



Adria Digital Media
Observatory

MAPPING CLIMATE DISINFORMATION ECOSYSTEM IN CROATIA AND SLOVENIA

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Dubrovnik, January 2024

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Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency (HADEA). Neither the European Union nor the granting authority can be held responsible for them. This project has received funding from the European Union's Digital Europe Programme, under Grant Agreement 101083909.

SUMMARY

This report is part of the research activities conducted under the project “Adria Digital Media Observatory”, financed by Digital Europe Program. The aim was to identify local (Croatian) sources of disinformation (websites, blogs, social media groups, media outlets, opinion makers and well known conspiracy theorists) related to climate disinformation, and to explore the reach and size of audiences of identified local disinformation sources.

Key findings:

- Identified the existence of a current climate disinformation ecosystem, consisting of 10 clusters and supranational in nature, encompassing the SEE region,
- Identified a decrease in the number of actors disseminating and creating disinformation about climate compared to the Ukrainian war and COVID-19,
- Identified community and broadcast clusters formed around pseudo-media and mainstream media,
- 66,7% of leading purveyors of climate disinformation have double role as the most influential vertices and super-spreaders.

INTRODUCTION

This report analyzes the spread of disinformation about the climate in Southeast Europe (Croatia). Previous research (Brautović, 2022a; Brautović, 2022b, Brautović, 2023) identified COVID-19 and Ukraine war disinformation ecosystems consisting of 18 to 21 supranational clusters covering the SEE region, with the central clusters formed around pseudo-media, influencers and mainstream media from Serbia and the Republic of Srpska.

The research on COVID-19 disinformation (Brautović, 2022a) identified two distinct groups of purveyors: the influential vertices and the super-spreaders:

“The influential vertices were pages/groups/profiles whose content (URLs) was most, and super-spreaders were vertices who were sharing others’ content the most. The super-spreaders were sharing

links to alternative media, mainstream media and individuals, but this communication was mainly one-way and was in function of sharing (confirming) their narratives and discourses.” (Brautović, 2022a)

Based on the previous research, the following research questions were developed:

RQ1: Who are the online purveyors of climate disinformation in Croatia and Slovenia (users, accounts, pages and websites)?

RQ2: If the ecosystem of climate disinformation has formed in Croatia and Slovenia, what kind of structure does it have and how does this structure reinforce the transcendence of disinformation?

For the purposes of this report, we have used the term disinformation, which is defined as verifiably false or misleading information that has been created and/or disseminated and can cause harm and has been labeled as such by fact-checkers.

METHODS

For this study, we adopted the methodology from project “Pro-fact: Research, education, fact-check and debunk COVID-19 related disinformation narratives in Croatia” which used a mixture of methods to retrieve and analyze one samples of data: Content Analysis, Social Network Analysis, and Visual Network Analysis. These methods were applied on study of the networks of URL exchanges that allowed us to map “...communities of pages, groups, and profiles that promoted similar content” (Bruns et al., 2020, p. 15). In terms of the network of URLs, the vertex (node) represents the page, group, or profile, while the edge (links) represents the relationships or interactions that connect them.

The dataset was collected using the snowball method from the collection of URLs found on Faktograf.hr’s website about climate disinformation (<https://faktograf.hr/tag/klima/>). A total of 90 fact-check URLs (N=90) were collected for disinformation published from September 28, 2018, to August 25, 2023. Based on this URL list, manual content analysis was performed and the original (still active) 46 disinformation URLs (N=46, 51,1%) were identified¹. We then used

¹ Possible explanation could be found in the mitigation efforts by social media platforms because in COVID-19 disinformation it was 47% (Brautović, 2022) and in the Ukraine war disinformation it was 14,5% (Brautović, 2023).

CrowdTangle to collect Facebook data on URLs leading to fact checks and disinformation. The result was a dataset with 245 edges (N=245) and unique 118 vertices (N=118).

