

# The Uneven Climate of Norwegian Climate Journalism

*A study of the drivers in Norwegian climate journalism and its challenges, using  
quantitative programming methods and exploring interdisciplinarity*

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# Foreword

Writing a Master's thesis has proven to be everything I thought it would be, while also being a process full of surprises. I have experienced being the most inspired and excited I have ever been, while also going through the most stress I have ever felt. However, to sit here with the finished work is one of my biggest achievements to date, and I am proud of myself and the work I have put into it.

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Kajsa, May 2023

# Abstract

This thesis has examined a dataset of Norwegian climate articles in an attempt at answering the research questions: What are the main drivers in Norwegian climate journalism, what challenges does this bring to light concerning Norwegian climate journalism, and how can interdisciplinary collaboration and AI facilitate as methods in this research? The dataset of climate articles in the time period 1st of January 2021 to 31st of May 2022, was examined by using quantitative programming analysis and supplemented with a quali-quantitative survey of Norwegian journalists. AI was additionally utilised as a tool through an interdisciplinary collaboration with Faktisk.no and OsloMet. The findings of this thesis demonstrates how valuable interdisciplinary collaboration can be and how AI can be applied as a research method in such a project. Furthermore, the main drivers in Norwegian climate journalism have been found to be major political and mainly international climate-centred events such as implementation of new climate policies, the release of the IPCC's climate reports, and climate summits. These findings display the discontinuity in Norwegian climate coverage, and the many challenges that journalists face when covering climate change. The challenges have been found to be rooted in the complexity of the issue, while the need for more resources, time and expertise on the issue within the newsroom is evident.

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# 1. Introduction

## 1.1 Background for the project

The background for this project is multifaceted, just like the issue of climate change is. Having grown up in a time where climate change and global warming have become an increasingly larger and more acute problem each year, the question of why I have chosen the topic as the theme of this thesis, is to me self-explanatory. This, combined with a period of time where the world feels like it is growing increasingly stranger, conflicted and desperate, makes journalism and its role in society perhaps even more important than ever. After a few years in and out of lockdown due to the world wide pandemic, followed by the escalation in conflict when Russia invaded Ukraine and started a war on the European continent, it was a guest lecturer last year, Professor Simon Cottle from the University of Cardiff, who with his stance on peace and conflict reporting argued that we are now reporting on a “world-in-crisis”. What is meant by this is that all conflicts, crises and catastrophes in the world have to be viewed in conjunction with each other and that journalism has to do this to a much larger degree than they have done before (Cottle, 2021). This served as inspiration to examine further if climate change is portrayed in connection with other events and crises in Norwegian news coverage, and to what extent.

As a working news journalist in the early stages of a career, I have often been asked if I aspire to be a climate journalist and work exclusively with covering climate change and all that comes with it. However, I find this a difficult question to answer, not because the issue is not important enough, but rather because the issue of climate change is such a complex one. A quote from Kunelius and Eide (2017) explains the complexity of the situation in a quote:

Climate change saturates decision-making from everyday life and local politics to global governance; it penetrates deep into the structural conditions of modern societies and their social order and reaches from the distant past hundreds of years into the future (Kunelius & Eide, 2017, p. 2).

This quote also highlights how all-encompassing climate change and its consequences is, which makes journalism all the more important in that news media “plays an important role in shaping the context” of the information on climate change to the public (Painter & Schäfer, 2018, p. 39). Because of this, I find the field of climate journalism, not only important, but highly interesting. An additional aspect that makes this an interesting topic of research, is Norway’s position in the battle against climate change. As Eide et al. (2014) points out, there is a paradox between Norway the oil nation and the Norway who is internationally deemed a leading country in the battle against the consequences of global warming (Eide et al., 2014, p. 9). Therefore, in this thesis I sought the occasion and opportunity to examine the field of climate journalism closer and investigate its main drivers in the Norwegian press.

## **1.2 Interdisciplinary collaboration**

While developing the ideas for this thesis, I was introduced through my supervisor to a project between Faktisk.no and OsloMet. The project’s aim was to examine Norwegian climate journalism in an attempt to understand why a relatively large number of Norwegians are sceptical of the concept of climate change and global warming. I was given the opportunity to partake in this project and chose to do so because the aim and theme of the project aligned well with what I wanted to examine in my own thesis, in addition to the intriguing methods that the project was using. The project participants, Morten Langfeldt Dahlback from Faktisk.no and Marina Fridman from OsloMet, wanted to use Artificial Intelligence (AI) in their project to examine a dataset of Norwegian news articles related to climate change and global warming, while the further analysis was programming based in the programming language Python. I saw this as a valuable opportunity to be introduced to AI as a research method, while also being able to work with highly knowledgeable people within my field of interest. The experience of partaking in interdisciplinary research where different disciplines have advanced together around a common problem (Porter et al., 2007), have been highly beneficial and enjoyable. I have learnt a great deal more than I would have on my own, in addition to the opportunity to be able to discuss methods and findings throughout the process. The findings in this thesis would not have been as advanced as they are without the interdisciplinary project with Dahlback and Fridman.

### **1.3 Methodological inspiration and reasoning**

As already mentioned, one of the reasons I had for joining the interdisciplinary collaboration with Dahlback and Fridman, was the opportunity it gave me to use programming as a quantitative method and being introduced to the use of AI in research. Before this, I had already decided on utilising programming as a methodological tool to conduct quantitative analysis. My inspiration for this methodological choice came from my bachelor's degree and my dissertation thesis. Through the Digital Culture degree at King's College London, I was introduced to the use of digital methods for research in the social sciences. Inspired by scholars such as Rogers (2009) and my supervisor at the time, Jonathan Gray, I utilised scraping and visualisation tools to obtain and analyse data. In addition to this I was through the course introduced to the programming language Python. Wanting to further develop my digital methodological skills in addition to my programming skills, I saw the opportunity to utilise this tool to examine Norwegian climate journalism. I have found throughout my time in higher education that the methods utilised in the field of media, communication and journalism research are often limited to a number of relatively traditional methods. Additionally when it comes to climate journalism, as Schäfer and Painter argues, the diversity in methods used is minimal (Schäfer & Painter, 2021, p. 15), which inspired me to challenge the methodological field. This thesis should then be viewed as filling a gap in previous research in that it participates in moving the methodological landscape of journalism research by employing quantitative programming and interdisciplinary collaboration utilising AI as a method.

### **1.4 Research questions**

The aim of this research is then to get a better understanding of Norwegian climate journalism, to understand its challenges and to move the methodological landscape of journalism research. Based on the background presented in this chapter, I formed one main research question and two sub-questions as such:



***What are the main drivers in Norwegian climate journalism?***

*What challenges does this bring to light concerning Norwegian climate journalism?*

*How can interdisciplinary collaboration and AI facilitate as methods in this research?*

## **1.5 Structure of the thesis**

Following this chapter, the thesis consists of further five chapters. The next is chapter 2 where the literature will be presented which includes previous research and theories that are relevant for this project. This includes research on climate change, previous research and theories connected to climate journalism, and data journalism. Additionally, the role of AI and machine learning in journalism and research will be presented, following teamwork in data journalism and the concept of interdisciplinary research. Furthermore, the methodological choices for this thesis will be accounted for in the methodology chapter. Here, I will begin by elaborating on the interdisciplinary project that is part of this research and where the data that was used came from and what the dataset contains. The AI model, how it works and what it was used for will also be presented here, in addition to what my role in the interdisciplinary project entails. Thereafter, the quantitative programming method, and why it was chosen as a method will be presented, before survey as a method and triangulation of methods contributes to this thesis. Then, I will describe the steps taken in the analysis process, first in the quantitative programming analysis and thereafter the qualitative and quantitative survey analysis. Next, the research quality of this thesis and research will be discussed, before the chapter ends by mentioning the research ethics that had to be accounted for in this research. Following this, chapter 4 will present the findings and the results from the research. Firstly, the process and experiences from the interdisciplinary collaboration will be accounted for, in addition to the content analysis and reflections around the method. Thereafter, the results from the AI will be displayed, following the further results from the quantitative programming analysis which consist of the overall timelines of climate articles and word clouds from the titles, and then the five spikes in publishing will be presented one after the other with corresponding word clouds and top publishers from the day with the highest number of published articles. Following this, the survey findings will be presented, first the quantitative findings and thereafter the

qualitative findings. The findings of the research will then be discussed in chapter 3 which is divided into three main sections. The first section will discuss the findings of driving events and newsworthiness in climate journalism, where notions of the visibility of climate change in the context of journalism and international climate events will be considered, in addition to the publishers of climate journalism. Next, the political drivers of climate journalism will be discussed, following the challenges of climate journalism for journalists. The thesis will then conclude by summarising the findings from the research in conjunction with concluding thoughts, and finally suggestions for further research. Lastly, the bibliography followed by appendices with relevant attachments and figures from the research will be located.

## 2. Literature review

This chapter will present the existing research that is relevant for this thesis and the research conducted herein. First, climate change research and its implications will be presented, before climate journalism and previous research on climate news coverage, its impact, and the challenges it can prove for journalists will be presented. Further, previous research on data journalism and the advantages and challenges it can bring will be brought to light, before Artificial intelligence and machine learning and its role within research and journalism will be demonstrated. Lastly, the chapter will present research on the topic of teamwork in data journalism and then interdisciplinary research and its advantages for a project such as this one.

