

“The sea is not a dump yard”. A comparative corpus-assisted analysis of media representations of the Fukushima nuclear water release in China and Japan

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Abstract

On 13 April 2021, the Japanese cabinet, with the International Atomic Energy Agency (IAEA) approval, decided to release Fukushima nuclear plant water into the Pacific Ocean over 30 years. This decision elicited significant domestic and international opposition, including a seafood import ban from China. Although various studies have addressed the Fukushima nuclear water release from legal (Wu and Gong 2023), marine safety (Yue and Yang 2024), and the global economic (Wu et al. 2023) perspectives, the media representation of this issue remains insufficiently explored, particularly due to the absence of linguistically-informed, corpus-based discourse analysis. Our study conducts a comparative analysis of representations of the Fukushima nuclear-contaminated water issue by contrasting coverage in the English-language press of China and Japan. Drawing on a corpus-driven investigation of 141 news articles published in the *China Daily* and *Japan Times* from August to September 2023, we explore how different news agencies represent, legitimise, and stigmatise the release of contaminated water. The findings of our analysis reveal differences in the use of keywords and metaphorical expressions in the news articles published in these countries. *China Daily* tends to emphasise the potential environmental harm from the discharge of nuclear wastewater and calls for international attention, while the *Japan Times* predominantly portrays the safety of treated wastewater and deems China’s seafood import ban unjustified. The combination of corpus-driven methodology and metaphor analysis highlights the potential of keywords and lexical-conceptual patterns in deepening our understanding of the ideological differences and geopolitical tensions.

Keywords

Fukushima treated water, corpus-driven analysis, keyness, metaphor, China, Japan.

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Introduction

On 13 April 2021, the Japanese cabinet unanimously approved the release of stored water from the Fukushima nuclear plant into the Pacific Ocean over a 30-year period, with the endorsement of the International Atomic Energy Agency (IAEA). This decision provoked domestic and international backlash, including from China, which banned imports of Japanese seafood. Although existing studies have discussed the Fukushima nuclear water release from different perspectives, such as law (Wu and Gong, 2023), marine safety (Yue and Yang, 2024), and the global economy (Wu et al., 2023), media representation of this issue remains underexplored, particularly due to a lack of linguistically-informed, corpus-based discourse analysis. Given the importance of media discourse in shaping public opinion and attitudes, we are interested in comparing the attitudes toward the release of nuclear water as portrayed by Chinese and Japanese media outlets. Specifically, in the study, we aim to investigate how linguistic resources are used by different stakeholders to frame conflicts surrounding the management of nuclear water, focusing on the role of lexical choice in legitimizing or delegitimizing the policy debates surrounding the issue. A discursive analysis, informed by Critical Discourse Analysis (van Dijk, 1995) and Corpus Linguistics (Sinclair, 1991), will be carried out on 82 news articles from *China Daily* and 59 from *The Japan Times* to contrast the representation of the Fukushima nuclear water release in the news media of both countries.

The following sections will first outline the background of the Fukushima contaminated water release and then discuss the theoretical frameworks applied in this research: corpus linguistics, critical discourse analysis, and its derivative branch, critical metaphor analysis (Charteris-Black 2014). Subsequently, it will detail the corpus construction and discursive analysis methods, including keyness analysis and metaphor scenario analysis. For instance, Ahrens (2020) suggested that analyzing lexical-conceptual patterns offers a deeper understanding of argumentation and positioning in political discourse, thereby enriching CDA's exploration of the meaning constitution in the social context (Narty, 2019). Metaphor is one such linguistic device that reveals these patterns (Ahrens, 2020). The findings will then be presented and interpreted using contextual examples to illustrate the implications and relevance of the research. The paper will conclude by reflecting on the study's limitations.

Fukushima contaminated water release

This paper is situated in the context of Japan's discharge of radioactive water from the Fukushima nuclear plant, impacted by the tsunami, into the Pacific Ocean on 24 August 2023. The discharge of radioactive water can be traced back to the 2011 Tōhoku earthquake and tsunami, which severely damaged almost all of the Fukushima nuclear plant's backup energy sources, leading to multiple explosions and subsequent radioactive contamination of the surrounding environment. To cool the melted nuclear fuel, seawater needs to be pumped continuously into the reactor. As the volume of cooling water accumulates, nuclear facilities are confronted with the challenge of saturated storage capacity. Therefore, on 13 April 2021, the Japanese cabinet unanimously endorsed the discharge of stored water into the Pacific Ocean over a period of 30 years, with the backing of the International Atomic Energy Agency (IAEA). By August 2023, when the decision to commence discharge was made, the storage facility had amassed over one million tons of wastewater.

Japan's discharge of nuclear wastewater has attracted significant attention and discussion from both local and international media outlets. On one hand, Japan's mainstream media have

endeavored to reframe the Fukushima crisis from a disaster to an opportunity, and from a setback for the nuclear industry to a source of renewed pride in Japan’s nuclear technology, using various linguistic and discursive strategies (Puspita and Pranoto, 2021). Reframing the Fukushima crisis may help to regain authority and enhance the perception of being a technologically advanced nation.

