Climate change media discourse in Hong Kong: an analysis of Southern China Morning Post (SCMP) between 2016-2017

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1. Background and research question

The research question is **How does the Hong Kong-based electronic newspaper Southern China Morning Post (SCMP) present climate change issues?** This is an investigation of digital environmentalism in Asia, aiming to implement computational analysis tools/methods to explore discourses of climate change in electronic news. More specifically, I explored longitudinal patterns in climate change online news coverage and identified common themes and frames of climate change using a novel sample, with inspirations from Hase et al. (2021), "Climate change in news media across the globe: An automated analysis of issue attention and themes in climate change coverage in 10 countries (2006–2018)" and Broadbent et al. (2016), "Conflicting climate change frames in a global field of media discourse". The analysis sheds light on climate change discourses in Hong Kong (SCMP), which existing cross-country studies of climate change journalism have overlooked.

2. Data

Online news articles of the outlet with the keyword "climate change" from 01/09/2016-31/12/2017 were obtained from Nexis Uni with the archive's engine search. The dataset is not openly accessible according to "Terms and Conditions for accessing Nexis Uni"[1], however, all source codes used during preprocessing and analysis are available in the GitHub repository of this study[2].

During the selected timeframe, several important international events occurred: the Paris Agreement (2015) came into force on 4th November 2016, which was followed by the presidency of Donald Trump and the withdrawal of the US from the accord (June - September 2017).

The collected dataset contains 255 entries (in separate text files) with metadata (published date, word count, and several topic/industry/geography labels) and articles' contents (title and body text). To preprocess the data for analysis, three procedures were carried out.

- Extracting metadata and content from individual entry files
- Lematizing words in articles' title and body text using stanza lemmatizer

[1] Terms and Conditions for accessing Nexis Uni https://guides.lib.uchicago.edu/lexisnexis#:~:text=Sciences%2C%20Social%20Sciences-,Terms%20and%20Conditions%20for%20accessing%20Nexis%20Uni,not%20permitted%20under%20our%20license

[2] https://github.com/sol080/scmp_climatechange/

- Constructing a concept network of labels and articles (label A with article 1 is connected if label A is annotated to article 1 with more than 80% confidence (heuristic threshold)

3. Analysis

The analysis was done exploratively, with three aspects to consider: the volume of media coverage, the content (word-level and topic-level), and the fluctuation over time of these two features. Though they are intertwined in the analysis, it is divided into two parts, one focusing on media volume[3] and another part on quantitative content analysis[4] (both include the source code and visualized results).

3.1 Stable overage volume despite major climate change politic events

More specifically, for media volume, length per article records 764 words on average and 643 words on median (Figure 1) . The shortest article has 167 words about "Typhoon warning as Hong Kong Observatory issues No 1 signal", published on 2017-07-22 (YYYY-MM-DD). The longest article has 3522 words about "Former top US envoy to China Gary Locke on Trump, trade and strategic mistrust", published on 2016-11-17. About half of the articles have a moderate length of 500-1000 words (122 entries).

