

Analysis Of Public Perception And Knowledge About RIP Current At Drini Beach, Gunungkidul Regency, Yogyakarta Based On X Data

Syintia Bella^{1*}, Nursida Arif², And Ikhlas Nur Muhammad³

¹Geography Education Master Program, Yogyakarta State University, Yogyakarta, Indonesia

²Department of Geography Education, FISIP, Yogyakarta State University, Yogyakarta, Indonesia

³Department of Disaster Management Study Program, Indonesia Defense University, Bogor, Indonesia

*E-mail: syintiabella021001@gmail.com

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ABSTRAK

Penelitian ini menganalisis persepsi dan pengetahuan publik terhadap bahaya arus rip (*rip current*) di Pantai Drini, Kabupaten Gunungkidul, Daerah Istimewa Yogyakarta, menggunakan data dari platform X (Twitter) yang dikumpulkan pada periode 1 Januari hingga 22 April 2025. Penelitian ini dilatarbelakangi oleh rendahnya tingkat kesadaran masyarakat yang berkontribusi terhadap terjadinya kecelakaan pantai berulang. Data diperoleh melalui proses *crawling* berbasis Python menggunakan Google Colaboratory dengan kata kunci #ripcurrent dan #pantaidrini, yang menghasilkan 200 cuitan, kemudian disaring menjadi 23 cuitan relevan. Data tersebut dianalisis menggunakan *Social Network Analysis* (SNA) untuk mengidentifikasi aktor kunci, pola interaksi, dan jaringan penyebaran informasi. Analisis spasial pendukung dilakukan melalui interpretasi citra Google Earth untuk mengidentifikasi zona rawan arus RIP dan mengaitkannya dengan respons publik di media sosial. Hasil penelitian menunjukkan adanya peningkatan signifikan dalam diskusi daring dan kesadaran publik setelah terjadinya insiden tenggelam yang menimpa seorang pelajar asal Mojokerto pada Januari 2025. Meskipun jumlah cuitan relevan terbatas, informasi yang disebarakan terbukti efektif dalam meningkatkan kesadaran risiko dan keselamatan pantai. Penelitian ini menegaskan potensi platform X sebagai sarana komunikasi kebencanaan yang cepat serta perannya dalam meningkatkan kesiapsiagaan masyarakat di kawasan wisata pesisir.

Kata Kunci: Arus Rip, Pantai Drini, Analisis X (*Twitter*)

ABSTRACT

This study analyzes public perception and knowledge regarding rip current hazards at Drini Beach, Gunungkidul, Yogyakarta, using X (Twitter) data collected between January 1 and April 22, 2025. The research was motivated by the low level of public awareness, which contributes to recurring coastal accidents. Data were obtained through a Python-based crawling process in Google Collaboratory using the hashtags #ripcurrent and #pantaidrini, producing 200 tweets, of which 23 were identified as relevant after a filtering stage. These tweets were further examined using Social Network Analysis (SNA) to identify key actors, interaction patterns, and information dissemination networks. Complementary spatial analysis was performed through the interpretation of Google Earth imagery to identify rip current-prone zones and relate them to public responses on social media. The findings indicate a sharp increase in online discussion and awareness following a fatal incident involving a student from Mojokerto in January 2025. Although limited in number, relevant tweets effectively disseminated safety information and risk awareness. This study highlights the potential of X as a rapid disaster communication tool and its value in enhancing community preparedness in coastal tourism areas.

Keywords: Rip Current, Drini Beach, Analysis X (*Twitter*).

INTRODUCTION

Areas along the southern coast of Java, including Gunungkidul Regency in the Special Region of Yogyakarta Province, geographically face the Indian Ocean and are therefore vulnerable to various coastal hazards such as erosion, extreme waves, and tsunamis (Marfai et al., 2016). Gunungkidul Regency itself has the longest coastline in the province, at around 71 km, which makes it one of the areas with a high level of coastal disaster vulnerability, (Marfai et al., 2019). In particular, the southern coastal area of Gunungkidul, including Drini Beach and Kukup Beach, is located in the active subduction zone of the Indian Ocean which is one of the nine seismic gaps in southern Java, making it highly vulnerable to large earthquakes and tsunamis, (Danardono, 2023).

The coastal morphology of Drini Beach, which is dominated by wave erosion and the lack of natural barriers, increases the potential for tsunami inundation, especially in flat areas that are the center of coastal community activities. The morphology of this beach is also influenced by limestone rocks typical of the karst region of Gunungkidul that are easily eroded, making the coastline dynamic and prone to change.

