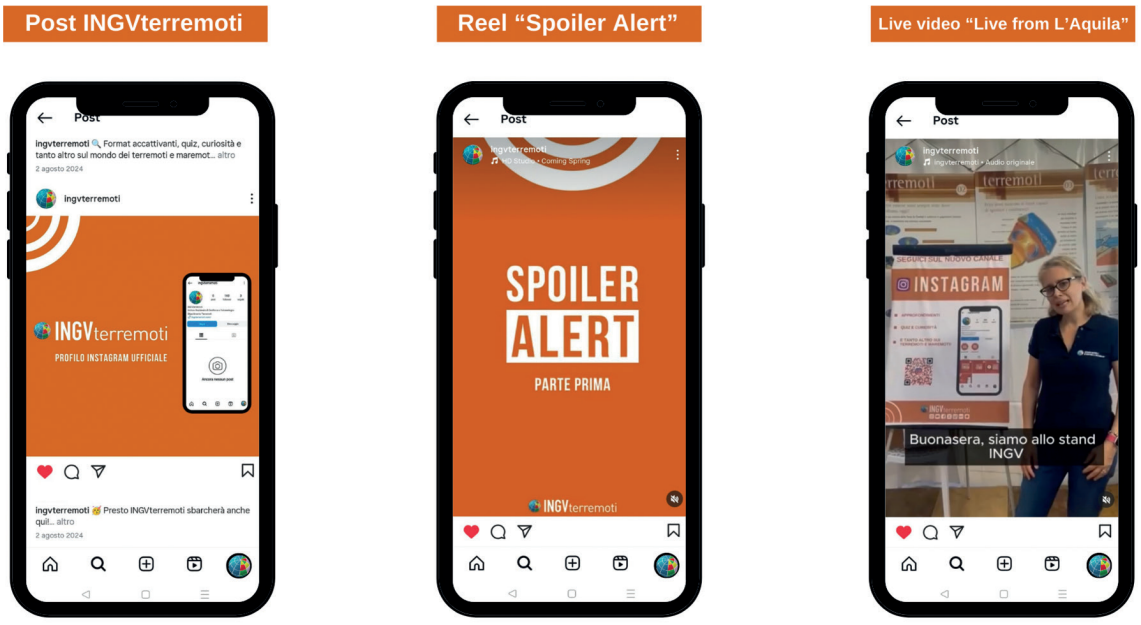

Fig. 2 - Some contents of the INGVterremoti launch campaign on Instagram.

4. Editorial plan and formats

On Instagram, INGVterremoti has developed a distinct editorial approach compared to other channels within the INGVterremoti digital platform and, indeed, distinct from the other INGV thematic channels previously analysed. The main challenge for INGVterremoti has effectively been conveying scientific information in an engaging manner without compromising its inherent reliability, objectivity, and transparency. Furthermore, in the material production phase, due consideration has been given to all best practices that enhance user engagement on the new social profile, visibility, and accessibility. To address this, the approaches cited in Table 6 have been prioritised.

Table 6 - Strategies adopted for the INGVterremoti Instagram channel.

Objectives	Strategies
Engagement	• Narrative frameworks • Use of storytelling techniques • Clear calls to action • Coherence and clarity of all disseminated messages • Concise and engaging captions
Visibility	Integration of geotags and hashtags
Accessibility	Integration of subtitles and alt texts

Additionally, the editorial plan has set the content into specific formats and defined their public frequency. Specifically, content has been consistently published, two to three times per week, supported by an editorial calendar created using Google Sheets. This frequent publication strategy, as shown by the statistics in the next chapter, is a crucial element for community growth and the dissemination of reliable information.

Table 7 reports the key features of some of the channel formats.

Table 7 - Key features of some of the INGVterremoti Instagram channel formats.

Format	Main features
Accadde oggi [On this day]	• Reimagining of the INGVterremoti facebook channel format • Recounting of both recent and historical significant seismic events • Adapted into Image posts, Carousels, Reels • Visual elements including historical photographs, transcriptions, epigraphs, postcards, newspaper front pages, videos, and animations
Terremoti del mese [Earthquakes of the month]	• Reimagining of the INGVterremoti blog-magazine format • Monthly maps of earthquakes localised in Italy and seismic trends • Adapted firstly into carousels (with maps and infographics), and then into Reels with voiceover
Storie di terremoti e maremoti [Earthquake and tsunami stories]	• Reimagining of the INGVterremoti articles and story maps • Recounting facts and curiosities from past earthquakes and tsunamis • Emotional and impactful storytelling • Adapted into carousels and Reels
Sai che [Did you know]	• Providing scientific explanations on earthquakes and tsunamis • Addressing public curiosities and questions • Engaging and compelling tone • Adapted into carousels and reels
Glossario [Glossary]	• Clear and concise explanation of scientific concepts • Reimagining of content from the INGVterremoti blog-magazine and editorial publications • Visual clarity through illustrations and images drawn from the INGVterremoti book *Terremoti e maremoti: come conoscerli e ridurre i rischi* [Earthquakes and tsunamis: understanding them and reducing risks] (AA.VV, 2025)

The consistent dissemination of these formats has established a fixed and predictable periodicity, which cultivates confidence with followers. This demonstrates the continuous commitment of INGVterremoti and, more broadly, of the institute to provide reliable, up-to-date, and verified information.

Furthermore, the recognisable format structures, coupled with the use of multimedia language and storytelling, have contributed to two key outcomes: making complex scientific data and information accessible to a non-specialist audience, particularly younger individuals, and facilitating greater public awareness (Fig. 3).

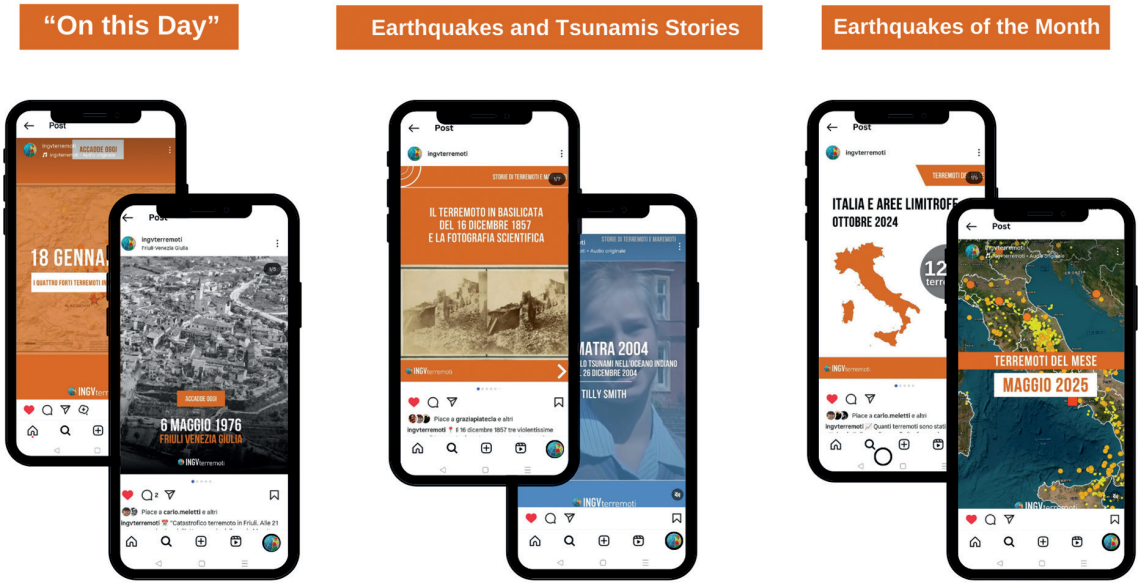

Fig. 3 - Images of some @INGVterremoti Instagram channel formats.

