



Media coverage of scientific issues in the aftermath of earthquakes: a comparative research on Emilia 2012 and Amatrice 2016

Andrea Cerase

Istituto Nazionale di Geofisica e Vulcanologia (Roma), Department of Social Sciences and Economics (La Sapienza University of Rome)

Introduction

After a large earthquake, broadcast and traditional media play a crucial role, fulfilling complex social and psychological functions, which can alternatively foster or hinder the return to normality of both exposed communities and society at large.

Media are a relevant resource for citizens to cope with disasters. Especially in the first days after the first big shake, scientists are asked by the media to provide scientific assessments of seismic phenomena, to explain both what is happened and what is purported to happen in a next future. As a consequence, geo-scientists visibility and voice across the media is doomed to rise till to become central in media narratives of disasters, providing an unprecedented window of opportunity to disseminate relevant messages about hazard, risk mitigation and resilience.

The urge to make sense of the event thus results in a genuine appetite for scientific knowledge (Wein et al. 2010), stressing the role of journalistic mediation along the whole risk / science communication process, as well as the ability of the media to provide public with steady and authoritative point of references to anchor their understanding of seismic phenomena.

The here presented research considered the media coverage of scientific issues during the Emilia 2012 and Amatrice 2016 seismic crisis, to the extent they were covered by the four most circulating Italian national newspapers within the 31 days following the first earthquake shock.

The research considered 248 editions of the mentioned newspapers, and collected and processed data by using content analysis, an empirical methodology that allows analysing media messages as well as other types of communicative texts, in order to formulate statistical inferences on their explicit meaning (Neuendorf 2002).

The comparative analysis of news media coverage of Emilia (2012) and Central Italy's earthquakes (2016) highlights the relationship between physical events and media representation of expert knowledge, highlighting key trends and some significant signs of change in the news frames used to assess and communicate seismic risk.

The newsworthiness of scientific advice is everything but taken for grant: in fact, analysis made emerge two relevant points. First, media coverage of geo-science follows a 'typical' life cycle, broadly compatible with hype media theory (Vasterman, 2005). Most of the articles are indeed concentrated in the very first days, rapidly decreasing in the following days till to disappear at the end of the month. Second, the daily amount of news story is significantly defined by three variables: the maximum magnitude of aftershocks in the previous day, the number of days after the 'zero event' and the degree of controversy / conflict that arises from scientific evaluation of the ongoing phenomena.

The research has been partially published by the Italian journal "Problemi dell'Informazione" (Cerese, 2017), but will be deepened still further in new articles, in order to give geo-scientists and risk managers a more comprehensive description of data and of their related implications on their own work.

Methods

Sample: 289 news stories containing scientific information about earthquake, seismology, risk mitigation and seismic engineering published in the major national dailies (*Repubblica*, *Corriere della Sera*, *La Stampa*, *Il Messaggero*) in the 31 days after first shake. 248 issues were analysed, for a total of 289 news stories that meet at least with one of the following criteria: 1) research institutions are cited; 2) scientists or experts are cited; 3) the content mainly focuses on scientific issues; 4) reference to articles or other scientific texts are made; 5) processed data, maps or scientific explanations (e.g. seismogenesis processes) are presented.

On these premises, 150 news stories were retrieved for the earthquake in Emilia and 139 for the earthquake of Central Italy. The selected research methodology is content analysis, which consists of accurate, precise, objective, reliable, repeatable and valid procedures to analyse media messages as well as other types of communicative texts in order to formulate valid inferences on their explicit meaning (Neuendorf, 2002).

A general hypothesis of the research concerns salience and frames. For the scopes of this work salience is first and foremost defined in terms of attention (number of news stories on a specific issue or frame) and prominence, that refers to the positioning of a story within a media text to communicate its importance (Kiousis, 2004). To ensure a more effective measurement of prominence, two indices have been constructed the positioning index (IPR) and the relative visibility index (IVR). The first one (IVR) measures the page visibility of the article based on its location on the page, if it is the main news-story. The second (IPR) measures the relative distance of the article from the front page. In both cases indices span from 0 minimum value to 1 maximum value, also allowing to compare newspapers with different overall number of pages.