One of the coastal disasters that often occurs in Drini Beach is sea accidents that annually claim lives, (Saputro, 2008), (Febryane et al., 2024). Reporting from CNN Indonesia (2019) Since 2017, sea accidents in this area have been recorded to increase, with 77 cases and four fatalities in that year, rising to 128 incidents with three fatalities and one person missing in 2018. The main cause of these accidents is generally the negligence of tourists who play in the water and are dragged by the rip current (Fatchurohman et al., 2021). This phenomenon is a strong current that flows from the beach to the sea and is often not realized by tourists (Dumitriu et al., 2023),

so it is very dangerous, especially in areas that are crowded with visitors such as Drini Beach, (Marfai et al., 2019). The increasing number of tourists in Gunungkidul (Adinugroho, 2017) indirectly indicates the high exposure to potential coastal disasters, especially ocean backflow.

The tragedy in January 2025, in which a student from Mojokerto died after being swept away by the current while swimming with his school group, is a clear example of weak supervision and lack of education about the dangers of rip currents, both among tourists, accompanying teachers, and beach officials. This incident shows that there is a big gap in public education efforts regarding the dangers of ocean rip currents and the urgency of implementing an early warning system. The low risk perception of the community is one of the reasons for the lack of preparedness for this phenomenon.

Conversations about the incident were also busy on social media, especially X (formerly Twitter), which became a forum for conveying opinions, personal experiences, and criticism of tourism area management, (Lubis et al., 2024). X has the advantage of being an *up-to-date* news-based social media with real-time features that allow people to provide reports directly from the scene, (Pasaribu et al., 2021). This can be utilized by relevant agencies as an initial source of information in emergency handling. In the context of disaster, citizen participation through tweets, photos, and videos provides a quick overview of the situation on the ground, helping decision-making by authorities, (Budhi & Prasadana, 2020).

Hashtag search and analysis algorithms can also be used to monitor conversation dynamics and detect spikes in public attention to an event, making X an important tool in community-based early warning systems, (Gusti, 2023). The use of hashtags (#) such as #PantaiDrini and #RipCurrent can massively shape and

disseminate public opinion (Eriyanto, 2020).

Twitter can be utilized as a data source to understand public perceptions of rip current risk. Through digital social analysis approaches such as *Social Network Analysis* (SNA) and content analysis, patterns of information dissemination and key actors in public discourse on the issue can be identified, (Bakry & Nurislaminingsih, 2023). By observing public opinion on social media, we can get an overview of the level of understanding of the danger of ocean backwash as well as people's expectations of the coastal safety system. If managed well, social media has the potential to be an effective disaster education tool, supported by the role of local governments, tourism managers, and disaster volunteers, (Mulyadi, 2022).

However, research related to the utilization of X data for analysis of public perception and knowledge about rip current in Drini Beach is still very limited. In addition, there are data limitations that can only access information that is openly published on X, so the analysis can only infer the pattern of news dissemination and public opinion without exploring private or closed data. The use of tools and software such as Google Collaboratory for data crawling allows free access to data, but this research is expected to provide an understanding of the potential utilization of social media in supporting disaster risk mitigation in coastal tourism areas.

Despite the increasing number of studies on rip currents using field observations, hydrodynamic measurements, and modeling approaches (e.g., Fatchurohman et al., 2021; Dumitriu et al., 2023), research examining how the public perceives and discusses this hazard in digital environments remains very limited. Previous disaster communication studies on floods, tsunamis, volcanic eruptions, and coastal safety have shown

that social media particularly X plays an important role in monitoring public attention, disseminating real-time warnings, and shaping collective awareness (Houston et al., 2015; Pasaribu et al., 2021; Bakry & Nurislaminingsih, 2023). However, these studies have not specifically addressed rip current hazards, nor have they explored how public perception evolves in response to coastal incidents at the local level.

Furthermore, although the introduction briefly notes the limitations of X data, it does not explicitly highlight the scientific gap: the lack of research integrating Social Network Analysis (SNA) with spatial interpretation of rip current-prone areas to understand how public discourse aligns with actual coastal risk conditions. No prior studies have evaluated how discussions, concerns, and risk knowledge regarding rip currents emerge, escalate, and circulate in real time following a marine accident.

Therefore, this research fills that gap by analyzing public perception and awareness of rip current hazards at Drini Beach based on real-time discourse on X. Previous studies have analyzed rip currents through field observations and modeling, but none have assessed public perception and awareness through real-time social media discourse. This study addresses that gap.

METHOD

1. Data Collection

This research uses secondary data obtained from previous studies on rip currents at Drini Beach and from data crawling on platform X (Twitter) using a Python-based script executed in Google Collaboratory. Data collection focused on tweets containing the hashtags #ripcurrent and #pantaidrini between January 1 and April 22, 2025, resulting in a total of 200 raw tweets. These raw tweets were

exported into a spreadsheet format that included tweet text, interaction type (original, retweet, reply), and publicly accessible metadata retrieved through the X API (Cahyono, 2021). All crawled tweets were then filtered using a combination of automated rules and manual verification. The relevance criteria consisted of:

- (1) direct mention of Drini Beach or explicit reference to rip current hazards;
- (2) substantive informational content such as incident reports, warnings, educational explanations, or visual documentation;
- (3) exclusion of duplicates or passive retweets without additional information.