The INGVterremoti Instagram editorial plan initially excluded real-time seismic activity information, focusing instead on broader narratives and curiosities. However, within a few months of its launch, public feedback prompted the team to incorporate ongoing seismicity-related content, delivered in the form of image posts. Specifically, this content is limited to events with a magnitude of 3.5 or greater and is published, with updates, concurrently and automatically (via Make.com, a visual automation platform used to connect various apps and tools and automate complex workflows with a drag-and-drop interface) on all other platforms (apps, X, Facebook). Moreover, since November 2024, the Stories have also provided in-depth information on seismic events through links to the blog-magazine (Fig. 4). To this end, image posts named *Terremoti in Italia* [Earthquakes in Italy] or *Terremoti nel Mondo* [Earthquakes in the World] are customised with a title and external link based on the seismic event.

INGVterremoti has integrated Stories since the launch of its Instagram channel. These temporary, vertically-formatted contents (images, videos, and texts) are visible for 24 hours and offer extensive, interactive customisation (stickers, filters, text, and hyperlinks) to facilitate immediate communication and enhance audience engagement. Furthermore, Stories can be archived into Story Highlights for permanent profile visibility. In particular, they are also used

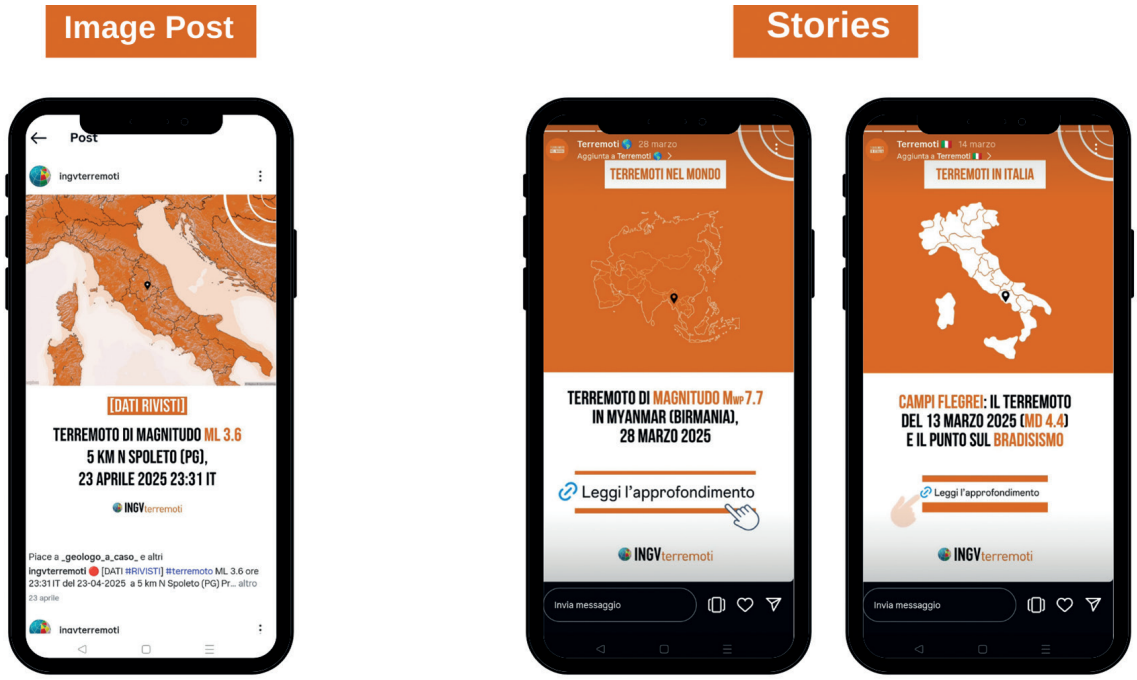

Fig. 4 - Some images of INGVterremoti real time seismicity-related content on Instagram.

to share in-feed content (Posts and Reels) and to create ad-hoc content, such as during public events organised by or involving INGV. Calls to actions are employed to prompt the audience to delve deeper into subjects on the blog-magazine through embedded external links. On the other hand, the Story Highlights categorise the formats outlined above (Fig. 5). Currently, these

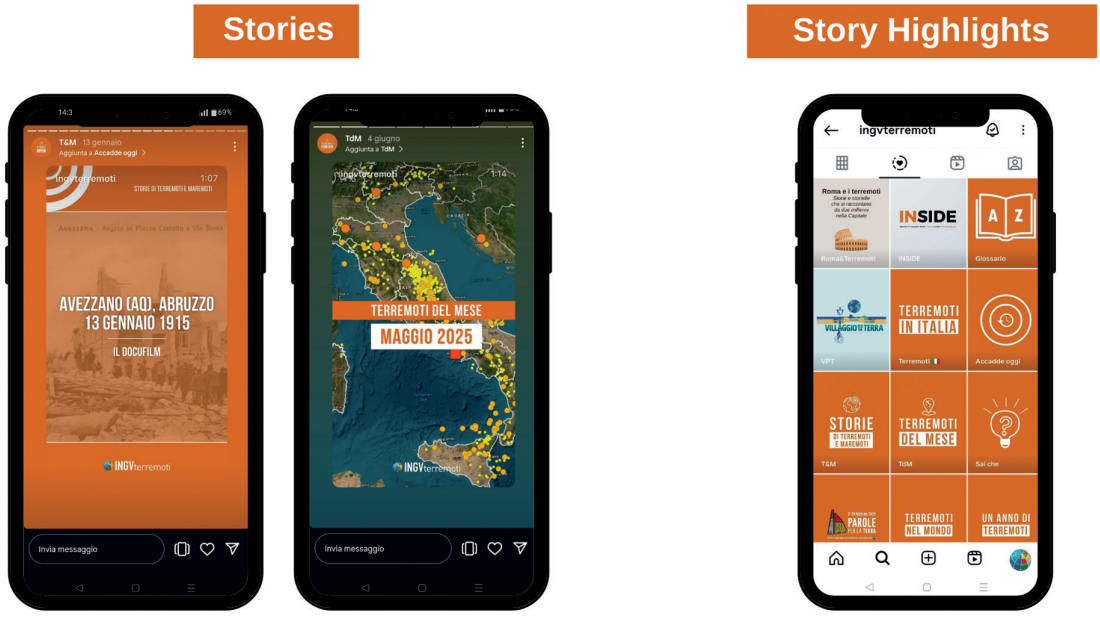

Fig. 5 - Some images of @INGVterremoti Instagram channel Stories and Story Highlights.

also include those related to public events such as *Festival della Scienza* [Science Festival] and *Parole per la terra* [Words for the Earth], as well as INSIDE, a format conceived to highlight the INGVterremoti research and monitoring activities through brief interviews with researchers.

5. The communicative impact of the Instagram channel

Content generation and dissemination activities have been accompanied by a systematic analysis of associated metrics to evaluate communication effectiveness and to align the strategy. Data acquisition has been conducted via Meta Business Suite, Meta's integrated platform for managing Facebook and Instagram accounts.

The metrics were extracted periodically, more specifically on a monthly basis. To assess the real-time trend of the metrics following the publication of content, the tools available in Meta Business Suite were supplemented by the use of the Talkwalker platform. For a comprehensive analysis of the first eight months on Instagram, all metrics were aggregated in a tabular format. Quantitative parameters, such as the number of views, number of followers, and the engagement rate, were considered to evaluate audience response. The analysis was conducted by comparing different timeframes to assess the evolution of the content's impact over time.

