

Geosciences in Italian and International television and film fiction: a study on dramaturgy, semiotics, and ethics of narrative models

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Abstract

This study analyses the representation of the geosciences in Italian and international audiovisual fiction, investigating how films and television series contribute to shaping public perceptions of science, natural hazards, and scientific institutions from an ethical perspective. Adopting an interdisciplinary approach that integrates Media Studies, semiotics, ethics, and the sociology of science, the study examines a corpus of Italian and international productions spanning from the twentieth century to the present day. The research is intended as both a methodological and an exploratory contribution, proposing a framework for the analysis of the geosciences in audiovisual fiction and illustrating its application through selected case studies.

The findings reveal a significant evolution in narrative models: from the Hollywood tradition, characterized by catastrophism and the figure of the isolated “Cassandra” scientist, to more realistic and institutionally grounded representations in recent Italian productions. Contemporary films and television series increasingly portray the geoscientist as a “competent hero,” closely connected to local communities and actively engaged in disaster risk prevention, communication, and management.

The study also explores how these narratives may shape the ethics of public engagement with science, contributing to bridge the gap between the scientific community and society while redefining the cultural role of the geosciences in the Anthropocene. Through a

dramaturgical analysis of selected films and television series, the study argues that contemporary Italian narratives humanize scientists, promote a culture of prevention, and frame disasters as shared social and cultural challenges rather than as inevitable consequences of natural hazards.

This work lays the foundation for future research on the role of audiovisual narratives in fostering prevention, strengthening the ethical communication of geoscientific knowledge, and enhancing dialogue between science and society.

Keywords: Geosciences in the Media, Geoethics, Science communication, Environmental storytelling, Disaster and climate fiction, Public engagement with science.



1. Introduction

In the contemporary media landscape, fictional audiovisual products (cinema, television series, streaming platforms, transmedia products) represent the main vectors through which the general audience not only assimilates scientific notions, but sediments the cultural image of science and those who practice it (Kirby, 2011). The main difference between cinema and television fiction lies in the destination and the format. Cinema is conceived for the dark theatre and usually lasts about two hours. Television fiction (or TV series) is structured for home viewing, divided into multiple episodes or instalments, and has much more extended narrative development times.

The geosciences have a unique epistemological and aesthetic peculiarity: they are intrinsically confronted with the concept of *Deep Time*, a term that describes the immense time scale necessary for the completion of great natural transformations, such as the birth of mountain ranges, with macro-phenomena on a planetary scale, not directly experienced by the human senses and with the intrinsic dimension of natural risk (earthquakes, eruptions, hydrogeological instability, climate collapse). Telling the story of the Earth Sciences means, for the media, translating this complexity into anthropocentric and dramaturgically sustainable narrative structures. Historically, international cinema, particularly the Hollywood and European disaster movie tradition, has approached the geosciences through standardized formulas and recurring tropes: Nature as a moral or punitive antagonist, the short-sighted or colluding bureaucratic

institution (Stewart and Nield, 2013) and the isolated and heroic “Cassandra” scientist. In the scientific and popular science fields, the ‘Cassandra scientist’ is a metaphor used to describe a researcher or scholar who makes accurate predictions based on rigorous data regarding imminent catastrophes, but whose warnings are ignored or derided by public opinion, politicians, or large corporations. The term derives directly from Greek mythology in which the priestess Cassandra receives the gift of foreseeing the future but also the curse of never being believed.

However, the emergence of the Anthropocene as a central topic in both scientific and public debate has profoundly altered this balance across all forms of media. The current global climate change, the overexploitation of natural resources, and the increasing frequency of environmental disasters have driven the international production of audiovisual fiction to develop increasingly complex narrative structures. Consider satirical-apocalyptic films such as *Don’t Look Up* (2021), the dramatic or speculative TV series *Extrapolations* (2023), and the European film focused on an ecological collapse such as *Drought* (2022; Italian title: *Siccità*). In this context, the figure of the Earth scientist is no longer limited to that of the field geologist equipped with a geological hammer; instead, it has evolved into that of a mediator of complex systemic crises at the interface between science, policy, and society.

At the same time, there is a lack of analysis regarding the staging of the geoscientific institution that concerns research institutions, monitoring networks, volcanological observatories, environmental protection agencies such as the United States Geological Survey (USGS) or the Italian National Institute of Geophysics and Volcanology (in Italian: Istituto Nazionale di Geofisica e Vulcanologia – INGV).

In fiction, scientific and public institutions constantly oscillate between being portrayed as reliable guardians of society, as in the RAI (Italian public TV broadcast) television series *Always by Your Side* (2024; Italian title: *Sempre al tuo fianco*), and as instruments of censorship or bureaucratic inefficiency, as in the HBO and Sky Atlantic miniseries *Chernobyl* (2019). This dramaturgical polarization risks generating significant distortions in the public perception of science. If audiences become accustomed to narratives in which disasters are predicted with unrealistic precision or in which institutions systematically conceal scientific information for political reasons, public trust in scientific expertise and public institutions during real emergencies may be seriously undermined (Bucchi and Trench, 2021).

Although the sociology of science and Media Studies have extensively investigated the representation of biomedical sciences, nuclear physics, and space exploration, the geosciences (including geology, volcanology, seismology, climatology, and oceanography) remain comparatively underexplored in studies of the dramaturgy and narrative structures of audiovisual fiction, including films, television series, and docu-fiction.

2. Materials and methods

This study started from the vision of the most representative audiovisual material of international cinema, based on the titles suggested and analysed by the authors considered in this bibliography (Sturkell et al., 2015; 2026). In most cases it was not easy to find the audiovisual document, both because it was absent in the main streaming platforms and because many of the titles are very old.

This study therefore based the analysis only on a few titles that would give a fairly clear idea of the dramaturgy staged and the themes communicated.

Original title	Country of production	Year	Duration
Dr. No	United Kingdom	1962	109 minutes
Doctor Who	United Kingdom	1963-1989 (classic series); 1996 (TV movie); 2005-2022 (revival series); 2023-ongoing (new series)	TV series 697 episodes (classic series); 172 episodes (revival series) Duration: 25 min. (1963-1984, 1986-1989); 45-60 min. (1985, 2005-2023, 2024-ongoing); 60-75 min. (special)
A View to a Kill	United Kingdom, United States of America	1985	131 minutes
Back to the Future	United States of America	1985	115 minutes
Jurassic Park	United States of America	1993	127 minutes
Dante's Peak	United States of America	1997	109 minutes
Volcano	United States of America	1997	104 minutes
Armageddon	United States of America	1998	150 minutes

Table 1. Production credits for the British and American films and television series examined. For optimal viewing, it is recommended to enable "Two-Page View" and "Show Cover Page".

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Among the international productions analysed in this study are *Dr. No* (1962), *A View to a Kill* (1985), *Back to the Future* (1985), *Jurassic Park* (1993), *Dante's Peak* (1997), *Volcano* (1997), *Armageddon* (1998), and the long-running television series *Doctor Who* (1963-present) (Table 1).

Among the Italian productions, this study examines *The Extraordinary Adventures of Jules Verne* (2013; Italian title: *Le straordinarie avventure di Jules Verne*), *Repairing Time* (2021; Italian title: *Riparare il tempo*), *Drought* (2022; Italian title: *Siccità*), *Never Too Late* (2024; same title in Italian), and *Always by Your Side* (2024; Italian title: *Sempre al tuo fianco*) (Table 2).

Director	Production company	Plot
Terence Young	EON Productions	The plot follows 007's investigation in Jamaica into Dr. No, a SPECTRE agent who threatens USA space launches from his secret base.
Miscellaneous	BBC (classic series); BBC Wales (revival series, seasons 1-13); Bad Wolf Productions (season 1-ongoing)	A mysterious, centuries-old time-travelling alien known as the Doctor travels through the universe aboard the TARDIS with a succession of human companions, saving worlds and civilizations from cosmic threats through his intelligence, ingenuity, and unique ability to regenerate into a new body.
John Glen	Albert R. Broccoli, Michael G. Wilson	James Bond must stop a crazy psychopathic industrialist who plans to destroy Silicon Valley with an artificial earthquake, to obtain the world monopoly of microchips.
Robert Zemeckis	Bob Gale, Neil Canton	The young Marty McFly is accidentally catapulted into 1955 thanks to a time machine created by the scientist Doc Brown and must make his future parents fall in love, to avoid vanishing into thin air and being able to return to his present.
Steven Spielberg	Kathleen Kennedy, Gerald R. Molen	A group of scientists and experts must fight for survival in a biological amusement park, after a computer sabotage frees dozens of cloned and starving dinosaurs.
Roger Donaldson	Gale Anne Hurd, Joseph Singer	Volcanologist Harry Dalton must save the town of Dante's Peak and the mayor's family, before a sudden and catastrophic volcanic eruption completely destroys the entire area.
Mick Jackson	Neal H. Moritz, Andrew Z. Davis	An emergency team led by Mike Roark must divert and stop a river of glowing lava, which suddenly emerged in downtown Los Angeles due to an underground volcano.
Michael Bay	Michael Bay, Jerry Bruckheimer, Gale Anne Hurd	A group of oil drillers is trained by NASA, to land on a giant asteroid, on a collision course with Earth and blow it up from the inside with a nuclear bomb.

