PIONEER
ACADEMIC PUBLISHING LIMITED

Journal of Linguistics and
Communication Studies
ISSN 2958-0412
www.pioneerpublisher.com/jlcs
Volume 4 Number 2 April 2025

Applications and Limitations of Corpus Linguistics: A Corpus-Based Study on Nuclear Wastewater Discharge Coverage in *Asahi Shimbun*

Xu Tongkai[1]

[1] University of Nottingham Malaysia, Malaysia
Correspondence: Xu Tongkai, University of Nottingham Malaysia, Malaysia.

doi:10.56397/JLCS.2025.04.11

Abstract

This study investigates the strengths and Weaknesses of Corpus Linguistics (CL) in analyzing media discourse, using a case study of *Asahi Shimbun*'s coverage of Japan's nuclear wastewater discharge from the Fukushima Nuclear Power Plant. The research objective is to evaluate CL's effectiveness in uncovering linguistic strategies and ideological framing within Japanese media narratives. Employing keyword, collocation, and concordance analyses, the study analyzes a corpus of 34 articles published between August 22, 2023, and March 1, 2025, comprising 17,072 tokens. Key findings reveal a geopolitical emphasis, with "China" (177 occurrences) surpassing "Japan" (161 occurrences) in frequency, reflecting tensions exacerbated by China's seafood import ban, and a strategic framing of "treated water" (73 occurrences) over "contaminated water" (16 occurrences) to suggest safety and control. CL demonstrates strengths in efficiently processing large datasets and providing objective, quantitative insights into linguistic patterns. However, it does not fully reflect emotional details or how social roles are represented, such as Japan being seen as responsible and China as a critic. To improve this, the study uses the Social Actors Framework (SAF) to analyze agency and hidden ideologies more effectively. By applying CL to non-English media, this research shows the need to combine quantitative and qualitative methods for a clearer understanding of media framing in complex environmental and geopolitical issues.

Keywords: Corpus Linguistics, discourse analysis, nuclear wastewater discharge, ideological framing, Social Actors Framework

1. Introduction

Japan's 2023 decision caused widespread international concern. Environmental warnings clashed with trade bans, and media reports heightened the controversy. This study aims to evaluate the strengths and weaknesses of Corpus Linguistics (CL) in analyzing ideologies in Japanese newspapers regarding the coverage of Japan's nuclear wastewater discharge (Bednarek & Caple, 2017).

Unlike traditional linguistic methods, CL is an approach that uses computational tools to study language. It allows researchers to analyze large text collections, identifying patterns and structures in discourse (McEnery & Hardie, 2012). This study takes place in the ongoing

debate on handling Fukushima's nuclear wastewater release into the Pacific. The policy has sparked domestic and international controversy. Global reactions range from environmental concerns to diplomatic tensions, especially with neighboring countries like China. The media plays an important role in shaping public opinion on such complex issues (Gabrielatos & Baker, 2008). Given its influence, studying news language helps reveal how narratives are constructed and ideologies communicated. These ideas can improve public communication and help manage international disputes.

While CL has been widely applied to English-language media, few studies have explored its use in analyzing Japanese media discourse on environmental controversies, a gap this study addresses. Thus, articles from the *Asahi Shimbun* are employed as a case study to uncover how language strategies may influence public perceptions of the issue. This study uses functions of CL tools to explain how CL can be used to examine the language construction of social narratives. The findings stress how media language presents controversial issues and influences ideology.

The paper first introduces the nuclear wastewater issue and outlines its methodology. It then analyzes how keywords and collocations shape public awareness. It also discusses CL's limitations, such as its inability to capture emotional and rhetorical details. To address this, the study uses the Social Actors Framework, which qualitatively analyzes how social entities like nations and organizations are represented in media discourse.

2. Research Context

Concerns are rising over Japan's release of nuclear wastewater, as it has global impacts on environmental safety and public health (Behrens et al., 2012). Radioactive elements like cesium and tritium remain in the water, causing long-term dangers. Once enter the food chain, these elements could cause genetic mutations and other human health issues. The environmental impact also affects Pacific ecosystems, potentially harming marine life and biodiversity (Liu, 2023). On August 24, 2023, the Japanese government started discharging the wastewater into the Pacific Ocean. This moves quickly triggered opposition from local protesters, neighboring countries, and global environmental groups. For instance, China's negative response, including a ban on seafood imports, clearly indicates political rivalry.