Results

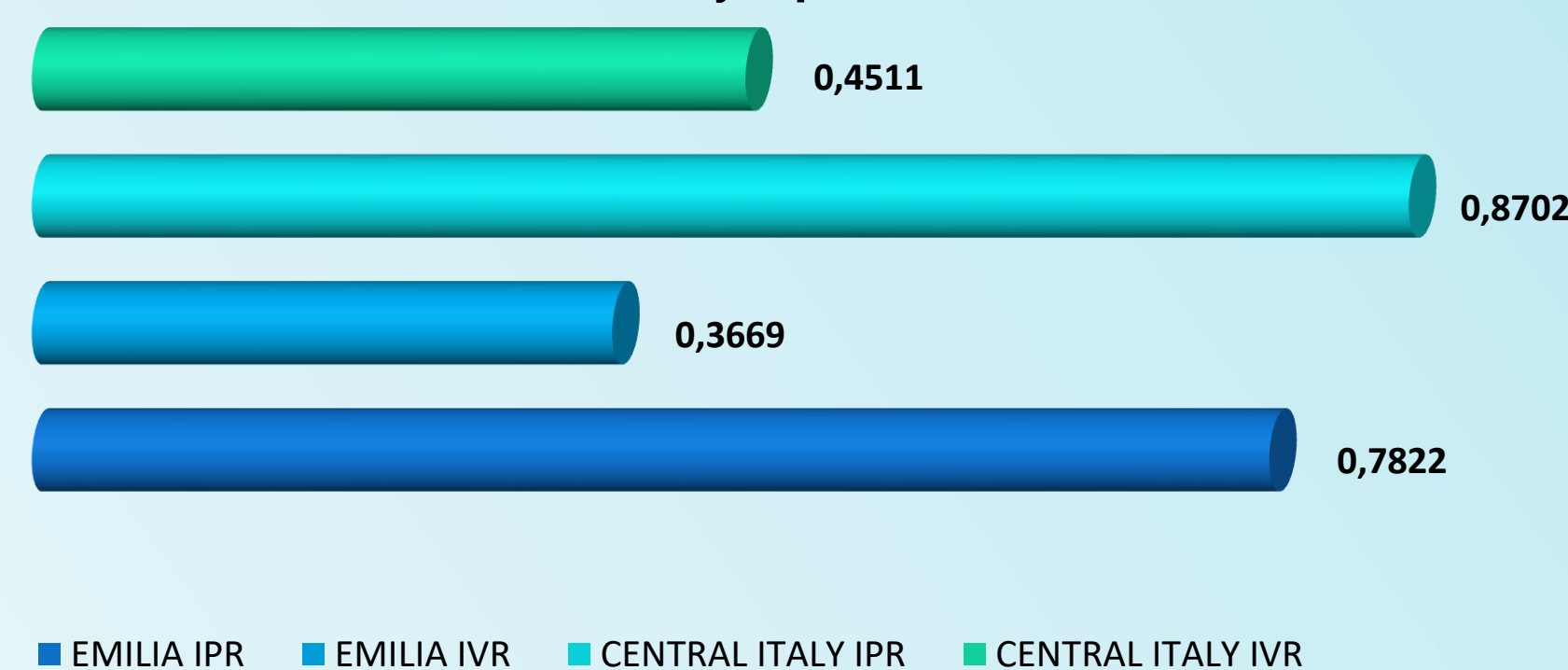
GENERAL ISSUES: EQ SCIENCE NEWSWORTHINESS