### 2.1 Climate change research

Scientists have been researching anthropogenic climate change and its effects for several decades now. As early as in 1988, the United Nations Environment Programme and the World Meteorological Organization set up the Intergovernmental Panel on Climate Change (IPCC) “to assess the state of research on climate change and its potential impact” (Plehwe, 2014, p. 102). The work done by IPCC stretches wide across the world and is carried out by “thousands of research scientists at universities and national laboratories around the world” (Archer & Rahmstorf, 2009, p. 2). One of the tasks of the IPCC is to publish assessment reports based on the research on climate change. In 1995, the IPCC released the Second Assessment Report which stated that there was already evidence of human influence on the climate, while the Third Assessment Report released in 2001 read “There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities” (Archer & Rahmstorf, 2009, p. 4). In line with the IPCC’s second report being published in 1995, this was also the first year the Conference of the Parties (COP) met in Berlin, and the COP continue to meet annually unless it is decided otherwise (*Conference of the Parties (COP) | UNFCCC*, n.d.).

Last year the UN Secretary-General António Guterres stated that the immediacy of the situation is not exaggerated and that “It is what science tells us will result from our current

energy policies. We are on a pathway to global warming of more than double the 1.5-degree (Celsius, or 2.7-degrees Fahrenheit) limit” (*UN Climate Report, 2022*). This 1.5-degree limit Guterres refers to is a legally binding treaty that was agreed on during COP 21 in Paris in 2015 in which the parties decided to endeavour to limit the global warming of the earth to 1.5 degrees Celsius, and no more than 2 degrees (*Parisavtalen, 2020*). It is then apparent that scientific research on climate change and global warming is making it increasingly more obvious that the earth is warming up due to human activities and that our efforts to slow and stop the warming, is not enough.

After many years of research, it is now evident what is happening to the climate. Within its field of research “Hardly any academic expert on climate change remains doubtful about the prospect and gravity of global warming caused by the burning of fossil fuels and the release of other greenhouse gases due to human activity over the last century and a half” (Plehwe, 2014, p. 102). Despite there being almost scientific consensus on the stance of anthropogenic climate change and global warming, “a sizeable and highly vocal segment of the public denies those facts for political or ideological reasons” (Lewandowsky et al., 2019, p. 1446). The denialism of anthropogenic climate change can be said to have started by far-right and conservative groups in the US where the movement started in the 1960s and 70s as “a general social movement whose leaders link single issue campaigns with consistent conservative ideology – free markets, anticommunism, and social conservatism” (Jacques et al., 2008, p. 351). This has led to what can be called a ‘conservative echo chamber’, especially in U.S. media, where the leading news corporations such as Fox News and those throughout Rupert Murdoch’s news empire, give “disproportionate attention to contrarian scientists and other “skeptical” voices and thereby created the impression that the scientific evidence for global warming is highly “uncertain”” (Elsasser & Dunlap, 2013, p. 756). The disbelief and denial of anthropogenic climate change in the US is also apparent when looking at how the media presents global warming and climate change. American news outlets have in larger parts than in other countries portrayed the issue of climate change and global warming as a debate, “as a controversial issue characterised by scientific uncertainty” (Jacques et al., 2008, p. 356), which in turn has created a view of the issue as something that has two sides to it. However, it is not only in the US where denial of climate change is prominent. Recent research carried out by King’s College London found that only

six in ten Norwegians believe that humans are the main contributors to climate change, and only 27% of Norwegians say climate change is causing their own country harm (The Policy Institute, 2022). These numbers are significantly lower than the ones from the other European countries studied in the research.

## 2.2 Climate journalism

Over the last few decades increasingly more research has been conducted on the topic of climate journalism around the world. The research focuses on different aspects of journalism, such as public engagement (Appelgren & Jönsson, 2021), frequency of climate journalism (Ytterstad & Bødker, 2022), the climate coverage surrounding elections (Bergskaug, 2022; Eide & Naper, 2014) or climate summits (Eide & Kunelius, 2010; Eide & Ytterstad, 2010, 2011; Nossek & Kunelius, 2012), similarities and differences in how countries cover climate change news (Painter & Schäfer, 2018), how journalists work with pieces on the topic of the climate crisis (Brüggemann & Engesser, 2014), and the challenges of translating complex, scientific information and findings into readable news coverage (Duarte & Eide, 2018). However, these are just a few examples of the increasingly broad field of research that is climate journalism. Before previous research will be presented, it is important to understand what is meant by climate journalism.

This Master's thesis will, similarly to Handgaard et al. (2013), use a definition of journalism from media professor Martin Eide which states that journalism is a modern institution that collects, processes and conveys information which claims to be true and can be democratically relevant (Handgaard et al., 2013, p. 18). Furthermore, a definition of climate journalism is acquired from Schäfer and Painter (2021) which defines climate journalism as "the segment of journalism concerned with climate change, specifically with its characteristics, causes, and impacts in various societal fields, as well as ways of mitigating or adapting to it" (Schäfer & Painter, 2021, p. 2). In addition to defining what is meant by climate journalism, it is also important to state that climate journalism includes journalism from a range of different topics. Because the climate crisis affects most aspects of our lives, climate journalism "cuts across beats" (Brüggemann & Engesser, 2014, p. 400), which means

that news journalism on the topic of the climate change and global warming can be found in more or less all sections of a news medium. Because climate change encompasses so many aspects of society, Cottle (2021) argues that the issue must be seen in connection with other crises in the world and that climate journalism has to consider this and discuss crises in conjunction with each other rather than as separate issues (Cottle, 2021).

Climate change is one of, or according to the UN, *the* biggest challenge and threat humanity has ever faced (United Nations Climate Action Summit, 2022), and therefore journalism plays a crucial role in informing about climate change as news media have the power to influence people into action (Boykoff & Boykoff, 2007, p. 1202). This is a part of the press' responsibility to society which is described in 'Vær varsom-plakaten', the ethical guidelines which all Norwegian journalists and news media have to follow (*Vær Varsom-plakaten*, n.d.). In addition to informing about events and developments in society, Norwegian press has "to uncover and disclose matters, which ought to be subjected to criticism" (*Vær Varsom-plakaten*, n.d.). Thus, the ideal for the press is that they should act as 'the fourth estate', as a 'watchdog' who keeps an eye on the other state powers by critically examining how they enforce their power on society (Hornmoen & Steensen, 2021, p. 97). Therefore, it is the Norwegians press' obligation to keep an eye on the authorities and the choices they make in the attempt to reach the UN goal of 2 degrees (*Parisavtalen*, 2020). Research on the topic of Norwegian climate journalism has been done in several areas of the field, and Ytterstad et al. (2021) refer to previous research on newspaper coverage of climate policy in Norway which "suggest a tendency to simply reproduce the tensions between Norwegian aspirations to be a climate champion on the one hand and a major oil and gas exporter on the other" (Ytterstad et al., 2021, p. 5). Journalists and the press are important actors which means that what they publish can have an impact on and shape public opinion (Ytterstad et al., 2021, p. 5) on issues such as climate change and how it is being handled.

The way in which the press has an influence on the public opinion and when people should care about an issue, can be explained through agenda setting theory. Coleman et al. (2009) explain agenda setting as "the process of the mass media presenting certain issues frequently and prominently with the result that large segments of the public come to perceive those issues as more important than others" (Coleman et al., 2009, p. 147). Climate

journalism is therefore important and must be frequently made prominent to set the agenda and influence public opinion. However, when examining the climate coverage before the 2013 Norwegian general election, Høiby and Ytterstad (2014) found that the newsrooms' reasoning for not putting climate on the agenda to a larger degree was because they claimed that the public was not interested in climate stories, however the authors question whether this is correct and if journalism as an institution should mirror the public opinion (Høiby & Ytterstad, 2014, p. 80). By this they mean that the press should be the ones setting the agenda when it comes to climate change, not wait until the public is ready and wants to hear about it. Furthermore, the political aspect of climate change and the debates surrounding climate policies can often overshadow the actual issue of climate change in news journalism. This was evident in Eide and Ytterstad's (2010) study where the political game is more in focus in the Norwegian newspapers during the climate summits in Bali and Copenhagen, than the possibilities and outcomes for the future that the summits have potential to influence (Eide & Ytterstad, 2010, p. 249). Similarly, Eide and Naper (2014) found in their study of climate coverage during the Norwegian election in 2013 that a number of stories prioritise climate as a strategic piece of the political game in the race to power (Eide & Naper, 2014, p. 55). Inspired by this research, Bergskaug (2022) examined in her Master's thesis the climate coverage before the 2021 Norwegian general election and found that the climate articles did not appear often on the front pages, there were few long and in-depth climate stories, and the Norwegian press was dominated by a high number of opinion pieces on the topic of climate (Bergskaug, 2022, p. 3). Bergskaug (2022) also refers to MeCCO's world newspaper coverage on climate change and highlights that the spikes on the timeline of the collected numbers of published articles world-wide can all be seen in context of international political events such as climate summits and the release of UN's climate reports (Boykoff et al. 2022, in (Bergskaug, 2022, pp. 18–19)). Comparable findings are also present in Schäfer et al. 's (2014) research where they state that their hypothesis that "Political events increase media attention for climate change" was fully supported in their findings (Schäfer et al., 2014, p. 167). This indicates how the press often prioritise climate stories where the political game has been shown to be a favourable aspect within coverage.