Original title	Country of production	Year	Duration	Director
The extraordinary adventures of Jules Verne (Italian title: Le straordinarie avventure di Jules Verne)	Italy	2013	Animated TV series 26 episodes of 26 minutes	E. Paolantonio
Repairing the weather (Italian title: Riparare il tempo)	Italy	2021	Documentary 52 minutes	G. Castiglione
Drought (Italian title: Siccità)	Italy	2022	124 minutes	Fr. Virzi
Never Too Late (same title in Italian)	Italy	2024	TV Series 10 episodes of 30 minutes	L. Vignolo and S. De Chirico
Always by your side (Italian title: Sempre al tuo fianco)	Italy	2024	TV series 12 episodes of 50 minutes	M. Pontecorvo and G. Mazzella

Table 2. Production credits for the Italian films and television series examined.
For optimal viewing, it is recommended to enable "Two-Page View" and "Show Cover Page".

The study aimed to map, analyse, and share the narrative models and rhetorical structures through which geosciences and their institutions are represented in past and contemporary international audiovisual narratives. It also assessed the impact of this narrative on ethical public engagement with science, taking into account data collected from major databases of reviews, information, and news on film and TV series (MYMovies, IMDb, Rotten Tomatoes, Movieplayer, The Movie Database, and Metacritic). Unfortunately, these databases do not provide information on how scientific data is received by the public, but only on its general appreciation. It would therefore have been very interesting to have further insights into this aspect, both for an empirical classification of scientific audiovisual production and for framing ethical public engagement with science, so sought after in this study.

This work is intended as an exploratory contribution and a starting point for more in-depth future research. To initiate the systematic study of the representation of the geosciences in cinema and television fiction, the research was structured around the following specific objectives:

- 1) Compilation and mapping of an international audiovisual corpus spanning from the birth of cinema to the present day (1895-2026). The corpus includes fiction productions (feature films, television series, and docu-fiction) that place the Earth sciences at the centre of their narratives. For the productions analysed in detail,

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Production company	Plot
Lux Vide, Rai Fiction, Musicartoon	The young and brilliant student Jules Verne abandons his boring law studies to join the editorial staff of the magazine <i>Contes de Voyage</i> , experiencing first-hand with his companions, breathtaking explorations and technological challenges in every corner of the world that will provide him with the inspiration for his future and famous novels.
Rai Com	A road documentary set in South Tyrol that tells the stories and real-life experiences of people who, for generations, have adapted to climate and environmental change while living in harmony with nature and promoting sustainability.
Wildside, Vision Distribution	In a Rome exhausted by three years without rain and disrupted by water restrictions, the lives of several characters intertwine in a dense web of loneliness, guilt, and selfishness as they seek personal redemption.
Propaganda Italia Rai Fiction	In a dystopian 2046, planet Earth suffers from a lack of oxygen and nature is forbidden to people in order to cure it. A group of teenagers, who grew up in a strict ecological lockdown, decide to break the prohibitions and enter the inaccessible forest of Nur, to investigate the disappearance of their parents and take back their future.
Rai Fiction, March 11 Movies	An esteemed volcanologist working for the Civil Protection Department balances the front-line management of disasters with professional challenges and the emotional demands of her family life.

the following information was recorded: original title, country of production, year, running time, director, production company, and plot.

- 2) Taxonomy of narrative models and tropes. The study identifies recurrent dramaturgical patterns and actantial structures (Subject/Object, Helper/Opponent, Sender/Receiver, following semiotics in Greimas, 1983) associated with geological and climatic phenomena. It also defines recurring character archetypes (e.g., the field geologist, the data scientist, and the climate scientist or activist) and analyses the forms of pathos associated with risk, uncertainty, and environmental crises.
- 3) Analysis of the representation of power and institutions. The study examines the narrative mechanisms through which audiovisual fiction represents the relationship between geoscientific institutions and political and economic decision-makers. The aim is to understand how fiction constructs the concepts of scientific authority and disaster risk management, including their ethical dimensions, such as early warning, evacuation, and post-disaster response.

From a methodological perspective, the study sought to adopt an integrated interdisciplinary approach, bringing together Media Studies, ethics, visual semiotics, the sociology of cultural processes, and the Digital Humanities. The methodological

framework was structured into three main phases: research, corpus collection, and dramaturgical analysis of the collected corpus.

Through libraries, online databases and international catalogues, the project has identified more than 100 titles representative of all eras, Italian and foreign and of all audiovisual formats (cinema, TV, docufiction, film or long series). On the 13 selected titles, a standardized analytical grid based on two theoretical levels was applied in the corpus:

- Dramaturgic/Production Analysis: cataloguing data, plot structure (Vogler, 2007), study of the plot and configuration of narrative functions, with particular attention to the management of temporality (story time vs. discourse time, crucial for the representation of geological Deep Time), based on the data collected, where present, in the Cinemetrics database that provides information on tight editing and ASL (Average Shot Length), i.e., the Average Duration of the Shots in seconds. The ASL is obtained by dividing the total duration of the work (usually excluding the opening and closing credits) by the total number of shots. In some cases, however, the website reports different data, both for the years considered in the case of the TV series *Doctor Who* (1963-ongoing) and for the various calculations that each user has processed on the platform. As far as Italian Fiction is concerned, there is no information in the database. In addition to the numerical values found, therefore, this study based a personal evaluation, following the viewing of the films and series, establishing a measurement term for the Pathos, such as “High Tension,” “Medium Tension” or “Low Tension.”
- Visual Enunciation Analysis: study of staging strategies. How scientific data are visually shown (use of graphic interfaces, radar screens, 3D computer simulations) and how the Earth is spectacularized through CGI (Computer-Generated Imagery).

2.1. International fiction

A notable precursor to the present study is the recent article by Sturkell et al. (2026). The authors analyse 141 American and British films produced and released between 1919 and the present day, highlighting that geologists are most often portrayed as positive characters. Of the 202 geologist characters identified across the 141 films, 85% are depicted as competent, likeable, and essential to the resolution of the plot. The 2026 study builds on the authors' earlier work, which examined a selection of emblematic films, analysing both their plots and the ways in which geologists are portrayed (Sturkell et al., 2015).

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Figure 1. From left to right, collage of the posters of the following international films and TV series: "A View to a Kill" (1985), by John Glen; "Dr. No" (1962), by Terence Young; "Volcano" (1997), by Mick Jackson; "Armageddon" (1998), by Michael Bay; "Back to the Future" (1985), by Robert Zemeckis; "Doctor Who" (1963-ongoing), by various authors; "Jurassic Park" (1993), by Steven Spielberg, and "Dante's Peak" (1997), by Roger Donaldson (Image created with Adobe Express and used solely for illustrative purposes in this scientific analysis. Non-profit use).