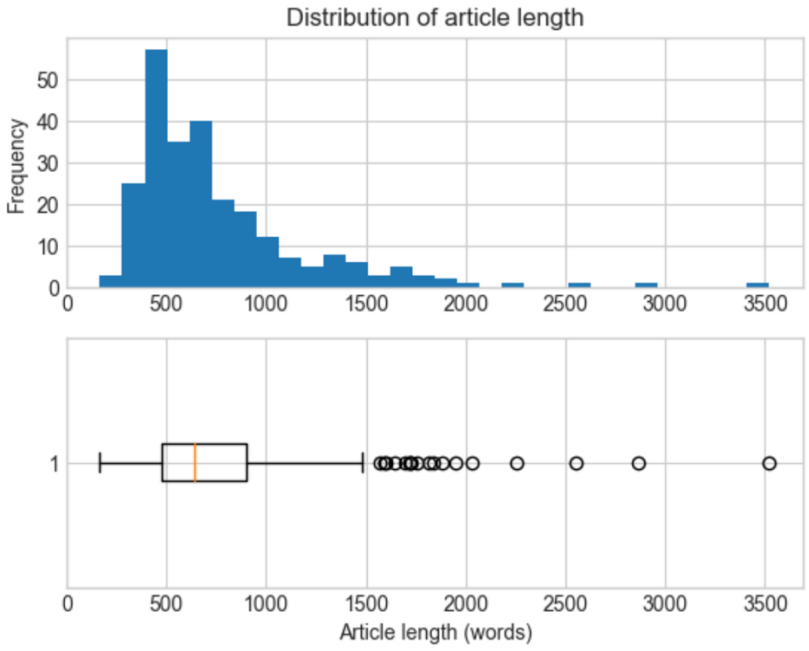

Figure 1 Distribution of article lengths

[3] https://github.com/sol080/scmp_climatechange/blob/main/volume_analysis.ipynb
[4] https://github.com/sol080/scmp_climatechange/blob/main/content_analysis.ipynb

The top longest articles (18 outliers) are generally between 1500-2000 words, with only 3 exceptions (one yearly compilation article, one on US-China relations before the US Presidential Election in 2016, and one after Xi Jinping's speech at the Chinese Communist Party 19th Congress). Six of them appear to mainly feature environmental issues, ranging from biodiversity, environmental impact, air pollution, wildlife trade, electric bus, and green economy. The outlier entries are concentrated around the end/beginning of quarters, except for Nov 2016.

Overall, the number of words/articles published gradually accumulated without any major disruption though there exist slight fluctuations on the week-level, indicating a stable trend of the outlet itself (Figure 2) but mild peak moments such as Nov 2016 (the US Presidential Election 2016) and June 2017 (US withdrawal from the Paris Agreement). Two dates with most articles published are 2017-06-02 (6 entries) and 2016-11-13 (4 entries).