Although considerable attention was paid to the construction of the messages, their effectiveness was not tested according to predefined models, such as those cited by Mello *et al*. (2023) concerning health and emergency risk communication, or through qualitative investigation tools such as direct feedback, interviews, or focus groups.

A final methodological note regarding the results to be described concerns the nature of the content: the forthcoming results are solely based on organic content, meaning content published without any financial investment or sponsorship. As a public institution, INGV's official policy is to utilise content sponsorship only for the promotion of public events to ensure a wider audience reach.

In its first eight months of activity, the INGVterremoti Instagram channel was populated with 362 content items, distributed as follows: 68 Reels, 162 Stories, and 132 Posts. Of the latter, 39 focused on real-time seismicity, while the remaining 93 pertained to recurring formats.

As of 31 May 2025, the channel acquired over 6,000 followers (Table 8). As of October 2025, the closing date of this article, the follower count stands at 7,855. The audience primarily consists of young adults aged 25 to 34; however, according to the latest data collected, the public has become more diverse over time. It is structured as follows:

- 13–17 years (0.3%)
- 18–24 years (5.1%)

Table 8 - Main insights from the @INGVterremoti Instagram channel (source: Meta).

Metrics	August 2024 to May 2025
Followers	6,075
Reach	130,000
Views	570,500
Interactions	10,000
Visits	41,410
Link clicks	1,823

- 25–34 years (23.2%)
- 35–44 years (25.5%)
- 45–54 years (22.1%)
- 55–64 years (17%)
- over 65 (6.8%).

The audience comprises Italian men (44.4%) and women (55.6%), predominantly located in Campania and Lazio, with the following interests: science, university, environment, weather, social media, art, and music (Talkwalker data processing). Further audience profiling is not currently feasible. The *followers* metric can be useful for analysing the growth of the potential public.

Specifically, audience growth was consistent over time, with an average increase of 13% every 30 days. Between January and March 2025, growth reached a peak of 70%. An analysis of content and publication dates, in relation to follower trends, reveals that Instagram's audience grew significantly following a series of seismic events that garnered attention and interest. Specifically, the automatic publication of two image posts concerning the magnitude 3.9 seismic events in the Phlegraean area on 16 and 17 February corresponded to a net increase of 1,302 followers over those two days.

During those days, public attention towards bradyseism events in the Phlegraean Fields area was high, as six events with a magnitude of 3 or greater were recorded within 48 hours. The first occurred at 3:30 PM on 16 February, followed by the second and third just one minute apart, shortly before midnight. The fourth and fifth occurred after midnight, with the last event at 8:12 AM on 17 February. The following month, on 14 and 15 March, three seismic events further contributed to an increase of 718 followers. Specifically, on 14 March, a Richter magnitude (M_L) 4.7 event was localised by the National Seismic Network off the Gargano coast. On 15 March, an M_L 3.9 seismic event occurred in the Phlegraen area, and an M_L 4.0 seismic event was recorded in the Egadi Islands.

Insight analysis reveals that days with the highest follower growth, coinciding with seismic events, also saw an increase in profile visits (Fig. 6). These data indicate that citizens, predominantly young people aged 25 to 44, searched for the INGVterremoti channel on Instagram because

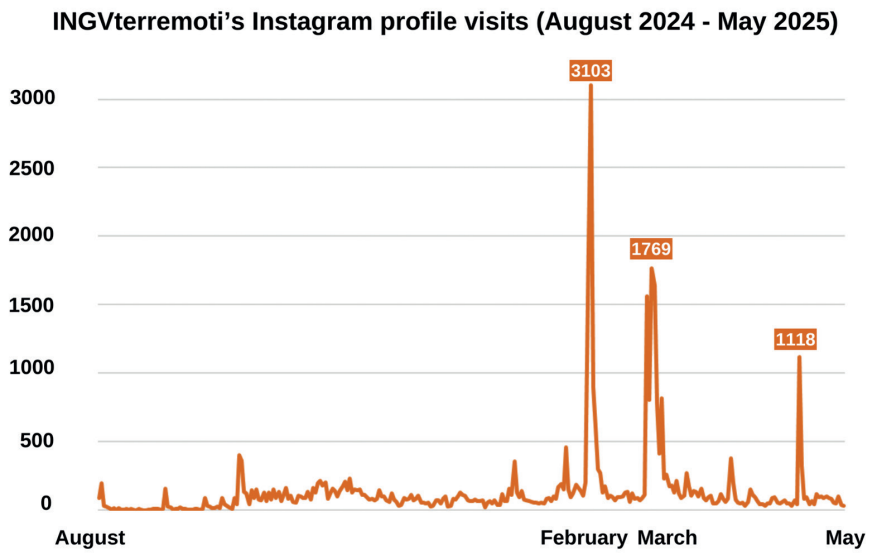

Fig. 6 - @INGVterremoti Instagram profile visit trend (source: Meta).

it is considered an authoritative source for real-time information regarding seismicity in Italy. Subsequent to 14 and 15 March, all INGVterremoti content on Instagram reached a 70% larger audience.

Furthermore, data indicate a correlation between an increase in followers and profile visits and a growth in audience originating from areas where seismic events occurred or were felt. As of the current update (31 May), the largest user base resides in the city of Naples (21%).

Generally, an increase in followers was observed following significant seismic events. However, substantial growth also occurred on other occasions: concurrently with the official launch of the channel (+119 followers), during the European Researchers' Night as previously highlighted, on 12 March (+218), and on 15 April (+62). It is interesting to note that no content was published on 12 March. However, on the preceding day, 11 March, a Reel was published and, subsequently shared via Stories. It recounted the wreckage from the 11 March 2011 tsunami in Japan as part of the *Storie di terremoti e maremoti* [Earthquake and tsunami stories] format.

On 15 April, two Posts were published in collaboration with other accounts. The first is a Reel produced by INGVterremoti, featuring imagery provided by the KM3NeT Neutrino Telescope project. This Reel, *La stazione sismica sottomarina più profonda del Mediterraneo* [Deepest seismic station in the Mediterranean Sea], which describes the deepest underwater seismic station in the Mediterranean, was published in collaboration with INFIN, the Italian coordinator of the project (Fig. 7). The *collaboration* Reel is typical of Meta and enables multiple accounts to be co-authors of a Post or Reel, making the content appear in both the publisher and collaborator's feeds, thus increasing the potential reach of all involved accounts. Specifically, this Reel garnered over 8,000 views, recording a higher percentage of views beyond the first three seconds (34.3% compared to the usual 28% up to that point) and primarily reaching a new audience (62% of views came from non-followers).