The impact of this decision reverberates beyond immediate environmental concerns; it has led to broader geopolitical tensions, particularly between Japan and China (Sora, 2022). These tensions underscore the complex intersection of national policy, public health, and international relations. Considering the power of mass media in shaping societal views, a careful analysis of the language in news reports on significant topics is necessary (Fackler, 2016).

Japan's historical experience and sensitivity to nuclear concerns make it essential to explore how Japanese newspapers report on this subject. Founded in 1879, *Asahi Shimbun* is among one of the most prominent national newspapers in Japan, receiving an average of 140 million page views and more than 34.5 million unique visitors each month, thus it is a key indicator of public opinion (Asahi Shimbun Media Business Division, 2024). The newspaper's dual-language publications in Japanese and English ensure that it reaches both domestic and international audiences. The media is important in reflecting government ideologies and shaping public perceptions. Its impact is significant. Therefore, analyzing the language used in covering this controversial issue provides important ideas. It helps people understand how the media handles environmental crises and political tensions.

3. Methodology

3.1 Data Collection

The study collected data from the official website of *Asahi Shimbun*, focusing on articles published between August 22, 2023, and March 1, 2025. This period was chosen because it includes Japan's announcement on August 22, 2023, about releasing nuclear wastewater, which began on August 24, 2023. This timeframe gives ideas for how the media and the public responded to the announcement. It shows both the immediate reactions and the evolving media coverage, while also including the latest development on this issue.

The corpus was built based on this timeframe. Thirty-four articles were selected using search terms like "Fukushima water" and "radioactive water," ranging from 400 to 600 words, each article was chosen for its suitability. This word count gives enough space to discuss the topic in detail without being too complicated, as longer

articles might be. It also avoids the shallowness of shorter articles, ensuring a balanced and clear perspective on the issue.

3.2 Research Instrument

For data processing, the corpus tool AntConc was used to compile and analyze the collected data. Known for the user-friendly interface, AntConc is a free tool designed for linguistic research and text analysis (Froehlich, 2015). This tool was chosen for its ability to handle large text datasets and provide quantitative insights into word frequency and relationships.

Before the analysis, all collected articles were cleaned by removing images, extra spaces, and symbols. The text was then converted to a standard plain text format. This step ensured the corpus was clean and ready for analysis, which is essential for obtaining accurate results. The corpus "*Asahi Shimbun*-Nuclear Wastewater" was created using AntConc. It contains 17,072 tokens, representing distinct words and symbols in the text. The corpus was carefully assembled from articles about nuclear wastewater in the *Asahi Shimbun*, a major Japanese newspaper. This corpus is the main linguistic resource for this study and will be analyzed to study how topics like nuclear wastewater are presented in the media.

3.3 Data Analysis

When the corpus was prepared, the analysis began. A multi-dimensional approach was used to study the language in the *Asahi Shimbun* articles, focusing on keyword analysis, collocation analysis, and concordance analysis. For keyword analysis, the "*Asahi Shimbun*-Nuclear Wastewater" corpus was compared with the "British English 2006 Press Reportage" corpus. This reference corpus contains 88,187 tokens and is publicly available. It is well-organized and validated, making it reliable for analysis. Both corpora are derived from news reports, and a comparison between them can identify the unique expressions specific to the topic of the target corpus. However, only the analysis of keywords is far from enough, word collocation and concordance can provide additional insights for a more comprehensive analysis. To achieve this, the study employed collocation analysis to identify words that commonly appear alongside keywords such as "water" and "China," enabling a deeper exploration of framing and affective patterns (Biber, Reppen, & Conrad, 1998). Further analysis of these terms through concordance analysis provided a better understanding of the ideological context within the texts. This multifaceted approach showed the effectiveness of Corpus Linguistics in analyzing media discourse.