Title	Year
Captain Kidd, Jr.	1919
Two women	1919
Partners of the Sunset	1922
No More Women	1924
The fighting sap	1924
Lightning Bill	1926
Roaring Ranch	1930
With Byrd at the South Pole	1930
Hot Saturday	1932
The Gay Divorcee	1934
The Law of the 45's	1935
Whispering Smith Speaks	1935
Black Gold	1936
Valley of Terror	1937
Danger – Love at Work	1937
Flying G-Men	1939
Heritage of the Desert	1939
Quick Millions	1939
Boom Town	1940
Dr. Cyclops	1940
Blazing Six Shooters	1940
Remedy for Riches	1940
The Valley of vanishing men	1942
The Saint Meets the Tiger	1943
Marked Trails	1944
The San Antonio Kid	1944
Tarzan and the Amazons	1945
The Monster and the Ape	1945
Conquest of Cheyenne	1946
The Cockeyed Miracle	1946
Jesse James Rides Again	1947
My Favorite Brunette	1947
Durango Kid – Bandits of El Dorado	1949
Tulsa	1949
Kim	1950
The White Tower	1950
Tarzan and the Amazons	1945
The Monster and the Ape	1945
Conquest of Cheyenne	1946
The Cockeyed Miracle	1946
Jesse James Rides Again	1947
My Favorite Brunette	1947
Tulsa	1949
Kim	1950
The White Tower	1950
Unknown World	1951

Title	Year
Leadville Gunslinger	1952
African Treasure	1952
A Yank in Indo-China	1952
Red river shore	1953
Creature from the black lagoon	1954
Day the World Ended	1955
Canyon Crossroads	1955
Swamp Women	1956
Written on the Wind	1956
Magnificent Roughnecks	1956
Attack of the Crab Monsters	1957
Campbell's Kingdom	1957
The Astounding She-Monster	1957
The Black Scorpion	1957
The Monolith Monsters	1957
The Night the World Exploded	1957
The Trollenberg Terror	1958
Giant from the Unknown	1958
Journey to the Centre of the Earth	1959
Terror in the Midnight Sun	1959
Ten Who Dared	1960
Tulsa	1949
Kim	1950
The White Tower	1950
Unknown World	1951
Leadville Gunslinger	1952
African Treasure	1952
A Yank in Indo-China	1952
Red river shore	1953
Creature from the black lagoon	1954
Day the World Ended	1955
Canyon Crossroads	1955
Swamp Women	1956
Written on the Wind	1956
Magnificent Roughnecks	1956
Attack of the Crab Monsters	1957
Campbell's Kingdom	1957
The Astounding She-Monster	1957
The Black Scorpion	1957
The Monolith Monsters	1957
The Night the World Exploded	1957
The Trollenberg Terror	1958
Giant from the Unknown	1958
Journey to the Centre of the Earth	1959
Terror in the Midnight Sun	1959
Ten Who Dared	1960

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Title	Year	Title	Year
A Matter of WHO	1961	RocketMan	1997
Dr. No	1962	Volcano	1997
Crack in the World	1965	A Civil Action	1998
The City under the Sea	1965	Armageddon	1998
Daleks' Invasion Earth 2150 A.D.	1966	The Insider	1999
Battle Beneath the Earth	1967	South Park: Bigger, Longer & Uncut	1999
The Money Jungle	1967	Pitch Black	2000
Countdown	1967	Kin	2000
Finian's Rainbow	1968	The Last Patrol	2000
The Southern Star	1969	Deep Core	2000
Joniko and the who's got it	1969	Atlantis: The Lost Empire	2001
Equinox	1970	Evolution	2001
Walkabout	1971	Power Play	2003
Street of a Thousand Pleasures	1972	Flight of the Phoenix	2004
Beware! The blob	1972	Blueberry (Renegade)	2004
Gold	1974	The Dukes of Hazzard	2005
Earthquake	1974	Eight Below	2006
Doc Savage: The Man of Bronze	1975	The Last Winter	2006
Track of the Moon Beast	1976	Ocean's Thirteen	2007
King Kong	1976	There Will Be Blood	2007
The Shadow of Chikara	1977	Journey to the Centre of the Earth	2008
The Last Dinosaur	1977	Quantum of Solace	2008
Comes a Horseman	1978	The Day the Earth Stood Still	2008
Summer camp	1979	2012	2009
When Time Ran Out ...	1980	Creation	2009
St. Helens	1981	Nine Miles Down	2009
Mother Lode	1982	The Age of Stupid	2009
Waltz across Texas	1983	Whiteout	2009
Sheena	1984	Another Year	2010
A View to Kill	1985	The Thing	2011
Sherman's March	1985	Prometheus	2012
Creature	1985	Transformers 4: Age of Extinction	2014
Leviathan	1989	GOLD	2016
DeepStar Six	1989	Monster Trucks	2016
Gas, Food, Lodging	1991	Kong: Skull Island	2017
Landslide	1992	Living Proof	2017
Seedpeople	1992	Jungle	2017
Merlin	1993	Wonder Woman 1984	2020
How to Make an American Quilt	1995	Godzilla vs. Kong	2021
Twelve Monkeys	1995	Fire and Love	2022
Bio-Dome	1996	Good Night Oppy	2022
Dante's Peak	1997		

Table 3. List of British and American films containing geologist characters, based on the compilation by Sturkell et al. (2026).

According to Sturkell et al. (2015), the first film to feature a geologist in a leading role was *Hot Saturday* (1932), in which Randolph Scott (1898-1987) plays a geologist living in a cave who loses his girlfriend to the character portrayed by Cary Grant (1904-1986). Sturkell et al. (2015) also note that geologist characters frequently appear in supporting roles in Western films of the 1930s and 1940s. For example, the film *Marked Trails* (1944) features an oil exploration geologist whom the “bad guys” describe as “one who walks and takes notes everywhere” – a somewhat dismissive characterization intended to portray him as an odd or eccentric individual.

Sturkell et al. (2015) also note that the number of films featuring geologists as protagonists increased from the mid-1940s onward, while the range of genres expanded considerably. In addition to Westerns, geologists began to appear in adventure films, thrillers, disaster movies, and monster films. In 1957, two monster films, *The Black Scorpion* and *The Monolith Monsters*, were released, both featuring heroic geologists as their protagonists.

The Cold War also left its mark on representations of geologists, introducing a theme that would become increasingly familiar: the threat of world domination by an evil organization. Released in 1962, at the height of the Cold War, the first James Bond film, *Dr. No*, features a murderous geologist (a petrologist) who heads a criminal uranium-mining organization.

The first female geologist appears in the Cold War-era disaster film *Crack in the World* (1965). In the film, she joins two male geologist colleagues in a geothermal drilling project. By detonating a nuclear bomb at the boundary between the Earth’s crust and mantle, the three inadvertently trigger a massive global rift that threatens to destroy the planet. To prevent the crack from spreading further, a second nuclear bomb must be detonated, and one of the geologists ultimately sacrifices himself to save the world (Sturkell et al., 2015).

One of the few other female geologists appears in the James Bond film *A View to a Kill* (1985). As in *Dr. No* (1962), the plot revolves around a villain seeking world domination, this time through economic rather than political means, with geologists playing a central role. The villain’s scheme involves triggering massive earthquakes simultaneously along the San Andreas and Hayward faults in order to destroy Silicon Valley. The film features two geologists: one dies a gruesome death while assisting the villain, whereas the other – a California State Geologist and Bond girl – survives. These Cold War-inspired narratives were followed in the 1990s by a series of disaster films, including *Dante’s Peak* and *Volcano*, both released in 1997 and featuring a total of nine geologists. The following year, *Armageddon* (1998) was released, portraying two geologists among the team of oil drillers who are prepared to sacrifice their lives to save the world (Sturkell et al., 2015).

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Overall, geologists in films are overwhelmingly portrayed as men. While science has increasingly addressed issues of gender inequality, cinema – and Hollywood in particular – appears to exhibit an even greater lack of gender diversity. According to Johnson (2018), only 14 female geologists appear across 12 American films, representing just 11% of all geologist characters portrayed on screen.

Some of these issues were also examined by Easton et al. (1990). Their study found that geologists are generally portrayed as “good guys” and are, more often than not, men who are strongly dedicated to their work.

Weart (1988) argued that physicists and chemists are frequently portrayed in films as mad scientists intent on dominating the world or destroying the Earth. Even when they are not depicted as villains, Weart observed that they are most often characterized as absent-minded or misunderstood geniuses.

Taken together, these studies suggest that the British and American film industries generally portray geology as a respectable profession, albeit one with an extraordinarily high mortality rate. This conclusion is further supported by Follows (2026), who conducted a study comparable to that of the Göteborg research team. Using a different methodology, Follows estimated the mortality rate of geologist characters at 31%, compared with 34% reported by the Göteborg study.

The broader representation of scientists in cinema has also been examined by Frayling (2005). From Victor Frankenstein and Dr. Moreau to Doc Brown in *Back to the Future* (1985), scientists have long been portrayed in popular culture as enigmatic, fascinating, and potentially menacing figures.