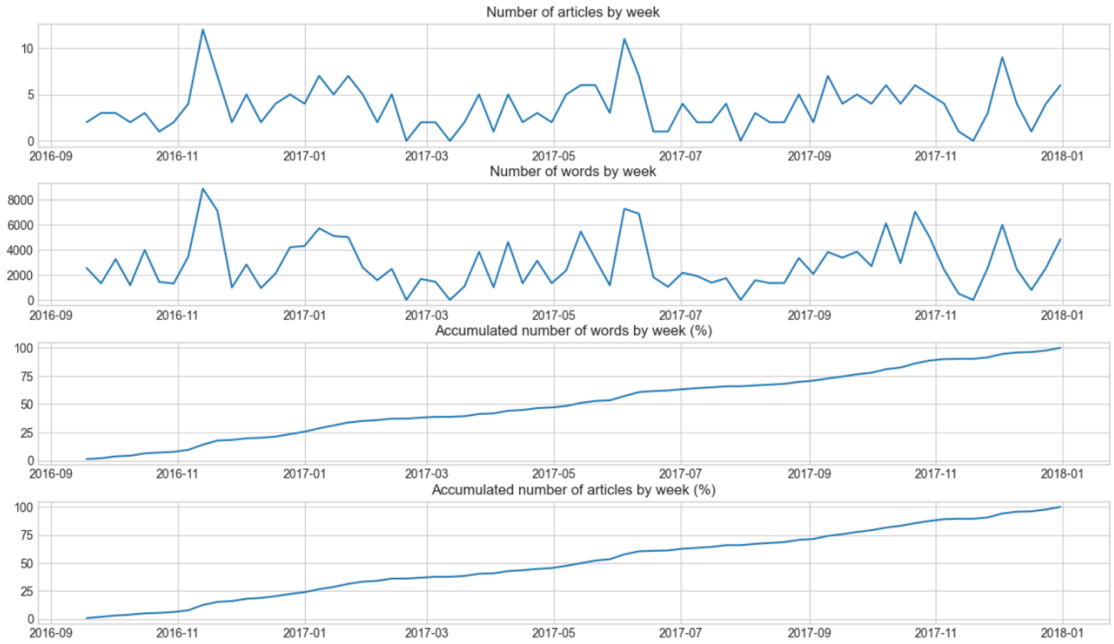

Figure 2 Trends in climate change coverage volume

3.2 International politics and the local techno-scientific narratives at two ends of the climate change news spectrum

For quantitative content analysis, I first summarized lemmatized words that occur in the title or body text with two wordclouds which provide a heuristic glance into the content (Figure 3ab). Many proper nouns can be spotted in both title and body text wordclouds, including “China”, “Hong Kong”, “US”, “Donald Trump”, “Beijing”, “Chinese”, “Xi Jinping”. These are expected given the news outlet is based in Hong Kong and several regional and international affairs occurred during the studied timeframe. Climate change related nouns are expectedly abundant (“smog”, “emission”, “green”, “carbon”, “disaster”...) and economic/industrial vocabularies are noticeable (“power”, “electric (-ity)”, “energy”,

"trade", "fund", "bond", "market",...), especially in the body text. International relation topics are evident with names of other actors ("UN", "Asia", "EU", "Germany", "BRICs"...), and related vocabulary ("summit", "leadership", "role"...).

Figure 3 Wordclouds for keywords in article titles (a) and article body texts (b)

The labels are first summarized by their frequencies and their fluctuation over time, which insights into which topics are frequently featured in SCMP articles on climate change. Most labels only occur once a month, though a few occur more than 10 times per month (Figure 4a). "China" and "United States" are the most common labels, however other locations such as "Hong Kong" (top 10), "Europe", "Germany", "France (top 30) are also frequently used. Regarding subject labels, "negative news" and "pollution & environmental impacts" are included in top 10 most common apart from "US presidential candidates" labels. Other prominent labels are related to climate change policies & agreements, international relations & foreign policies, relevant industries (energy & utilities science & technology, banking & finance, international trade), and environmental topics (emissions, climatology, natural resources, air pollution). (See Figure 4b for top 10 most common labels, other figures for top 10-20, 20-30 can be found in the source code file content_analysis)

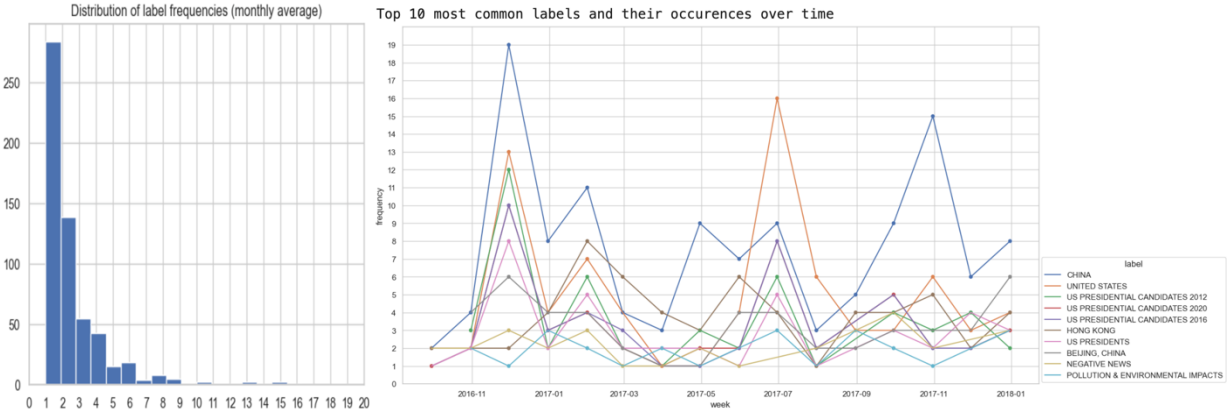

Figure 4 Overview of labels, their monthly average frequencies (a) and fluctuations over time for top 10 most common labels (b)