4. Findings

4.1 Keyword Analysis

Using AntConc, the Keyword List (Table 1) has been obtained. Given that the newspaper articles focus on Japan's nuclear wastewater discharge, terms like "water," "Japan," and "Japanese" are expected to be used repeatedly. These keywords contribute to a better understanding of the articles' ideological framework. However, "China" emerged as the most frequent keyword (177 occurrences, keyness = 624.211), surpassing even "Japan" (161 occurrences). This may reflect the geopolitical tensions surrounding the wastewater issue. Meanwhile, the term "water" ranked third in the keyword list (Table 1), appearing 167 times with a keyness value of 520.109. This high frequency underscores its centrality in the discourse on nuclear wastewater discharge. These keywords partially reflect the report's theme, but a deeper understanding requires collocation and concordance analysis.

Table 1. Top 5 words from Keyword List

Type	Rank	Freq_Tar	Range_Tar	Keyness (Likelihood)	Keyness (Effect)
China	1	177	24	624.211	0.021
Japan	2	161	29	566.114	0.019
water	3	167	34	520.109	0.019
Japanese	4	128	26	466.466	0.015
Chinese	5	119	20	433.615	0.014

4.2 Analysis of the Keyword "China"

4.2.1 Collocate Analysis

Through AntConc, collocates of "China" can be obtained (Table 2). Here, the "s" is a possessive, so it is not included in the discussion. "Japan" and "ban" will be analyzed further through concordance analysis. This begins with exploring Japan-China relations in the concordance data.

Table 2. Collocates with five-word span surrounding "China"

Collocate	Rank	Freq (Scaled)	FreqLR	FreqL	FreqR	Range	Likelihood	Effect
s	1	1370	46	12	34	17	47.396	1.729
Japan	2	1610	47	34	13	16	39.277	1.527
ban	3	440	20	2	18	14	29.673	2.166
in	4	3840	72	52	20	22	23.422	0.889
nationals	5	90	7	7	0	6	16.811	2.941

4.2.2 Concordance Analysis

The way "China" is depicted in the *Asahi Shimbun* articles goes beyond just economic ties, also shedding light on the diplomatic relations between the two nations. By analyzing how "Japan" is referred to, we can better understand the multifaceted nature of the China-Japan relationship. This examination uncovers not only the economic aspects but also the diplomatic ones, offering a deeper understanding of the complexities that define their bilateral interactions. As a result, it presents a more comprehensive view of the evolving dynamics between these two countries.

1) After the meeting, Kishida told reporters, "Japan and China agreed to work together to resolve the issue through discussions and dialogue while holding a constructive attitude." (AS, 17/11/2023)
2) Japan and China have been coordinating a meeting between Prime Minister Fumio Kishida and Chinese Premier Li Qiang on the sidelines of ASEAN-related summits scheduled in Indonesia in early September. (AS, 28/08/2023)
3) As nations with a significant responsibility for regional stability, Japan and China must engage in continued and meaningful dialogue to explore avenues of effective and fruitful cooperation. (AS, 18/11/2023)
4) "Japan and China must establish stable and smooth relations that run like a local train (instead of a roller coaster)," Tarumi said. (AS, 18/11/2023)
5) SAN FRANCISCO — The leaders of Japan and China drew on the past to move fraught bilateral relations forward during talks here aimed at leveraging the two countries' common interests. (AS, 18/11/2023)
6) We welcome the emerging willingness among policymakers in both Japan and China to expand bilateral dialogue as a first step toward improving relations between the two nations. (AS, 16/12/2024)
7) They are also expected to confirm that Japan and China will maintain the principles and shared awareness included in the four basic documents concluded between the two countries and will build a relationship that allows for candid conversations. (AS, 15/11/2024)
8) "I want to create a bright future for Japan-China ties and look forward to a frank exchange of views from a larger perspective," Kishida said. (AS, 17/11/2023)
9) The policy to comprehensively advance the strategic and mutually beneficial relationship, in which the two countries will cooperate over their common interests, has been a pillar of Japan's China policy since it was first laid out in 2006. (AS, 15/11/2024)
10) Leaders of China and Japan agree to 'mutually beneficial' ties. (AS, 11/10/2024)

Using expressions such as "work together," "establish stable and smooth relations," and "create a bright future," the 10 examples from

news texts demonstrate that Japan and China are actively advancing dialogue and cooperation to build a stable bilateral relationship.