After applying these criteria, 23 tweets qualified as relevant samples for qualitative interpretation and Social Network Analysis (SNA). The selection of this subset ensures that network metrics represent meaningful patterns of information dissemination rather than noise or unrelated content. All filtering steps were documented, and representative tweets are provided in Appendix A for transparency. Statistical summaries of the raw dataset are presented in Table 1.

Table 1. Ripcurrent Hashtag Data Statistics

Data	No Location Restrictions
Data Capture Time	January 1 - April 22, 2025
Number of Tweets	200
Population Data	23

Secondary data collection was carried out on January 1, 2025 to April 22, 2025 by taking data on the hashtags *#ripcurrent*, *#pantaidrini*, without using location limits, which means that the hashtags are not limited to coming from one region or city. The number of *#ripcurrent*, *#pantaidrini* hashtag posts obtained on January 1, 2025 to April 22, 2025 was 200 posts. Then, satellite image interpretation through Google Earth was used for spatial visualization of the presence and pattern of rip current in the

Drini Beach area.

2. Data Analysis Procedure

a. Data Pre-Processing

The secondary data collection process was conducted by building and running a *crawling script* on Google Collaboratory (Figure 1). This platform allows researchers to access public data from social media platform X (Twitter) based on keywords or hashtags relevant to the topic of *rip current* at Drini Beach. The raw data output from the *crawling* can then be downloaded in Google Spreadsheet format for the next stage of analysis.

The crawled data from X (Twitter) first goes through a preprocessing stage, the data cleansing process aims to separate data that is relevant to the research objectives and discard irrelevant data, such as duplication or *noise*. The result of this stage is a final data set that is ready for further analysis.

b. Social Network Analysis (SNA)

The main analysis in this research uses the Social Network Analysis (SNA) approach implemented through the Google Collaboratory platform, a cloud-based tool capable of automatically analyzing text and mapping communication networks on social media. In the context of SNA, social media accounts are treated as actors (nodes), while interactions between accounts (mention, tag, reply, retweet, repost) are represented as relationships (edges).

3. Spatial Analysis

As a complement, spatial analysis was conducted based on secondary data and interpretation of Google Earth satellite imagery. This analysis aims to identify rip current-prone zones in Drini Beach and relate community perception patterns to actual geographical conditions. This and

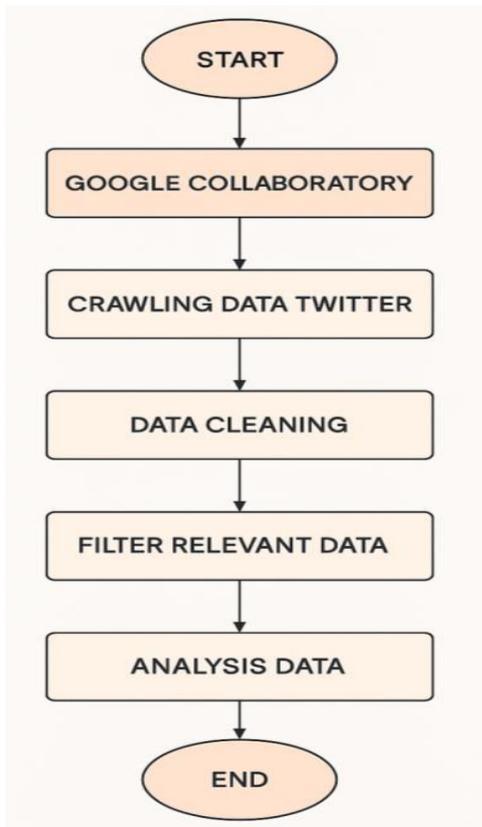


Figure 2. Data Analysis Procedure

RESULTS

1. General Condition of Drini Beach, Gunung Kidul Regency

Drini Beach, is one of the beaches in Tanjungsari District, Gunungkidul Regency, Yogyakarta which is geographically located between $8^{\circ}9'12''$ - $8^{\circ}10'10''$ LS and $110^{\circ}36'48''$ - $110^{\circ}37'15''$ (Figure 3). East, Drini Beach, is part of the karst landscape of Mount Sewu with an elevation of 0-20 meters above sea level Fig 3. The beach has a unique coral island that can be accessed at low tide and wave characteristics that vary calm in the west, larger in the east, (Damayanti & Ayuningtyas, 2010). The coastal vegetation is dominated by plants adapted to limestone and high salinity conditions, such as sea cypress and sea pandanus, while local communities also utilize the land for agriculture, (Gunungkidul, 2015). Nonetheless, Drini Beach is vulnerable to the *rip current* phenomenon, a dangerous countercurrent formed by the buildup of wave water masses and non-uniform coastal morphology, including the presence of coral islands, (Noe, 2023).