Labels are then mapped into a network where they form links with articles labelled accordingly, using unnormalized Laplacian embeddings to show possible clusters of nodes

(implemented by the Python library networkx [5] . We can analyze this network as representation of a semantic space (Anderson, A. B., 1970), where the more labels cooccur (appear in more common articles), the closer they conceptually are. It should be noted that the analysis might not yield universal results on how labels have related meaning, rather, it shows how such labels (and concepts they represent) are used to form frames and narratives by SCMP.

In the semantic space, there is a highly dense area with several state names, and international institutions with labels such as “foreign relations”, “international economic organizations”, “international relations & security”, “international trade”... Next to that on the upper left, a sparser area continues with climate-change-related concepts (“climatology”, “greenhouse gases”, “negative news”,” emissions”, “air pollution”...) with fields such as (“energy & utilities”, “banking & finance”, “science & technology”, “government & public administration”, “climate change regulation & policy”...) (Figure 5a). The sparseness can be explained by fewer number of articles written on several of these concepts simultaneously. This indicates either a relative lack of media attention or a more segregated approach to these topics compared to the dense international affairs area, where concepts are highly connected and featured in many articles.

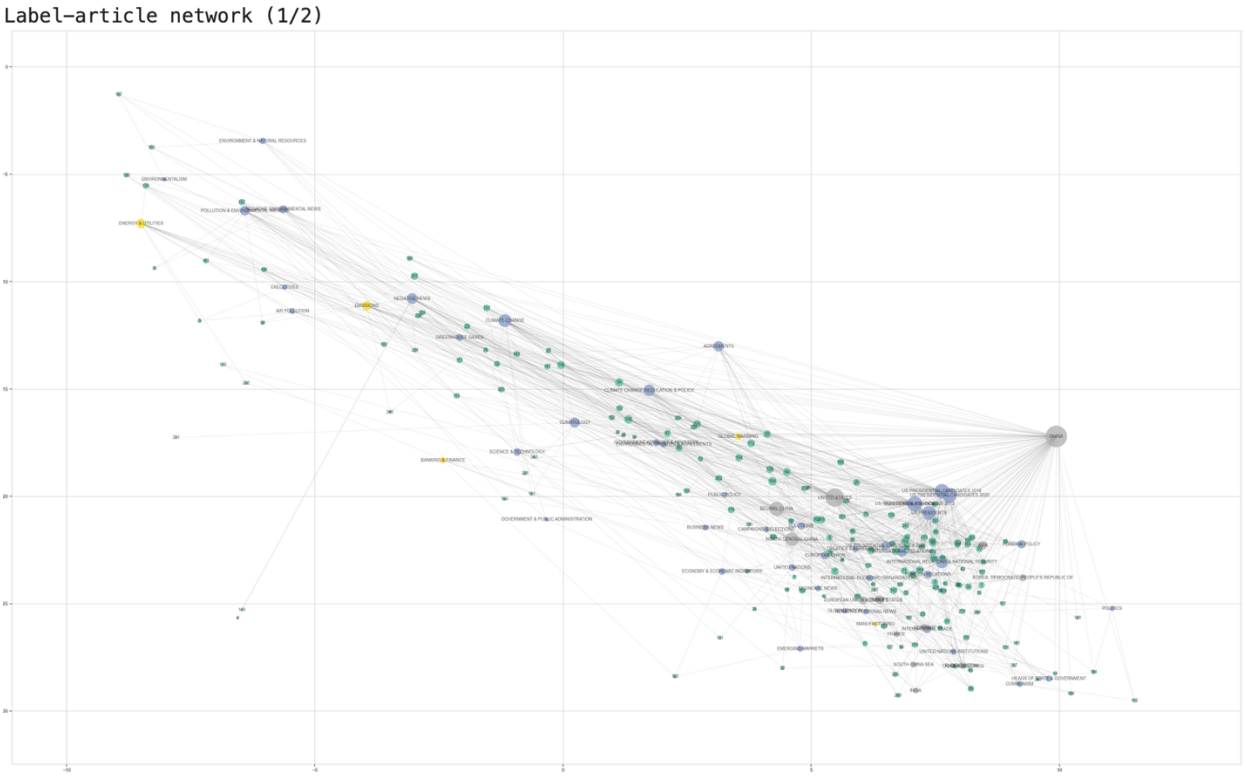

Figure 5a. Most dense areas of the semantic space

[5] Network documentation on Spectral Embeddings
https://networkx.org/documentation/latest/auto_examples/drawing/plot_spectral_grid.html#sphx-glr-auto-examples-drawing-plot-spectral-grid-py

"Hong Kong" has a very interesting location in an "outlier" part of the semantic space, to the upper left of the large clusters and connected to nodes like "environmentalism" (Figure 5b). The label also locates near "college & university professors", "sustainability", "sustainability development", "energy & environment", "alternative & renewable energy"... which indicates coverage of certain advancements in sustainability in the local context. A few nodes on this part point to extreme "weather" conditions, "pollution & environmental impacts"...

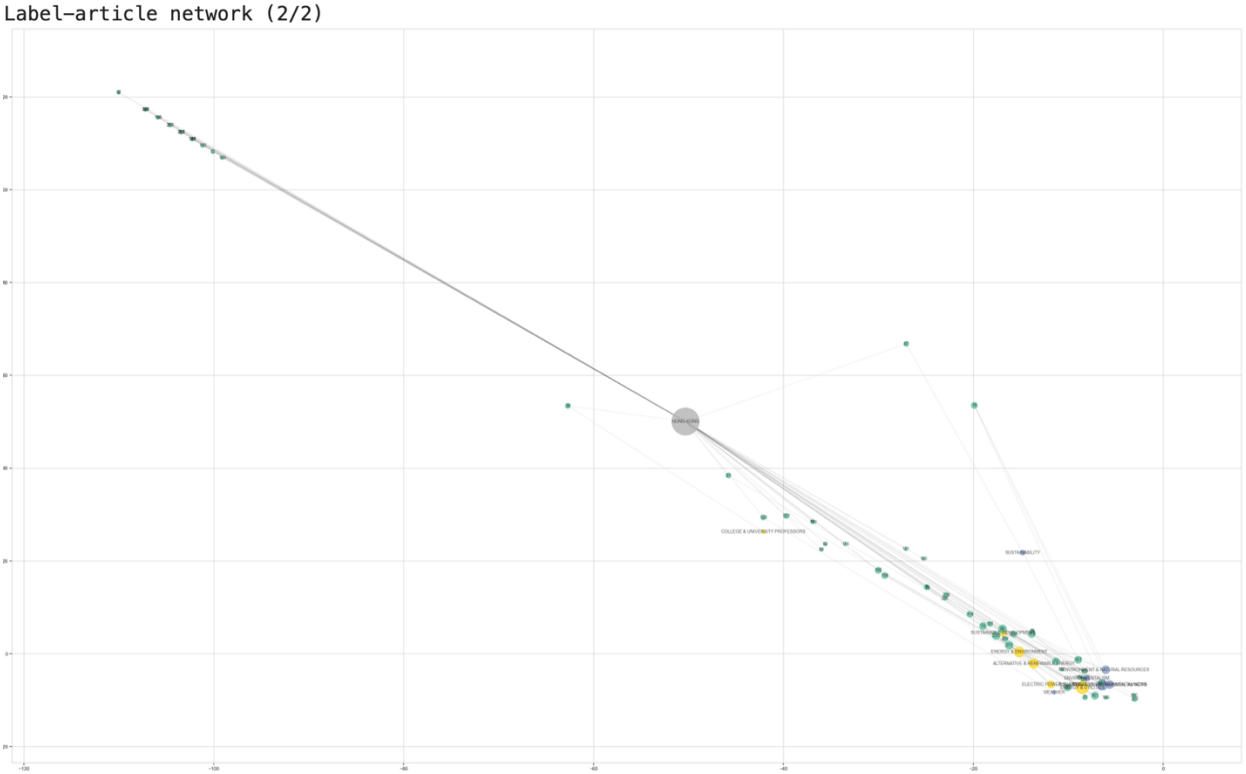

Figure 5b The outlier area of the semantic space with "Hong Kong" and related labels