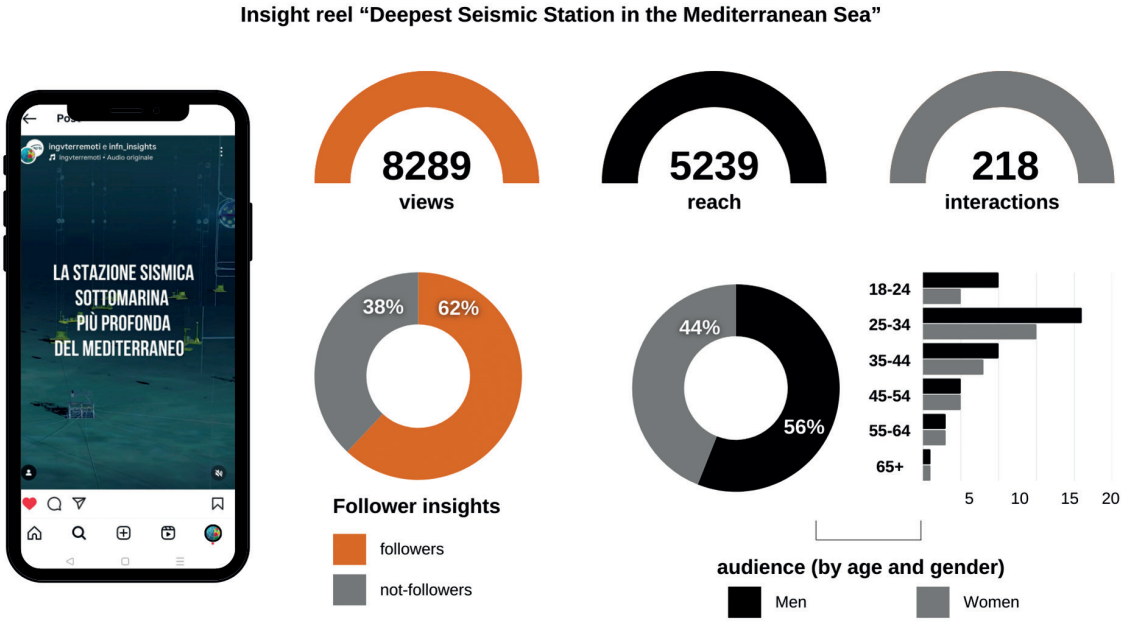

Fig. 7 - Insight Reel: *La stazione sismica sottomarina più profonda del Mediterraneo* [Deepest seismic station in the Mediterranean Sea] on the @INGVterremoti Instagram channel (source: Meta).

On the same day, the Instagram channel managed by the INGV press office, in collaboration with INGVterremoti, shared a post featuring images from the "I AM, io sono, epicentro donna" event, held on 12 April in Rome at the National Etruscan Museum of Villa Giulia. This collaborative approach proved highly effective in these two instances and subsequently as well.

An in-depth analysis of the reach of individual content published during the first eight months of activity has highlighted that the account's follower growth metric is partially negligible when considering, conversely, the growth in average content views, even among non-followers. As the thematic expression of a public institution, reaching the widest possible number of citizens is fundamental for INGVterremoti. Consequently, the impact analysis was primarily focused on the *views* metric which denotes how frequently content (such as a Post, Reel, or Story) has been accessed by the public.

Over the initial eight-month period, a cumulative total of 570,000 views were registered. Of this total, 33% was attributed to content dedicated to real-time seismicity, with the remaining 67% deriving from the channel formats (Table 9). The monthly views have increased progressively over the months, rising from a total of 30,000 in October 2024 to 60,000 in May 2025. As of October 2025, the closing data of this article, monthly views have grown further, increasing from 80,000 in June to over 120,000 in September. Considering the first eight months of activity (September–May 2025), the insights highlight a peak in views in March 2025, with a significant concentration over three consecutive days, from 13 to 15 March. This period coincided with seismic events exceeding magnitude 4. The most-viewed post, accumulating over 45,000 views, pertained to the 13 March earthquake in the Phlegraean area. The second highest-ranking content, with over 26,000 views, was the Reel promoting *Terra. Il Pianeta in 5 sensi* [Earth. The planet in five senses], the exhibition organised in Rome by INGV to commemorate the institute's 25th anniversary. The content was shared on 30 March, by the INGV press office account, utilising the *in collaboration* function with INGVterremoti, INGVambiente, and INGVvulcani. Following these, two posts related to real-time seismicity garnered substantial attention: the 14 March earthquake off the Gargano coast, with 23,144 views, and the 15 March earthquake in the Egadi Islands, with 15,706 views. The performance of these latter contents, as previously noted, contributed to an increase in follower count.

An analysis of content views, as depicted in Fig. 7, reveals that the most popular content is associated with real-time seismicity and posts shared using the *collaboration* feature with other accounts.

However, to guide communication strategies, a specific analysis was also conducted on scientific outreach content. Data concerning impact were, therefore, collected and analysed, excluding content related to real-time seismicity and that shared in collaboration. Considering the *views* metric, the following content reached the highest number of people: the carousel post for the *Accadde Oggi* [On this day] format, concerning the Sannio and Alta Irpinia earthquake of 14 March 1702, which garnered 6,651 views; the animation of the May 2012 earthquake in the Emilia-Romagna Po Valley, with 6,474 views; the Reel titled *Sai che tutta l'Italia è sismica?* [Did you know all of Italy is seismic?], achieving 6,320 views; and the Reel *Pianura Padana Emiliana 2012. Il fenomeno della liquefazione* [Pianura Padana Emiliana 2012. The liquefaction phenomenon], which received 5,795 views.

In addition to the views, other parameters were also taken into consideration to evaluate the communicative effectiveness of these contents. While it has been observed that current relevance and the commemoration of past events significantly drive views, the inherently visual nature of these high-performing contents is also a pivotal factor. They predominantly consist of Reels, animations, or short videos designed to capture audience attention. This outcome validates

Table 9 - Most popular content by views on the @INGVTerremoti Instagram channel (source: Meta).

TITLE	CATEGORY	TYPE	VIEWS	DATE
Phlegraean Fields Earthquake	Real-time seismicity	Post	45,643	13 March 2025
Terra. Il pianeta in 5 sensi [Earth. The planet in five senses]	*Eventi* [Events]	Collaborative Post	26,823	30 March 2025
Gargano Coast Earthquake	Real-time seismicity	Post	23,144	14 March 2025
Egadi Islands Earthquake	Real-time seismicity	Post	15,706	15 March 2025
Phlegraean Fields Earthquake	Real-time seismicity	Post	14,325	15 March 2025
Vaglio Basilicata (PZ) Earthquake	Real-time seismicity	Post	12,698	18 March 2025
International Oceans Day	*Eventi* [Events]	Collaborative Post	10,404	18 February 2025
Parole per la terra [Words for the Earth]	*Eventi* [Events]	Collaborative Post	9,947	17 February 2025
Phlegraean Fields Earthquake	Real-time seismicity	Post	9,745	13 May 2025
La stazione sismica sottomarina più profonda del Mediterraneo [The deepest seismic station in the Mediterranean sea]	*Sai che* [Did you know]	Collaborative Post	8,283	15 March 2025
14 Marzo 1702 Sannio-Irpinia, Campania [March 1702 Sannio-Irpinia, Campania] Earthquake	*Accadde oggi* [On this day]	Post	6,651	14 March 2025
Pianura Padana Emiliana 2012 [Po Valley] Earthquake Animation	*Accadde oggi* [On this day]	Post	6,474	20 May 2025
Sai che tutta l'Italia è sismica? [Did you know all of Italy is seismic?]	*Sai che* [Did you know]	Post	6,320	24 March 2025
Southern Ionian Sea Earthquake	Real-time seismicity	Post	5,932	16 April 2025
Foligno (PG) Earthquake	Real-time seismicity	Post	5,798	4 March 2025
Pianura Padana Emiliana 2012. Il fenomeno della liquefazione [Po Valley 2012. The liquefaction phenomenon]	*Sai che* [Did you know]	Post	5,795	29 May 2025

the strategic decision by the INGVterremoti team to prioritise Instagram over other platforms for disseminating scientific messages with a public outreach focus, leveraging storytelling and the channel's functional capabilities.