While diplomatic efforts typically promote dialogue and cooperation, the "ban" reflects the presence of tensions, as will be explored further in the following discussion. Analyzing the concordance of "ban" demonstrates that this term is consistently associated with Japan's seafood imports, indicating that the restrictions play an important role in the ongoing dispute.

11) The meeting also addressed China's import ban on Japanese seafood, which was imposed shortly after Japan began releasing treated radioactive water into the ocean from the crippled Fukushima No. 1 nuclear power plant in August last year. (AS, 11/10/2024)
12) A priority issue for Japan is China's blanket ban on seafood imports over the release since August of treated radioactive water from the crippled Fukushima No. 1 nuclear power plant into the Pacific Ocean. (AS, 18/11/2023)
13) China also imposed a blanket ban on seafood imports from Japan in August to protest the release of treated radioactive water from the crippled Fukushima No. 1 nuclear power plant into the Pacific Ocean. (AS, 05/12/2023)
14) Kishida called on Li to immediately lift an import ban that China slapped on Japanese marine products when Japan began releasing treated water into the Pacific Ocean in August last year, sources said. (AS, 27//05/2024)

Examples 11) to 14) illustrate that China's import ban on Japanese seafood was implemented following Japan's commencement of discharging treated radioactive water from the Fukushima nuclear power plant into the Pacific Ocean. This incident is regarded as the direct trigger for the ban, imbued with a political connotation of "protest."

15) Prime Minister Fumio Kishida pledged an additional 20.7 billion yen ($141 million) to help the fishing industry cope with China's blanket ban on Japanese seafood imports, but the plan was immediately met with skepticism. (AS, 25/09/2023)
16) The government plans to establish a fund to help the fisheries industry cope with China's import ban on all Japanese seafood over the release of treated radioactive water from the Fukushima nuclear plant. (AS, 31/08/2023)
17) Prices of scallops in Hokkaido and three other prefectures plunged 11 to 27 percent since China imposed the ban, according to a survey by the Fisheries Agency. (AS, 03/10/2023)
18) According to a survey by the Fisheries Agency, prices of scallops in Hokkaido and three other prefectures have plunged 11 to 27 percent since China imposed its ban. (AS, 25/09/2023)
19) Companies seek new market for scallops after China ban. (AS, 25/09/2023)

China's blanket ban on the import of Japanese seafood has had a direct and multifaceted impact on Japan's fishing industry. Examples 17) to 19) illustrate that the price of scallops has significantly decreased after the ban was imposed, prompting some companies to explore new markets for scallop exports. Examples 15) and 16) show the Japanese government announced financial assistance and set up a special fund to support the fishing industry.

4.3 Analysis of the Keyword "Water"

4.3.1 Collocate Analysis

Through AntConc, a list of collocates of "water" can be obtained easily (Table 3). In the context of Japan's nuclear wastewater discharge, an analysis of the top collocates of the word "water", including "treated", "release", "radioactive", and "discharge", reveals critical insights into the surrounding discourse. The prominence of "treated" suggests that discussions heavily focus on the treatment or purification processes applied to nuclear wastewater prior to its release, stressing efforts to mitigate its hazards. Meanwhile, "release" and "discharge" indicate that much of the conversation centers on the act of releasing or discharging the water, particularly into the ocean or broader environment, a pivotal aspect of Japan's wastewater management strategy. Additionally, the frequent collocation with "radioactive" underscores widespread concern about the water's radioactivity, a key factor in debates over the safety and environmental impact of its discharge. Collectively, these collocates illuminate the core themes dominating discussions about Japan's nuclear

wastewater: the treatment process, the mechanics of release, and the persistent risks posed by radioactivity.