Figure 3. Research Locaton Map

In response to this risk, research by Hendy Fachturohman (2025), a lecturer from Gadjah Mada University's Bachelor of Applied Geographic Information Systems Program, has contributed to the identification of *rip currents* with an innovative method. The research uses a green fluorescent solution (Figure 4.) that is released into the ocean and observed for movement using *drones*, enabling accurate visualization of current paths to help with risk area mapping and rescue strategies, making Drini Beach safer. Research by Hendy (2025) also added that *rip current* forming factors are

influenced by hydrodynamic conditions or waves and tides, as well as bathymetry conditions or seabed depth. Hard structures such as cliffs can also be a factor in forming *rip currents* because they reflect incoming waves. However, some *rip currents* are sedentary and some are mobile, depending on the morphological conditions of the seabed when the rip current is formed. "An increase in wave activity can also increase the strength of the rip current because it can generate stronger feed currents," quoted from the news portal (ugm.ac.id).



Figure 4. Identification of Drini Beach Ripcurrent Using Fluorescent
Source: Research by Hendy Fachturohman (2025)

2. Identification of Public Perception and Knowledge of Ripcurrent at Drini Beach, Yogyakarta

Based on the data collected on April 22, 2025, 200 tweets with the keyword "*Rip Current* Drini Beach" were obtained. However, there are only 23 tweets or about 12% that are related according to the *rip current* phenomenon and disaster events at Drini Beach Yogyakarta. There are 307 unique tweets with the keywords "beach" and "disaster" or about 88% of the total tweets, which cannot be included in the data analysis process as shown in the diagram attached in (Figure 5).

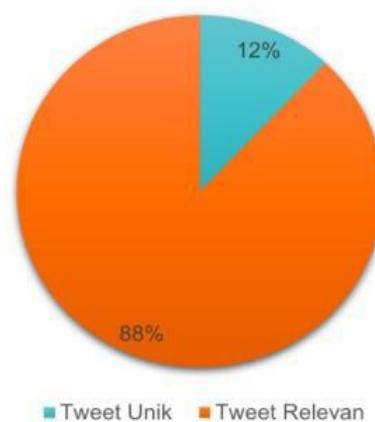


Figure 5. Comparison of Tweets in X

Figure 5 illustrates the comparison of the number of relevant and unique tweets containing the keyword "Rip Current Drini Beach" based on the number of tweets recorded in the web crawling during the research period. Unique tweets contain posts with the keyword "Rip Current Drini Beach", but not in the actual sense. Among the unique tweets were allusions and various posts that did not refer to the Drini Beach *Ripcurrent* event in question.

Next, there are ten initial posts of the hashtag *Ripcurrent* Pantai Drini this post is data that shows the initial post of a hashtag on twitter presented by Crawling Google Collaboratory data according to the time period taken by researchers, this data presents data posts within four months of a post uploaded to twitter. The initial posts were taken in the type of original tweets (original posts from twitter user accounts), retweets (those who repost information posted by other accounts), and replies (users who comment on other account posts) from accounts with the same hashtag posts. The ten initial posts on accounts using the hashtag *Ripcurrent* Pantai Drini can be a pioneer of the development of information on the hashtag, the presence of early posting accounts in the network shows that the communication network has key actors in the network. These actors occupy various positions, some act as a source of reference, conversation material, and as

pioneers or initiator of network formation and channeling messages, (Rakhman et al., 2021).

Table 2 shows ten accounts of initial posts of the *ripcurrent* hashtag taken in the period January 1-April 22, 2025. In the data, it can be seen that the initial posts are dominated by users who are in locations adjacent to the Drini Beach area of Yogyakarta and also victims of the affected *ripcurrent* disaster, namely Mojokerto City. Then, from the ten initial posts of the *ripcurrent* hashtag, it is known that four accounts are twitter accounts from mass media, and six others are from personal accounts.

The ten initial posts of the *Ripcurrent* hashtag that occurred in Table 2 show the community's response regarding the information on the Drini Beach *ripcurrent* disaster that killed the Mojokerto student with a pioneer post originating from the @merapi_uncover account in a post that reads "January 11, 2025, another sea accident occurred on Parangtritis beach, the victim was successfully rescued by swimming by Sar Parangtritis The victim and his group came to Parangtritis Beach at 09.00 wib then the victim played on the beach near the https ripcurrent area", through the post encouraged the emergence of other initial posts with trending topics on the hashtag *ripcurrent* at Drini Beach Gunungkidul, Yogyakarta.