On the other hand, while sympathy of Japan for the disaster exists, neighbouring countries such as China and Korea have expressed dissatisfaction with Japan’s unilateral decision to release wastewater, arguing that Japan’s disposal cannot be simply viewed as an exercise of sovereignty; rather, it poses substantial risks to other countries’ interests in marine utilization (Chang and Zhao, 2012). In China, state-owned news agencies serve as primary channels through which government perspectives on policy matters are conveyed to the public. The way in which reports on the release of nuclear wastewater are portrayed in these media outlets reflects both the evolution and implementation of Chinese government policies on such discharges, influencing public perceptions and attitudes toward Japan’s actions and broader nuclear safety concerns.

Theoretical framework

This research adopts a combined analytical approach, integrating Critical Discourse Analysis (CDA) and Corpus Linguistics (CL) to capitalize on their respective methodological strengths. CDA is described as an “interdisciplinary research movement” focused on examining “the semiotic dimensions of power, injustice, abuse, and political-economic or cultural change in society” (Fairclough et al., 2011, p. 357). The social cognitive approach to CDA (van Dijk, 1995, 2006), which emphasizes shared social representations and their functions in social contexts, provides a framework for uncovering hidden ideologies embedded in discourse (van Dijk, 2014). Central to this analysis is the concept of “social cognitions,” which illustrates how social structures are “instituted, legitimated, confirmed or challenged by text or talk” (Wodak, 2011: 60). Consequently, CDA is particularly useful for examining how ideologies and national identities are constructed in media narratives surrounding the discharge of nuclear wastewater in China and Japan.

A critical analysis of textual content in news media is both valuable and compelling, given that media selection, frequency, and tone of coverage play an important role in shaping not only readers’ priorities but also their perceptions and attitudes towards these socio-political issues (Gabrielatos and Baker, 2008). Opinions expressed in newspapers typically reflect broader social, institutional, or political viewpoints rather than personal ones. These viewpoints are often subtly influenced by the interests of influential stakeholders, including institutional and corporate elites, advertisers, and affluent consumers. Understanding embedded ideologies through language thus offers insights into how power dynamics are either perpetuated or transformed within broader social and political landscapes (Wodak and Meyer, 2016).

Despite its analytical strengths, CDA has faced criticism, particularly concerning its methodological limitations. A primary concern is its reliance on qualitative analysis, which has led scholars to question its objectivity and representativeness. Critics argue that CDA’s selective approach to textual analysis can result in “cherry-picking,” where researchers focus on arbitrarily chosen examples that may lack representativeness in relation to wider discourse.

To address these concerns, Corpus Linguistics (CL) offers an empirical and systematic approach to discourse analysis by enabling the quantitative examination of frequent linguistic patterns and recurring structures (Narty & Mwinlaaru, 2019). The integration of CDA and CL has been recognised as a powerful methodological approach for examining political discourse and its associated ideologies, as demonstrated in numerous studies (e.g., Li, 2021; MacDonald et al., 2015). For example, Cheng and Lam (2013) analyzed shifts in Western perceptions of Hong Kong by comparing discourse from the handover period with discourse from a decade later. Their study combined corpus-based techniques, such as the analysis of two-word concgrams and key semantic categories, with CDA. Similarly, Li (2021) investigated differences in the portrayal of Sino-US trade negotiations in American and Chinese media by examining word lists, keywords, and collocates of the term “trade” in news reports from both countries during the tariff truce.

In addition, there has been a growing trend of integrating critical metaphor research into CDA and CL, particularly since the introduction of Critical Metaphor Analysis (CMA) (Charteris-Black, 2004). Scholars of metaphor theory argue that human thought is primarily structured through metaphorical conceptualizations, with linguistic metaphors acting as manifestations of underlying conceptual metaphors, which entail structured mappings from “source domains” to “target domains” (Lakoff and Johnson, 1998/2013; Semino, 2008). As such, metaphor is a fundamental mechanism for concept formation and argument construction (Musolff, 2014). In political communication, metaphors are frequently employed to illustrate new or unfamiliar political concepts, enhance the coherence of text, and support analogical conclusions (Charteris-Black, 2004; Musolff, 2011). For example, Charteris-Black (2014) analyzed metaphors in various political discourse corpora, including U.S. presidential inauguration speeches and British political manifestos, and found that conflict metaphors such as “fight,” “protect,” and “threaten” were prevalent. These metaphors, derived from the conceptual mapping between “conflict of political views” and “war,” were strategically exploited to highlight personal sacrifices and the struggles involved in achieving societal goals.

Linguistic strategies, frames, and geopolitical conflicts

When engaging in the public depiction and reporting of conflict, news media participate in a framing process—a social and cognitive activity that defines situations to facilitate human action (Goffman, 1986; Ojala and Pantti, 2017,). The key to news framing is deciding what will appear in the audience’s “perception domain” (Butler, 2005: 823). This involves various editorial choices, such as favoring certain viewpoints, to provide specific problem definitions, causal analyses, solutions, and ways of making moral judgments. While the significance of linguistic strategies in framing geopolitical tensions in news articles has been emphasized (e.g., Entman, 1993), these discussions primarily occur at a macro-conceptual level. Discussing lexical-conceptual patterns, such as metaphors, allows us to understand the culture of argumentation from a more nuanced perspective (Ahrens, 2020).