We used NodeXL software to conduct social network analysis and visual network. The visualization was created using the Harel-Koren Fast Multiscale algorithm, clusters were colored with different colors and connections (shared URLs) were colored from orange to purple depending on the weight of the relationship (number of shared URLs). The size of the vertex was scaled based on the betweenness centrality measure (measure of the vertex's influence in spreading information on social networks), and only the most influential vertices (the top 30 vertices) were given labels. Since the same sources (organizations or individuals) usually have multiple sources such as websites, Facebook pages, and similar web domains, we used the same names/labels to reduce them to the same source whenever it was possible to determine.

RESULTS

The network structure showed that the climate disinformation ecosystem consists of 10 interconnected clusters, of which three main clusters (G4, G5 and G7) dominate and have a supranational character due to the coverage of the SEE region (Bruns et al., 2020) with a dominance of pseudo-media. Only a few climate disinformation clusters had a community character, with pseudo-media at their center (G4 - Epoha & paraf.hr; G5 – narod.hr, G7 – 2012 Transformacija Svijesti). Other clusters have a star-shaped distribution with pseudo-media (G1 – hop.hr, G3 – dnevna gazeta.rs, G6 – provjeri.hr, G10 - logično.com), mainstream media (G8 – bljesak.info) and influencers (G10 - Podrška za prelazak na demokratski socijalizam) in the center. No communities were formed in these clusters and the vertices have minimal interaction with each other. All the sources mentioned have previously been labeled as disinformation purveyors by various fact-checking organizations. For example, the medium Bljesak.info was previously identified as "... the only media outlet from the Federation of Bosnia and Herzegovina that remains in this 'disinformation network'... thanks to strong links with several media outlets from Serbia (Sputnik, Informer) and the Republic of Srpska (RTRS, Glas Srpske)." (Cvjetičanin et al., 2019, pp. 51-52)

The G2 cluster, which formed around the Croatian fact-checking organization Faktograf, had a broadcasting structure. Nevertheless, we can argue that many vertices shared Faktograf's content as a form of critique and that 55.6% (N=35) of all edges in cluster G2 were self-loops where Faktograf's Facebook page shared links to Faktograf's website (Table 1).