Table 2. The First Ten Posts of The Hashtag *Ripcurrent*, Drini Beach

No.	Author	Pub-Date	Favorite Count	Location	Reply	Retweet
1	Merapi_Uncover	03-03-2025 (15:21:58)	20	Yogyakarta, Indonesia	2	0
2	Ditjenpk_Kkp	01-02-2025 (11:49:16)	4	Jakarta Capital Region, Indone	0	0
3	Suaramerdeka	31-01-2025 (03:55:28)	0	Indonesia	1	0
4	Kominfodiy	31-01-2025 (03:44:55)	0	Yogyakarta, Indonesia	1	0
5	Kominfodiy	31-01-2025 (03:44:55)	0	Yogyakarta, Indonesia	1	0
6	Maddumadani	31-01-2025 (02:34:27)	1		0	0

No.	Author	Pub-Date	Favorite Count	Location	Reply	Retweet
7	Kabarterdepanid	30-01-2025 (10:41:46)	3	Mojokerto, East Java	0	0
7	Serat_Ketjil	30-01-2025 (03:30:54)	3		1	0
8	Merapi_Uncover	11-01-2025 (06:18:35)	37	Yogyakarta, Indonesia	6	7
9	Medcom_id	03-02-2025 (09:20:00)	0	Capital Region, Indone	0	0
10	kabarterdepanID	06-04-2025 (01:43:30)	0	Mojokerto, East Java	0	1

4. Identification and Analysis of Public Perceptions Based on Post X

Graph 1 (Figure 6) in the retrieval of the hashtag *Ripcurrent* shows a significant increase in the hashtag due to initial information about the disaster that killed a number of Mojokerto students in January 2025 at Drini Beach which was allegedly due to *ripcurrent* waves. The increase in posts was mainly influenced by the existence of a twitter media account as a means of sharing news information in the Yogyakarta area with the @merapi_uncover account as the initial provider of information/posts regarding the death of Mojokerto students due to being carried away by waves at Drini Beach, Gunungkidul, Yogyakarta. Through the twitter account, it can be seen that the public's perception and knowledge of the Drini Beach *ripcurrent* is increasingly open and their curiosity about the *ripcurrent* phenomenon is increasing rapidly. Graph 1 (Figure 6) in the retrieval of the *ripcurrent* hashtag shows an increase in the time span from January 1 to April 22, 2025, the data search deadline. Unlike the beginning of the disaster that befell the Mojokerto students, the first time it went viral was at the end of January 2025, while in the following months when the news had begun to fall, so it is possible that the trending topic of the *ripcurrent* hashtag is no longer dominated by tweets about the *ripcurrent* phenomenon of Drini Beach Yogyakarta as a trigger for the Mojokerto students to die. Public perception and

knowledge with the hashtag *ripcurrent* on that date shows the existence of opinion as the main role in public perception in discussing the *ripcurrent* phenomenon of Drini Beach, Gunungkidul, Yogyakarta posted by Merapi Uncover and public perception of beach tourism on the south coast of Jogja which was crowded at the beginning of the year which then the post was retweeted by many twitter users about their concerns about Jogja, one of which was about the large waves on the coast of the southern panti.

The increase in the number of posts on social media X is due to an event that affects the *ripcurrent* hashtag to become a trending topic on that date, as in the graph above with the *ripcurrent* hashtag trending topic on January 11, 2025 influenced by the news that a number of students from Mojokerto who were on a study tour at Drini Beach, Gunungkidul Yogyakarta drowned. @merapi_uncover posted a thread in X regarding the tragedy. Posts with the highest increase in the number of tweets on January 28, 2025 when the phenomenon of drowning of Mojokerto students at Drini Beach, Gunungkidul, Yogyakarta occurred. The post at that time showed the highest graph with posts around retweets and several thousand replies accompanied by an amateur video recording the flow of waves on Drini Beach so that curiosity increased and was reflected in their response to the account's initial post. The post caused a diverse response from the community in providing their perceptions and knowledge

on twitter social media regarding the ripcurrent phenomenon, either commenting directly on Merapi Uncover's twitter social media as an initial post, retweeting the initial post or writing a personal tweet topic regarding the

dangers of ripcurrent, the magnitude of the community response shows a significant increase in the ripcurrent hashtag with user response post data that can be seen in the following images.