However, climate journalism can be a demanding field for journalists as public engagement is highly important, but also challenging. This is why research on this topic is crucial as previous research shows that “media reporting and the framing of climate change may increase public concern and engagement” (Appelgren & Jönsson, 2021, p. 756). There are many reasons why climate journalism is a challenging area for journalists and news media alike. The temporal aspect of the climate crisis can make it difficult to connect the issue and the problems surrounding it to specific news events. The absence of “unambiguous and visible symptoms means that the dynamics of climate change are not very well aligned with the frequency of journalism” (Ytterstad & Bødker, 2022, p. 1292). The process of climate change is long and not always visible, which most often leads to news coverage on climate change to be episodic and not thematic, meaning that stories are linked to specific events and portray climate change as individual problems, rather than thematic stories, which puts the responsibility on a more societal scale (Weathers, 2013, p. 21). Thus, because the issue of climate change is one of great complexity, it can be a challenging topic for journalists to cover as they try to decide what is newsworthy. This, Ytterstad and Bødker (2022) argue, is one of the reasons why climate change is difficult for journalists to approach, however, in their study of the term “the green shift” they found it to be a temporal frame which allowed for inclusion of a greater diversity of events (Ytterstad & Bødker, 2022, p. 1303). Climate journalism’s challenge here is then to connect the multifaceted issue to concrete examples and events.

The frequency of news articles on the topic of climate change and its challenges have varied greatly over time. This is evident in the mapping of climate articles that has been done, from 2004 until today, by MeCCO. In their latest yearly report, Nacu-Schmidt et al. (2023) state that the global level of media publications concerning climate change in 2022 decreased 11% from the previous year, however, after 2021, it was still “the year with the second-highest amount of coverage of climate change or global warming overall” (Nacu-Schmidt et al., 2023, p. 2). At the time of writing, the latest monthly review from MeCCO says that news coverage of climate change in February 2023 was mainly focused on themes concerning “ecological and meteorological” matter following several natural disasters and weather-related disasters such as in South America (Boykoff et al., 2022, p. 2). This confirms the need for newsworthiness in climate journalism as the themes and number



of published articles correlates with events and their occurrences. MeCCO's report on the year of 2022 also states that the different events that defined the year really illustrated how climate change is not a solitary issue but rather one that affects all aspects of our life and planet, "at times threat multipliers – that weave through most critical concerns in our shared world" (Nacu-Schmidt et al., 2023, p. 2). In other words, the issue of climate change is increasingly affecting most aspects of human life on all levels of society, whether under our own control or not.

## **2.3 Data journalism**

As stated above, journalism and its position in society has changed with the advent and development of digital technologies and social media. This means that journalists have had to adapt the way in which they work, just as digital technologies have changed the way we communicate, seek, gather, and store information. This has meant that basic journalistic ideas, such as what is considered a source, have changed. Sources can now be an abundance of different things such as "Public data sets, leaked troves of emails, scanned documents, satellite imagery and sensor data. In tandem with this, new methods for finding stories in these sources are emerging" (Leon, 2021, p. 128). To be able to work with these 'new' forms of sources, journalists have also integrated methods which allow them to collect, sort through, and present material in new ways. This work with data material includes "scraping, cleaning, statistics (work you could do in a spreadsheet); back-end work—the esoteric world of databases, servers and APIs; and front-end work—most of what happens in a web browser, including interactive data visualizations" (Simon, 2021, p. 125). Data journalism means "journalists working with software, spreadsheets, and computer programs to find patterns and meaning in data" (Appelgren & Jönsson, 2021, p. 758). Not only can the source and processing of information change, the way in which it is published and consumed can also be different from traditional journalism. Therefore, "data journalism facilitates new ways of engagement" (Appelgren & Jönsson, 2021, p. 758). However, this does not mean that data journalism is a different or detached from traditional journalism, but rather "blending traditional practices of news production with statistical analysis, computer science, visualization techniques, and web design, forming a specialized subdomain of

journalism characterized by “hybridization” (Widholm & Appelgren, 2022, p. 1364). The values from the open-source culture and the journalistic field are similar in that “they have aspirations of both being facilitators (enabling others to take action) and gatekeepers (being impactful and steer debates)” (Widholm & Appelgren, 2022, p. 1364), which means that when combining the two fields, they already have a common ground in their values. Thereby, data journalism has presented new opportunities for journalists to explore valuable information from data and publish it in ways which can enhance public engagement on the issue.

There are many different ways in which data journalism can be done which include an abundance of tools and software to apply when journalists work to discover, investigate and present information. Data journalism does present great value to newsrooms in that “it frees journalists from the low-level work of discovering and obtaining facts to allow greater focus on the verification, explanation and communication of news” (Karlsen & Stavelin, 2014, p. 35). Journalists who choose to use data journalism methods in their work have had to learn a new skill set, often involving programming, the use of spreadsheets and statistics, and visualisations (Appelgren, 2018, p. 308). More and more newsrooms have in recent years understood the importance of using programming in journalism, as “coding can make working with data simpler, more elegant, less repetitive and more repeatable” (Simon, 2021, p. 124). Different newsrooms use different coding languages and software, however it is down to the organisation to decide which techniques and software are best suited to them (Simon, 2021, p. 124). However, this does not mean that data journalists simply use coding as a means to create their story. The different techniques often involve different software and the data journalists “jump between techniques as they need: Scraping data with Python notebooks, throwing the result into a spreadsheet, copying it for cleaning in Refine before pasting it back again” (Simon, 2021, p. 124). These are approaches and tools used to sort through data so that it becomes readable and understandable for the journalists to write stories on the information found, and so that it is comprehensible for the audience.

According to Leon (2021), it might be relevant in some cases to explain to readers how the journalists have discovered and sorted the data. It can be difficult to read and understand code if you do not know it yourself, however some newsrooms’ approach to this is to do

what Leon refers to as literate programming, and use programs that allow for the coder to write in normal text next to the code to explain what the line of code means. Software such as Jupyter Notebook and R Markdown can be used for this purpose and “may be capable of reassuring even those readers who cannot read the code itself that the steps taken to produce the conclusions are sound” (Leon, 2021, p. 132). Not only will this make the method and code used to sort through data and create a story understandable to non-coders, but it will also make it understandable to other journalists who do not use code or know any coding language. This means that the method can be reviewed and the journalistic work is “reproducible” (Leon, 2021). This is also evident to Borges-Rey (2016), who argues that data journalism allows for journalists to tell stories that are more robust, while also appearing more transparent to the audience (Borges-Rey, 2016, p. 841).

Although data journalism is now a part of the workflow in most newsrooms, it is not a given that all journalists use these methods. However, the journalists who do use programming or other tools while working on stories have to combine “journalistic skills and value systems with programming skills to bring forth the finished story based on the data, the form and the purpose of the case” (Karlsen & Stavelin, 2014, p. 37). The coding journalist will have to learn how to use a programming language appropriately, or the coder will have to abide by and work according to journalistic values. In their research, Karlsen and Stavelin (2014) found that some journalists had experienced working with developers who did not have enough knowledge or experience in journalism and similarly journalists who did not have the relevant data development skills, which ultimately resulted in the projects “falling to pieces” (Karlsen & Stavelin, 2014, p. 41). This shows just some of the challenges that data journalists can face in the newsroom. In addition to this, some of the journalists in the study also highlighted the challenge of colleagues, especially editors, in the newsroom not understanding the amount of time it can take to do data journalism, and thereby “time and goodwill from editors were repeatedly mentioned as key resources when doing computational journalism” (Karlsen & Stavelin, 2014, p. 40). As has been shown in this section, data journalism is more often than not considered a method of doing journalism that requires teamwork and a combination of different methods and skills. This literature review will further explore the topic of teamwork in journalism later in this chapter.

## 2.4 Artificial intelligence (AI) & Machine learning (ML)

Artificial Intelligence (AI) is not a new term nor is it a new technology. The term does not define one specific technological task or tool, but is rather used as an umbrella term which includes an abundance of approaches to handle and solve data problems “which are usually presumed to require intelligence when solved by humans and other animals, distinct from deep and machine learning techniques which are subsets of AI” (Chubb et al., 2022, p. 1441). Thereby, machine learning is a form of AI and will here be included when AI is discussed and referred to. However, it is also important to know what is meant by machine learning and how it works. The term simply means that a machine is taught to make predictions by being given data, or in other words, it “improves system performance by learning from experience via computational methods. In computer systems, experience exists in the form of data, and the main task of machine learning is to develop learning algorithms that build models from data” (Zhou, 2021, p. 2). Algorithms are what drive AI and enable computerised machines “to learn from experiences, adjust to new inputs, and perform human-like tasks” (de-Lima-Santos & Salaverría, 2021, p. 6). As mentioned earlier, AI has been around for decades and has been studied and researched for just as long in the academic field of computer science, however the implementation of AI elsewhere has been limited until recently, where “countless developments relating to data, sensors, and technology, including the surge of the smartphone segment, which allowed data to be collated and stored in massive databases and moved across multiple devices using the Internet” (de-Lima-Santos & Salaverría, 2021, p. 12). Digital technologies have developed at such a high rate and with such a wide reach over the last few decades that the technology needed to implement and use AI is now in most pockets around the world. The use of AI can be wide and varied, including the use of the technology in, for and with journalism and newsrooms.