In practical terms, while studies have examined nuclear safety and marine safety issues revolving around the Fukushima nuclear power plant in Japan (Wang and Li, 2023; Yue and Yang, 2024), there has been a lack of investigation into the media discourse surrounding Japan’s recent decision to discharge nuclear water into the Pacific Ocean. Considering the heated debate it sparked in the media and on social platforms in China and Japan, a comparative study examining the media portrayal of this issue in diverse social contexts facilitates a deeper understanding of the underlying ideologies and public attitudes regarding the political tensions between the two countries. Moreover, while metaphor plays an important role in shaping

diverse political perspectives, previous inquiries into the discursive portrayal of nuclear wastewater releases have largely overlooked this aspect. Exploring the metaphorical representation of nuclear wastewater can also contribute theoretically and practically to understanding the interplay between metaphor and the ideational function of language.

Method

Data

To examine the similarities and differences in how the Fukushima water release is reported in China and Japan, a corpus of 70,295 tokens was constructed, comprising two distinct sub-corpora: the CD corpus (sourced from *China Daily*) and the JT corpus (sourced from *The Japan Times*). The CD corpus consists of opinions and editorials sourced from the English version of *China Daily*, the leading English-language newspaper in China. The JT corpus, on the other hand, includes editorials and opinion articles from *The Japan Times*, a well-established and widely respected English-language daily in Japan. These two newspapers were selected for their representativeness in their respective national media landscapes, as both serve as key platforms for communicating their governments’ perspectives to international audiences. While relying on two newspapers may limit the generalizability of the findings, this selection allows for a focused and in-depth comparative analysis of media framing strategies within distinct socio-political contexts. Moreover, a close reading of relatively small but carefully curated corpora enables the identification of key terms central to the discourse while maintaining analytical precision in cross-national comparisons (Ahrens, 2021; Hardt-Mautner, 1995; Leech, 2007).

Given Japan’s commencement of nuclear wastewater discharge into the Pacific Ocean on August 24, we opted to collect articles pertaining to this topic published by both newspapers throughout 24 August 2023 to 27 September 2023, which spans a month after the announcement. This decision was based on the observation that the average duration of topics on social media platforms is 33.3 days (Zhao et al., 2017). We utilized the search function of the official websites of China Daily and The Japan Times to locate relevant articles by typing keywords such as “nuclear,” “water,” and “Fukushima.” Full-text articles were retrieved and saved as text files, with headlines preserved.

The search initially generated 115 articles from China Daily and 88 articles from The Japan Times. Following this, we conducted data screening to remove duplicates and ensure that the articles’ topics were specifically focused on Fukushima water discharges. Each article underwent thorough review and cross-checking by two linguistic scholars, who meticulously removed any article unrelated to the Fukushima nuclear water release. After completion of the data screening, 82 news articles from China Daily and 59 from The Japan Times were kept for further analysis, with 39,430 words in the CD corpus and 30,865 words in the JT corpus.

Word count and keyword list generation were relatively straightforward tasks conducted using the software tool WordSmith 6.0. The aim of generating keywords list was to identify significant terms in the corpus, assessing their “keyness,” which indicates whether these terms more frequently in the target corpus than in a larger reference corpus. For our study, we selected the UM-Corpus as the reference corpus. The UM-Corpus is a parallel corpus between English and Chinese and includes eight different text domains: News, Spoken, Laws, Thesis, Educational Materials, Science, Speech/Subtitles, and Microblog (Tian et al., 2014). We exclusively used the News domain (in English) of the UM-Corpus to ensure relevance and

comparability of our analysis. This reference corpus comprises 8,646,174 tokens, which is considered an “appropriate sample” for linguistic analysis (Scott and Tribble, 2006).

Metaphor identification

Metaphorical expressions were identified using the Metaphor Identification Procedure VU University Amsterdam (MIPVU, Steen et al., 2010), followed by source domain verification procedure to determine the source domain of each metaphor (Ahrens and Jiang, 2020). The basic protocol of MIPVU involves establishing cross-domain mappings by comparing meanings, whereby an item is considered metaphorical if its basic and contextual meanings can be contrasted but comprehended through comparison.

Then, reference sources like WordNet and SUMO, which offer semantic and ontological details for individual lexical units, were employed to validate the suggested source domain of each metaphorical term, in line with the approach outlined by Ahrens and Jiang (2020). For instance, since “move” is labeled as “Translocation” in SUMO, we used “JOURNEY” as its source domain.

Ten per cent of the data underwent an inter-rater reliability examination procedure (Cohen’s $\kappa=0.8515$), indicating a strong degree of agreement between the two raters (McHugh, 2012). Two fluent English speakers engaged in a process that involved calibrating their understanding of the identification scheme, independently coding half of the corpus, and conducting final discussions to resolve any disagreements.