- As trivial as it may appear, data show that EQ and other disasters are likely to trigger a sudden increase in the number of news stories till to saturate available space, followed by a slower decrease. In simpler words, there is an **inverse correlation** between the number of news stories and the number of days that have passed since the first "big" shake.
- Data also show a **strong correlation** between the intensity of seismic activity (measured on a daily basis) and the amplitude of coverage on newspaper. The number of news stories on scientific issues is very likely to follow the maximum EQ magnitude recorded on the previous day (INGV - National Earthquakes Centre, 2016).
- Nonetheless coverage amplitude is not affected only by physical intensity of EQ, but also by "**social factors**", namely the conflict arising from controversial issues related to risk assessment and their implication on people's lives and local economy.
- As an example, in 2012 Major Risk Commission made a statement on the evolution of seismic sequence, thus suggesting a possible eastward migration of seismicity. Such an assessment triggered a **huge wave of concern, outrage and other social reactions**, revamping media attention on EQ science.
- When available, images and infographics are likely to increase both salience and newsworthiness of scientific issues. The ability to provide graphic contents discloses a "window of opportunity" to reach general public, also improving their understanding of seismic phenomena and related risks.

DIFFERENCES BETWEEN THE TWO EVENTS

- More salience:** scientific issues are increasing their visibility (IVR), also obtaining a better positioning (IPR). In simpler words, newspaper devote **more space** in single pages to news stories related to scientific issues, that also "**migrate**" towards the **front page**. Is it a slight change? Not at all: news values and news selection criteria remain quite stable over the time.

Figure 2: 2012 Emilia and Central Italy Eqs': salience indicators



- Attention peaks** (sudden rise of the number of news stories) appear to be strictly related to three factors: A) **physical intensity** of the event (magnitude); B) **loss of lives**; C) **social and political controversies** arising from officials' evaluations and their purported impact on society and economics (MRC statement about possible seismicity migration).