The amount of content that is now being produced and consumed has increased in line with the growth of digital technologies. The way we consume, produce and distribute this content has also been influenced by automated processes such as algorithms, which accordingly, have made AI increasingly popular in the area of automation (de-Lima-Santos & Salaverría, 2021, p. 13). Automation can be used for a range of different tasks in different

fields and areas, such as in journalism. As de-Lima-Santos and Salaverría (2021) argue, automation can allow for journalists to let the machine do boring and repetitive work, which in turn will save them time to spend on bigger tasks or projects which cannot be handled by computers (de-Lima-Santos & Salaverría, 2021, p. 13). Whether it be news reporting or investigative journalism, AI can be used to keep track of and monitor news feeds, “find socially relevant patterns among diverse data sets, and maybe even write up the resulting stories” (Stray, 2019, p. 1076). These are tasks that can be time-consuming and would be of immense help, perhaps especially to investigative reporters who will need to do these chores to create a story. However, Stray (2019) states that despite the promise of efficiency that AI provides, its use in investigative journalism is not common (p. 1076), at least not yet.

There are also other areas of journalism and news production where AI is being used. Techniques using machine learning are being used for business purposes in many news organisations, “including predicting the popularity or “virality” of stories in order to decide what to promote, modeling user behavior to increase subscriptions and minimize churn, and so on”(Stray, 2019, p. 1078). In addition to this, Stray (2019) also states that in recent years automated production of news stories has also been more widely used (Stray, 2019). An example of this is the Los Angeles Times’ “Quakebot”, which has been created by the news organisation so that they can report on earthquakes in the area as fast as possible. The newspaper explains that the algorithm they have named Quakebot “reviews earthquake notices from the U.S. Geological Survey and, if they meet certain criteria, automatically generates a draft article” (*Quakebot*, n.d.). In addition to earthquakes, sports scores are another area of reporting where AI is being used to produce stories in a relatively simple way, as the “process is akin to filling out a form, with some conditional elements to select from a finite set of sentences based on data values (e.g., “the home team emerged victorious” vs. “it was a sorry loss for the home team.”)” (Stray, 2019, p. 1078). These are simple and newsworthy stories that can be published quickly to keep the audience up to date, while the more in-depth stories on the topic are being produced. In addition to detecting breaking news such as the examples above, AI has previously been successfully used in journalism in areas such as “document classification, language analysis, data cleaning” (Stray, 2019, p. 1080). These are all examples of areas of journalistic work which can be mundane and time-consuming for the journalists.

There are a range of benefits to not only journalists, but also to the journalism they create by applying AI to the work. Not only can AI save journalists time when searching for stories or rummaging through large amounts of data, according to a report from Columbia Journalism School, AI tools can facilitate journalists to “tell new kinds of stories that were previously too resource-impractical or technically out of reach” (Hansen et al., 2017, p. 2). While in some fields and areas, people fear that ‘intelligent machines’ will take over their jobs (Chubb et al., 2022), the 2017 report concluded that AI has the possibility to transform the field of journalism for the better as “it will enhance, rather than replace, journalists’ work. In fact, for AI to be used properly, it is essential that humans stay in the loop” (Hansen et al., 2017, p. 2). When talking about these new types of stories that AI can create, Stray (2019) further explains that what is meant here is that AI can quickly find patterns that humans may not and tell stories that have to be uncovered from data, “or otherwise illuminate previously unknown connections” (Stray, 2019, p. 1079). An example of where stories have been created from high amounts of data, is the International Consortium of Investigative Journalists’ (ICIJ) “Paradise Papers”. The journalists on this investigative project started out with over 13.6 million documents, which would have taken one journalist 26 years to go through even if they only spent one minute per file (Díaz-Struck et al., 2021, p. 110) without the use of automation and/or computerised filing systems and ways to detect patterns and uncover significant findings.

In a similar vein, AI can also be used as a tool in academic research in a range of different areas of the field. Chubb et al. (2022) states that the technology has the potential to transform the field and that funding to use AI can enable “new methods, processes, management and evaluation in research” (Chubb et al., 2022, p. 1439). Similarly to what AI can do for journalists, it also has the potential to do the same type of time-consuming tasks that can help researchers spend their time more efficiently (Chubb et al., 2022, p. 1440), in addition to being a tool in the methods used to do the actual academic research. However, the use of AI might not be as straightforward and easily applied to these areas of work. As mentioned earlier when discussing data journalism, Karlsen and Stavelin (2014) found that lack of knowledge in the field can be a problem when working on such projects. The same can be said for the use of AI as there “is both a knowledge gap and communication gap

between technologists designing AI and journalists using it that may lead to journalistic malpractice” (Hansen et al., 2017, p. 2). It is therefore important that journalists with sufficient experience and knowledge with AI are assigned to the work so that there is no misuse of the technology or misunderstanding of the results of the use.

## **2.5 Teamwork in data journalism**

As has already been made apparent above, working in teams and collaborating is highly useful in journalism and can even be essential when it comes to data journalism. In Borges-Rey’s (2016) research it was made clear by informants how significant the collaborative nature of journalism is, and that data journalists even “tend to engage with audiences in collaborative crowdsourced projects by sharing datasets as part of their news outputs” (Borges-Rey, 2016, p. 838). This is similar to how coders tend to collaborate and share experiences, knowledge and data on platforms such as GitHub, a platform which is now “also used by a range of news organizations (e.g., The New York Times and BuzzFeed News) to share datasets, data-analysis methods, and newsroom innovations as well as to invite audience participation” (Haim & Zamith, 2019, p. 84). Such collaboration and sharing is becoming increasingly more common in data journalism and can in some cases lead to “data journalists investing much of their time in training sessions, assistance or simply dealing with data-related issues that in many cases are outside their core remit” (Borges-Rey, 2016, p. 838). As this can take some time away from the data journalists’ actual tasks, the sharing and collaborative nature of the field can benefit greatly as data journalists can support each other and help in areas others might not have the knowledge. This also came to light in Karlsen and Stavelin’s (2014) research, where a respondent stated that “they most often work in teams to “exploit each other’s strengths”” (Karlsen & Stavelin, 2014, p. 39). Thereby data journalists who work in teams can fill each other’s knowledge gap and work much more efficiently together.

A great example of teamwork in journalism, is, as briefly mentioned earlier, the international network of journalists around the world that makes up ICIJ and their work. The network, which on one project reached a number of 396 journalists from all over the world, all have

different skills they can participate with, some are well established data journalists who are experts in coding, whereas others are better reporters and have the necessary sources needed (Díaz-Struck et al., 2021, p. 109). In addition to collaborating within the newsroom, Applegren (2018) argues that working methods like this can facilitate new forms and ways of collaborating with people in other fields than journalism (Appelgren, 2018, p. 308). Furthermore, such collaborations and methods of work like in the case of ICIJ, makes it possible for journalists to access and share “findings as they are working, not only with their immediate co-workers, but also with journalists halfway around the world” (Díaz-Struck et al., 2021, p. 110), which in turn can facilitate possibilities that would not be present without this collaboration.

## **2.6 Interdisciplinary research**

It is evident that the journalism occupation and the research field of journalism are both highly collaborative fields. Within research, there are different levels of collaboration which can all be applied to journalism research; interdisciplinary, multidisciplinary, transdisciplinary, and cross-disciplinary. The latter, cross-disciplinary research can be defined as encompassing the first three levels where a gradual process of integrating different disciplines over time and moving from “multi- to transdisciplinarity and which is taking place at different paces” (Aagaard-Hansen, 2007, p. 426). The level of transdisciplinary research is here defined after Rosenfield (1992), who states that the level of collaboration means that “researchers work jointly using [a] shared conceptual framework drawing together disciplinary-specific theories, concepts, and approaches to address [a] common problem” (Rosenfield, 1992, p. 1351). Furthermore, multidisciplinary in research refers to a project where researchers use elements from different disciplines (Morillo et al., 2001, p. 204), however they stay within the boundaries of their own discipline (Choi & Pak, 2006). Lastly, what is meant by interdisciplinary research is that concepts and theories, tools and techniques, and/or data from different disciplines are integrated in the research where the purpose “is to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single field of research practice” (Porter et al., 2007, p. 119). In their research, Morillo et al. (2001) found that interdisciplinary research often resulted in



solutions to specific problems or in some cases helped develop a new field (Morillo et al., 2001, p. 339).

When it comes to journalism studies, the field can be said to include a wide range of other disciplines. Zelizer (2004) states that the field has borrowed in great deal from both social sciences and the humanities (Zelizer, 2004, p. 19), and the field itself is “highly interdisciplinary and thus diverse entity” (Steensen & Ahva, 2015, p. 3). This is not surprising, as the nature of the journalism field means that the press must cover almost every aspect of society, and therefore the study of the field encompasses many different disciplines. In their study of the journal *Digital Journalism*, Steensen et al. (2019) found that the research in the peer reviewed articles are highly interdisciplinary, including the disciplines “sociology, political science, cultural studies, language, history, economy, philosophy, technology and law but also quite some substantial influences from the disciplines of psychology and library and information science” (Steensen et al., 2019, p. 335). However, the results from the research revealed that fields such as informatics and computer science were much less influential than the researchers might have expected, and that data journalism studies are not too dissimilar from journalism studies in that the disciplines found in the research are commonly found to also cross into the field of journalism studies (Steensen et al., 2019, pp. 335–336).