Of particular relevance to this current examination is the Reel titled *Sai che tutta l'Italia è sismica?* [Did you know all of Italy is seismic?]. This content was developed in response to a need for information from the community and public in general, prompted by a succession of seismic events throughout the month of March. The National Seismic Network recorded two seismic events in the Phlegraean Fields area on 13 March, an earthquake off the Gargano coast on 14 March, another event near the Egadi Islands on 15 March, and finally an earthquake in the province of Potenza, in Vaglio Basilicata, on 18 March. Semantic and sentiment analysis

conducted on Facebook — INGVterremoti's bidirectional communication channel — revealed public disorientation and concern. In 80% of the comments expressing these sentiments, citizens questioned what was happening. In 10% of cases, comments revolved around the semantic field of interconnected events, with words such as "also", "even" "everywhere", and "everything" frequently appearing in these conversations. Finally, 5% of the comments focused on the geography of the events, specifically drawing attention to southern Italy.

Given these findings, and the media accounts that highlighted the matter (for instance, the interview of 16 March: https://www.rainews.it/tgr/puglia/video/2025/03/terremoto-puglia-gargano-foggia-protezione-civile-piani-emergenza-comuni-362ab5eb-fd37-485f-8927-d271b7ddd657.html?nxtep), the INGVterremoti team opted to develop content on Instagram to reach a younger audience through Reels. Starting with a visualisation of the seismicity map, produced for INGV's 25th anniversary, the narrative focused on the distribution of earthquakes across the national territory, leading to current events and the absence of a connection between the recorded seismic events.

The public's response, as demonstrated by the *views* metrics, was positive, indicating significant interest in the topic (Fig. 8). The impact of a Reel needs to be considered in light of two additional factors: its timely publication, occurring just days after the seismic events when the subject remained highly relevant, and its communicative approach, didactic yet simultaneously engaging. This was achieved through the integration of compelling visuals, a clear voiceover, and reliable information.

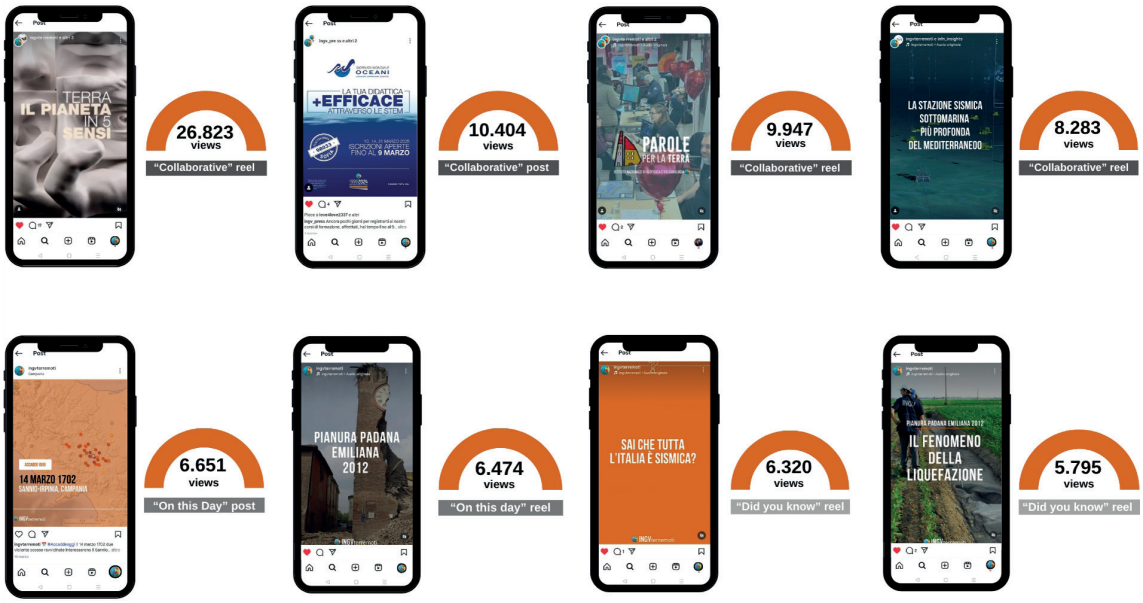

Fig. 8 - Infographic of the most viewed content by number of views on the @INGVterremoti Instagram channel (source: Meta).

Regarding Reels specifically, it is crucial to emphasise the average *watch time* metric, which denotes the mean period for which the audience engages with the video content. In the first eight months of activity of the INGVterremoti Instagram channel, Reels garnered an average viewing time of eight seconds, with the peak duration attained being 16 seconds. Significantly, out of the

68 Reels disseminated, 55% exhibited a viewing duration ranging from 8 to 12 seconds. Another 40% registered less than eight seconds, and a small segment of 5% fell between 13 and 16 seconds. The Reels that achieved the most extended viewing periods include: the Reel released on 21 February, focusing on seismic events exceeding magnitude 9 in Italy (16 seconds), the Reel from the *Storie di terremoti e maremoti* [Earthquake and tsunami stories] format, specifically recounting the 2004 Sumatra tsunami, published on 17 January (15 seconds), the Reel related to the seismic activity that occurred in Greece on 6 February, and, finally, the *Sai che* [Did you know] Reel, which explained the liquefaction phenomenon, made public on 29 May.

Excluding the latter, which has been previously analysed, the Reel published on 21 February, is particularly noteworthy. A few days prior, on 17 February at 5:46 PM, the monitoring room of the Vesuvius Observatory located a seismic event in the Phlegraean Fields area, with a magnitude of 0.9. Due to a typographical error, a magnitude of 9.0 was erroneously published on all the INGVterremoti communication channels. The inaccurate information was promptly removed and subsequently published correctly on X and Facebook. A clarifying post regarding the event was also published on the blog-magazine and the press office issued a statement to the media. However, this prompt and accurate service communication was not extended to Instagram.

The communication mishap of the typo, coupled with the community's reactions (disorientation, but also humour), presented a new opportunity to create an *ad-hoc* content for the INGVterremoti Instagram channel, specifically dedicated to curiosities. Consequently, a Reel was produced featuring an INGV researcher who explained why earthquakes of magnitude nine or higher cannot occur in Italy. The narrative focused on scientific and historical evidence, adopting a didactic yet engaging tone. As previously observed with the Reel *Sai che tutta l'Italia è sismica?* [Did you know that all of Italy is seismic?], this strategy proved successful once again: nearly 5,000 users viewed the proposed content, and the Reel was among the highest-performing contents in terms of interactions, demonstrating public interest in this topic.

A review of further insights revealed that a total of 10,000 interactions were achieved on the INGVterremoti Instagram channel within the first eight months. Interactions quantify the level of user engagement with content. This metric includes *likes*, *comments*, *shares*, *saves*, *mentions* for posts, and *views* for Reels, as previously analysed. As illustrated in Table 10, it is evident that the most popular content pertains to real-time seismicity and content shared in collaboration with other accounts (Table 10), mirroring the trend observed in the analysis of the views metric.

Specifically, the content that garnered the highest levels of interaction included the automated post from 13 March 2025, concerning the seismic event in the Phlegraean Fields (652 interactions), which was also identified as the most viewed post, and the post published by the account managed by the press office regarding the *Donne nella Scienza* [Women in science] event.

The analysis of Instagram's impact revealed that the engagement level, measured in terms of *shares* and *likes*, increased by 6,000% from September 2024 to May 2025 (Talkwalker processing data). Specifically, the engagement rate for posts concerning earthquakes rose over time, particularly for events with a magnitude greater than four, originating from accounts with potential influence, such as professional organisations (for example geologists), civil protection associations, and national and local media. This type of engagement signalled the establishment of the INGVterremoti account as an authoritative source on Instagram as well. This is significant considering that on the Facebook and X platforms, the sharing of real-time seismicity content and in-depth analyses of earthquakes or seismic sequences by official social media profiles of other public institutions, stakeholders, and media is already an established practice. The official accounts of the Civil Protection Department or the Fire Department, for instance,

Table 10 - Most popular content by *interactions* on the INGVterremoti Instagram channel (source: Meta).