Figure 1: 2012 Emilia EQ: number of news stories and max magnitude

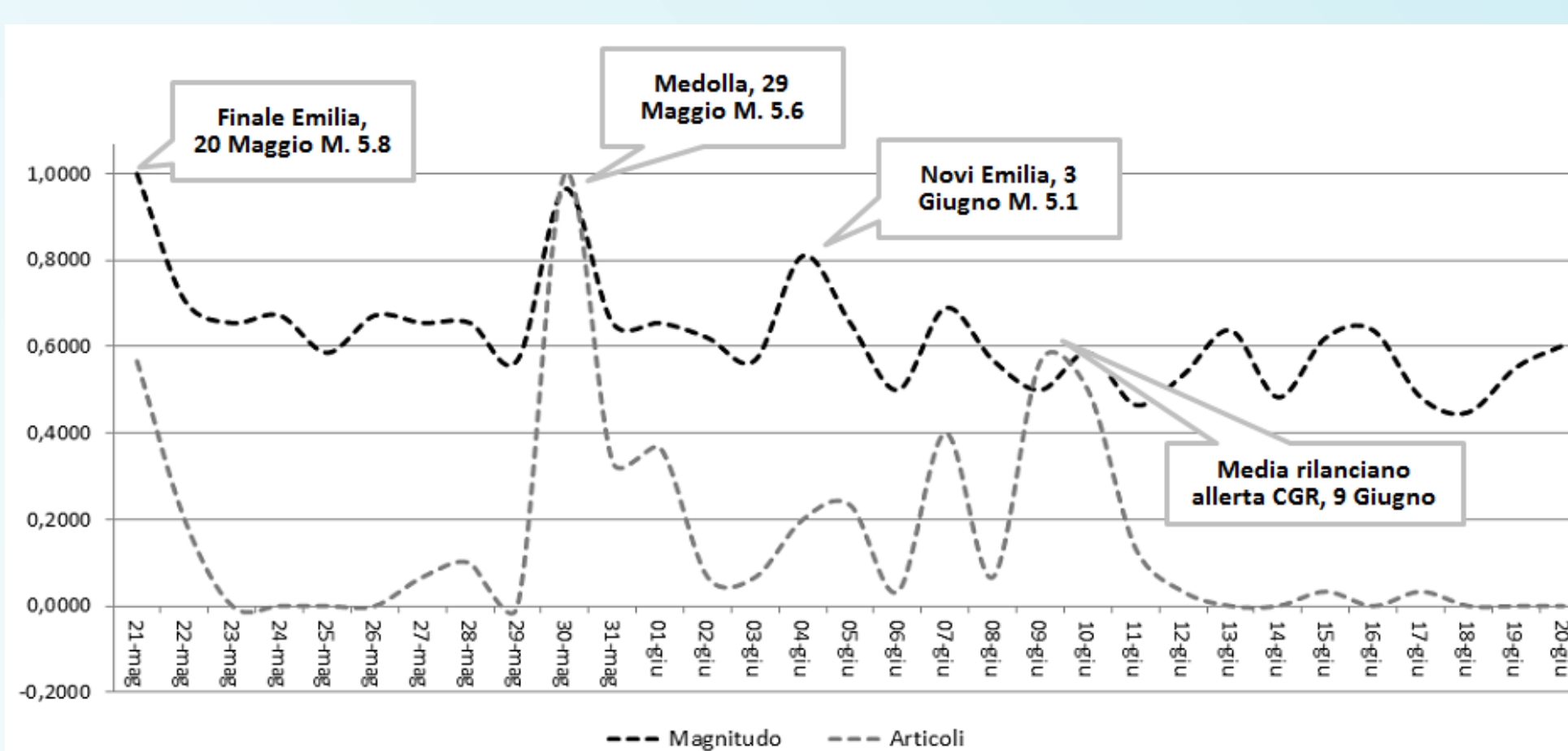
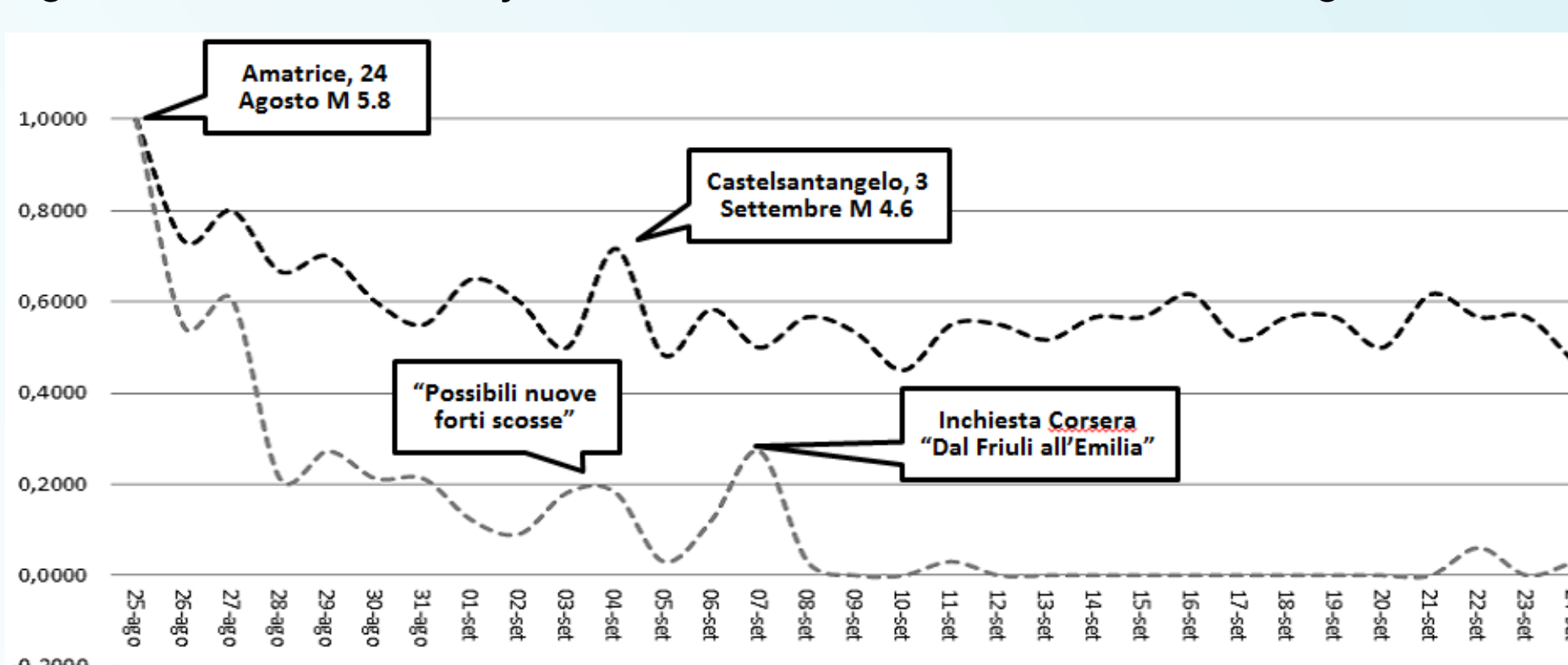