Research on journalism can indeed benefit from studying the interdisciplinary nature of the field and how it is highly collaborative with fields such as computer science. Baack (2018) also states that civic tech should be studied in how it compliments data journalism and vice versa as the “relationship is shaping how journalism and forms of civic engagement are responding to the progressive datafication of social life” (Baack, 2018, p. 674). By researching journalism across different disciplines, whether it be inter-, multi, or cross-disciplinary, the study and results can give a more diverse understanding to the field. What’s more, the research field of journalism as far as this author has experienced, is rather limited in its interdisciplinarity and could benefit greatly by applying interdisciplinarity, such as from the field of computer science which has been demonstrated already, to different research areas within the field.

## 3. Methodology

The lack of references in this thesis on the topic of using programming and AI as a research method makes it clear that this is not a common approach to research, especially not in the field of social sciences. Most research and peer-reviewed journal articles as well as the choice of methods amongst fellow students, have in my experience been based on ‘traditional’ methods, often qualitative, within the field of social sciences and media studies. There is an abundance of different methods that can be applied to explore the drivers in Norwegian climate journalism. However, applying a triangulation of several methods to the research will give a broader perspective and a deeper understanding of the research question. By incorporating interdisciplinarity, the methods will be able to have a broader reach and give different perspectives to the research more so than by keeping to one specific discipline. In addition to this, the choice of methods and the combination of content analysis, quantitative programming and use of AI/machine learning, and quali-quantitative survey allows for this research project to give an overview of the drivers in Norwegian climate journalism at the same time as it looks at the research question from different angles and perspectives. As has been stated above in the literature review, using such methods along with more ‘traditional’ methods in the field, can enhance research and contribute to more depth and understanding. For me, it has also been important to learn and do something new in this project, to challenge myself and gain valuable skills and knowledge, at the same time I would like to challenge the methodological landscape within the field of journalism studies.

### 3.1 Interdisciplinary project with Faktisk.no and OsloMet

A large part of this Master’s project is based on an interdisciplinary project between the Norwegian fact-checking organisation Faktisk.no and Oslo Metropolitan University. The AI Journalism Resource Center, which is part of the Institute for Journalism and Media studies at OsloMet, has received financing for the project from the Directorate for Higher education and Competence (HK-dir), The Research Council of Norway, and the Fritt Ord Foundation with an aim to develop and learn a new type of method which can facilitate as a journalistic

method that the institute can then teach to journalism students. Faktisk's motivation for this project started with the results from the Peritia research from King's College London, which found that Norway was the most-climate sceptic country of all the European countries included in the research (The Policy Institute, 2022). The project aims to use AI and machine learning to find out if there are traces of climate-scepticism in Norwegian press coverage, and to examine if there is something the press can do differently when publishing information and facts about climate change to the Norwegian public. This is a part of a larger project where Faktisk aims to educate Norwegian news media on climate journalism, how to develop and gain competence in this particular field (M.L., Dahlback, personal communication, February 2023). From Faktisk, Morten Langfeldt Dahlback is the project lead, while Marina Fridman is a researcher from the AI Lab at OsloMet, which is located at the Institute of Journalism and Media studies.

### **3.1.1 Dataset**

The data used for the collaborative project and the research for this thesis, was collected by Web64, a Norwegian company that can scrape all publicly available publications, and can then use AI to examine connections between them ([www.web64.com](http://www.web64.com), n.d.). The articles in the dataset are from all Norwegian publications from 1<sup>st</sup> of January 2021 to 31<sup>st</sup> of May 2022. However, it is important to mention that the months of February and August 2021 have been excluded in the scraping process for unknown reasons. The dataset is still representative of the period, however it is important to keep this in mind. The dataset was first acquired by Fridman and Dahlback for a project last year which required the dataset to encompass all Norwegian articles published. For this project, they filtered the dataset so that the data included only climate-related articles, however after encountering certain findings that I wanted to compare to the non-filtered data, I was given access to the original data for specific months of interest (the entire dataset was too big to send and process with my current computer). The climate-filtered dataset then became the starting point for the research done in this thesis, in addition to the final results from the AI which was a zero-shot classifier.

### **3.1.2 Zero-shot classification**

As a Master's student at the institute for Journalism and Media studies with an interest in researching Norwegian climate coverage using digital methods and programming, this project and collaboration was a perfect starting point for my Master's thesis. I joined the team in October 2022 to assist in training the AI for this project. The AI is a zero-shot text classifier which is known as one of the most common uses of natural language processing (NLP). Text classification is most frequently used for applications such as spam and detecting hate speech where its task is "assigning a set of predefined categories to a text snippet. Depending on the type of problem, the text snippet could be a sentence, a paragraph, or even a whole document" (Müller, 2022). Before the classifier can be put to work, it must be trained to know how to categorise the text and into which categories. This training is also called data labelling which refers to, in this case, humans labelling data in the form of text, images, video or sound, which is then given to the AI so that it can use this information to make predictions or categorise through algorithms (Bussler, 2021). Another important step in the process is to give the classifier a document containing Norwegian stopwords. Stopwords are the words in a language which do not add meaning to a sentence, such as 'the', 'is', 'which', etc. in English, and can therefore be removed to simplify the process without losing any meaning to the text (Teja, 2020). The classifier can then learn how to map the text to the category that it most likely belongs to (Müller, 2022). In this case, the output from the zero-shot classifier was incorporated into the existing dataset as additional columns, with each label or category which had been given a score by the classifier determined by how likely the article was to be a match to each category.

### **3.1.3 Data labelling as content analysis**

To train the zero-shot classifier to be able to recognise the themes we were looking for, I was tasked with manually labelling just over 200 articles with tags that described the theme of each story. The creation of labels was extensive work which required reading of the title, description and in some cases the whole article if and when it was available. Therefore this process is akin to that of a content analysis which is "one of the most efficient and widely used research methods for the systematic and quantitative analysis of media and communications content" (Hansen & Machin, 2019, p. 88). This content analysis however, is not merely quantitative, but rather consists of both qualitative and quantitative

components. I was not given any specific directions with this task, except from one label indicating whether an article was concerning something local, national, or international. Each article was assigned between two and six labels such as politics, oil and gas production, transportation, agriculture, etc., which were created consecutively while reading through the articles which were randomly picked from the whole dataset. Code was thereafter written in Python to extract articles from the dataset which included certain words, before these were then labelled to 'fill' the categories with few labels so that the zero-shot classifier had a certain number of articles to train with each label. Thus, I read through and labelled 211 articles with 45 different labels which were developed throughout the process of reading and determined which two to six labels each article should be labelled with. After the labelling was finished and each category consisted of a certain number of articles, Dahlback checked the labelling to see if it was consistent. Most of the work was then approved, however a few articles were noted as needed to add or remove a label, which was then done by me. Following this, the classifier, or the AI, was given the labels and trained by Fridman before the results could be shared and the research group could discuss them and consider which labels to change, exclude and add for further runs so that the results would be the most accurate. The entirety of this process and the interdisciplinary project will be thoroughly described and reflected over in chapter 4.

Throughout this project, I have attended weekly digital meetings with Dahlback and Fridman where developments, results and challenges have been discussed. Fridman has also been a great help in the research done in this thesis where I have been able to ask her questions and receive tips, lines of code and resources for how to write the relevant code for my research. In addition to this, I provided some of the graphs and plots that were made for the research in this thesis to the project. These, along with other results from the zero-shot classifier which had been programmed by Fridman, were then presented by Dahlback at a climate conference in Bergen called *Varmere Våtere Villere (Warmer Wetter Wilder) (Mellom Håp Og Fornektelse - Om Medias Rolle i Klimaspørsmålet, 2023)*. The results were not published, but presented, and were followed by a discussion from industry professionals from the news media organisations Bergens Tidende, Nationen and TV 2 Nyhetene on what these findings might mean and what this information means to the Norwegian press. This was so that the conference-goers could get a preview of the findings in this project, and

were able to receive feedback on the results so far. In the discussion, it was pointed out that the results shown at the time display a wider perspective at the structural properties in Norwegian climate journalism, which means that larger, time-consuming, single articles that might have a bigger impact are not visible in these results. Later, Dahlback also presented findings at the industry conference Nordiske Mediedager (Nordic Media days), where he received feedback from several news organisations present that they were interested in learning more about the findings of the project for their own newsrooms.