Table 3. Top 10 Collocates with five-word span surrounding "water"

Collocate	Rank	Freq (Scaled)	FreqLR	FreqL	FreqR	Range	Likelihood	Effect
treated	1	760	73	70	3	33	212.221	3.309
release	2	620	53	24	29	24	141.876	3.141
radioactive	3	480	33	33	0	31	74.851	2.827
discharge	4	500	33	17	16	15	72.445	2.768
the	5	12900	214	124	90	33	58.107	0.776
into	6	550	30	3	27	18	55.853	2.493
contaminated	7	160	16	13	3	10	47.284	3.368
Fukushima	8	910	34	11	23	22	42.517	1.947
ocean	9	400	22	2	20	15	41.197	2.505

4.3.2 Concordance Analysis

Word choice plays an important role in shaping how we think and feel about a topic. It affects readers' emotions, attitudes, and can influence public opinion (Zhou, 2022). Looking at Table 3, we see the words "treated" and "contaminated" used differently. The word "treated" appears 73 times, suggesting that the water has been processed properly and is safe to release. On the other hand, "contaminated" is used much less, which shows an effort to avoid stressing any negative side. This choice seems to aim at presenting the water positively, focusing on its safety and readiness. The message reassures the public and reduces worries by using "treated" more often and avoiding "contaminated". This difference in word choice helps shape how people see the situation. Both words carry emotional meaning and can strongly influence how the public feels about the release of nuclear wastewater.

By looking at how "treated" (Table 4) and "contaminated" (Table 5) are used, we can better understand their meaning in different situations. The way these words are used in context helps shape the message of the discourse.

Table 4. Sample concordance lines for "treated"

Left Context	Hit	Right Context
of water. For Japan's planned discharge of	treated	radioactive water from the crippled Fukushima No. 1
from 30 tanks this fiscal year. The release of	treated	radioactive water from the Fukushima No. 1 nuclear
expressed concerns and outrage over plans to release	treated	radioactive water from the crippled Fukushima nuclear
China amid the backlash surrounding the discharge of	treated	radioactive water from the Fukushima nuclear plant.
on all Japanese seafood over the release of	treated	radioactive water from the Fukushima nuclear plant.
Beijing's harsh reaction to the release of	treated	radioactive water from the crippled Fukushima nuclear
government and Tokyo Electric Power Co.	treated	radioactive water from the stricken

began releasing		Fukushima No. 1
seafood imports in response to the discharge of	treated	radioactive water from the crippled Fukushima No. 1
South Korean respondents were "against" the release of	treated	radioactive water from the crippled Fukushima No. 1
seafood imports that started after the discharge of	treated	radioactive water from the crippled Fukushima No. 1

Table 5. Sample concordance lines for "contaminated"

Left Context	Hit	Right Context
make a dent in the massive amount of	contaminated	water accumulating there. Plant operator Tokyo Electric
or "slurry," produced in the process of treating	contaminated	water continues to increase, but no effective
buildings, increasing the volume of contaminated water. The	contaminated	water has been filtered to remove radioactive
only radioactive element that cannot be removed from	contaminated	water using the Advanced Liquid Processing System
fuel debris, which is the source of the	contaminated	water, has been extremely difficult. The first
effort A splashing sound was heard as treated	contaminated	water, mixed with seawater pumped in for
discharge of what it calls "the Fukushima nuclear-	contaminated	water" and immediately banned imports of Japanese
catching fish in what Beijing calls "Fukushima nuclear-	contaminated	water" for distribution in China, while the
plant, the Chinese government said the water was "	contaminated"	and imposed a blanket ban on Japanese
discharge of what it calls "the Fukushima nuclear-	contaminated	water" and immediately banned imports of Japanese

To investigate the emotional inclination of news reports in their portrayal of nuclear wastewater, a comprehensive analysis of the data was conducted (Figure 1). A closer analysis of the data shows that 86% of the words typically linked to "nuclear wastewater" carry positive meanings, while only 14% are associated with negative implications. The rare mention of the term "contaminated" suggests an effort to minimize or avoid stressing the negative aspects of the nuclear wastewater issue. On the other hand, the repeated use of the word "treated" is important in promoting the idea that the wastewater is safe and properly managed. This choice of words shows a clear effort to present nuclear wastewater in a positive way, showing its careful treatment and avoiding mention of any possible dangers. The goal is to reassure the public by focusing on good management and reducing concerns. These language choices also show Japan's attempt to position itself as a responsible actor both in the country and on the global stage.