TITLE	CATEGORY	TYPE	INTERACTIONS	DATE
Phlegraean Fields Earthquake	Real-time seismicity	Post	652	13 March 2025
I AM – io sono on Women in Science	*Eventi* [Events]	Post	619	8 March 2025
Gargano Coast Earthquake	Real-time seismicity	Post	287	14 March 2025
Phlegraean Fields Earthquake	Real-time seismicity	Post	240	13 May 2025
La stazione sismica sottomarina più profonda del Mediterraneo [The deepest seismic station in the Mediterranean sea]	*Sai che* [Did you know]	Reel	218	15 March 2025
Vaglio Basilicata (PZ) Earthquake	*Eventi* [Events]	Post	209	18 March 2025
Phlegraean Fields Earthquake	*Eventi* [Events]	Post	194	13 May 2025
Earthquakes in Italy: Magnitude 9 and Above	*Sai che* [Did you know]	Reel	149	2 February 2025
Speciale. I terremoti del 2024 [Special edition: the 2024 earthquakes]	*Un anno di terremoti* [A year of earthquakes]	Reel	145	16 January 2025
Planura Padana Emiliana 2012. Il fenomeno della liquefazione [Pianura Padana Emiliana 2012. The liquefaction phenomenon]	*Sai che* [Did you know]	Reel	124	29 May 2025
La scala Mercalli [The Mercalli Scale]	*Sai che* [Did you know]	Post	86	21 May 2025
6 Maggio 1976. Friuli Venezia Giulia [6 May 1976. The Friuli Venezia Giuliaearthquake]	*Accadde oggi* [On this day]	Post	75	6 May 2025
The new INGVterremoti Instagram channel	*Eventi* [Events]	Post	73	27 September 2025
Quanto dura un terremoto? [on Earthquakes' felt duration]	*Sai che* [Did you know]	Post	70	19 February 2025

share INGVterremoti posts to provide updates on ongoing verifications following a significant earthquake.

Excluding real-time seismic activity content and collaborative posts, the most popular content, measured by the number of interactions, pertained to the commemoration of past seismic or tsunami occurrences, featured in the *Accadde oggi* [On this day] format, or posts, predominantly presented in carousel format, offering definitions and intriguing facts (Fig. 9).

Notably, the audience engaged most significantly with the following: the *Sai che* [Did you know] Reel addressing earthquakes with a magnitude of 9 or greater (149 interactions); the animated Reel depicting seismic events of 2024 (145 interactions); and the liquefaction phenomenon Reel (124 interactions).

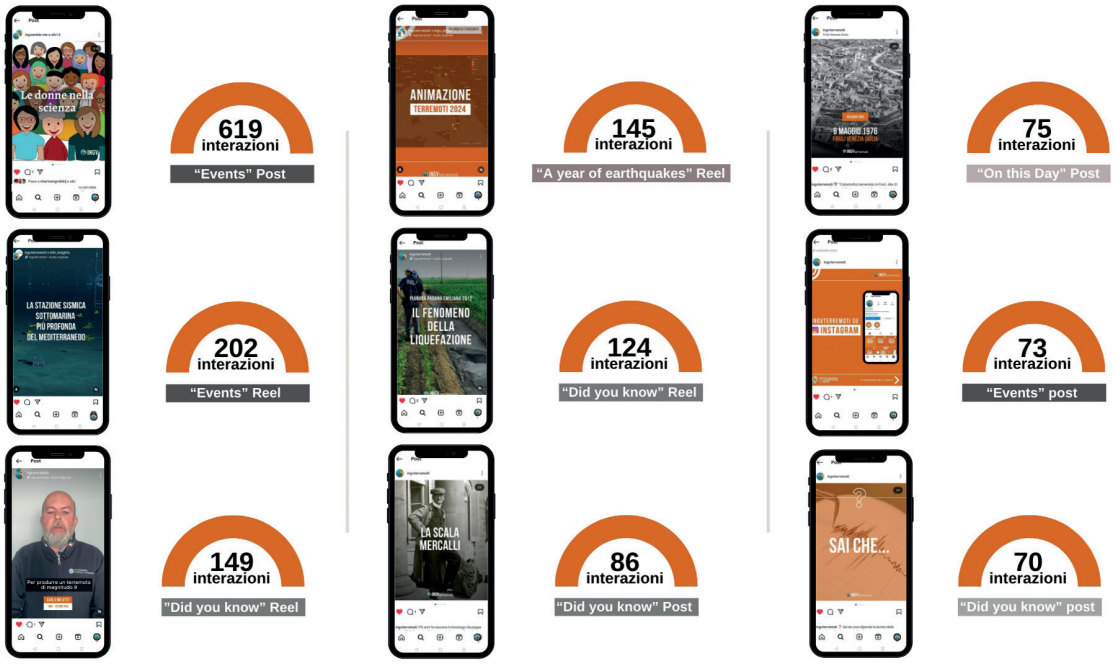

Fig. 9 - Infographic of the most viewed contents by *interactions* on the @INGVterremoti Instagram channel (source: Meta).

In conclusion, considering the Stories, 162 were created and shared within the first eight months of activity, achieving a total of 100,000 views, with an average of 617 views per Story.

As illustrated by the infographic, the most popular Stories were those related to real-time seismic activity (Fig. 10). At the top of the list is the Image post published on 17 February, providing an update on the seismic swarm in the Phlegraean Fields area. This is closely followed by the story, published on 14 March, linking to an in-depth article on the blog-magazine concerning the magnitude 4.6 earthquake in the Phlegraean Fields and the phenomenon of bradyseism.

It is noteworthy that for both these instances, the *link* click metric was significant. This metric measures the number of users who navigate away from the Instagram platform to read the full articles on the blog-magazine through the provided links. There were 374 clicks for the 17 February Story and 201 clicks for the 14 March Story. Following these, in terms of views (totalling 2,664), was the story providing an in-depth analysis of the magnitude 4.7 event off the Gargano coast on 14 March 2025.

6. Final observations

In 2024, the INGV Earthquake Department launched its Instagram channel to reach a new audience by experimenting with new formats. This choice aligns with the global trend, which emerged following the COVID-19 emergency, of intensifying the use of social media, particularly Instagram, in the communication strategies of public institutions that provide information on potentially high-risk phenomena and may need to manage crisis communication (Comunello and Mulargia, 2018; Mello *et al*., 2023; Elhersh et al., 2024).