### **3.2 Digital quantitative methods**

As so much of what we do in every aspect of our life, whether it is working, communicating, consuming information, shopping, banking, etc., now happens online, there are extraordinarily large amounts of data that can be gathered and analysed in order to research almost every aspect of human life. This data can then be explored and examined by both journalists and researchers to create stories about what humans are doing, how they are doing it and why. Because of this, the way researchers work and the methods used to gather and understand information have also, in some fields, evolved. Richard Rogers (2009) refers to digital methods as digitally native rather than 'classic' methods being used online (Rogers, 2009, p. 5). Digital methods refer to far more than that which has been used in this thesis but have served as a form of inspiration for the methods I have chosen to use. In the work carried out for my bachelor's dissertation, I used digital methods to gather and map hyperlinks from websites connected to organised climate change denial or misinformation, and found which Facebook groups and pages they appeared in. This experience with digital methods was part of what inspired the choice of methods in this thesis. Digital methods can be characterised as quali-quantitative in that they allow for collecting and analysing huge amounts of data, while at the same time facilitating the possibility of examining connections, numbers and text closer on a smaller scale (Venturini & Latour, 2009, p. 95). This then displays how digitally native methods can facilitate both breadth and depth when analysing data.

Both qualitative and quantitative research methods are commonly used within the field of journalism studies. However, there are some methods that are more commonly used than others when doing research in the social sciences and media studies. According to Hansen and Machin (2019) the methods that are most suited for research when it comes to studying media and communications content are “content analysis, semiotics, discourse analysis, corpus linguistics, narrative analysis, genre analysis” (Hansen & Machin, 2019, p. 23). Similarly, Parratt-Fernández et al. (2021) found when analysing academic work done on the application of AI in journalism, that an overwhelming majority of almost 60 percent of the articles used qualitative research methods, and this, despite the numerical nature of the object of study, “would seem to lend itself to a greater prominence of quantitative research” (Parratt-Fernández et al., 2021, p. 6). This aligns well with my own perception, which is that most methods used in media and journalism research are predominantly qualitative, with the exception of some using the quantitative versions of the methods mentioned above, such as quantitative content analysis or quantitative questionnaires. Although the use of digital methods is more widespread within the field of digital humanities, my experience is that it is a less common occurrence when it comes to journalism studies. A reason for this, Sjøvaag and Karlsson (2016) suggest, is that there is a much higher threshold for journalism scholars to approach methods that deal with big data simply because they often do not have the skills and knowledge necessary to use the tools needed to run automated analysis on big sets of data (Sjøvaag & Karlsson, 2016, p. 91). However, as most journalism today is situated online and therefore can be quantified and analysed as data in different ways, this can be particularly useful to journalism scholars who intend to research characteristics such as the content and trends in journalism today. As mentioned in the literature chapter, Chubb et al. (2022) state that AI and automation can be highly useful in research when it comes to sorting through and analysing extensive amounts of data in order to make sense of it.

### **3.2.1 Quantitative programming analysis in Python**

To specify the quantitative method used in this research project more precisely, it will here be referred to as quantitative programming. The tool used in this case to perform the programming is the programming software Anaconda. The software allows users to code in programming languages Python or R, where the preferred language for this project is Python. The choice to use programming in Python as the research method was led by

ambitions of wanting to develop my own programming skills which, at the start of the project, were only what can be described as basic after two introduction courses which took place about two years apart. Therefore, part of this research process can be viewed as practice-based research. Although more common for PhD students than Master's students, the approach means the researcher aims to "gain new knowledge partly by means of practice and the outcomes of that practice" (Candy, 2006, p. 3). This is also the aim for using programming as a method in this project as I aim to further develop my programming skills, which in turn can be highly useful and relevant in my career. Because this method is practice-based, I needed some guidance and help on the way, which, as stated above, I received from Fridman. In addition to this, it was discovered during this project that AI can be extremely helpful in learning how to conduct research with AI. The relatively new AI chat service ChatGPT, provided by OpenAI, is a trained language conversation model which the user can ask questions and follow-up questions to (*Introducing ChatGPT*, n.d.) and receive answers which are almost indistinguishable from human-written ones. ChatGPT is especially useful when it comes to coding because it will not only give an answer to the coding problem or why an error has occurred, but the AI will also explain in detail what the error means and how to fix the problem. Therefore, it will not simply solve the problem for you, but also help you learn from it and understand why it happened.

Python has here been chosen as the preferred programming language for several reasons. The coding language was what I was introduced to while participating in an introduction course in programming during my undergraduate degree (at King's College London) and was therefore the only programming language I had any knowledge of at the start of this thesis. In addition to this, Python is also a simple programming language which is suitable to learn while also allowing for 'real' programming, and it is easily accessible as an open source software (Srinath, 2017, pp. 354–355). These might be some of the reasons why Python was ranked as the second most used programming language as of June 2022 by RedMonk, which means that Python is the second most visible programming language on the programming community websites GitHub and Stack Overflow (O'Grady, 2022). The community-based discussion forums such as GitHub and Stack Overflow facilitate a platform where programmers can communicate and help each other out, which in turn makes the experience of learning to code easier and more inclusive, and therefore also more



approachable as a method to use in a practice-based research project. According to McKinney (2011), Python is being used increasingly as a scientific tool in research areas which previously have been dominated by other tools such as R and similar software (McKinney, 2011, p. 1).

As already mentioned, Python has been used as a tool in this thesis to sort through and visualise data from the dataset with Norwegian climate-related articles from a period of 18 months. To do this, different libraries have been downloaded to Anaconda and then used in Python. The libraries in question which have been most featured in this analysis are; Pandas, Matplotlib, and Word Cloud, in addition to the results from the zero-shot classifier which was trained for the Faktisk/OsloMet project. Pandas provides a wide range of opportunities when it comes to data analysis and “a solid foundation upon which a very powerful data analysis ecosystem can be established” (McKinney, 2011, p. 9). It has been used to structure the data and extract wanted information from the dataset. Furthermore, the Matplotlib library has been used to visualise the data from the dataset into graphs and figures (*Matplotlib Documentation — Matplotlib 3.7.1 Documentation*, n.d.). This includes the timelines of the whole dataset, the “spike” periods where a high number of articles were published, and graphs showing the top publishers in these periods. Word clouds generated from the titles of articles have also been used to give a greater idea of which topics and words have been most present. To generate word clouds, NLP is used so that a computer can process and analyse human language. The most familiar technologies which use NLP are “Siri and Alexa, spam filters, chatbots, auto-complete, and translate apps” (Plagata, 2021). Lastly, the results from the zero-shot classifier have been used to show the most common themes in the spike-periods and the timelines of each theme, displaying the number of articles that the AI has connected with each theme throughout the entire time-period. A more detailed and thorough explanation of how this was all done, can be found later in this methodology chapter in the ‘analysis’ section.

### 3.3 Survey and triangulation

In addition to using qualitative content analysis and quantitative data analysis using programming and AI as a method, this research project has also used a survey to collect data from Norwegian journalists on their views and experience of Norwegian climate coverage. The form of the survey is a questionnaire consisting of both multiple-choice questions which provide quantitative data to be analysed, in addition to some text-based answers which require qualitative analysis. Survey was chosen as a method here because it can give an insight into the journalist's own view on the research topic and it provides the possibility of reaching a larger number of respondents than when using, for example, an interview as a method. Survey as a method is often applied in media studies to gather audience perceptions and behaviour, and is frequently employed by governments to examine the media landscape and to further develop policies and regulatory framework for broadcast media (Hansen & Machin, 2019, p. 200). When it comes to research in the media and communications field, surveys have and still do play a major role. While some researchers choose to use survey research as their main method, others look at it as "a complementary method" to supplement their research (Hansen & Machin, 2019, p. 201). Survey research can be categorised in many different ways depending on what the aim of the research and survey is, however, the most common way to carry out a survey is in the form of a questionnaire, whether it is in the form of an interviewer presenting the questions to a person, or the subject of the survey fills out the questionnaire themselves in written form (Stoop & Harrison, 2012, p. 8). In this case, the survey consists of a written questionnaire which was distributed in two channels; the private Facebook group 'Norske journalister' (Norwegian journalists) which currently holds 3414 members, and through Norsk Journalistlag's (The Norwegian Journalist Union) newsletter, where the goal was to get as many journalists as possible from a variety of local, regional, and national news outlets to answer the survey.

There are different ways in which a survey can be designed and analysed. Depending on the way the questions are asked and how the participant can answer them, the results can be analysed both qualitatively and quantitatively. A qualitative survey can be beneficial in the way that it can be flexible with the type of questions provided in addition to allowing "access

to data that range in focus from peoples' views, experiences, or material practices, through to representational or meaning-making practices" (Braun et al., 2021, p. 642). However, one of the most common types of quantitative research methods in the social sciences, is surveys in the form of questionnaires which are often "used to study broad research questions that involve public opinion; differences among large groups of people; or differences based on fixed characteristics" (Arsovska, 2012, p. 408). In this case, the survey can be characterised as quali-quantitative as it includes both closed-ended and open-ended questions, where the former have been analysed quantitatively, and the latter qualitatively. This addition of a qualitative method makes this a mixed-method approach, or a triangulation of methods. Triangulation is often used to gather a more in-depth understanding of the topic of research and can add "rigor, breadth, complexity, richness, and depth to any inquiry" (Denzin, 2012, p. 82). A triangulation of methods including this quali-quantitative survey in the form of a questionnaire has therefore been chosen as an additional method to understand the drivers in Norwegian climate journalism and will add more depth, complexity, and new perspectives to the findings, in combination with the findings from the quantitative programming of the dataset of articles. Although the survey received a limited sample size of 46 respondents, which precludes generalisability of the findings to all journalists in Norway, the smaller subset of responses can still be considered in conjunction with the other findings presented in this thesis to examine and perhaps validate this author's interpretation of the data. The low number of respondents is due to the timing of when the survey was sent out through the NJ newsletter, which was much later than first anticipated. However, the responses and findings can in this case serve as testing my own evaluation of the research questions.