These films suggest that scientists are often portrayed either as evil, megalomaniacal geniuses or as awkward yet ultimately heroic saviours of society. Frayling (2005) traces the genealogy of the scientist in cinema, showing how this figure has repeatedly embodied the dominant anxieties of different historical periods. The fear of nuclear catastrophe in the 1950s gave rise to a series of horror films featuring radioactive mutants, such as *Creature from the Black Lagoon* (1954) and *The Giant from the Unknown* (1958), while concerns about cloning and biotechnology in the 1990s found expression in films such as *Jurassic Park* (1993). Throughout these periods, the scientist was portrayed as a figure who simultaneously inspired fascination and fear.

In recent decades, with growing public awareness of environmental issues and the impact of technology on nature, representations have increasingly depicted scientists as agents of powerful corporations, driven by greed and the pursuit of profit.

Also of particular interest is the work of Orthia (2013), who explores the intersection between the *Doctor Who* universe and geology, examining key themes such as volcanism and deep time. The Earth’s geological history is, in fact, a recurring theme throughout the series. For example, the Tenth Doctor episode *The Fires*

of *Pompeii* (2008) allows viewers to experience the eruption of Mount Vesuvius in 79 AD, blending established volcanological knowledge with science fiction. Other episodes address environmental crises and geological disasters – such as pollution-induced climate change or catastrophic flooding – to offer a critical perspective on Western science, industrialization, and their environmental consequences. Among the titles identified and discussed in the literature reviewed above, this study selected eight films for detailed analysis. The results of this analysis are presented in Table 4, following the methodological framework described earlier. With regard to the ethics of public engagement with science, the study also includes an evaluative assessment of the scientific representation in the selected

Series/ Movies	Fundamental Actantial Roles	Start: Ordinary/ Call World	Descent: Guardians and Extraordinary World	Crisis: The Cave and Central Trial
Greimas Semiotics – The Hero's Journey (Vogler)				
Volcano (1997)	Subject: Mike Roark. Receiver: Nature/Emergency. Valuable Item (Desire/Purpose): L.A.'s Salvation. Opponent: Bureaucracy/Lava. Helper: Dr. Barnes/Fire.	Urban routine in L.A. An unusual earthquake and tremors in the subsoil serve as a call.	Bureaucracy denies the danger. The eruption breaks the road: the beginning of the extraordinary world.	The trapped subway. Maximum test: the sacrifice of individuals to slow down the flow.
Armageddon (1998)	Subject: Harry Stamper. Receiver: NASA/Extinction. Object: Salvation of the Earth. Opponent: Time/Asteroid. Helper: Team/Military.	Harry works on oil wells. NASA urgently summons him for a space mission.	Flash military training for civilians. The Shuttle's take-off exceeds the threshold.	Disastrous landing. Central Trial: Harry sacrifices himself to manually activate the bomb.
Back to the future (1985)	Subject: Marty McFly. Receiver: Time error. Object of Value (Purpose): Timeline Reset. Opponent: Biff/Technological Limitations. Helper: Doc Brown (1955).	Marty is a high school student born in 1985. The call was triggered by the attack of the Libyans against Doc.	Accidental trip in 1955. The guardian is the initial skepticism of the Doc of the past.	School dance party. Maximum test: make the parents kiss before vanishing into thin air.
Jurassic Park (1993)	Subject: Alan Grant. Receiver: Survival Instinct. Valuable Item (Purpose): Island Escape. Opponent: Dinosaurs/Nedry/Greed. Helper: Ellie/The Children/Chaos.	Grant digs dinosaur fossils. John Hammond invites him to evaluate his new park.	Arrival on the island. The guardian is the tropical storm that isolates the energy structure.	The T-Rex fence collapses in the rain. Try: protect children in the jungle.
Doctor Who (1963-ongoing)	Subject: the Doctor. Receiver: Sense of Justice. Valuable Item (Purpose): defense of the Universe. Opponent: Dalek/Cybermen/Master. Helper: Human Companions/TARDIS.	The Doctor regenerates or travels into space and meets a new human companion.	The companion agrees to board the TARDIS, overcoming his fear of the unknown.	Heart of the cosmic adventure: head-on clash with the Daleks and apparent defeat of the hero.

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films. This assessment is based both on data collected from major film review websites (Tables 5 and 6) and on a systematic analysis of the films themselves. Films that prioritize spectacle to such an extent that scientific realism is substantially compromised are evaluated less favourably. Conversely, films that make a clear effort to represent scientific knowledge accurately – even when this may come at the expense of artistic or production quality – are evaluated more positively, in recognition of the ethical value of such representational choices. These evaluations are necessarily interpretative and reflect the author's analytical judgment rather than an objective or universally applicable assessment.

Return: Resurrection and Climax	Resolution	Visual Enunciation	Public Engagement with Science	Pathos	Deep Time
Lava diversion by explosives. Roark emerges alive from the rubble of the building.	Rain cleans the city. L.A. discovers a new social cohesion and solidarity.	Use of graphical user interfaces, radar screens, CGI (Computer-Generated Imagery) and 3D computer simulations	Negative	High-Tension	High
Ben and the survivors flee before the explosion. Symbolic resurrection of the planet.	The asteroid is destroyed. The Earth is saved; Sacrifice leaves a legacy of love.	Use of graphical user interfaces, radar screens, CGI (Computer-Generated Imagery) and 3D computer simulations	Negative	High-Tension	High
Race against time under the storm. The lightning strikes the clock tower.	He returned happily in 1985 with a much more united, rich and secure family.	Optical/digital compositing visualeffects.	Positive for Albert Einstein's theory of Special Relativity, traveling to the future is theoretically possible.	High-Tension	High
Desperate escape to the visitor centre from the Raptors and final rescue by helicopter.	Deep understanding of the limits of science and total rejection of the artificial park.	Use of graphical user interfaces, radar screens, CGI (Computer-Generated Imagery) and 3D computer simulations	Negative	High-Tension	High
Resolution of the temporal paradox. The final regeneration acts as a resurrection.	The universe is saved once again; the comrades acquire a new consciousness.	Use of graphical user interfaces, radar screens, CGI (Computer-Generated Imagery) and 3D computer simulations	Positive for Einstein's relativity (time dilation), black holes, time paradoxes, quantum mechanics and the nature of spacetime.	High-Tension	High

Series/ Movies	Fundamental Actantial Roles	Start: Ordinary/ Call World	Descent: Guardians and Extraordinary World	Crisis: The Cave and Central Trial
Dr. No (1962)	Subject (Hero): James Bond-007. Object: Find out who killed Agent Strangways and foil the sabotage of American rockets at Cape Canaveral. Sender (who activates the mission): M (the head of the British Secret Service) and the British Government. Receiver (who benefits from success): the free world, the safety of American spaceflight and the British Empire. Helpers: Quarrel (the local guide), Felix Leiter (CIA agent) and Honey Ryder (the "Bond girl", helper in the finale). Opponents: Dr. Julius No, the SPECTRE organization and their henchmen.	Bond is urgently summoned to M's office at midnight. He receives the mission: to investigate the mysterious disappearance in Kingston (Jamaica) of the local station master, John Strangways.	The Extraordinary World: Jamaica, seemingly paradisiacal but full of pitfalls. The Guardians of the Threshold: immediately after landing, Bond confronts a fake driver who tries to poison him; a photographer who tries to immortalize him; a lethal tarantula in his bed. Bond outmaneuvers the guardians by eliminating them.	The Cave island is the heart of Dr. No's kingdom, defended by a "dragon" (a flamethrower tank) that kills Quarrel. The Central Trial: Bond and Honey are taken prisoner and taken to Dr. No's underground bunker. This place represents a technological and dystopian descent into hell. The hero is stripped of his weapons, cleaned up and "exposed" in front of Dr. No.
A View to a Kill (1985)	Subject: James Bond (007). Object: Preventing the destruction of Silicon Valley. Sender: M/British Secret Service. Receiver: Western technology market and the U.S. government. Helpers: Chuck Lee (CIA), Tibbett (MI6 agent), Stacey Sutton (heiress and geologist) and, in the finale, May Day (former ally of the villain). Opponents: Max Zorin (industrial psychopath born from Nazi genetic experiments) and his bodyguard May Day.	Call: M shows Bond the microchip. It is identical to the British electromagnetic pulse-proof ones. The investigation leads to the industrial tycoon Max Zorin.	Extraordinary World: The Chantilly racecourse and the luxurious villa of Zorin in France, a sumptuous setting that hides a high-tech criminal operation. Guardians of the Threshold: Bond infiltrates Zorin's racing world under an assumed name. Zorin and May Day discover the deception, kill the helper Tibbett and attempt to drown Bond inside a car in a lake.	The Cave: San Francisco, specifically the Zorin mine close to the San Andreas fault. Central Trial: Bond discovers the crazy "Grand Slam" plan: to cause an artificial earthquake to flood Silicon Valley and monopolize the microchip market. Zorin traps Bond and Stacey in a burning City Hall elevator to have them accused of murder. Soon after, Zorin floods and explodes his own mine, sacrificing May Day and her workers.
Dante's Peak (1997)	Subject: Harry Dalton (USGS volcanologist). Object: to save the population of the town from the impending cataclysm. Sender: Nature and professional duty. Receiver: the inhabitants of the town of Dante's Peak and the mayor Rachel Wando with her children. Helpers: Rachel Wando, the USGS team technicians. Opponents: Paul Dreyfus (Harry's chief bureaucrat who delays the alarm so as not to damage the local economy) and, on an environmental level, the destructive force of the volcano.	Ordinary World: Harry Dalton lives in the trauma of the past (the death of his girlfriend caused by an eruption in Colombia). He works by aseptically monitoring scientific data. Call: he is sent to Dante's Peak, a quiet mountain town, due to seismic anomalies. Upon his arrival, he meets Mayor Rachel and discovers the first disturbing warning signs (dead trees, acidity of the water, two tourists boiled alive in a spring).	Extraordinary World: the sacred mountain that turns into a death trap. Guardians of the Threshold: Harry's boss, Paul Dreyfus, minimizes the danger so as not to scare investors and blocks the Civil Protection alert. When the sulfur contaminates the city's water, the City Council meets, but the volcano explodes.	The Cave: the ascent to the mountain to save Rachel's children and grandmother Ruth. Central Trial: the crossing of the acid lake by boat. The engine dissolves and Grandma Ruth sacrifices herself, throwing herself into the corrosive water to push the boat ashore and save the family. Chief Dreyfus dies overwhelmed by the collapse of a bridge, leaving Harry as the sole leader.