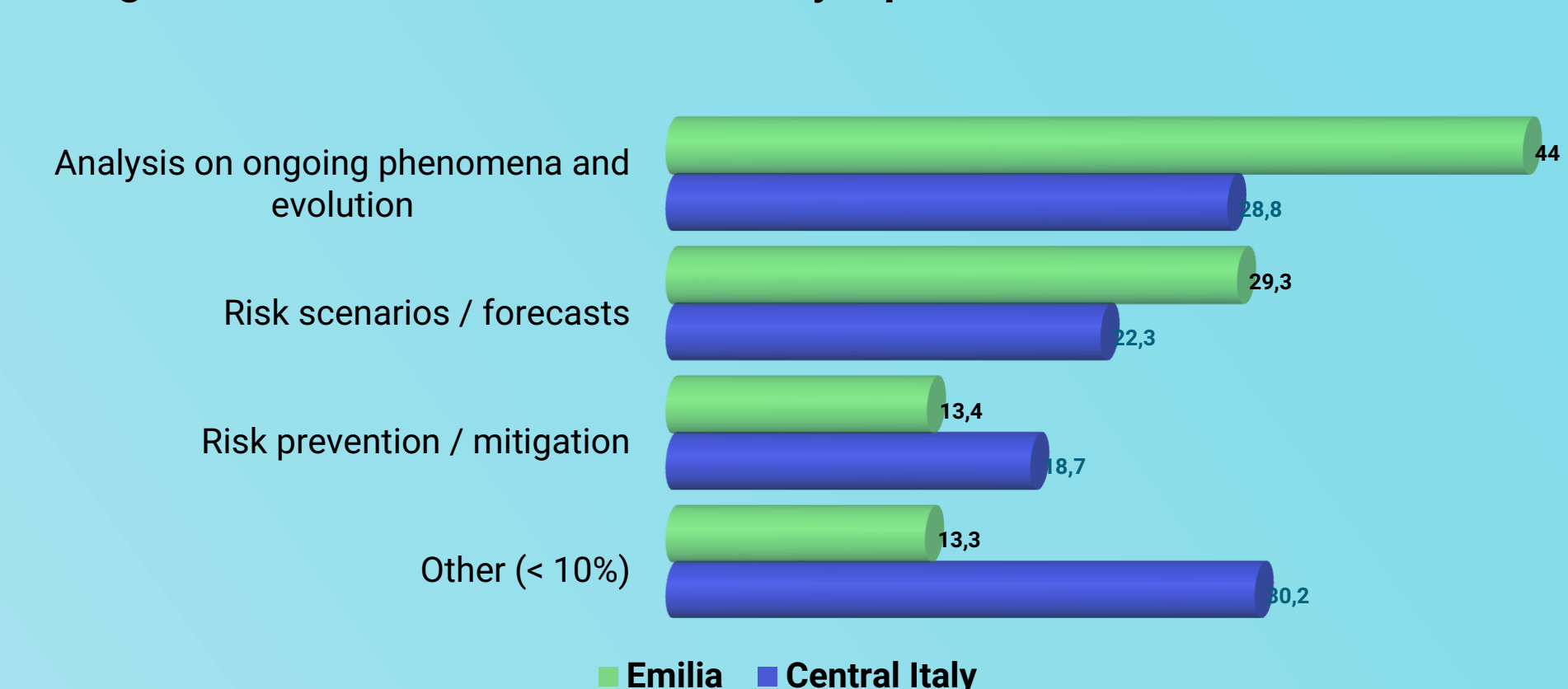
Figure 2: 2016 Center Italy EQ: number of news stories and max magnitude