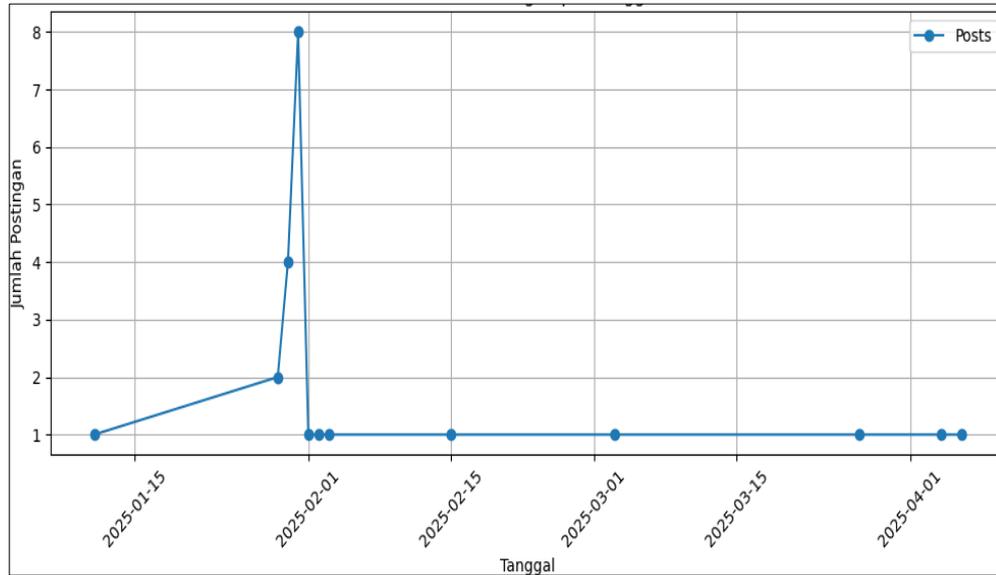


Figure 6. Chart of Posts Dated January 1-April 22, 2025

Post 1. @merapi_uncover account regarding the news of the drowning of Mojokerto students at Drini Beach, Gunungkidul, Yogyakarta (28-January-2025)

Post 2. @merapi_uncover account regarding the dangers of the Drini Beach ripcurrent phenomenon, Gunungkidul, Yogyakarta (01-February-2025)

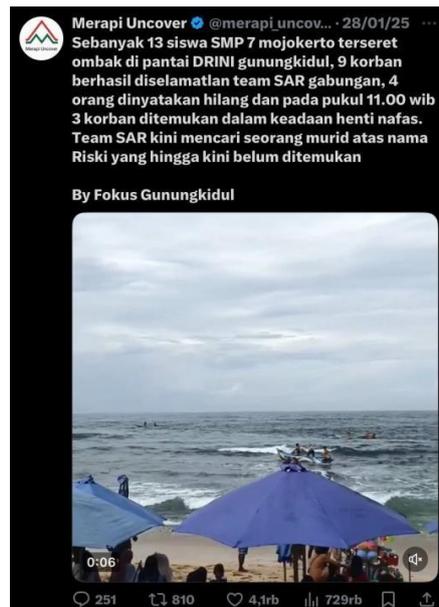


Figure 7. Initial Post Accounts in Graph 1 that played a role in increasing the hashtag Ripcurrent Drini Beach, Gunungkidul, Yogyakarta

As shown in post 1 (see figure 7) it can be seen that the @merapi_uncover account as an account with an initial post increased the hashtag *ripcurrent* on January 28, 2025 with posts in the form of news text and amateur video uploads regarding the drowning of a number of Mojokerto students at Drini Beach, Gunungkidul, Yogyakarta with the number of users who liked the information as much as 4.100 likes/likes, impressions (videos that have been opened by other users) of 729,000 impressions, users who repost information posted by other accounts (retweets) as many as 810 retweets, users who quote other account posts (quotes) as many as 290 quotes and other users who save other account posts on their twitter accounts (bookmarks) as many as 326 bookmarks and also users who reply (comments) as many as 251.

Meanwhile, in post 2 (see Figure 7) the @merapi_uncover account as an account with an initial post increasing the *ripcurrent* hashtag on February 01, 2025 with posts in the form of text and video about the dangers of the *ripcurrent* phenomenon on Drini Beach, Gunungkidul, Yogyakarta with a total of 4,600 likes/likes, 728,000 impressions, 957 retweets & 259 quotes, 368 bookmarks and also users who reply (comment) as much as 108. Based on the data on these posts, it can be seen that the @merapi_uncover account posts received a very high user response. The highest post of the *ripcurrent* hashtag in the first graph is known to have a connection between public perception and knowledge of the *ripcurrent* phenomenon at Drini Beach,

Gunungkidul, Yogyakarta with the highest number of trending topics regarding the tragedy of the marine accident phenomenon shown by the increase in the *ripcurrent* hashtag from January to February 2025. Trending topic posts on the graph are shown in Figure 6, where @merapi_uncover posts about the dangers of *ripcurrent* at Drini Beach, Yogyakarta.

Two threads from the accounts @zakiberkata and @darmadi084 (Figure 8)

on January 29, 2025 represent the form of public perception and knowledge about the rip current phenomenon at Drini Beach, Gunungkidul Regency, Yogyakarta. The first post by @zakiberkata was in the form of an educational thread that detailed the definition of *rip current*, the visual characteristics that can be recognized, and the steps to save oneself if caught in the current. Meanwhile, a post by @darmadi084 highlighted a real-life case of a junior high school student drowning due to a rip current in the same location. By including a visualization of the current in the form of beach imagery, this account seeks to raise public awareness about the importance of recognizing the characteristics of rip currents to avoid the risk of drowning.