### **3.4 Analysis**

The methods utilised in this thesis require different forms of analysis to understand and make sense of the data collected. The content analysis and further analysis related directly to the interdisciplinary project will be presented thoroughly in chapter 4. In addition to this analysis, I have performed quantitative programming analysis on the dataset of the climate

articles and the quantitative results from the survey, and a qualitative analysis of the text-based survey responses.

### **3.4.1 Quantitative programming analysis**

The first step of this analysis consisted of creating the timelines of the complete climate dataset which was done by programming in Python. Here, I received help from Fridman to get started, and then again to split the timelines into three different periods so that each timeline represents six months in order to portray a better overview of the entire period, and to examine the patterns, trends, and frequency of publishing. Thereafter, five peaks in the publishing pattern were determined and I programmed plots of the month surrounding each of these five spikes. To easily be able to differentiate between the different spikes, I wanted to plot them in different colours. I did not know how to specify the colour and had to research the different colour names and colour maps and how to plot them into the script (Matplotlib 3.7.1 documentation, n.d.). I experimented with the colours and the sizing of the plots until I was satisfied. The one issue I had concerning the layouts of these plots was that I was not able to remove the timestamp in the date labels of the y-axis in any of the plots except from Spike 1. I was not able to find out why this occurred, and did not have the expertise to solve the problem, however it was decided that because this only concerns the layout of the label, not the visualisation of the data itself, I had to move on and spend time on further plots rather than dwelling on this problem.

Thenceforth, the word clouds from the titles in each of the spike days were created. Again I received initial help and guidance from Fridman because I have never encountered word clouds in programming before. I then created scripts for each word cloud and experimented with the different colour maps until I was content with the layout. Thereafter, the charts displaying the top publishers in each of the spike days were created. This was a rather straightforward and simple step as it is easier to create a list counting the occurrence of each publisher on a day, than to create the timelines and time-dependent charts. However, the last plots made from this dataset, showing the timelines of the labels, was more complicated because they were based on the results from the AI. The results were added to the original dataset with each label in columns and the score of that label for every article. Again, this was complex programming for me and I received guidance from Fridman on how to start the

process and further checks of the code to ensure that the results came out correctly. After I was certain the code was correct, I experimented with the scaling of the plots and their sizes and saved two different plots, one to display the timelines of all the labels, and one with the 20 most prominent labels where the visualisations were easier to examine with slightly more details. The link to all the Jupyter Notebooks where the code was written and the plots made, have been included in the Appendix of this thesis.

### **3.4.2 Survey analysis**

As mentioned earlier, the responses collected from the survey encompassed both qualitative and quantitative data. The results were downloaded as an Excel-file and a duplicate CSV-file was created and uploaded in a Jupyter Notebook. Here, the quantitative data was analysed in a similar manner to the charts showing each of the spikes mentioned in the above section. However, I wanted to visualise the responses as pie charts instead of bar charts which I had previously done. Because I had the initial code at hand, I used ChatGPT to ask how I could make them into pie charts. This was a very simple procedure when I had already programmed the code for the chart. Furthermore, I used the colour maps from Matplotlib to decide which colours would best visualise the different sections of the answers. Although this was a fairly straightforward process after the previous analysis I had done, one of the responses was organised in a different manner in the downloaded file because it gave respondents the option of choosing several options as their answer. To compile these columns together correctly, I researched the programming community StackOverflow and tested a method which turned out to be successful. Furthermore, I asked ChatGPT once again how to adjust the layout so that the labels of each piece of the pie could be placed in a separate box. I experimented with the layout, labels and the placement of them until I was satisfied with the result. The link to this Jupyter Notebook has also been attached to the Appendix of this thesis.

The second half of the survey analysis consisted of qualitatively analysing the text-based responses from the questionnaire. This was done by thoroughly reading through each response while simultaneously noting down the most common themes and opinions appearing in the answers. Additionally, I copied down quotes from some responses which I perceived to be encompassing some of the most commonly expressed opinions.

Nevertheless, the text-based responses from the questionnaire could also have been analysed in a quantitative manner. Python could have been utilised for example to program word clouds from the responses, or a codebook could have been created to conduct a quantitative content analysis of the responses. However, the time-limit of this project hindered me in risking a further quantitative analysis of the text-based responses. If this was to be done by programming, it would require me to experiment a great deal, in addition to further help from someone more experienced like Fridman. Another reason why this was not considered, is because the number of responses is not enough for the findings from the survey to be generalisable to the whole population of Norwegian journalists, but rather as a supplement to the other findings in this study.

### **3.5 Research quality**

There are components of this research that need to be considered to be able to establish the quality of the project. Firstly, I would like to state that there are several other methods and combinations of methods that could have been utilised in this project and given the same insights into the drivers and challenges of Norwegian climate journalism. Although I have argued strongly for why the use of alternative digital methods, such as quantitative programming and the use of AI, are well suited to examine datasets in journalism research such as in this very project, methods such as qualitative interviews, content analysis, and discourse analysis would also have been suitable to examine this research question. However, the research, findings and outcomes would have differed to a certain extent. Furthermore, it is important to establish how the chosen methods have been used, how reliable they are and how this affects the results.

Reliability and validity are the terms used in research when it comes to measuring the quality of a research project. Hansen and Machin (2019) defines reliability as the extent to which the research and the its process is replicable and whether it is consistent, while validity refers to which degree “a study does indeed examine or measure what it claims to be examining or measuring” (Hansen & Machin, 2019, p. 288). Because this research project employs both qualitative and quantitative methods, it is necessary to consider the several

ways in which both reliability and validity can be measured within both qualitative and quantitative processes. Furthermore, Tjora (2021) approaches the terms in a qualitative way and determines reliability to include the coherence throughout the entire research project, while validity concerns the connection between the research and the object of research, and to which extent the results are generalisable (Tjora, 2021, pp. 259–260). There are several components in this research project that can and will be discussed to strengthen the reliability and validity of this research project.

The content analysis that was used to create labels for the zero-shot classifier AI can, as mentioned before, be said to be a mix of a qualitative and quantitative method. However, to be certain the list of labels and the labels given to each article was appropriate and suitable, Dahlback looked through the labels and we discussed possible changes that had to be made. In addition to this, I have and will document and argue for the choices and methods I have used in this research and the process of employing them. This means that the documentation of what I have done throughout the quantitative programming analysis is included in the appendix after this thesis so that it is possible to examine it further and replicate the code if desired. The same can be said for the questions that were posed to respondents in the questionnaire, which is also added to the appendix of this project file. Furthermore, I have and will throughout the thesis explain the process such as the interdisciplinary collaboration and how the teamwork was executed, through to the thorough reasoning for why the methods used in this research have been chosen and how they have been executed. All these components contribute to strengthening the reliability of this research and its results.

The interdisciplinarity project which was part of this research, provided possibilities that would not be present without such collaboration. Because the quantitative programming analysis that I did can be described as a practice-based research approach, it was highly valuable to be a part of an interdisciplinary project where I had access to guidance and help from an expert in the field. This meant that at times where I was struggling with the code and how to proceed, I would receive appropriate guidance which also helped the learning process where certain aspects of the coding were explained which I might not have acquired otherwise. These aspects of the research can then be said to strengthen the reliability as

well as the validity of the thesis in that it gives insight into the tools and methods, and their connection with what is being examined. However, to give further insight into the findings of the research and whether they are connected to what the research aims to find, it is important to consider the generalisability of the findings. Whether findings are generalisable or not, is related to the relevance of the research beyond the specific units that have been examined (Tjora, 2021, p. 260), and when it comes findings from quantitative data and analysis such as survey research, generalisability refers to whether or not the findings are generalisable for the population they are meant to represent (Mullinix et al., 2015). As mentioned before, the survey received 46 responses from Norwegian journalists. This number in itself is not enough to be able to generalise the results from the survey to the whole population of journalists in Norway. However, what the survey findings can do is be seen in connection with the other findings in this research and validate or invalidate them. The survey results can then be seen as a complimentary collection of data, where the findings merely supplement further findings where they are discussed in conjunction with each other. Moreover, the application of methodological triangulation encompassing both qualitative and quantitative methods in this research, enhances the validity and reliability of the findings and the overall project. It creates a broader view of the findings and allows for the research to examine both in depth and breadth.