Analysis

Keyword analysis

Table 1 lists the top 25 keywords and highlights those unique to the CD corpus and the JT corpus. Although the keyness analysis shows some common keywords in both corpora, the differences between the two are salient. From Table 1, it is evident that the common keywords among the top 10 in both corpora are directly related to the events, such as “nuclear,” “Japan,” “water,” “Japanese,” “discharge,” and “Fukushima.” However, other keywords in the two corpora display distinct characteristics in terms of emotional valence and topical focus. For the CD corpus, words associated with wastewater, which typically carry negative connotations, are more frequent, including expressions like “contaminated,” “wastewater,” and “dumping.” Also, references to the location of the wastewater discharge, such as “marine” and “Pacific,” are significantly more frequent in the CD corpus.

In contrast, Japanese media prioritize the technical aspects of wastewater discharge, as indicated by keywords like “tritium” and “treated.” It was also noted that Japanese media tend to concentrate more on China and its economic policies, evidenced by the frequent occurrence of keywords such as “Chinese,” “China’s,” “Beijing,” and “ban” in their report articles. To further investigate the usage of these keywords in our data, we employed Wordsmith to generate concordance lines containing these keywords, and subsequently conducted sentential analyses to explore their discursive functions.

Table 1. The top 25 most frequent keyword in the two corpora.

	CD corpus	JT corpus
1	NUCLEAR	WATER
2	JAPAN	FUKUSHIMA
3	WATER	CHINA
4	CONTAMINATED	JAPAN
5	JAPAN’S	JAPANESE
6	JAPANESE	NUCLEAR
7	DISCHARGE	RELEASE
8	FUKUSHIMA	SEAFOOD
9	RADIOACTIVE	DISCHARGE
10	OCEAN	TRITIUM
11	WASTEWATER	TREATED
12	CHINA	PLANT
13	MARINE	JAPAN’S
14	SEA	CHINESE
15	DUMPING	RADIOACTIVE
16	RELEASE	BAN
17	PACIFIC	CHINA’S
18	PLANT	TOKYO
19	SEAFOOD	KISHIDA
20	TOKYO	BEIJING
21	INTERNATIONAL	POWER
22	SAFETY	IAEA
23	TEPCO	SAFETY
24	DAIICHI	TEPCO
25	POWER	OCEAN

Source: authors’ own work

Usage of keywords in *China Daily*

The analysis of keywords in the CD corpus reveals that *China Daily*’s reporting on the Fukushima nuclear water release utilized four distinct framing strategies to underscore the potential risks associated with Japan’s water discharge, suggesting that the safety of the discharged water is a primary concern for China. These strategies include depicting the released water as contaminated or polluted with radiation, critiquing the scientific rationale behind Japan’s actions, emphasizing the threats posed to marine ecosystems and human health, and characterizing Japan’s conduct as irresponsible and unilateral.

Based on the language material analyzed, it was observed that expressions such as “wastewater” (Example (1)) and “nuclear-contaminated” (Example (2)) are prominently featured in *China Daily* reports. These expressions call into question the legitimacy of the discharge, the scientific foundation behind it, and the efficacy of the purported wastewater treatment. Instead of being described as “treated” scientifically, “water” in the CD corpus is often modified by expressions with negative connotations such as “polluted” or “nuclear-contaminated,” highlighting China’s concern about the safety of the discharged water.

- (1) The unprecedented release of the **radioactive wastewater** from the stricken nuclear power plant into the **sea** actually constitutes a major nuclear safety issue.

(*China Daily*, 27 September 2023)

- (2) To put it simply, Japan is being irresponsible, because it wants to save money and make the rest of the world, especially its neighboring countries, deal with the threat the **nuclear-contaminated** water will pose.

(*China Daily*, 07 September 2023)

The geographic proximity of China and Japan, with the East China Sea separating them, along with China's political and economic interests in the Pacific, intensifies China's concerns about the potential impacts on its marine ecosystem resulting from Japan's radioactive discharges. In this case, ocean-related terms, including "marine," "sea," and "Pacific" are assuming greater prominence and significance in China's media discourse, as shown in examples (3) and (4):

- (3) This is a uniquely hazardous long-term radiation threat to the environment, especially the **marine** ecosystem, including the **Pacific** Ocean.

(*China Daily*, 29 August 2023)

- (4) Considering all the scientific disposal options, discharging the radioactive water into the **sea** is the worst choice because it will damage the **marine** environment and ecology.

(*China Daily*, 21 September 2023)

The environmental impact of the nuclear water, as depicted in the CD corpus, is perceived to be enduring and potentially severe (Example (3)) and could have been mitigated if Japan had taken a more rigorous and scientifically grounded approach to managing the wastewater (Example (4)). Moreover, Japan's management of nuclear water is compared to littering, which is implied by the statement, "the sea is not a dump yard" (Example (5)). This comparison suggests that Japan's decision to release water is perceived as lacking robust scientific justification and is instead driven by economic motives aimed at cost reduction. Finally, the decision is portrayed as disregarding the potential harm to others' interests, particularly the well-being of future generations.