Figure 8. indicates the awareness of the public, especially active social media users, of the hidden dangers that threaten tourists in coastal areas. Public perception in this case is not passive, but active and reflective, as evidenced by the desire to share educational information and early warnings with the public. In terms of knowledge, the shared content demonstrates a fundamental understanding of the mechanism of *rip current* and appropriate rescue actions, such as swimming towards the shore instead of against the current. This knowledge is applicable and very important in emergency situations, showing that social media has become one of the effective channels in delivering disaster literacy to a wide audience.

Both posts can be categorized as part of the 12% of relevant posts found in the collected tweet data. This shows that although most social media content other than platform X has not fully supported disaster literacy, there is a small portion that has made a real contribution to building public understanding, (Houston et al., 2015), (Knop et al., 2016). Thus, public perceptions of *rip current* disasters begin to form through collective experiences and digital narratives spread across online platforms, (Alexander, 2014).

Post 3. @zakiberkata account

Thread related to anticipated coastal currents south of Drini Beach, Gunungkidul, Yogyakarta (29-January- 2025)

Post 4. Account @darmadi084 on the characteristics of *ripcurrent* at Drini Beach, Gunungkidul, Yogyakarta (29- January-2025)

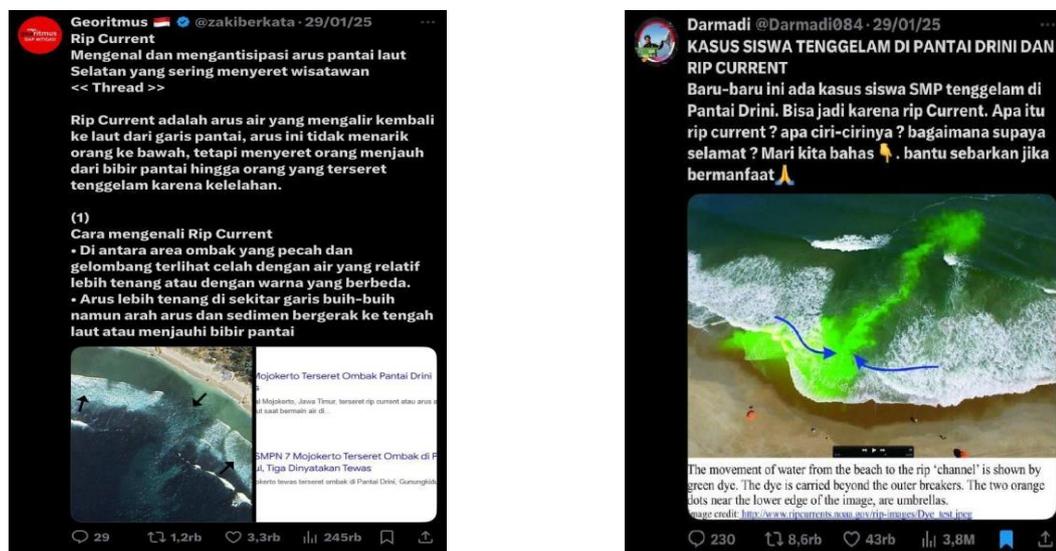


Figure 8. Posts in the form of Threads containing anticipation and characteristics of Ripcurrent Drini Beach, Gunungkidul, Yogyakarta

Posts from the @masjae_ account and the @convomf information platform (Figure 8.) uploaded on January 30, 2025 show a form of knowledge dissemination that focuses on an overview of the rip current hazard at Drini Beach, Gunungkidul. The account @masjae_ responded to the previous post by adding visual documentation from a height, which clearly shows the pattern of the rip current in the area to the east of the beach. This image is not only informative, but also plays an important role in visually shaping public understanding of the dangers of invisible ocean currents. Even without technical explanations, such visualizations allow the public to recognize the characteristics of rip currents based on observational experience, such as a straight seaward current pattern or a dark zone between breaking waves.

Meanwhile, posts from the account (see Figure 9) @convomf, which is known as an actual and viral information platform on social media, contributed differently through a public warning approach. The post conveyed both surprise and a new awareness of the existence of rip currents, which were

previously unknown to the general public.

The phrase "I just found out there is a current like this" (Figure 9) reflects the real condition that information about this phenomenon is still relatively minimal in the public sphere, and is often only understood after a visual trigger or event. As an influential information channel, @convomf plays a role in expanding the reach of safety messages to a wider audience, especially among social media users who have been less touched by formal disaster education.

Based on the results of identifying people's knowledge and perceptions from Data X, these two posts are among the small subset of tweets (around 12%) that are actually relevant to the rip current phenomenon. While still quantitatively limited, content like this has the power to quickly change people's perceptions as it touches on emotional and visual aspects. In other words, people's knowledge about rip currents seems to develop reactively and based on direct vision, rather than as a result of planned conceptual learning. Posts like this help fill the gap, strengthening collective

awareness through visual, narrative and viral approaches that match the characteristics of

Post 6. Reply to account's post by @masjae_ regarding text and documentation of *ripcurrnet* view from above the beach east of Drini Beach, Gunungkidul, Yogyakarta (30-January-2025)

information consumption in the digital age.