Table 4. Dramaturgical and actantial analysis of the selected British and American films and television series. For optimal viewing, it is recommended to enable "Two-Page View" and "Show Cover Page".

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Return: Resurrection and Climax	Resolution	Visual Enunciation	Public Engagement with Science	Pathos	Deep Time
The Resurrection: Bond's escape from death through the bunker's ventilation ducts and the antagonist drowns in his own destructive element.	Return with the Elixir: With the bunker on the verge of destruction, Bond frees Honey Ryder. The two flee aboard a boat as the island of Crab Key explodes behind them. The global threat is averted.	Use of graphical user interfaces, radar screens, special effects and explosions.	Negative	High-Tension	High
Resurrection: Bond escapes fire and police. In the mine he allies himself with the revived and betrayed May Day, who sacrifices herself by bringing the nuclear device out of the fault line on a railway trolley, saving Silicon Valley. Bond clashes with Zorin on an airship, frees Stacey and suspended in the air, makes Zorin lose his balance, who falls into the void.	Return with the Elixir: Zorin's accomplice scientist explodes on the airship, foiling all traces of the plan. Silicon Valley is saved. The KGB awarded Bond the Order of Lenin (a unique case for a British spy), but he preferred to escape the radar of the secret services to enjoy the triumph and intimacy with Stacey Sutton in his shower.	Use of graphical user interfaces, radar screens, special effects and explosions.	Negative	High-Tension	High
Resurrection: Harry returns to the spooky town to retrieve a NASA radio beacon (the instrument of salvation). He is trapped with his family inside an abandoned mine. The mountain explodes, the mine collapses, burying them alive. Harry, with a broken leg, manages to activate the beacon.	USGS rescue teams locate the beacon and extract Harry, Rachel, and children safely from the mine and on the helicopter observe the devastation of Dante's Peak. Harry has overcome the guilt of his girlfriend's death, finding a new family and salvation.	Use of graphical user interfaces, radar screens, CGI (Computer-Generated Imagery) and 3D computer simulations	Negative	High-Tension	High

Title	MYMovies	IMDb	Rotten Tomatoes	Metacritic
Dr. No (1962)	Rating: 3,56/5 (Agent 007 – License to Kill – Film (1962) – MYmovies.it)	Rating: 7,2/10 (Agent 007 – License to Kill (1962) – IMDb)	Rating: 3.9/5 (Dr. No Rotten Tomatoes)	Grade: 78/100 (Dr. No Reviews – Metacritic)
Doctor Who (1963-ongoing)	Rating: 3,38/5 (Doctor Who – Serie TV (2005) – MYmovies.it)	Rating: 8,5/10 (Doctor Who (Serie TV 2005-2022) – IMDb)	Rating: 7,70/10 (Doctor Who Rotten Tomatoes)	Grade: 77/100 (Doctor Who critic reviews – Metacritic)
A View to a Kill (1985)	Valutazione: 3/5 (007 – Bersaglio mobile – (1985) – My Movies – The Movie & TV Network – My Movies – The Movie & TV Network)	Rating: 6.3/10 (007 – Moving Target (1985) – IMDb)	Valutazione: 5,0/10 (A View to a Kill Rotten Tomatoes)	Valutazione: 40/100 (A View to a Kill critic review – Metacritic)
Back to the Future (1985)	Rating: 4,11/5 (Rating: Back to the Future MYmovies)	Rating: 8.5/10 (Back to the Future (1985) – IMDb)	Valutazione: 9/10 (Back to the Future Rotten Tomatoes)	Valutazione: 88/100 (Back to the Future critic reviews – Metacritic)
Jurassic Park (1993)	Rating: 3.61/5 (Jurassic Park 3D MYmovies)	Rating: 8.2/10 (Jurassic Park (1993) – IMDb)	Valutazione: 8,60/10 (Jurassic Park Rotten Tomatoes)	Valutazione: 68/100 (Jurassic Park critic reviews – Metacritic)
Dante's Peak (1997)	Rating: 2,63/5 (Press review Dante's Peak – The fury of the mountain MYmovies)	Rating: 6.1/10 (Dante's Peak – La furia della montagna (1997) – IMDb)	Rating: 5,20/10 (Dante's Peak Rotten Tomatoes)	Valutazione: 43/100 (Dante's Peak critic reviews – Metacritic)
Volcano (1997)	Rating: 3,67/5 (Volcano – Film (2011) – MYmovies.it)	Rating: 5.6/10 (Vulcano – Los Angeles 1997 (1997) – IMDb)	Valutazione: 5,40/10 (Volcano Rotten Tomatoes)	Valutazione: 54/100 (Volcano critic reviews – Metacritic)
Armageddon (1998)	Rating: 2,76/5 (Armageddon – Final Judgment – Film (1998) – MYmovies.it)	Rating: 6.7/10 (Armageddon – Final Judgment (1998) – IMDb)	Rating: 5.30/10 (Armageddon Rotten Tomatoes)	Valutazione: 42/100 (Armageddon critic reviews – Metacritic)

Table 5. Compilation of evaluations by international film critics.

Title	Cinemetrics
Dr. No (1962)	ASL 6.6 (Dr. No – Cinemetrics)
Doctor Who (1963-ongoing)	$8 \leq ASL \leq 13.6$ (1963); $7.1 \leq ASL \leq 8.5$ (1967); ASL 8.4 (1974); $5.6 \leq ASL \leq 10.4$ (1975); ASL 3.3 (2005); $2.2 \leq ASL \leq 3.3$ (2013); (Measurement Database – Cinemetrics)

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Title	Cinematics
A View to a Kill (1985)	—
Back to the Future (1985)	$1.7 \leq \text{ASL} \leq 91.4$ (Measurement Database – Cinematics)
Jurassic Park (1993)	$3.1 \leq \text{ASL} \leq 8.8$ (Measurement Database – Cinematics)
Dante's Peak (1997)	ASL 3.7 (Measurement Database – Cinematics)
Volcano (1997)	—
Armageddon (1998)	ASL 2.2 (Measurement Database – Cinematics)

Table 6. Where available, ASL (Average Shot Length) values – that is, the average shot duration in seconds – were collected from the Cinematics database of international films and television series.

2.2. Italian fiction

As far as the Italian film and television industry is concerned, cinematic and serial storytelling is undergoing a significant transition, with increasing attention being devoted to the Earth Sciences. Italian directors and screenwriters are increasingly turning to ecological thrillers, climate dystopias, and geological dramas to explore the fragility of territories.