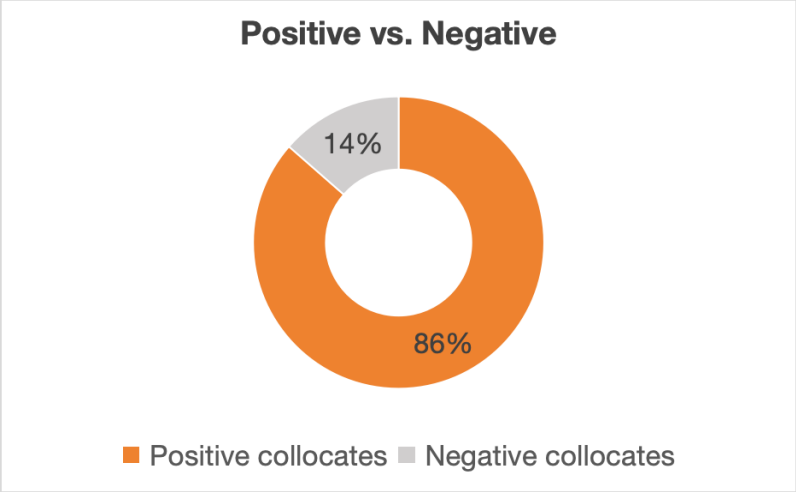

Figure 1. Emotional Tendencies for "water"

5. Strengths and Weaknesses of Corpus Linguistics

5.1 Strengths of CL

Corpus Linguistics (CL) is very useful for analyzing media discourse, especially because it can handle large datasets and provide objective, quantitative insights into how language is used. In this study, CL was used to analyze 34 articles from the *Asahi Shimbun* on the coverage of nuclear wastewater discharge, published from August 2023 to March 2025. The study used AntConc to process over 17,000 tokens, finding important patterns that would be hard to notice manually. This shows the strength of CL to cope with huge amounts of data effectively (Baker, 2006). For example, keyword analysis showed that "China" was mentioned 177 times with a keyness value of 624.211, more than "Japan" (161 mentions), showing the geopolitical focus of the articles. Also, "water" appeared 167 times with a keyness value of 520.109, showing how central water is to the story.

CL also provides a solid quantitative foundation, it improves the credibility and reliability of the findings through exact numerical data (Tognini-Bonelli, 2001). The study used AntConc's keyword and collocation tools to analyze terms and their relationships. For instance, the collocation analysis showed that "treated" appeared with "water" 73 times, compared to "contaminated" with only 16 mentions. This difference is shown in phrases like "release of treated radioactive water" versus the less common "contaminated water." It clearly shows how the wastewater is framed as safe, reflecting Japan's effort to manage public perception. This kind of statistical evidence helps minimize researcher bias and provides an objective view of how media creates narratives.

CL can also reveal small patterns that traditional methods can miss. For example, the collocation of "China" and "ban" (20 times), as in "China imposed a blanket ban," shows China as an active opponent, showing ideological tensions in the discourse. These ideas show CL's ability to uncover language strategies that shape public understanding.

5.2 Weaknesses of CL

While CL's quantitative strengths are evident in this study, its weaknesses in showing qualitative details need more consideration. CL has problems in showing the emotive and metaphorical significations conveyed in rhetorical devices and metaphors. (O'Halloran, 2007). CL can quantify the frequency of terms such as "treated water" (appearing 73 times) versus "contaminated water" (appearing only 16 times), but it cannot fully show the implications of these choices-such as how "treated" means safety and control, while "contaminated" shows danger and negligence. This emotional and rhetorical gap restricts CL's ability to fully understand how language influences public perception. In other words, the lack of attention to the emotional tone and rhetorical strategies in language makes it difficult for CL to grasp the deeper impact language has on how people view certain issues or events. Without addressing these aspects, CL's analysis remains limited in capturing the true effect of language on public opinion.

