Storytelling with Satellites: A Preliminary User Study of Satellite Data in the News

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Abstract:

Satellite data and earth observation technologies are increasingly utilized in data journalism, news cartography, and investigative reporting (Bogucka 2022; Kelly et al. 2022) to document critical stories of our time like the impacts of climate change (Hernandez et al. 2020), human rights violations (Rajagopalan et al. 2020), and geopolitical events (Gamio et al. 2021). Most recently, Russia's invasion of Ukraine (Werbeck and Jones 2022) and Israel's most recent siege on the Gaza Strip (Leatherby et al. 2023) have exposed news readers to satellite data nearly every day. Yet, we know little about the impact of news maps that incorporate satellite data on news readers. As such, we ask: How do news readers understand, interpret, and engage with satellite-derived news maps?

With over 6,700 satellites in orbit as of January 2023 (UCS 2023), satellite data is more accessible than ever to newsrooms given open data streams from governmental agencies (e.g., NASA and ESA) and the expansion of commercial satellite companies (e.g., Maxar, Planet, and Airbus). The spatial, temporal, and spectral resolution of satellite technologies have also radically sharpened introducing the potential to use daily sub-one meter resolution satellite data in many applications. In addition, open-source tools along with advances in cloud computing and data retrieval technologies have transformed the reporting process enabling data processing within seconds, a feat not possible even five years ago. The proliferation of satellite data, its increased resolution, and the availability of new processing tools has required newsrooms to expand their journalistic toolkit subsequently shifting how readers consume the news (Kelly et al. 2022).

Now more than ever, news readers are synonymous with "map users" given the rise of satellite data and news maps, more broadly. Geographers and cartographers have long been interested in the impacts of spatial data and maps on their users. Previous scholarship, for example, has engaged a range of qualitative and quantitative methods like participant observation, interviews, focus groups, eye tracking, and controlled experiments to better understand how users understand, engage with, and respond to maps (Suchan and Brewer 2000). User studies have emerged as another method particularly well-suited to analyze visual stimuli hosted online like interactive maps and digital stories (Roth et al. 2017). Recent work has employed user studies to better understand digital storytelling techniques commonly used in the news like "scrolly-telling" where maps are combined with text, photo, video, and sound as the user scrolls (most often) on their phones (Song et al. 2019; see Hernandez et al. 2020 as an example). Other user studies have examined the impacts of maps on climate change and story comprehension (Fish 2020) and the emotive impact of maps and digital stories on users (Garrison 2021). The impacts of satellite data in news maps on users have received less scholarly attention.

Here, we present a user study of satellite-derived news maps exploring the impacts of satellite data in media on news readers or, better yet, map users. More specifically, we outline our mixed-research methods and our preliminary results across three areas: *story comprehension* (i.e., how do news readers understand stories through satellite data and does satellite data increase, reinforce, or decrease story comprehension?), *satellite data literacy* (i.e., how do news readers interpret satellite data and do news readers understand the production and presentation of satellite data?), and *user engagement* (i.e., how do news readers engage with satellite data in online environment and do news readers spent more time on stories with satellite data or do they click, pan, zoom more with satellite data?).

Taken together, these research findings will expand how we understand the design of news maps, specifically news maps with satellite data, and how users engage with them. This is particularly relevant as satellite data becomes ubiquitous, showing up in news maps on the front pages of newspapers and as we scroll our phones.

Acknowledgements

References

Bogucka, E.P. (2022) Data-driven design and analysis of map-based storytelling. Technische Universität München. Available at: https://mediatum.ub.tum.de/1651639 (Accessed: 24 April 2024).

Fish, C. (2020) 'Storytelling for Making Cartographic Design Decisions for Climate Change Communication in the United States', Cartographica: The International Journal for Geographic Information and Geovisualization, 55(2), pp. 69–84. Available at: https://doi.org/10.3138/cart-2019-0019.

Gamio, L. et al. (2021) 'Chaos and Desperation at the Kabul Airport', The New York Times, 16 August. Available at: https://www.nytimes.com/interactive/2021/08/16/world/asia/kabul-airport-maps-photos.html (Accessed: 24 April 2024).

Garrison, M.A. (2021) Transportation, Emotion, and Climate Change Attitude: Understanding Map Reader Response to Storytelling Maps. M.S. University of Oregon. Available at: https://www.proquest.com/docview/2572554384/abstract/C10237E9440A4D7DPQ/1 (Accessed: 24 April 2024).

Hernandez, M. et al. (2020) 'Shifting smoke', Reuters, 17 September. Available at: https://www.reuters.com/graphics/USA-WILDFIRE/POLLUTION/xlbpgjgervq/ (Accessed: 24 April 2024).

Kelly, M., Chen, J. and Alvarez León, L.F. (2022) 'Digital Storytelling from Above', Abstracts of the ICA, 5, pp. 1–2. Available at: https://doi.org/10.5194/ica-abs-5-127-2022.

Leatherby, L. et al. (2023) 'Maps: Tracking the Attacks in Israel and Gaza', The New York Times, 7 October. Available at: https://www.nytimes.com/interactive/2023/10/07/world/middleeast/israel-gaza-maps.html (Accessed: 24 April 2024).

Rajagopalan, M., Killing, A. and Buschek, C. (no date) China Built A Vast New Infrastructure To Imprison Uighurs. Available at: https://www.buzzfeednews.com/article/meghara/china-new-internment-camps-xinjiang-uighurs-muslims (Accessed: 24 April 2024).

Roth, R.E. et al. (2017) 'User studies in cartography: opportunities for empirical research on interactive maps and visualizations', International Journal of Cartography, 3(sup1), pp. 61–89. Available at: https://doi.org/10.1080/23729333.2017.1288534.

Song, Z. et al. (2022) 'Visual Storytelling with Maps: An Empirical Study on Story Map Themes and Narrative Elements, Visual Storytelling Genres and Tropes, and Individual Audience Differences', Cartographic Perspectives, (100), pp. 10–44. Available at: https://doi.org/10.14714/CP100.1759.

Suchan, T. and Brewer, C. (2000). 'Qualitative Methods for Research on Mapmaking and Map Use', The Professional Geographer, 52(1). Available at: https://doi.org/10.1111/0033-0124.00212

Werbeck, N. and Jones, D. (2022) 'Another possible mass grave with as many as 9,000 bodies is found near Mariupol', NPR, 22 April. Available at: https://www.npr.org/sections/pictureshow/2022/04/22/1094234731/possible-mass-graves-near-mariupol-shown-in-satellite-images (Accessed: 24 April 2024).