Rather than depicting fantastical journeys to the centre of the Earth or producing spectacular disaster blockbusters, Italian fiction approaches the geosciences through a more realistic and intimate lens, focusing on the relationship between humans and nature, disaster risk prevention, and the tangible impacts of climate change.

In *Always by Your Side* (2024; Italian title: *Sempre al tuo fianco*, M. Pontecorvo and G. Mazzella), disaster risk prevention and geological hazards lie at the heart of every episode. The series does not merely recount the experiences of emergency responders; it also places at the centre of the narrative a professional figure rarely represented in fiction: a geological engineer specializing in volcanic risk on the island of Stromboli.

From seismological analyses to the monitoring of lava flows and landslides, the series highlights the crucial importance of prevention and continuous environmental monitoring, while introducing the general public to the organization and operations of the Italian Civil Protection Department.

The film *Drought* (2022; Italian title: *Siccità*, by P. Virzì), set in a hauntingly desolate Rome where it has not rained for three years, explores hydrology and the climate crisis. The film transforms scientific evidence on drought and hydrological change into a powerful social drama. The Tiber River, reduced to a vast expanse of sand, gravels, and pebbles, becomes a striking visual symbol of water scarcity and environmental collapse. Through this imagery, the film offers a profound reflection on water resource management and the tangible consequences of global warming for urban environments.

By contrast, *Never Too Late* (2024; same title also in Italian, by L. Vignolo and S. De Chirico) is a teen science fiction series set in a dystopian 2046. Climate collapse has become a reality, and oxygen is now a rationed resource. The series is of particular scientific interest for its concept of the “refuge forest,” located in Sardinia: a last green sanctuary protected by walls, where nature struggles to survive in the face of extinction. This narrative device serves as a warning grounded in current ecological projections concerning biodiversity loss, desertification, and the long-term consequences of climate change.

Repairing Time (2021; Italian title: *Riparare il tempo*, by G. Castiglione), situated at the intersection of documentary and narrative cinema, explores the impact of climate change on the Alpine ecosystem of South Tyrol. The film examines glacier retreat and the adaptive responses of local communities, highlighting how the geological memory preserved in the ice is literally melting away before our eyes.

Finally, for younger audiences, the animated series *The Extraordinary Adventures of Jules Verne* (2013; Italian title: *Le straordinarie avventure di Jules Verne*, by E. Paolantonio), co-produced by Rai Fiction and Lux Vide, follows a young Jules Verne (1828-1905) as he travels the world in search of inspiration for his future novels. Through his adventures, young viewers are introduced to geology, volcanology, and geography.

Interestingly, each national cinematography appears to develop its own taxonomy of narrative patterns and recurring tropes, reflecting different dramaturgical traditions and storytelling conventions.

This study analyses character roles according to Greimasian semiotics by identifying the principal actantial functions (e.g., Subject/Object, Helper/Opponent, and Sender/Receiver) (Greimas, 1983). In addition, it identifies recurring character archetypes – such as the field geologist, the data scientist, and the climate activist – that embody the archetypal hero undertaking the narrative journey (Vogler, 2007).

The analysis of the selected Italian titles reveals that the recent shift of Italian fiction towards ecological and geological themes does not adopt the conventions of the Hollywood disaster movie, characterized by hyperbolic heroism and spectacular catastrophes. Instead, it embraces a dramaturgy grounded in everyday life and immanence.

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The central conflict is not with alien monsters or abstract global threats, but with the intrinsic fragility of the Italian landscape, shaped by centuries of human intervention and inherently vulnerable. In these narratives, the Earth is not merely a backdrop but a fundamental actant that responds to human actions (Figure 2).

The television series *Always by Your Side* (2024; Italian title: *Sempre al tuo fianco*) combines the narrative structure of the procedural drama – where each episode

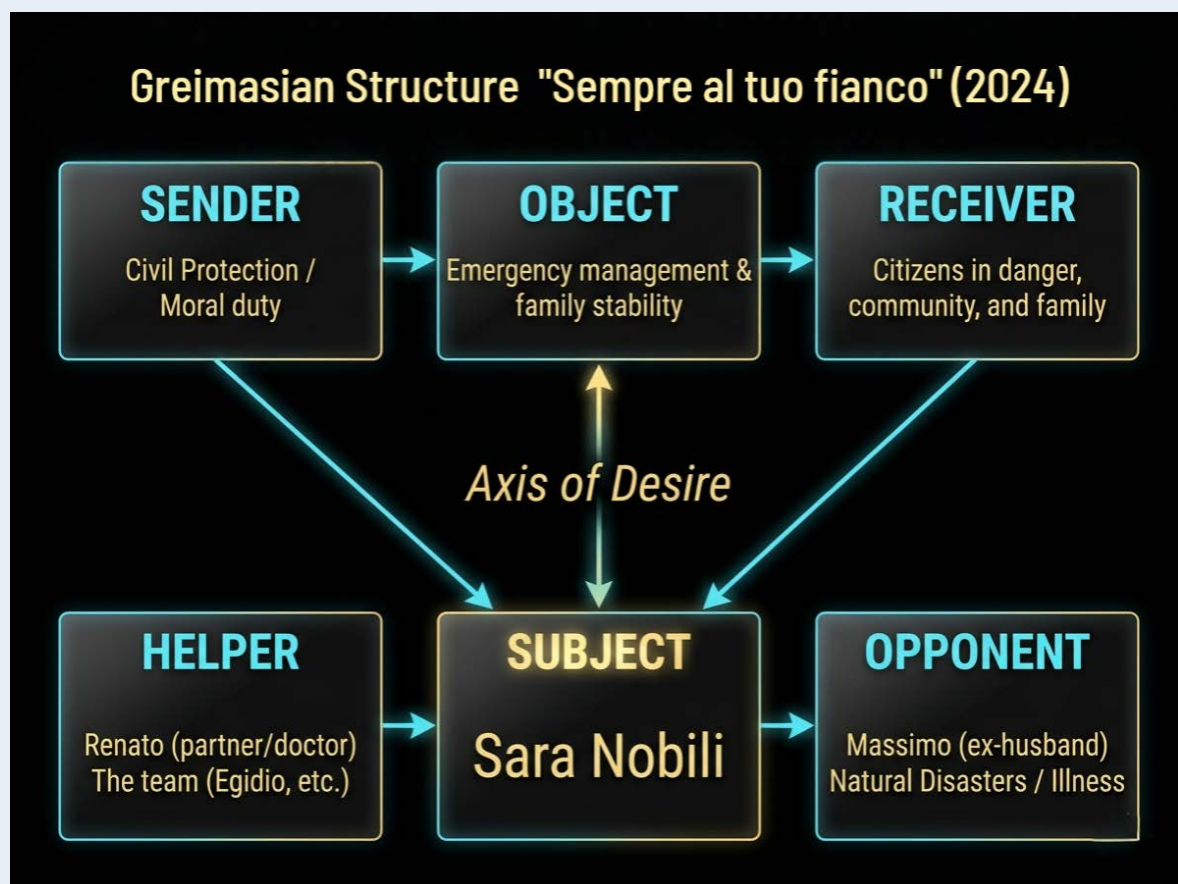


Figure 2. *Always by Your Side* (2024; Italian title: *Sempre al tuo fianco*): The Drama of Prevention in the Greimasian Actantial Model. The Axis of Desire (horizontal) links the Subject (the geologist, Sara Nobili) to the Object (the protection of the territory through the emergency management and family stability). The Sender (scientific responsibility) motivates the action for the benefit of the Receiver (the population in danger). The Axis of Power (vertical) is structured around the Helper, who provides the operational means to achieve the objective, and the Opponent (landslides, lava flows, and political constraints), whose resistance generates the dramatic conflict and suspense that drive the narrative (Image created with Gemini AI and used solely for illustrative purposes in this scientific analysis. Non-profit use.).

revolves around a specific case that is introduced and resolved within the same episode – with elements of the environmental thriller. Dramatic tension arises not from the expectation of the catastrophe itself, but from the conflict between the timescale of science (monitoring and risk assessment) and that of politics and society (emergency response).