- (5) The **sea** is not a **dump** yard. It is a heritage of mankind and it has to be protected for our future generation.

(*China Daily*, 09 September 2023)

In addition to delegitimizing the scientific and legal aspects of Japan's nuclear water discharge, China's media have also critiqued the decision from a moral perspective. The CD corpus highlights Japan's disruption of the marine ecological environment as "affecting the values of responsible environmental stewardship shared by humanity" (Example (6)), portraying Japan as an irresponsible country in order to elicit sympathy from readers.

- (6) Japan's **nuclear-contaminated** water **dumping** poses a serious threat to the **marine** environment and, in turn, affects the values of responsible environmental stewardship shared by humanity.

(*China Daily*, 09 September 2023)

- (7) They believe that this issue has already become an **international** problem.

(*China Daily*, 24 August 2023)

The representation of Japan's nuclear water release in the CD corpus portrays it as an "international" issue rather than solely a national concern, as indicated by the frequent use of the term "international." According to *China Daily*, the impact of releasing nuclear wastewater extends beyond Japan's borders, impacting neighbouring countries, particularly those with

coastlines adjacent to Japan’s waters, especially China. Therefore, Japan’s decision to unilaterally release the water, rather than engaging in cooperative discussions among stakeholders, is seen as an irrational approach. Elevating the matter to the international arena can strengthen accountability and require that Japan and potentially affected states are bound to cooperate under nuclear safety conventions and relevant international law (Example (7)).

Usage of keywords in *The Japan Times*

The keyness analysis and sentential analysis show that *The Japan Times* adopts a contrasting stance and approach in portraying the discharge of nuclear water, employing discursive strategies to frame it as well-managed and grounded in scientific principles. The reports also emphasize that the decision is made under the guidance of authoritative institutions and enjoys support from the international community. Moreover, *The Japan Times* seeks to delegitimize China’s response to Japan’s water release by portraying Japan as a victim of the import ban.

The two prominent keywords in the JT corpus are “tritium” and “treat”. Insights gleaned from linguistic data unveil a general tendency in Japan’s reports to view tritium as a harmless substance, using scientific language, aimed at alleviating readers’ anxieties regarding radiation risks. However, these reports may lack lay-friendly explanations to clarify the properties of tritium and its impact on human health. As shown in Example (8) and Example (9), reports tend to normalize the radiation risk by stating that “(the water discharge) is not a unique event” and “no detectable amount of tritium has been found”.

As suggested in Table 1, when describing the discharged water, *The Japan Times* prefers the term “treated,” whereas *China Daily* uses terms like “polluted” and “nuclear-contaminated.” This disparity in terminology choice between the two outlets reflects the differing attitudes of China and Japan toward discharged water, with Japan asserting that the management of nuclear water has been meticulously considered and adheres to scientific protocols, while China emphasizes that nuclear water poses risks to marine environments and human health.

- (8) Typical of the scientific consensus is a comment by Tony Irwin, an Australian nuclear scientist, who said that “The Fukushima water discharge will contain only harmless **tritium** and is not a unique event.”

(The Japan Times, 05 September 2023)

- (9) No detectable amount of **tritium** has been found in fish samples taken from waters near the crippled Fukushima No. 1 nuclear plant, where the discharge of **treated** radioactive water into the sea began a month ago, the government said Monday.

(The Japan Times, 25 September 2023)

The keyword “ban”, referencing China’s decision to restrict the importation of Japanese aquatic products, is recurrently mentioned in the JT corpus. Following Japan’s commencement of nuclear water discharge into the Pacific Ocean, China imposed a ban on importing Japanese fish products, citing concerns related to food safety and national health. This decision has significantly impacted Japan’s maritime export trade and economy.

In reaction to this measure, Japan has characterized China's policy as "retaliatory" (Example (10)), and devoid of rational and scientific basis (Example (11)).

(10) In retaliation, China imposed a **blanket ban** on all aquatic imports from Japan.
(*The Japan Times*, 27 September 2023)

(11) Hayashi urged Beijing to immediately lift its import **ban**, imposed Thursday shortly after the nuclear complex began discharging the water into the Pacific Ocean, saying the measure is "not based on scientific grounds."
(*The Japan Times*, 29 August 2023)

The keyword "IAEA", which is an abbreviation of the International Atomic Energy Agency, is used significantly in the JT corpus, but not in the CD corpus. When readers engage with reports on contentious topics, they often face uncertainties and conflicting perspectives that cast doubt on the accuracy of information. Therefore, it becomes essential for media organizations to establish information authority to gain trust among their readers. This can be achieved by referencing authoritative sources. For example, in Examples (12) and (13), the JT corpus mentions the noun "IAEA" to justify the decision to discharge the water, emphasizing that the entire process was carried out under the supervision and monitoring of this authoritative institution. Moreover, as evidenced in Example (12), international support for the IAEA, especially from South Korea, illustrates that Japan's decision has received backing beyond its domestic borders.