Moreover, CL falls short in analyzing how social

entities—countries like Japan and China, organizations like the Fukushima Nuclear Power Plant, or groups like the fishing industry—are portrayed in discourse. Although it can stress that "China" (177 occurrences) and "Japan" (161 occurrences) are key terms, it does not reveal whether these actors are framed as active agents driving events, passive recipients affected by them, or assigned specific roles such as problem solvers or problem causers. This lack of qualitative insight restricts CL's capacity to explore the ideological underpinnings of the text. The constraint of CL shows the necessity of combining it with different qualitative approaches to ensure a more comprehensive and balanced examination of issues (Widdowson, 2000).

5.3 Mitigations of the Weakness

Given these weaknesses, integrating qualitative approaches like the Social Actors Framework offers a promising solution to enhance CL's analytical depth (Partington, 2010). This approach analyzes how subjects, groups, and entities are distinguished in language. Readers can gain a richer understanding of the social, cultural, and ideological interpretations of figurative language and rhetorical techniques (van Leeuwen, 2008). A more extensive analysis can result from merging both CL and the Social Actors Framework.

CL shows important entities, such as "China" and "Japan," as central to the discourse. However, it does not provide the means to explore the roles or actions these entities play within the context. SAF, on the other hand, fills this gap by analyzing whether social actors are portrayed as active participants (carrying out actions) or passive recipients (being affected by actions). In addition, SAF looks into the specific roles these actors are given, such as being seen as the cause of problems, the solution providers, or the victims of circumstances. In the *Asahi Shimbun* data, SAF reveals that Japan is often activated as a proactive actor in phrases like "Japan began releasing treated water," positioning it as a problem solver managing the Fukushima crisis. Conversely, China is activated in contexts like "China imposed a blanket ban on Japanese seafood" (20 co-occurrences with "ban"), framing it as a resistant or antagonistic actor protesting Japan's policy. CL quantifies these terms' frequency, but SAF uncovers how such portrayals reflect ideological tensions, such as Japan's efforts to legitimize its actions versus China's role as a critic, enriching the analysis beyond mere word counts.

CL's focus on surface-level patterns, such as the collocation of "China" and "ban" (20 times), overlooks rhetorical devices like de-agentialization or metaphor that obscure responsibility or bias. SAF excels at identifying these strategies by analyzing how actions are attributed to social actors (Tashakkori & Teddlie, 1998). For example, the passive construction "Nuclear wastewater will be discharged into the sea" (noted in the news text) omits the responsible party, diffusing accountability away from Japan or the Fukushima plant. In contrast, explicit agency in "China imposed a blanket ban" assigns clear responsibility, potentially amplifying China's image as a disruptor. SAF's ability to dissect such rhetoric-whether Japan's use of "treated water" minimizes risk or China's "nuclear-contaminated water" heightens it-complements CL's data, exposing hidden biases and ideological framing that quantitative analysis alone cannot detect.

6. Conclusion

This study shows how effective Corpus Linguistics (CL) is in analyzing language and ideologies in the *Asahi Shimbun*'s coverage of Japan's nuclear wastewater discharge. The research used keyword, collocation, and concordance analysis to find that "treated water" (73 times) was used much more than "contaminated water" (16 times), creating a narrative of safety and control. This supports the study's goal to show how CL uncovers ideological views in media discourse and stresses its strength in identifying language patterns. However, the study also shows that CL struggles to show qualitative aspects like emotional tone or how social actors (such as Japan and China) are portrayed, which points to the need for more methods.

To address these gaps, the study used the Social Actors Framework (SAF) to add more depth, showing how Japan is shown as a responsible actor and China as a critic. This combination of methods not only confirms CL's value in analyzing non-English media but also shows its strengths and limitations.

The findings have practical value. The study can help Japan improve its environmental communication and respond better to international criticism and public concerns by understanding how the *Asahi Shimbun* shapes

public views on environmental risks. In addition, it offers ideas for the impact of China's seafood ban on Japan's fishing industry, and it guides policymakers in creating solutions for affected sectors.