Each episode unfolds around a fundamental ethical dilemma: whether or not to order an evacuation. The dramatic focus lies in the tension and responsibility inherent in scientific decision-making. The principal heroic figures are:

- The Geological Engineer, Sara Nobili (The Hero's Journey – Mentor/Competent Hero): Breaking traditional gender and professional stereotypes, the protagonist embodies the archetype of the field scientist. She is not a detached academic, but an operational heroine whose greatest strength lies in her ability to "listen" to the Earth (in this case, Stromboli). From a psychological perspective, she experiences a profound inner conflict between empathy for the local community – whose economic and emotional concerns she deeply understands – and the uncompromising rigour of seismological evidence.
- The Civil Protection Department (The Collective Helper): The Department represents the collective helper, serving as the operational force that seeks to contain geological hazards and restore order in the face of natural instability.

In *Drought* (2022; Italian title: *Siccità*) constructs a choral, apocalyptic, yet claustrophobic narrative. The dramatic countdown has already ended: it has not rained for three years. The film adopts an ensemble structure based on intertwined destinies, in which the aridity of the landscape becomes a powerful metaphor for the spiritual and social desiccation of its characters. The dried-up Tiber river functions as the dramaturgical *non-place* par excellence – an open wound that compels the characters to confront themselves. The Heroes are:

- The Social Archetypes (The Receivers of the Catastrophe): *Drought* has no single hero but rather a mosaic of anti-heroes – the ex-convict, the influencer, the doctor, the wealthy businessman – each responding to the water crisis in ways that reveal either their moral fragility or their unexpected humanity.
- The Climatologist/Expert (The modern Cassandra): The climatologist assumes the role of a tragic-ironic figure. Frequently invited onto television talk shows, he is treated more as a media curiosity than as a scientist worthy of being heard. In Vogler's model, he embodies the archetype of the Herald (Messenger), announcing impending catastrophe while remaining ignored by a society numbed by complacency.

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In *Never Too Late* (2024; same title in Italian), the series combines the conventions of survival science fiction with the coming-of-age drama, intertwining the protagonists' transition to adulthood with the broader context of a global ecological crisis. Its central dramatic engine is generational conflict: young people inherit a world devastated by the choices of previous generations.

The dramatic space is sharply divided between the "inside" – an asphyxiating, tightly controlled environment – and the "outside" – the refuge forest in Sardinia. This spatial opposition creates a strong polarizing tension characteristic of dystopian narratives. The Heroes are:

- The Teenagers (The Subjects/The Heroes of the Journey): They perfectly embody Vogler's Hero's Journey. Rejecting the *status quo* of oxygen rationing, they cross the threshold into the unknown – the forest. Their quest (Object) is not merely to survive, but also to reconnect with nature on both biological and emotional levels.
- The Forest Refuge (The Archetypal Helper): More than simply a setting, the Sardinian forest functions as a sentient presence – a "Great Mother" archetype that safeguards biodiversity while providing the heroes with protection, guidance, and the resources necessary for their initiation.

In *Repairing Time* (2021; Italian title: *Riparare il tempo*), the film stages the dramaturgy of ecological mourning (Craps, 2023). Blending docu-fiction and the visual essay, the narrative explores the grief associated with the destruction of nature through a dramaturgy of subtraction.

The central conflict is silent, slow, yet inexorable: the melting of the glaciers. There are no sudden twists, only an elegiac tension generated by the contrast between the millennial stability of the mountains and the anthropogenic acceleration of global warming. The Heroes are:

- The Local Community (The Tragic Chorus): The inhabitants of South Tyrol are not merely spectators but a collective protagonist embodying a profound sense of "solastalgia" – a term coined in 2003 by the Australian philosopher Glenn Albrecht to describe the psychological distress caused by environmental change in one's native place (Albrecht et al., 2007).
- The Glaciers (The Fading Object of Desire): Within the film's semiotic framework, the glaciers function as guardians of geological memory. As they disappear, the invisible Opponent – climate change – deprives the Subject (the local community) of its historical identity and cultural continuity.

In *The Extraordinary Adventures of Jules Verne* (2013; Italian title: *Le straordinarie avventure di Jules Verne*), didactic initiation is transformed into dramaturgy through the medium of animated storytelling.

The dramaturgical structure follows the classic nineteenth-century adventure journey, reinterpreted for a young audience. Each episode constitutes a stage in the protagonist's journey, where conflict is resolved through the scientific understanding of natural phenomena. Geology is presented not as a threat, but as a fascinating mystery to be explored and understood. The Heroes are:

- The Young Jules Verne (The Subject/The Curious Hero): Jules embodies the archetype of the young explorer, guided both by Enlightenment rationality and by a sense of Romantic wonder. His narrative arc is cumulative: each new discovery expands his knowledge and imagination, transforming geological experience into literary inspiration.
- The Earth (The Sender): Nature continually presents challenges – volcanoes, earthquakes, and abysses – that function as the Sender in Greimasian terms, prompting the protagonist to embark on a journey of discovery and intellectual growth.

With regard to Italian fiction, this study focused on five productions, whose in-depth analyses are presented in Table 7, following the methodology described above.

Concerning the ethics of public engagement with science, this study also undertook a qualitative assessment of the scientific representation in the selected productions. The evaluation was based both on data collected from major film review websites (Table 8) and on an independent analysis of the films' dramaturgical and scientific representation. Where the narrative showed a clear tendency to prioritize spectacularization at the expense of scientific realism, the representation was assessed negatively. Conversely, where there was a deliberate effort to portray scientific knowledge accurately – even at the expense of artistic or production value – the representation was assessed positively, in recognition of the ethical value of such a stylistic choice.

Only one production, *Repairing Time* (2021), was not reviewed on the major international film review websites considered in this study. Although it appears to have received little critical attention, this study assessed it positively because of both the relevance of the issues it addresses and its ethically responsible representation of science.

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Figure 3. From left to right, collage of the posters of the following Italian films and TV series: *Always by Your Side* (2024; Italian title: *Sempre al tuo fianco*), by Michele Pontecorvo and Giulia Mazzella; *Drought* (2022; Italian title: *Siccità*), by Paolo Virzì; *The Extraordinary Adventures of Jules Verne* (2013; Italian title: *Le straordinarie avventure di Jules Verne*), by Enrico Paolantonio; *Never Too Late* (2024; same title also in Italian), by Lorenzo Vignolo and Salvatore De Chirico; and *Repairing Time* (2021; Italian title: *Riparare il tempo*), by Giuseppe Castiglione (Image created with Adobe Express and used solely for illustrative purposes in this scientific analysis. Non-profit use).

Movies/Series	Conflict Model (Dramaturgy)	The Subject (Greimas)	The Hero Archetype (Vogler)	The Main Opponent
Always by your side (2024)	Institutional monitoring and decision-making tensions	The Geologist Engineer	The Field Scientist	The unpredictability of the volcano/bureaucratic blindness
Drought (2022)	Post-crisis social and choral apocalypse	The community in Rome	The Antiheroes mirror of the crisis	Human selfishness and the drying up of resources
Never Too Late (2024)	Generational dystopia and youth rebellion	The rebellious boys	The Seekers/ The Initiates	The rationing regime/ desertification
Repairing the weather (2021)	Documentary Elegy of Climate Change	The Alpine communities	The Keepers of Memory	Global warming (invisible and constant)
The Extraordinary Adventures of Jules Verne (2013)	Educational and training adventure	Young Jules	The Explorer/ The Innovator	The geographical unknown and the cataclysms

Table 7. Semiotic and archetypal synthesis of the narrative models identified in the Italian productions examined. For optimal viewing, it is recommended to enable “Two-Page View” and “Show Cover Page”.

Title	MYMovies	IMDb	Movieplayer	The Movie Database
Always by your side (2024)	Rating: 0/5	Rating: 5,8/10	Rating: 3,8/5	Rating: 43/100
Drought (2022)	Rating: 3,02/5	Rating: 6.2/10	Rating: 3,5/5	Rating: 64/100
Never Too Late (2024)	—	Rating: 8,1/10	Rating: 3,0/5	Rating: 60/100
Repairing the weather (2021)	—	—	—	—
The Extraordinary Adventures of Jules Verne (2013)	—	Rating: 8.0/10	Rating: 4,2/5	Rating: 87/100

Table 8. Collection of evaluations by Italian film critics.

3. Results as illustrative applications

With the present study, the author hopes to have taken a first step toward developing an initial taxonomy of geoscientific storytelling by proposing a preliminary critical and theoretical mapping of the representation of the geosciences in fiction from the nineteenth to the twenty-first century.

This framework helps address a gap in the literature on Media Studies and Science Communication by introducing and discussing the concepts of *geofiction* and the *narrative representation of planetary risk*.