(12) The South Korean representative said, "We sincerely expect the **IAEA** to continue to effectively monitor" the water discharge.
(*The Japan Times*, 24 August 2023)

(13) In collaboration with the **IAEA**, the Japanese government and TEPCO must provide all necessary data on the levels of radioactivity in daily catches from Fukushima to meet Japanese consumers' expectations with timely information.
(*The Japan Times*, 06 September 2023)

According to the keyword analysis, *The Japan Times* takes a contrasting stance to China's approach in describing the nuclear water discharge, employing discourse strategies to depict it as well-managed and scientifically grounded. *The Japan Times* also emphasizes that the decision was guided by authoritative bodies and enjoys international support. While both *China Daily* and *The Japan Times* elevate the issue to an international context, China urges Japan to enhance communication with other stakeholders, whereas Japan highlights broad support for its decision. Additionally, *The Japan Times* portrays Japan as a victim of the import ban, thereby challenging the legitimacy of China's foreign policy stance on the water release. The keyness analysis, when supplemented with sentential analysis, has shown its ability to identify framing strategies in media discourse from different socio-political stances.

Metaphor analysis

Ahrens (2020) proposed that conducting lexical-conceptual analyses on a small corpus with a specific topic focus enables a more profound exploration of editorial positioning and argumentation. In this section, we thus delved into the divergent and convergent metaphor

patterns present in both the China and Japan corpora to explore how metaphors are exploited to construct representations of the Fukushima nuclear water discharge in these two political contexts.

Using the MIPVU and source domain verification procedure, we observed that the source domain JOURNEY predominates in the CD corpus, whereas the JT corpus prefers the use of PHYSICAL OBJECT based on their raw frequencies. Accordingly, the metaphor analysis in this paper will focus on these two most prominent source domains. Table 2 below presents the raw frequencies of JOURNEY and PHYSICAL OBJECT metaphors in the respective sub-corpora.

Table 2. Raw frequency and Log-likelihood analysis of the metaphors JOURNEY and PHYSICAL OBJECT

Source domain	CD corpus	JT corpus	Log-likelihood value	p-value
JOURNEY	190	116	40.65	$p < 0.0001^*$
PHYSICAL OBJECT	103	174	4.53	$p < 0.05^*$

Source: authors' own work

After all metaphorical expressions related to JOURNEY and PHYSICAL OBJECT have been identified, the frequency of these two source domains in the CD corpus and the JT corpus was subsequently compared using Log-likelihood in order to determine whether the two corpora exhibit preferences in the utilization of metaphorical patterns (Rayson & Garside, 2000). As can be seen from Table 2, the results of the Log-likelihood test revealed that JOURNEY metaphors were significantly more prevalent (LL = +40.65, $p < 0.0001$) in the CD corpus compared to the JT corpus. Conversely, metaphorical expressions related to PHYSICAL OBJECT occurred significantly more frequently in the JT corpus (LL = +4.53, $p < 0.05$) compared to the CD corpus. In the next section, we will explore the use of the JOURNEY metaphor and PHYSICAL OBJECT metaphor by referencing linguistic materials in our corpus.

JOURNEY metaphor

Derived from Johnson's (1987) source-path-goal image schema, the JOURNEY metaphor stands out as one of the most commonly deployed metaphors in the domain of political communication, including in the scope of our data (i.e., Cibulskienė, 2012). In the structure of the JOURNEY metaphor, goals and objectives are metaphorically construed as destinations awaiting attainment, while the pursuit of these objectives is conceptualized as physical movement, which shapes or influences actions and strategies as movements directed towards these destinations (Semino 2008). The correspondence between physical travel and metaphorical progression has found application in many aspects of political discourse (Moragas-Fernández et al., 2018).

The statistical analysis unveiled the prevalence of the JOURNEY metaphor, particularly in the CD corpus. Upon examination of linguistic data from our corpus, it became evident that expressions related to the JOURNEY metaphor were deployed as the basis for talking about Japan's political agenda on the discharge of nuclear water. In this context, the JOURNEY metaphor was deployed in two distinct directions to conceptually frame and represent the issue

of nuclear water release: one portraying it as a path or movement forward, and the other as resistance to this movement. Specifically, the decision to release water is metaphorically compared to a progressive step, as evidenced by the use of terms such as “move” or “a further step.” Conversely, opposition to the release of water is framed as a “resistance” to this forward movement, as illustrated by Examples (14) to (18):

- (14) The protesters, led by Fijian NGO Coalition on Human Rights, called for international action to **halt** Tokyo’s **move** and to protect the ocean and future generations.

(*China Daily*, 01 September 2023)

- (15) The Fumio Kishida government has gone **a step further** to leverage its **nefarious move to advance** its value diplomacy, as it has **started** accusing anyone criticizing its action of “stoking anti-Japan sentiments.”

(*China Daily*, 07 September 2023)

- (16) South Korea’s government **shifted** from **active opposition** to a subdued silence, a **shift** that elicited public protest within the country.

(*China Daily*, 28 August 2023)

- (17) Beijing certainly isn’t the only one opposing Tokyo’s **move**.