For future research, it would be useful to compare the *Asahi Shimbun*'s coverage with that of Chinese media like Xinhua to study cultural differences in framing. Also, including environmental science data could provide a clearer picture of how linguistic patterns relate to ecological facts.

In conclusion, this study stresses CL's ability to detect ideological framing in media, as shown by the *Asahi Shimbun*'s focus on "treated water" to reduce controversy. Its full potential, however, is realized when combined with qualitative methods like SAF, which gives a more detailed understanding of language and perception. Future research can expand on this, using more media sources and exploring interdisciplinary approaches to better understand how language shapes environmental and geopolitical issues.

References

Baker, P. (2006). *Using corpora in discourse analysis*. London: Continuum.

Bednarek, M. and Caple, H. (2017). *The discourse of news values: how news organizations create newsworthiness*. New York, Ny: Oxford University Press.

Behrens, E., Schwarzkopf, F.U., Lübbecke, J.F. and Böning, C.W. (2012). Model simulations on the long-term dispersal of 137 Cs released into the Pacific Ocean off Fukushima. *Environmental Research Letters*, *7*(3), p. 034004. Doi: https://doi.org/10.1088/1748-9326/7/3/034004

Biber, D., Reppen, R. and Conrad, S. (1998). *Corpus linguistics: investigating language structure and use*. Cambridge: Cambridge Univ. Press.

Fackler, M. (2016). *The Asahi Shimbun's Foiled Foray into Watchdog Journalism*.

Froehlich, H. (2015). Corpus Analysis with Antconc. *The Programming Historian*, (4). Doi: https://doi.org/10.46430/phen0043.

Gabrielatos, C. and Baker, P. (2008). Fleeing, Sneaking, Flooding. *Journal of English Linguistics*, *36*(1), pp. 5–38. Doi: https://doi.org/10.1177/0075424207311247.

Kōkoku Asahi. (2024). Basic Data of the Asahi Shimbun 2024 (1). Asahi Shimbun Media Business Division. (広告朝日 (2024). 朝日新聞の基本データ 2024 年 ①. 朝日新聞社メディア事業本部) Available at: https://adv.asahi.com/marketing/analysis/15235085.

Liu, Z. (2023). How Does Nuclear Wastewater Discharge Affect Fishery and Marine Environment: A Case Study of Japan. *E3S Web of Conferences*, 424, p. 04012. Doi: https://doi.org/10.1051/e3sconf/202342404012.

McEnery, T. and Hardie, A. (2012). *Corpus Linguistics*. Cambridge University Press.

O'Halloran, K. (2007). Critical Discourse Analysis and the Corpus-informed Interpretation of Metaphor at the Register Level. *Applied Linguistics*, *28*(1), pp. 1–24. Doi: https://doi.org/10.1093/applin/aml046.

Partington, A. (2010). Modern Diachronic Corpus-Assisted Discourse Studies (MD-CADS) on UK newspapers: an overview of the project. *Corpora*, *5*(2), pp. 83–108. Doi: https://doi.org/10.3366/cor.2010.0101.

Sora, M. (2022). Geopolitical Competition Among the Larger Powers in the Pacific. *Journal of International Affairs*, *74*(2), pp. 111–126. Available at: https://www.jstor.org/stable/27169806.

Tashakkori, A. and Teddlie, C. (1998). *Mixed methodology: combining qualitative and quantitative approaches*. Thousand Oaks Sage.

Tognini-Bonelli, E. (2001). *Corpus Linguistics at Work*. Amsterdam/Philadelphia John Benjamins Publishing Company.

van Leeuwen, T. (2008). *Discourse and practice: New tools for critical discourse analysis*. New York: Oxford University Press.

Widdowson, H. (2000). On the limitations of linguistics applied. *Applied Linguistics*, *21*(1), pp. 3–25. Doi: https://doi.org/10.1093/applin/21.1.3.

Zhou, Z. (2022). Discourse Analysis: Media Bias and Linguistic Patterns on News Reports. *Advances in Social Science, Education and Humanities Research*, 637. Doi: https://doi.org/10.2991/assehr.k.220131.049.