Postingan 7. @convomf account about warnings related to new science on the beach, namely *ripcurrent* (30-January-2025)



Figure 9. Posts and Replies containing and overview of Ripcurrent, Gunungkidul, Yogyakarta

4. Visualization of Ripcurrent Based on Image Interpretation Using Google Earth

Visualization of the rip current phenomenon in the southern coastal area of Yogyakarta, especially around Drini Beach, was conducted through interpretation of satellite images using the Google Earth application (see Figure 10.). Visual data collection was conducted in 2025, while maintaining the same location point to maintain the consistency of spatial observations. The observed location covers the waters around Drini Beach, Gunungkidul Regency, which is known as one of the zones prone to rip current events. Image interpretation was done by utilizing the high-resolution image display feature on Google Earth.

The visualization results show a water flow pattern that narrows into the sea with a

darker color than its surroundings, as well as a zone without breaking waves, which is characteristic of the presence of rip current. These patterns can be recognized through changes in hue and texture in the image, and compared over time to see their consistency under certain tidal conditions. Through this approach, the rip current phenomenon can not only be understood theoretically, but also visualized concretely as part of coastal disaster risk mitigation efforts. This visualization is further displayed in Figure 10.

CONCLUSION

Based on the analysis of public perception and knowledge of rip current at Drini Beach, Gunungkidul Regency, Yogyakarta, through X (Twitter) data from January 1 to April 22, 2025, it can be concluded that public perception and

knowledge significantly increased after the tragic incident that killed the student from Mojokerto in January 2025. Although only 23 of the 200 tweets collected (about 12%) were actually relevant to the rip current phenomenon at Drini Beach, these tweets, especially from mass media accounts and personal accounts that were located close to the incident or were affected victims, played an important role as pioneers of information dissemination. Accounts such as @merapi_uncover became key actors in sparking discussion and increasing public curiosity, as evidenced by the spike in the number of posts, retweets and comments from late January to February 2025. Posts containing education on rip current characteristics, anticipation, and visualization through amateur videos or satellite imagery

(such as those by @zakiberkata, @darmadi084, and @masjae_) show that people are starting to actively share applicable information that is important for safety. However, there is still a gap where the majority of social media content (88%) does not fully support disaster literacy, suggesting that awareness is often formed reactively and based on visualization directly after an event, rather than from planned conceptual learning. This underscores the urgency of collaboration between local government, tourism managers, and disaster volunteers in utilizing social media as an effective and sustainable disaster education tool, as well as the need for a more comprehensive early warning system to reduce the risk of accidents at Drini Beach.

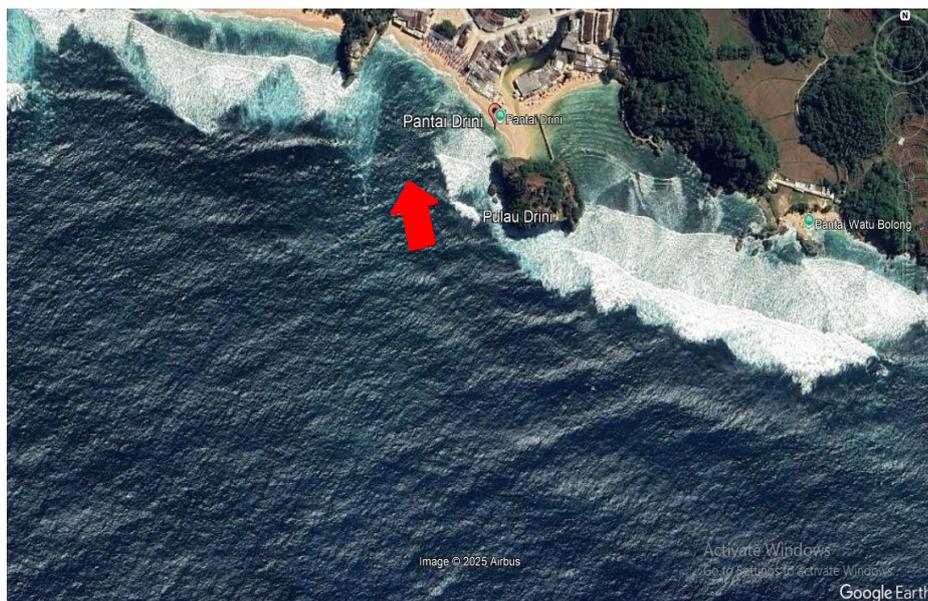


Figure 10. Visualization Data of Drini Beach Ripcurrent Phenomenon

Source: Google Earth Results, 2025

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