FRAMING AND SHARE OF VOICE

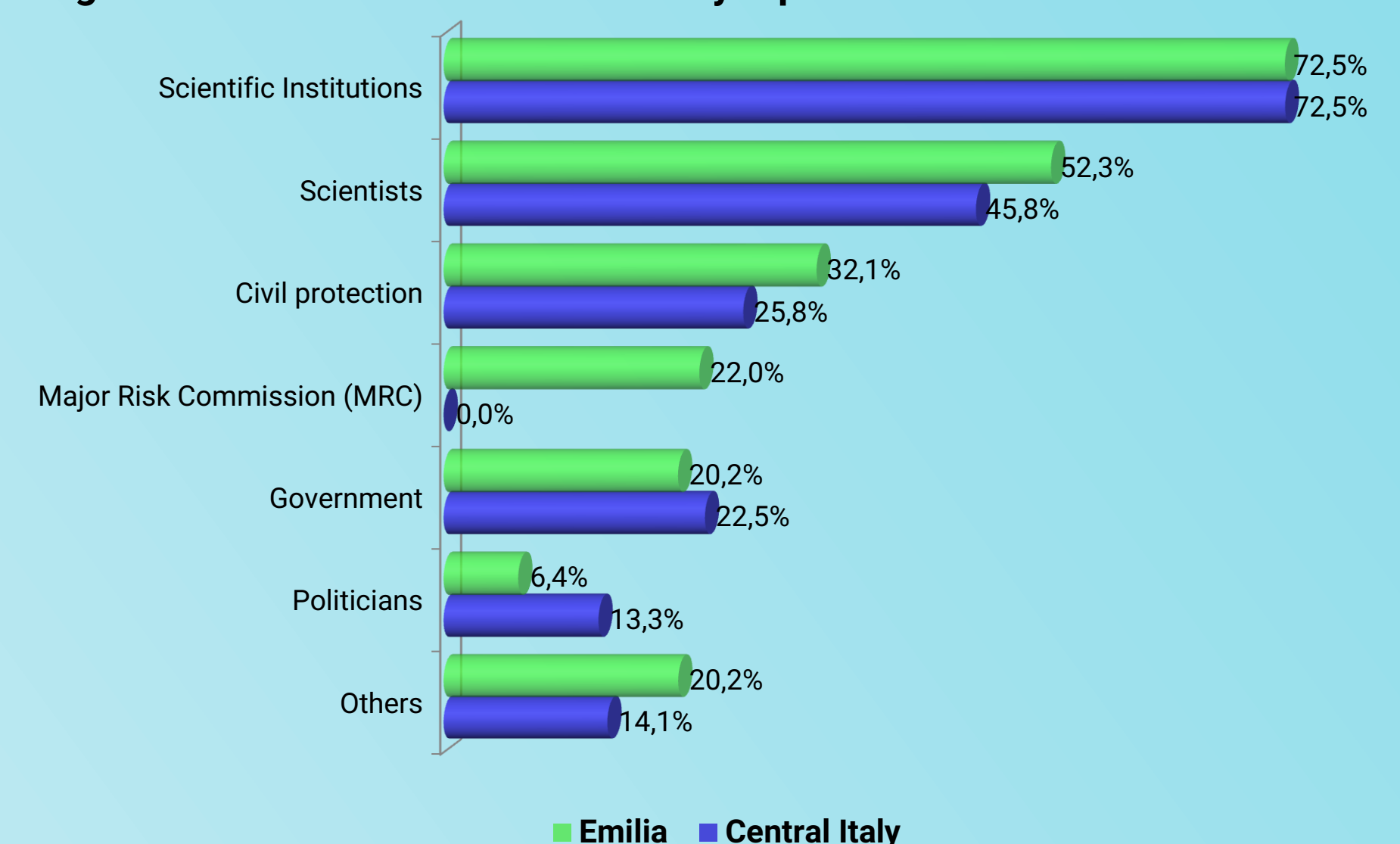
- Relevant difference have been found in the way some scientific issue are discussed and presented, also affecting the role of single scientists and scientific Institutions as legitimate owner of knowledge. **Scientist's role is shifting from diagnosis of phenomena to expert advisor on mitigation policies to be undertaken.**