4. Discussion

Analysis of media volume indicates that certain coverage of SCMP is reserved for environmental/climate issue regularly though it is unknown from the data how important role such reserved area plays in the entire SCMP content. International events can be opportunities for more climate change content to be featured as side issues, though they are unlikely to bring strong impact. However, we also heuristically observe more coverage on green economy around major international political events in 2017 such as the US withdrawal and The 2017 United Nations Climate Change Conference (COP23).

Furthermore, the content analysis with keywords and article labels allow the identification of important themes that are featured in climate change news (environmental issues, international relations, energy and finance industry sectors). Many align with themes and topics in coverage of climate identified by Hase et al. (2021) such as "climate politics" theme or topics such as the energy industry, greenhouse gases, extreme weather events.

The analysis noted some unique topics in the economic aspect (especially with banking & finance and international trade), with titles such as “Why some Chinese green bonds are not so green in the eyes of international investors”, “Why is Europes deep pool of funds attractive for Chinese green bond issuers?” or “Hong Kong can take the lead in carbon trading, US economist argues”. Economic frames here are also distinct from the “economic impacts” theme and more focused on the emerging green economy aspect, which arguably also drives China’s actions in international climate politics to balance constraints in development and attract foreign investments.

The analysis notes interesting nuance between climate change media frames used for Hong Kong and China. Broadbent et al. (2016) reported 4 contrasted frames in global media discourse on climate change: “relative acceptance or debating/opposition to consensus climate change science (a); global/foreign versus domestic scale of climate ecological impacts (b); orientation to multinational, global, or domestic climate change politics (c); and relative support for versus debate/opposition to governmental mitigation policies for the reduction of carbon emissions (d)”. Chinese media discourse in general is accepting of consensus climate change science, slightly leaning towards global-scale ecological impacts and oriented towards multinational/global climate change politics for mitigation policies. Such discourse tendency is in line with the semantic space analysis above, though Hong Kong is depicted in a less global/multinational light, focusing more on the local context in areas such as environmental impacts, sustainable development, renewable energy. Some relevant articles are “Tai O stilt homes to help prop up Hong Kongs power grid with solar panel systems”, “Walk the talk, Hong Kong transport minister urges conference on city walkability”, “HSBC seeks creative ideas to reach Hong Kong renewable energy targets”, “Land swap hailed as a boost for biodiversity in Hong Kong”, “Sharp improvement in Hong Kongs bad air days attributed to wild weather”.

5. Limitations & Future research

This work has a limited scope due to the analysis data and its distant reading nature. First, the collected material is incomplete due to affordances of the Nexis Uni archive, hence visual contents are not included and data representativeness is not guaranteed. The studied timeframe is short compared to over 120 years of the South China Morning Post history since 6th November 1903. Therefore, important themes identified by this work is strictly limited to the temporal context though one can expand the timeframe to acquire a more comprehensive knowledge of climate change news coverage themes. Furthermore, more in-depth analysis requires close reading into each article and careful consideration of their narrative processes. Such an approach is another potential extension of this analysis, as one can also check in higher resolution if identified frames are valid and more detailed substance within those frames. Lastly, reliance on pre-built computational methods without substantial fine-tuning can lead to bias, especially in constructing the semantic space. Further examinations of methods used in this work can be insightful to interpretations of analysis results and future applications of such methods in other studies.

References

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