(*The Japan Times*, 04 September 2023)

- (18) Tokyo won’t **change course** and failure to **move** Japan will make the Chinese government look petulant and weak.

(*The Japan Times*, 05 September 2023)

Representing the Fukushima water release as a journey prompts inquiries into the identities of the travelers, the guide of the tour, the direction of the journey, and the final destination. The iterative exchange of these inquiries unquestionably enhances the malleability of this particular source domain, making its narrative particularly suited to discussions and negotiations on multi-stakeholder topics in political discourse (Charteris-Black 2011; Moragas-Fernández et al. 2018). The linguistic materials from the CD corpus show that, from the perspective of China, the Japan’s use of all available means to achieve the goal of nuclear water discharge, along with the associated actions, is deemed intrinsically unreasonable. Therefore, considering the multitude of objections and environmental conservation concerns, such endeavours ought to be immediately “halted,” with no further “advancement” permitted (see Examples (14) and (15)). South Korea initially opposed the release, characterized by *China Daily* as a “firm stance.” However, it later shifted in favor of Japan, marking a significant shift “along the trajectory” (Example (16)). As a result, Chinese media outlets highlighted South Korea’s shift in their reports and stressed that it triggered protests in South Korea. In response to this, *The Japan Times* also employed the JOURNEY metaphors to illustrate its stance on the discharge of nuclear water. Specifically, Japan stated that it would steadfastly maintain its position and adhere to its “chosen course,” regardless of opposition from China or any other organization, as highlighted in Examples (17) and (18).

Physical object metaphor

The domain of PHYSICAL OBJECT emerges as the second most prevalent source domain in our corpus, in terms of its raw frequency and in its recurrent application, often manifesting in a conventional and subconscious manner. For instance, in Example (19), the nominal phrase “environmental protection” is metaphorically compared to a tangible entity endowed with specific shapes and forms, thus imbuing it with the potential for “movement”. Similarly, in Example (20), the noun “monitoring” is conceptualized as a concrete object capable of physical enlargement or reduction. Although expressions related to the PHYSICAL OBJECT source domain

often manifest unobtrusively, they are also discernible in genre-specific usage in our corpus, especially in the JT corpus, as evidenced by Examples (21) to (23):

- (19) There is a long-standing stereotype of China and pollution in the West, however, while being in China, I have seen that China has done more in **pushing for** environmental protection than many other nations.
(*China Daily*, 22 September 2023)
- (20) Specifically, this includes **expanding** monitoring to detect so-called fake news.
(*China Daily*, 19 September 2023)
- (21) Japan has demanded that China — its **biggest** market for fish — **drop its ban** on seafood imports while warning it will complain to the World Trade Organization.
(*The Japan Times*, 31 August 2023)
- (22) Kishida, however, added Japan will continue urging China to **swiftly lift a blanket ban** on Japanese seafood imports, which was quickly imposed after the beginning of the water release in late August.
(*The Japan Times*, 01 September 2023)
- (23) The fishing sector has been **hit** badly by **the blanket import ban** China imposed on Japan’s seafood products following the release.
(*The Japan Times*, 01 September 2023)

In the narrative presented by the Japanese media, China’s ban on seafood imports, enforced following the release of nuclear water, has been depicted as an act of economic and political retaliation against Japan. This portrayal arises from reports in Japan, which frequently associate the bans with water discharges, implying and highlighting a causal relationship (Examples (22) and (23)). According to *The Japan Times*, the ban has already inflicted significant damage on Japan’s fishing industry, just like the physical attacks (e.g., the expression *hit*). This serves as a strategy to deflect responsibility for Japan’s economic struggles onto another country’s export policies, thereby legitimizing such policies. Moreover, in the JT corpus, the word “ban” is often modified by “blanket,” suggesting a comprehensive and thorough restriction imposed.

In contrast, in the CD corpus, “ban” and “blanket” appear relatively infrequently, indicating fewer references to the import trade of marine products. The differing conceptual patterns between the two corpora align with our previous findings on keyness analysis, which suggested that Japan perceives China’s maritime trade policy as retaliatory, whereas China views the policy as a measure to protect public health.

Discussion and Conclusion

Situated in a socio-cognitive paradigm, this study blends the theoretical frameworks and methodologies from corpus linguistics and critical discourse analysis, showcasing the successful integration of the two linguistic inquiries and the potential of deploying quantitative analysis techniques in critical discourse analysis. Focused on Japan’s Fukushima nuclear water release, as reported by *China Daily* and *The Japan Times* between August 24, 2023, and September 27, 2023, the research investigates various representations of the nuclear water discharge, alongside strategies employed to legitimize or delegitimize it. It demonstrates that discourse is a fertile ground for observing, analyzing, and reflecting on the ideological

disparities between China and Japan in their response and approaches to the geo-political disputes.