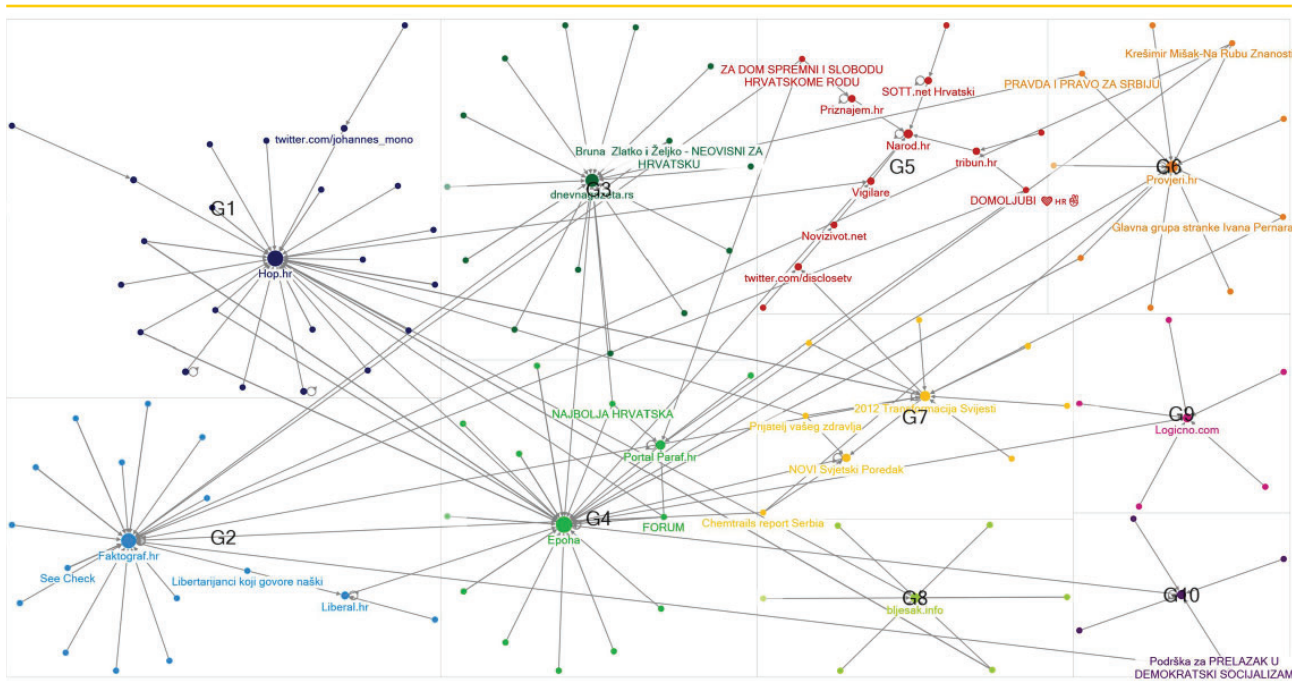


Figure 1: Social network analysis of climate disinformation ecosystem

Table 1 shows that all clusters have a small average geodesic distance, which can be interpreted as representing the spaces where disinformation can spread quickly (Franceschet, 2022). The average geodesic distance represents the shortest path between two vertices in the cluster and the average online geodesic distance is 6.41 (Franceschet, 2022). The average geodesic distance is in the range of 1,280 and 2,792, which is much lower than in the case of Ukraine war disinformation (from 1,772 to 2,826) (Brautović, 2023) and COVID-19 disinformation (from 1,830 to 3,471) (Brautović, 2022a). The graph density metric is relatively low compared to the COVID-19 clusters and higher than for the Ukraine war clusters, which can be interpreted to mean that climate disinformation is more efficient in information flow compared to COVID-19 and less efficient in information flow compared to the Ukraine war.

Table 1: Clusters statistics

Cluster	Vertices	Unique Edges	Edges With Duplicates	Total Edges	Self-Loops	Average Geodesic Distance	Graph Density
G1	23	19	13	32	2	1.981	0.043
G2	17	13	50	63	35	2.048	0.059
G3	15	11	6	17	0	1.742	0.067
G4	14	11	20	31	9	1.796	0.082
G5	12	13	2	15	4	2.792	0.083
G6	10	10	0	10	1	1.620	0.100
G7	9	9	5	14	5	1.679	0.125
G8	7	5	2	7	0	1.469	0.143
G9	6	5	0	5	0	1.389	0.167
G10	5	5	0	5	1	1.280	0.200

As Table 2 shows, the list of the most influential vertices is dominated by pseudo-media (Epoha, Hop.hr, dnevna gazeta.rs, Provjeri.hr, 2012 Transformacija svijesti, Paraf.hr, Logicno.com, Narod.hr, etc.), mainstream media from B&H (Bljesak.info) and conspiracy theories and extremist groups (Krešimir Mišak-Na Rubu Znanosti, Bruna Zlatko i Željko - NEOVISNI ZA HRVATSKU, DOMOLJUBI, Podrška za PRELAZAK U DEMOKRATSKI SOCIJALIZAM, Chemtrails report Serbia, ZA DOM SPREMNI I SLOBODU HRVATSKOME RODU, Glavna grupa stranke Ivana Pernara, PRAVDA I PRAVO ZA SRBIJU, FORUM, etc.). The super-spreaders were mainly conspiracy theories and extremist groups (Krešimir Mišak-Na Rubu Znanosti, HRVATSKA, Prijatelj vašeg zdravlja, Bruna Zlatko i Željko - NEOVISNI ZA HRVATSKU, Podrška za PRELAZAK U DEMOKRATSKI SOCIJALIZAM, Glavna grupa stranke Ivana Pernara, PRAVDA I PRAVO ZA SRBIJU, Libertarijanci koji govore naški, Stop prisilnoj KORONA vakcinaciji i globalizaciji!!!!, Pravo na izbor, Poštovaoci lika i djela dr Branimira Nestorovića, Osviješteni građani, Grupa potpore Karolini Vidović Krišto, etc.) and pseudo-media (2012 Transformacija Svijesti, Hop.hr, Provjeri.hr, Paraf.hr, Narod.hr, Liberal.hr, Priznajem.hr, Direktno.hr, dnevna gazeta.rs, etc.). In contrast to the COVID-19 disinformation (Brautović, 2022a), 66.7% (N=20) of the same purveyors are represented on the both lists of the most influential and super-spreaders lists (Table 2).