The launch of this channel, which stands out among other communication platforms used by

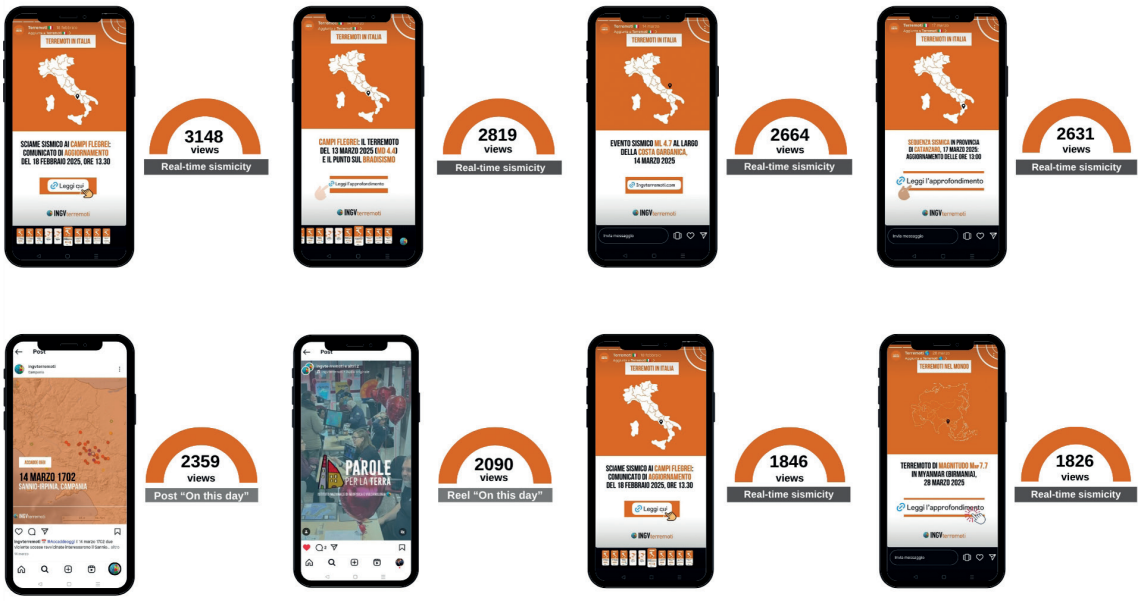

Fig. 10 - Infographic of the most viewed Stories on the @INGVterremoti Instagram channel (source: Meta).

public and scientific institutions related to civil protection, was preceded by a comprehensive and detailed planning phase and was made possible by integrating public digital communication experts into the team of seismologists, physicists, and geologists.

Within a few months, the INGVterremoti Instagram profile has established itself as an authoritative and accessible source of information, with over 6,000 followers, 362 posts, and more than 570,000 views. It successfully balances current events, scientific outreach, and historical retrospectives.

As of October 2025 (the article closing date), the audience and content reach have further expanded, currently exceeding 7,800 followers and achieving an average of 6,000 views per content piece, resulting in a total monthly reach of 100,000 views.

Originally, the INGVterremoti editorial strategy prioritised engaging content, such as interesting facts and curiosities, over providing real-time seismic updates. It was, then, decided to avoid communications on events within Italy and its nearby areas, a policy it has been following for over a decade on its X and Facebook channels. However, public interest in current events, particularly in the bradyseismic events in the Phlegraean Fields area since 2024, prompted the INGVterremoti team to introduce informational posts with data on earthquakes of magnitude 3.5 or greater. This threshold has allowed the channel to maintain a clear and unique identity.

Simultaneously, the introduction of real-time seismic data, even with this magnitude threshold, has been a driving factor in the growth of the INGVterremoti Instagram channel. A significant increase in followers occurred in conjunction with notable events, such as the seismic swarms in the Phlegraean Fields recorded between 16 and 17 February, and other seismic events in Italy that took place between 14 and 15 March.

The most impactful content was not limited to this specific type: it also included posts about past events and *Sai che* [Did you know] Reels. These Reels addressed public questions and curiosity on topics of public interest, such as "Is it possible for a magnitude 9 or greater earthquake to occur in Italy?" The challenge for the INGVterremoti team was to create engaging

content to increase public awareness. In this regard, collaborations with other accounts proved to be successful, as they helped expand the potential audience. The *collaboration* function, a Meta feature, was utilised for specific content, such as the Reels about the underwater seismic station produced with INFN, and for covering INGV public events that involved the Institute's other social media channels.

The themed and recurring formats, *Accadde oggi* [On this day], *Glossario* [Glossary], *Sai che* [Did you know], *Storie di terremoti e maremoti* [Earthquake and tsunami stories], *Terremoti del mese* [Earthquakes of the month], have been key to building audience loyalty. In many cases, this involved repurposing existing content from other platforms, such as the blog-magazine or story maps, or material previously published by the INGVterremoti team. New formats were created by leveraging Instagram's multimedia capabilities. The integration of images, reliable and contextualised data, and a narrator's voice with a researcher's face proved to be particularly successful. This is because dynamic and engaging content is most effective at capturing the attention of the public, especially younger audiences.

Through strategic and editorial efforts, the INGVterremoti Instagram channel has become a dynamic channel for rapid, visual dissemination, with considerable growth potential. It is a relatively new channel that needs to expand its audience and increase public engagement, which presents new opportunities.

First, the focus is on interaction. Currently, following the guidelines for public administration social media use, the channel operates at *presence* level (Formez, 2011): the INGVterremoti team uses Instagram to inform and initiate a relationship with the public. The next step is at *interaction* level, which entails a dialogue with the public, thereby building a relationship of trust. To this end, the team aims to enhance the use of Stories, encourage direct messages, expand the variety of content formats to include quizzes and question-and-answer sessions, and launch contests that directly engage the audience. Additionally, to enhance the reach of the content and the growth of influential followers, the team intends to expand collaborations to include other institutional accounts or those focused on scientific outreach with the objective of creating new content for a wider audience.

Furthermore, building on the first eight months on Instagram, new opportunities are emerging. Moving forward, it will be important, for example, not to overlook Instagram's potential in emergency situations. The increase in followers and interactions during significant seismic events demonstrates that citizens seek reliable sources on Instagram for accurate information. Social media platforms are increasingly serving as sources of information, in addition to entertainment: according to "Digital Report 2025. Italy" by We are Social, 32% of Italians use social media to search for and receive information.

Given the crucial role of public institutions in countering fake news, it is clear that the exclusively disseminative nature of the INGVterremoti Instagram channel must be increasingly reconciled with the demands of emergency communication when seismic or tsunami events occur. Indeed, well-constructed messages from public institutions not only can accurately inform but can also guide choices (Mello *et al*., 2023). Gürer *et al*. (2023) also reminds us that social media has revolutionised the way people access and receive information related to disasters. This has created an expectation for the rapid dissemination of scientific data and real-time updates, covering both the evolution of the event and the associated scientific outreach.

To this end, leveraging Instagram's potential while remaining true to the channel's identity and formats, successfully tested in response to informational needs arising during emergencies, can be replicated, such as the *Sai che* [Did you know] format with the Reel on *Sai che tutta l'Italia è sismica?* [Did you know that all of Italy is seismic?] of March 2025. For maximum effectiveness,

it will also be important to experiment with new formats aimed at providing explanations, eradicating doubts and false beliefs, or encouraging knowledge of the evolution phenomena, for example, image posts containing infographics on the spatio-temporal trend of a seismic sequence.

The conducted analysis also brings to light certain weaknesses, including the absence of an impact investigation substantiated by qualitative analysis. Going forward, it will be essential to integrate these to better align communication decisions.

Finally, although the launch on Instagram constituted a significant milestone for the INGVterremoti communication strategy, further developments are not ruled out for the future. According to the latest data from "Digital Report 2025. Italy" by We are Social, TikTok is the social media platform where people spend the most time. Citing PA Social, Italy's premier association for digital public communication and information, the objective is to engage with citizens on the platforms they frequent most (Di Costanzo, 2017). Consequently, the launch of the new Instagram channel is a natural progression for the already comprehensive INGVterremoti platform. Experimenting with new forms of communication for specific goals and target audiences is the new frontier for enhancing scientific efficacy while preserving reliability and transparency.

Acknowledgments. The authors wish to thank the anonymous reviewers whose suggestions contributed to the improvement of the article. A preliminary version of this study was presented at the 44th GNGTS meeting (Bologna, February 2025).