The study reveals that integrating keyness analysis with discourse analysis of corpus-specific keywords, in comparison to a reference corpus, has proven to be particularly valuable and insightful. Although performing detailed analysis on a large corpus can be challenging, it is more manageable in a relatively small, topic-specific corpus. This method enhances qualitative analysis, facilitating the identification of potential factors underlying lexical differences (Ahrens 2020). Specifically, the specific keywords identified between the CD corpus and the JT corpus highlight differing emphases placed on the Fukushima nuclear water release between the two countries. For example, the CD corpus prioritizes aspects such as the risk associated with the released water, the reliability of the water treatment process, the scientific justification for the release, and its implications for the marine ecosystem and public health. By contrast, the JT corpus focuses more on emphasizing the safety of the treated water, the endorsement of international authoritative institutions, and criticism of China's irrational response to the release.

The differences in strategies for legitimizing and delegitimizing wastewater between China and Japan are evident not only through explicit differences in keywords but also through implicit variations in the use of lexical-conceptual patterns. In this paper, we specifically focus on the JOURNEY metaphor and PHYSICAL OBJECT metaphor, which are the two most frequent source domains in the CD corpus and the JT corpus, respectively.

In political communication, the source-path-goal structure of the JOURNEY metaphor is often used to represent a nation's pursuit of specific political objectives. The diverse uses of this metaphor may reflect the differing political rationales underlying each nation's agendas. In our corpus, Japan's discharge of wastewater into the Pacific Ocean is figurative compared to the final destination of a journey, with the actions and policies adopted along the "way" representing the steps during this journey. However, China's resistance to nuclear water discharge, motivated by concerns over environmental pollution and public safety, has been compared to attempting to "halt" the journey; Any shift in attitude regarding the discharge of wastewater into the Pacific Ocean is perceived as a change in direction along this path. Deploying conceptual mapping to project abstract concepts into concrete ones, metaphor aids in articulating intricate political ideas with greater clarity, thereby improving reader comprehension and strengthening the persuasiveness of discourse. This finding aligns with previous research (e.g., Cibulskienė, et al. 2012; Moragas-Fernández, et al. 2018), which suggests that the JOURNEY metaphor in political texts can serve as a macro framework, helping to establish close relationships between different political scenarios.

The frequent references to China's ban on imports of Japanese seafood in *The Japan Times* account for the prevalence of PHYSICAL OBJECT metaphors in the JT corpus. These references are often accompanied by discussions regarding the reasons behind China's policy, the rationality of the ban, Japan's countermeasures, and the reactions of other countries to the ban. As the target of the ban, Japan is keen to urge China to lift the export ban and accuses it of retaliating against the water release, due to its detrimental effects on Japanese fishing. By challenging the legitimacy of the import ban, Japan endeavors to justify its resistance and portray itself as a victim. However, the PHYSICAL OBJECT metaphor is scarce in the CD corpus because export bans are relatively rarely mentioned in the Chinese media. The PHYSICAL OBJECT source domain, a type of conventional metaphor, is infrequently examined in research on political discourse compared to other source domains such as WAR, BUILDING, or JOURNEY in

previous literature (c.f. Heyvaert et al., 2020; Zeng et al., 2021). Our study indicates that conventional metaphors like PHYSICAL OBJECT also exert framing effects and can be employed to shape specific perceptions of reality, thus warranting greater scholarly attention.

The comparative analysis of keywords and metaphorical patterns in news reports concerning the Fukushima nuclear water release underscores the pivotal role of language strategies and discourse cues in framing geopolitical disputes. However, the aim of this study extends beyond merely examining the discursive construction of nuclear water release; it seeks to raise awareness of broader global environmental issues and human health concerns. From the Chernobyl disaster to the Fukushima nuclear crisis, global incidents of radioactive water pollution highlight the urgent need for international cooperation and the development of effective management strategies to mitigate the risks associated with radioactive contaminants in aquatic environments. Addressing radioactive water pollution is not solely an academic endeavour (Bhagat, 2024); it is a global concern that requires concerted action. A comprehensive understanding of stakeholders' narratives is essential for enhancing mutual understanding and facilitating dialogue, negotiation, and mediation on critical issues such as the marine environment, public health, and international cooperation in addressing nuclear crises. The elite discourses of news agencies are not only subjects of analysis but also powerful tools for shaping public perceptions and influencing real-world outcomes.

Moreover, Japan's release of nuclear wastewater connects the nuclear risks associated with the responsible country to the neighbouring nations that share marine ecosystems. This situation also reflects the limitations of the existing international legal framework in effectively addressing issues of liability and compensation following nuclear accidents. Although this article does not offer an immediate resolution to geopolitical conflicts, it serves to encourage mutual understanding and compromise between differing viewpoints, while advocating for a more robust and timely legal framework, as well as compensation mechanisms for the nations impacted (Wang et al., 2022).

The limitations of this study are recognized. Firstly, this study is confined to media reports from two mainstream newspapers in China and Japan. Future research could incorporate a broader range of data sources from various countries to facilitate cross-cultural comparisons. Secondly, the study is limited to an investigation of the two most prominent metaphorical framings. Subsequent research could expand the metaphor analysis to uncover more lexical-conceptual patterns.

Note

The data files have been uploaded to the Open Science Framework to ensure transparency and validity: https://osf.io/92br4/?view_only=79e17bc65f0f482789e44933c9dab0db.

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