Table 2: Top 30 the most influential and super-spreaders pages, groups and verified users

The most influential (in-degree)	Super-spreaders (out-degree)
Epoha	2012 Transformacija Svijesti
Hop.hr	Krešimir Mišak-Na Rubu Znanosti
Faktograf.hr ¹	DOMOLJUBI ♥HR🇭🇷
dnevnagazeta.rs	Chemtrails report Serbia
Provjeri.hr	ZA DOM SPREMNI I SLOBODU HRVATSKOME RODU
2012 Transformacija Svijesti	FORUM
bljesak.info	NAJBOLJA HRVATSKA
Portal Paraf.hr	Prijatelj vašeg zdravlja
Logicno.com	Hop.hr
Narod.hr	Provjeri.hr
NOVI Svjetski Poredak	Portal Paraf.hr
Liberal.hr	Narod.hr
Vigilare	NOVI Svjetski Poredak
twitter.com/disclosetv	Liberal.hr
tribun.hr	SOTT.net Hrvatski
SOTT.net Hrvatski	Priznajem.hr
Priznajem.hr	Direktno.hr
twitter.com/johannes_mono	Crodex.net
Novizivot.net	Bruna Zlatko i Željko - NEOVISNI ZA HRVATSKU
Direktno.hr	Podrška za PRELAZAK U DEMOKRATSKI SOCIJALIZAM
Crodex.net	Glavna grupa stranke Ivana Pernara
Krešimir Mišak-Na Rubu Znanosti	PRAVDA I PRAVO ZA SRBIJU
Bruna Zlatko i Željko - NEOVISNI ZA HRVATSKU	Libertarijanci koji govore naši
DOMOLJUBI ♥HR🇭🇷	Stop prisilnoj KORONA vakcinaciji i globalizaciji!!!
Podrška za PRELAZAK U DEMOKRATSKI SOCIJALIZAM	Pravo na izbor
Chemtrails report Serbia	Poštovaoci lika i djela dr Branimira Nestorovića
ZA DOM SPREMNI I SLOBODU HRVATSKOME RODU	Osviješteni građani
Glavna grupa stranke Ivana Pernara	Grupa potpore Karolini Vidović Krišto
PRAVDA I PRAVO ZA SRBIJU	Epoha
FORUM	dnevnagazeta.rs

Comparison showed that 56.3% (N=66) of identified purveyors of climate disinformation were sharing/creating COVID-19 disinformation. Similarly, 23.73% (N=27) of purveyors of climate disinformation were sharing/creating the Ukraine war disinformation too.

¹ It should be noted that Faktograf.hr was part of the ecosystem but NOT a purveyor of climate disinformation.