Figure 3: 2012 Emilia and Central Italy Eqs': role of scientists



- In media arena, **different players engage in a competition to get visibility and share of voice:** although Scientific Institutions still play a major role, single scientists are less mentioned as Civil Protection, while Government and local administrators see a slight increase.

Figure 4: 2012 Emilia and Central Italy Eqs': share of voice



Conclusion

The ways media represent science in the aftermath of a disasters depends both on **exogenous factors** as the magnitude and the days elapsed from the first "big" shake, and **endogenous factors**, as social conflict, and outrage, also considering newsmaking process itself. Media strongly need **certified knowledge** from scientific institutions and scientists as legitimate and trustworthy sources. Scientists and scientific Institutions have **improved their ability to interact with the media** as well as to "**frame**" political **debate** on future scenarios and mitigation measures that have to come. Between Emilia and Central Italy EQs **significant changes have occurred** in media portrayal of seismic phenomena and scientists' work, and in particular, there was a marked increase in the weight of **prevention frame**, encompassed by a stronger presence of scientists, government representatives, politicians and risk managers.

The **growing role of scientific Institutions** such as INGV and CNR appears to be partially related to their scientific leadership and partly to their ability to provide explanations, data and graphical information, such as shake maps or satellite images. Their ability to **meet with media needs** and to **build / restore reputation and credibility** resulted into an **improved effectiveness** of their communication strategies.

References

- Cerese, A. (2017). Amatrice anno zero: come cambia la rappresentazione mediale della scienza nei terremoti. *Problemi dell'informazione*, 42(3), 401-430.
- Kiousis, S. (2004). Explicating media salience: A factor analysis of New York Times issue coverage during the 2000 US presidential election. *Journal of Communication*, 54(1), 71-87.
- Miles, B., Morse, S. (2007). The role of news media in natural disaster risk and recovery. *Ecological Economics*, 63(2), 365-373.
- Neuendorf, K. A. (2002). *The content analysis guidebook*. Sage, London.
- Pidgeon, N. (1999). 'Risk Communication and the Social Amplification of Risk: Theory, evidence and policy implications', *Risk Decision and Policy* 4(2): 145-59.
- Vasterman, P.L.M. (2005) Media-Hype: Self-Reinforcing News Waves, Journalistic Standards and the construction of social problems. *European Journal of Communication*, 20(4), pp. 508-530.
- Wang, K., e Rogers, G. C. (2016). Beating Fear with Hope: On Sustaining Earthquake Preparedness. *Seismological Research Letters*.
- Wein, A., Potter, S., Johal, S., Doyle, E., e Becker, J. (2015). Communicating with the public during an earthquake sequence: Improving communication of geoscience by coordinating roles. *Seismological Research Letters*.