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Visual Enunciation	Ethics of Public Engagement with Science	Pathos	Deep Time
Use of graphical user interfaces, radar screens, 3D computer simulations	Positive for silent heroism, dedication of the Civil Protection Department, respect for the environment, culture of prevention, human solidarity in the face of emergencies.	Mid-Tension	Middle
Spectacularization of the Earth through CGI (Computer-Generated Imagery)	Positive for reflection on the climate and ecological crisis.	Mid-Tension	Low
Spectacularization of the Earth through CGI (Computer-Generated Imagery)	Negative for narrative forcing and inconsistencies with respect to the laws of physics and biology.	High-Tension	High
Spectacularization of the Earth through CGI (Computer-Generated Imagery)	Positive for sustainability and ecology issues, it avoids climate alarmism and focuses on resilience.	Low-Tension	Low
Spectacularization through animation	Positive for issues on respect for the environment, thirst for knowledge and human ingenuity applied to the common good.	Mid-Tension	Low

The claims regarding the effects of these narratives should be regarded as hypotheses for future reception studies, while the findings presented here are intended to provide a foundation for more comprehensive research.

The analysis also examined the gap between representation and reality through a qualitative comparison of the narrative structures identified in the selected productions and the actual operational protocols for seismic and volcanic early warning and emergency management. The results show that audiovisual fiction rarely seeks to reproduce reality faithfully. Instead, in its pursuit of dramatic effect and narrative twists, it often privileges spectacularization over scientific realism.

Investigating the extent to which fiction influences the public perception and social management of natural hazards therefore represents an important avenue for future research. Such studies could provide valuable support for institutions engaged in science communication and risk communication, helping citizens distinguish between scientifically plausible representations and purely fictional narratives.

The study also identified an evolution in the representation of the geosciences in audiovisual media, moving from the Hollywood paradigm of the “isolated scientist” confronting catastrophe toward a more institutional and human-centred realism, particularly in contemporary Italian productions. This shift humanizes scientific professionals and emphasizes prevention, thereby helping to bridge the gap between science and society.

Finally, the analysis revealed a persistent polarization in the representation of scientific institutions, which oscillate between bureaucratic organizations and technocratic authorities. Such portrayals influence the public understanding of science and its role in society. At the same time, recent Italian productions increasingly shift the focus from sudden catastrophic events to systemic environmental crises, portraying scientists not as solitary heroes but as key actors in collective resilience and risk governance.

4. Discussion

The growing social influence of the mass media has increased the importance of fundamental questions such as: “How are science and scientists represented in the mass media, and how are they perceived by the audience?” (Pansegrau, 2008). In this context, attention has increasingly focused on how science is communicated to the public and on the implications that these representations have for science itself. Pansegrau (2008) discusses the concept of the “public understanding of science” from a critical perspective. Within this framework, it is now widely acknowledged that the media do not simply transmit scientific information; rather, they construct and communicate their own representations of the world and reality. The media therefore do more than translate scientific knowledge: they actively shape public discourse by interpreting, framing, and disseminating scientific issues. This process has important consequences not only for the relationship between science and the media, but also for science itself.

The media thus become active participants in the dialogue with the public and exert a significant influence on how scientific topics are perceived and understood (Foresta Martin and Peppoloni, 2017).

As Perkowitz (2007) argues, the “science of Hollywood” is often scientifically inaccurate, distorting facts for dramatic purposes and portraying scientists through stereotypical images – as eccentric nerds, detached experts, villains, or heroic figures. Such representations do little to foster a more informed and constructive relationship between science and society.

With regard to recent Italian film and television productions, a different pattern emerges from this analysis. Contemporary Italian fiction appears to be making a significant contribution to the public representation of science, but it does so through a distinctive narrative approach that differs markedly from dominant international models.

Whereas Hollywood productions frequently employ science primarily as a narrative device to generate spectacle or catastrophic scenarios, Italian productions tend

to humanize scientists and embed scientific knowledge within specific territorial, social, and cultural contexts.

This study identifies several key elements that help explain why this narrative approach may contribute positively to the public perception of science:

- 1) Overcoming the stereotype of the “Mad Scientist” or the “Nerd”. In the productions analysed, scientists are no longer portrayed as eccentric figures confined to isolated laboratories. Instead, they are depicted as professionals working in close contact with society and engaged in addressing real-world challenges. In *Always by Your Side* (2024), the geologist is portrayed as an operational, empathetic professional fully integrated into the emergency response system. The series introduces the figure of the Competent Hero, presenting science as a profession grounded in civic responsibility, demanding fieldwork, and difficult decision-making. Rather than abstract formulas, audiences witness the practical application of the scientific method in the service of protecting human lives.
- 2) Science as a “Shield” rather than a “Threat”. In much classic science fiction, science is portrayed as the source of danger, whether through failed experiments, uncontrollable technologies, or artificial intelligences that rebel against their creators. By contrast, contemporary Italian fiction typically identifies the real threats as environmental degradation, unsustainable human activities, and political inaction. Within these narratives, science assumes the semiotic role of the Helper or Guide. It provides the means to understand environmental crises – such as the dried-up Tiber river in *Drought* (2022) or the retreat of glaciers in *Repairing Time* (2021) – and represents the principal instrument for mitigating their consequences.
- 3) Introducing prevention into public discourse. Perhaps the greatest dramaturgical achievement of these productions is their ability to make prevention narratively compelling. Representing prevention is inherently challenging because, by definition, its success is measured by the absence of disaster. Nevertheless, productions such as *Always by Your Side* (2024) generate dramatic tension around monitoring activities, data collection, and scientific assessment, while simultaneously demonstrating the importance of investing in scientific research before disasters occur.
- 4) The narrative risk: the unheard Cassandra. The principal ambiguity identified in these narratives lies in the recurring trope of the unheard Cassandra, particularly evident in *Drought* (2022). Scientists are frequently portrayed as tragic figures who warn of impending danger but whose voices are trivialized by the media or ignored by political decision-makers. Although this reflects the genuine frustrations experienced by many scientists in communicating climate-related risks, it may

also reinforce a sense of inevitability and public helplessness, contributing to what has been described as eco-pessimism (Craps, 2023).

According to the findings of this study, contemporary Italian fiction makes a valuable contribution to the public understanding of science by narrowing the gap between scientific institutions and society. Rather than using geology or climatology merely as vehicles for didactic science communication, these productions transform them into the driving force of compelling human stories. By making scientific knowledge emotionally engaging and firmly rooted in the lived experience of specific places and communities, Italian fiction encourages audiences to recognize that supporting science ultimately means safeguarding their own future.

5. Conclusion

It is hoped that this study will be of interest to the scientific community and will provide a starting point for further research on the topics addressed.

One of its most promising future developments could be the creation of a tool to support both research and institutional activities: an open-access database designed to systematically catalogue and analyse the representation of the geosciences in audiovisual fiction. Building on the framework proposed in this study, such a repository could collect standardized digital records for films, television series, and docu-fiction, integrating the findings presented here with future analyses conducted in both Italian and English. It could also include audience feedback, enabling users to express their perceptions of the scientific content presented in fictional narratives and thereby facilitating research on the public understanding of science.

The repository could function as an accessible archive searchable through keywords related to both the geosciences (e.g., geology, earthquakes, volcanoes, climate change, tectonics) and scientific institutions (e.g., observatory, research centre, scientist, agency). Advanced keyword-based search strings could be integrated with international databases such as IMDb, Letterboxd, specialized review websites, and streaming catalogues. Such a platform – provisionally entitled the *Geo-Fiction and Science Narrative Repository* – could serve as a permanent resource for Digital Humanities research, science communication studies, and institutional media monitoring.

Beyond serving as a digital archive, the repository could become a collaborative platform where researchers, institutions, and the public exchange information, share perspectives, and promote informed discussion on the representation of the

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geosciences in fiction. In this context, the term *Geo-Fiction* is not used in the sense commonly associated with worldbuilding or fantasy cartography, where it refers to the creation of imaginary geographies, but rather to narratives centred on the real Earth and its geological, environmental, and climatic processes.

A further development could be the design of a *Geo-Narrative Toolkit*: a methodological framework providing operational guidelines derived from the evidence collected in the repository. Such a toolkit could support institutions responsible for monitoring natural hazards and managing emergencies by improving their responses to media misinformation, while also enhancing the design and effectiveness of edutainment and citizen science initiatives.

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