Table 3: Top 15 most popular climate disinformation

1. <https://www.facebook.com/photo.php?fbid=853085756250172&set=gm.6838170582884067&type=3>
2. <https://www.facebook.com/photo.php?fbid=2269095413295255&set=p.2269095413295255&type=3>
3. <https://provjeri.hr/egzekucija-slavonije/>
4. <https://epoha.com.hr/2023/07/16/nobelovac-razotkrio-teoriju-o-klimatskim-promjena-ma-znanost-o-klimi-metastazirala-je-u-golemu-novinarsku-pseudoznanost/>
5. <https://www.hop.com.hr/2023/07/22/popis-100-americkih-patenata-koji-se-odnose-na-promjenu-vremenskih-uvjeta-od-1891-2013-godine/>
6. <https://www.hop.com.hr/2023/07/23/vijetnamski-projekat-popeye-ekskluzivna-strucna-analiza-o-kojoj-meteorolozi-sute/>
7. <https://www.index.hr/vijesti/clanak/plenkovic-na-mjestu-velikog-pozara-ne-mozemo-utjecati-na-klimatske-promjene/2379746.aspx>
8. <https://narod.hr/svijet/dobitnik-nobelove-nagrade-za-fiziku-2022-ne-postoji-klimatska-kriza-a-opasna-korupcija-znanosti-prijeti-svjetskom-gospodarstvu>
9. <https://www.hop.com.hr/2023/07/30/cia-zabrinuta-zbog-otkrivanja-ratovanja-vremenskim-uvjetima-i-laznog-geoinzenjeringa/>
10. <https://epoha.com.hr/2023/04/25/agenda-stigla-u-hrvatsku-zagreb-krece-s-realizacijom-wef-projekta-15-minutni-grad/>
11. <https://www.hop.com.hr/2023/07/15/dobitnik-nobelove-nagrade-za-fiziku-2022-dr-john-clauser-narativ-o-navodnoj-kriznoj-klimi-naziva-pseudoznanosc/>
12. <https://www.facebook.com/sladoljev.srecko/videos/1457383031705181/>
13. <https://epoha.com.hr/2022/07/09/pakistan-masovni-prosvjed-protiv-novog-svjetskog-poretka/>
14. https://www.index.hr/vijesti/clanak/plenkovic-na-mjestu-velikog-pozara-ne-mozemo-utjecati-na-klimatske-promjene/2379746.aspx?index_tid=238903
15. <https://liberal.hr/klimatske-promjene-smak-svijeta-bjorn-lomborg-joseph-stiglitz-index-494>

CONCLUSION

Like purveyors of COVID-19 and Ukraine war disinformation, climate disinformation purveyors formed supranational disinformation ecosystems consisting of various social media pages, groups, and profiles, including pseudo and mainstream media sites from the SEE region. At the center of the SEE climate disinformation ecosystem were the usual suspects in the form of pseudo and mainstream media. The analysis revealed that 56.3% (N=66) of the identified purveyors of climate disinformation shared/created COVID-19 disinformation, and 23.73% (N=27) of purveyors of climate disinformation shared/created disinformation about the Ukraine war. On the other hand, purveyors

of climate disinformation differed from those of COVID-19 and the Ukraine war, as 66.7% of them had a dual role as most influential vertices and super-spreaders. This finding confirms previous research that the disinformation ecosystem has a “superorganism characteristic that helps its resistance to mitigation techniques” (Brautović, 2022b).

LIMITATIONS

The data collected using CrowdTangle data comes only from public posts published on pages, public groups and verified profiles and represents up to 2% of all the posts published on the topic (Donovan, 2020). Also, the data collected for the purveyors of climate disinformation is limited only to actors/content available at the time of the research (November 2023).

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ADMO

Project Adria Digital Media Observatory (ADMO) ensures the establishment and continuation of the Croatian and Slovenian hub operation for tackling disinformation and cooperation with EDMO on multiple levels by a multidisciplinary and intersectoral approach. As an effective response to the challenges for democracy and society, the project sees a combination of different expertise and methods - attacking sources/actors, networks, reasoning, and disinformation narratives from different spheres and combining techniques. The implemented activities will contribute to the general objective - creating and ensuring the long-term development of a broader Croatian/Slovenian hub on digital media composed of a multidisciplinary community of academic researchers, fact-checkers and media practitioners, journalists and civil society advocates capable of detecting and analyzing disinformation campaigns; and supporting the government and regulator in strengthening the collective response to disinformation threat to democracy.

The project comprehensively approaches the social, political, and health problem of spreading disinformation campaigns through research, awareness-raising, and capacity-building methods. The key projects' outcomes/deliverables are: the project's website and its integration with the EDMO platform, production of the continuous flow of fact-checks, publication of analytic reports on disinformation content, disinformation sources, origins of disinformation narratives, the role of international actors in spreading disinformation, disinformation acceptance and debunking, on the reasoning behind conspiracist and anti-conspiracist behavior, training for journalists and student of journalism, media literacy education activities for citizens, reports on Code of Practice on Disinformation in Croatia and on the financial viability of the Croatian and Slovenian news media sector.