REFERENCES

AA.VV.; 2025: *Terremoti e maremoti. Come conoscerli e ridurre i rischi 4th ed.* 48 pp., ISBN 9791280282002, <ingvterremoti.com/wp-content/uploads/2025/09/libro-terremoti-e-maremoti-versione-2025.pdf>.

AGCOM; 2024: *Osservatorio sulle comunicazioni n. 4/2024.* <www.agcom.it/sites/default/files/documenti/osservatorio/AGCOM_Osservatorio%20n.4-2024_1.pdf>.

Al-Dmour H., Masa'deh R., Salman A., Abuhashesh M. and Al-Dmour R.; 2020: *Influence of social media platforms on public health protection against the COVID-19 pandemic via the mediating effects of public health awareness and behavioral changes: integrated model*. J. Med. Internet Res., 22, e19996, doi: 10.2196/19996.

Amato A., Arcoraci L., Casarotti E., Di Stefano R. and the INGVterremoti team; 2012: *The INGVterremoti channel on YouTube*. Ann. Geophys., 55, doi: 10.4401/ag-5546.

Amri A., Haynes K., Bird D.K. and Ronan K.; 2018: *Bridging the divide between studies on disaster risk reduction education and child-centred disaster risk reduction: a critical review. Children's geographies*, 16, 239-251, doi: 10.1080/14733285.2017.1358448.

Comunello F. and Mulargia S.; 2018: *Social media in earthquake-related communication shakenetworks*. Emerald Publishing Ltd., Leeds, UK, doi: 10.1108/978-1-78714-791-120181002.

Covello V.; 2009: *Strategies for overcoming challenges to effective risk communication.* In: Health R.L. and O'Hair H.D. (eds), Handbook of risk and crisis communication, Routledge, New York, NY, USA, pp. 143-167.

De Lucia M.; 2025: *Communication strategy for volcanic hazard understanding in Italy: the role of INGVvulcani team*. J. Geoethics and Social Geosci., 02, Special Issue, doi: 10.13127/jgsg-59.

Department of Public Administration; 2020: *4th National action plan for open government 2019-2021*. <open.gov.it/sites/default/files/media/documents/2022-06/Quarto_Piano_Azione_Nazionale_governo_aperto_2019-2021.pdf>.

Di Costanzo F.; 2017: *PA Social. Viaggio nell'Italia della nuova comunicazione tra lavoro, servizi e innovazione*. Franco Angeli ed., Milan, Italy, 208 pp.

Di Costanzo F. and Bonaventura D.; 2021: *Digitale, la nuova era della comunicazione e informazione pubblica. Storia e prospettive del modello italiano.* Giunti ed., Florence, Italy, 192 pp.

Ducci G. and Lovari A.; 2021: *The challenges of public sector communication in the face of the pandemic crisis: professional roles, competencies and platformization*. Sociologia della comunicazione, 61, 9-19, doi: 10.3280/SC2021-061002.

Elhersh G.A., Khan M.L., Malik A., Al-Umairi M. and Khaled H.; 2024: *Instagram for audience engagement: an evaluation of CERC framework in the GCC nations for digital public health during the Covid-19 pandemic.* BMC Public Health, 24, 1587, doi: 10.1186/s12889-024-18957-1.

Formez; 2011: *Pubblica Amministrazione e social media.* <docs.google.com/file/d/0B-9LwViHbVWkZXJCT0h5cXNMR3M/edit?pli=1&resourcekey=0-81Ii47MqGB5fLC7e_rwntg>.

Gürer D., Hubbard J. and Bohon W.; 2023: *Science on social media.* Commun. Earth Environ., 4, 148, doi: 10.1038/s43247-023-00810-9.

Holmes B.J., Henrich N., Hancock S. and Lestou V.; 2009: *Communicating with the public during health crises: experts' experiences and opinions*. J. Risk Res., 12, 793-807, doi: 10.1080/13669870802648486.

Lovari A. and Righetti N.; 2020: *La comunicazione pubblica della salute tra infodemia e fake news: il ruolo del Ministero della Salute nella sfida social al COVID-19*. Mediascapes J., 15, 156-173, <rosa.uniroma1.it/rosa03/mediascapes/article/view/17079>.

Martucci M. (ed); 2022: *Il bias dell'informazione: infodemia, fake news, echo chamber*. Durango Edizioni, Andria (BT), Italy, 145 pp.

Mello S., Glowacki E., Fuentes I. and Seabolt J.; 2023: *Communicating COVID-19 risk on instagram: a content analysis of official Public Health messaging during the first year of the pandemic*. J. Health Commun., 28, 38-52, doi: 10.1080/10810730.2023.2175278.

Merchant R.M. and Lurie N.; 2020: *Social media and emergency preparedness in response to novel coronavirus.* JAMA, 323, 2011-2012, doi: 10.1001/jama.2020.4469.

Muzenda-Mudavanhu C.; 2016: *A review of children's participation in disaster risk reduction.* Jamba: J. Disaster Risk Stud., 8, 1-6, doi: 10.4102/Jamba.V8i1.218.

Norman D.A. and Draper S.W. (eds); 1986: *User centered system design: new perspectives on human-computer interaction 1st ed.* CRC press, Boca Raton, FL, USA, 540 pp., doi: 10.1201/9780367807320.

Page S., Freberg K. and Saling K.; 2013: *Emerging media crisis value model: a comparison of relevant, timely message strategies for emergency events.* J. Strategic Secur., 6, 20-31, doi: 10.5038/1944-0472.6.2.2.

Pignone M.; 2015a: *Le story maps e l'informazione sui terremoti.* Rendiconti Online Soc. Geol. It., 34, 28-36, doi: 10.3301/ROL.2015.32.

Pignone M.; 2015b: *Story maps e terremoti, un nuovo strumento di informazione per la riduzione del rischio sismico*. GEOMEDIA, pp. 12-15, <www.earth-prints.org/handle/2122/10112>.

Pignone M., Cafarella L., De Lucia M., Nostro C., Casarotti E., Neri M., Behncke B., Di Mauro D., Angioni B. and Arena V.; 2020: *Progettazione e realizzazione di una nuova interfaccia di comunicazione per i blog INGVterremoti, INGVvulcani, INGVambiente.* In: Margheriti L., Cirillo F., Guglielmino F. and Moretti M. (eds), Progetto Sale Operative Integrate e Reti di monitoraggio del futuro: l'INGV 2.0, Report finale, Miscellanea INGV, 57, pp. 175-178, <https://editorial.ingv.it/miscellanea/2020/miscellanea57/>.

Pignone M., Amato A., Nostro C., Casarotti E., Meletti C., Quintiliani M. and Lauciani V.; 2022: *Public earthquake communication in Italy through a multi-source social media platform: the INGVterremoti experience (2010-2022)*. Front. Earth Sci., 10, 1003867, doi: 10.3389/feart.2022.1003867.

Slovic P.; 2000: *The perception of risk.* In: Sternberg R.J., Fiske S.T. and Foss D.J. (eds), Scientists making a difference, Section C - Complex Processes, pp. 179-182, doi: 10.1017/CBO9781316422250.040.

UNDRR (United Nations Office for Disaster Risk Reduction); 2015: *Sendai framework for disaster risk reduction 2015-2030*. London Earthscan Publications Ltd, London, UK, 37 pp., <www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf>.

Corresponding author: Carlo Meletti
Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa
Via Cesare Battisti 53, 56125 Pisa
Phone: +39 050 8311934; e-mail: carlo.meletti@ingv.it