Ensuring transparency regarding all aspects and processes of the study, enables the reader to gain comprehensive insight into the research to such an extent that they can evaluate the overall quality of the research project (Tjora, 2021, p. 264). One important aspect of transparency in this thesis is to be open about the flaws of the dataset which is the foundation of the quantitative analysis. Firstly, it is important to make clear that the dataset is missing all data from the months of February and July 2021. It is unknown why or how this has occurred, however the problem seems to have been during the scraping process, which was done by Web64 for a project that Faktisk.no and OsloMet did last year. This is important to keep in mind because in this research it will not be possible to examine if there are any peaks in publishing during these specific months. Although data is missing, I will argue that the findings still give a comprehensive view of the trends and drivers in Norwegian data journalism and that the findings can be compared to those of previous research in this field. Furthermore, there are a few aspects of the data that should be considered when examining



the findings, especially at a closer level. The dataset consists of some duplicate stories and some duplicate articles. Some stories have been published across different publishers as identical stories, however the source of the article changes in the dataset. This can then say something about the different publishers, because they show an interest in publishing the climate article, even though the story is the same. Furthermore, some articles appear several times from the same publisher, such as E24 articles where some identical articles appear in the dataset with a few variations in the title. Additionally a few NRK articles seem to appear as duplicates but with a slightly varying title again (all the examples above will be presented in a more thorough manner in chapter 4). Because the analysis of this data was rooted in a practice-based approach, I do not possess the expertise in the programming tools used to be able to extract these duplicates or create a comprehensive overview of them all. I am therefore choosing to be completely transparent about it and urge the reader to bear this in mind when reviewing the results of this research.

Lastly, I will state my role as a researcher within this project by making clear my experiences and position. In addition to being a Master's student at OsloMet, I am employed as a journalist in a temporary position with TV 2 Nyheter. I have worked as a journalist for one and a half years at the time of writing which means that my experiences within, and knowledge of the field, has to be taken into consideration when considering the findings, especially of the qualitative analysis of this thesis. That being said, as a researcher in this project, I strive to maintain a high level of objectivity and not hold any predispositions about the object of study.

### **3.6 Research ethics**

This research did not require ethical approval from Sikt, the Norwegian Agency for Shared Services in Education and Research. This is because the data analysed in the content analysis and quantitative programming analysis was collected from publicly published news and information sites online, and the data collected through the questionnaire did not ask respondents for any personal information. Additionally, respondents were anonymous and no personal data was collected, and therefore it is not possible to identify them.

## 4. Findings and results

This chapter will start by presenting the findings from my experience in an interdisciplinary collaboration, in addition to the process and the findings from the content analysis.

Thereafter, the results and findings from the further analyses will be presented. Firstly, the findings from the timelines of the labels from the AI, then the timelines and the word clouds from the entire climate news dataset. Furthermore, the spikes in publishing will be identified before the top five days of publishing will be presented, one day at a time, with corresponding word clouds and the top publishers for each of these days. Lastly, the results and findings from the survey will be presented; first the quantitative findings and thereafter the qualitative findings.

### 4.1 Interdisciplinary collaboration and methods

As mentioned previously, part of this thesis was to participate in the interdisciplinary research project between Faktisk.no and OsloMet, where the participants in this project were Marina Fridman from the AI lab at OsloMet and Morten Langfeldt Dahlback from Faktisk.no. Both of them also hold Phd degrees, Fridman in the field of neuroscience and Dahlback in philosophy in addition to his background in journalism. As was made known in the literature review, interdisciplinarity is highly important both in journalism research and in the journalism occupation, as the very nature of the field is vastly interdisciplinary in itself (Steensen & Ahva, 2015, p. 3). In this specific project, it was the fields of journalism, journalism research and machine learning that came together. Not only has interdisciplinarity been important to study Norwegian climate journalism in this way, it has also been crucial for this student to utilise the methods in this thesis and in contributing to the research field in developing and using interdisciplinary methods. As Porter et al. (2007) state, interdisciplinarity is useful when the aim is to solve or understand issues where the answer requires knowledge that reaches beyond one single field's research practice (Porter et al., 2007, p. 119). This is the case in this project as the dataset required machine learning practices to be able to analyse it in the way and time-frame that was needed to answer the research question sufficiently. In addition to this, my own journalistic knowledge and

experience was needed to be able to sufficiently train the AI and inform it what to look for in the data.

#### **4.1.1 Content analysis and label development**

As a participant in this interdisciplinary research project, my primary task was to train the AI model, the zero-shot classifier, with a certain amount of input so that it would learn how to classify the climate articles and thereafter carry out its task in labelling the articles. This is a highly important task in the project and the training of AI heavily relies on the labelling process. Unless unsupervised learning is being employed, where extensive amounts of data can be processed, the AI is dependent on the labels it is given to be able to further label or categories data on its own and therefore the labels must be of a certain quality “as the performance of the model in operations is directly influenced by the quality of the training data” (Fredriksson et al., 2020, p. 202). In one of the first digital meetings with Dahlback and Fridman in October 2022 it was decided that my task ahead was to give 150 to 200 articles labels that could then be used by the zero-shot classifier on the whole dataset. Some topics had already been briefly discussed between Dahlback and Fridman before my entry to the project, such as if an article contained some form of climate change denialism or scepticism, if it was political, or about topics such as farming or food production, oil and gas industry, or emissions. These labels were not set in stone, but rather given as examples of how the articles could be labelled. The topics came mainly from Dahlback, whose experience in journalism has provided him with good knowledge of the field and therefore what sort of themes are to be expected in a dataset with climate-related articles. Additionally, Fridman’s experience in programming meant that she could share her knowledge in how the labels should be best structured to train the AI. In addition to this, one characteristic that was important to include was whether the article concerned something that could be located as local, national, or international.

We decided to tag each article with multiple labels, but, other than this, I was given the freedom to decide how many and which labels to create. Following this, Fridman gave some guidance on how to employ Python to create a random sample document from the dataset and thereafter how to access and read the titles, description, and content of the articles.

The file with a random sample contained 500 articles which were then opened in the Jupyter Notebook before I located and read the first article's title, description, and content. However, not all articles in the dataset give access to the full content as some of them require subscription to access this and others were not picked up in the scraping process. This meant that the label had to be decided based on the information available which could vary to some degree, but all articles allowed for reading the title and description.

A Google sheet was created as the workspace for this manual labelling of the articles. In the sheet, the article's 'id', a unique series of letters and numbers for each one, was pasted in the first column, followed by the news outlet's domain and then the labels (see Figure 1). I started reading through each article and labelling with a minimum of two and maximum of six labels which would describe the topic and content of the article in addition to location. This range of the number of labels started out as five, but developed into six labels throughout the process. The reason why this was set as a limit and not developed further into more labels, was to not 'over-label' the articles too much. This is known as dimension reduction and refers to situations in data analysis when it is "beneficial to reduce the dimension of the data (describe it in less features) in order to improve the efficiency and accuracy of data analysis" (Cunningham, 2008, p. 91). In this case too, many labels would not be beneficial in training the AI as it could lead to it classifying too many articles as certain themes. After having labelled 52 articles, the process evolved slightly and I started adding

	A	B	C	D	E	F	G	H
1	id	domain	labels..					
2	INbW7Q3Qobyg	<a href="http://www.nordhordland.no">www.nordhordland.no</a>	mening	mild denial	nasjonalt			
3	4zbq7kZApepr	<a href="http://ilaks.no">ilaks.no</a>	transport / samferdsel	næringsliv / industri	innovasjon	mat	lokalt	
4	WZdPZXvLlaKg	<a href="http://www.stortinget.no">www.stortinget.no</a>	politikk	nasjonalt	næringsliv / industri			
5	MYer8BQZ6bOB	<a href="http://bymag.no">bymag.no</a>	mat	nasjonalt	konsekvenser	forskning / rapport		
6	I9avgjqogbG1	<a href="http://forum.steigan.no">forum.steigan.no</a>	ikke klima	internasjonal	covid			
7	openZYOMWe7A	<a href="http://www.bt.no">www.bt.no</a>	dødsannonse	aktivist				
8	ELe3ILAyAa69	<a href="http://fakta360.no">fakta360.no</a>	mening	denial	forskning / rapport			
9	zPdyrknBneQr	<a href="http://www.morgenbladet.no">www.morgenbladet.no</a>	politikk	internasjonal	protest	klimatoppmøte		
10	5xe717B1wb7r	<a href="http://www.firda.no">www.firda.no</a>	mening	næringsliv / industri	lokalt			
11	YQdJqjNpDbOG	<a href="http://bergensmagasinet.no">bergensmagasinet.no</a>	politikk	internasjonal	klimatoppmøte			
12	ELe32KqMQd69	<a href="http://e24.no">e24.no</a>	nasjonalt	næringsliv / industri	utslipp			
13	APdRogXqgeGy	<a href="http://www.venstre.no">www.venstre.no</a>	mening	lokalt	politikk			
14	5xe7LY101a7r	<a href="http://www.tu.no">www.tu.no</a>	mening	kjernekraft	energi	politikk	nasjonalt	
15	5xe76q55Ad7r	<a href="http://www.klimarealistene.com">www.klimarealistene.com</a>	lokalt	portrett	denial			
16	APdRo7VvweGy	<a href="http://neitilgiftdeponi.com">neitilgiftdeponi.com</a>	utslipp	lokalt	næringsliv / industri	politikk	nasjonalt	hav
17	olejqYLm4dJN	<a href="http://debatt.h-a.no">debatt.h-a.no</a>	mening	lokalt	natur			
18	y5eVPDJp5bEP	<a href="http://www.jarlsbergavis.no">www.jarlsbergavis.no</a>	ikke klima	lokalt	utdanning	politikk	lokalt	
19	pnelxkMlreKB	<a href="http://www.nationen.no">www.nationen.no</a>	natur	konsekvenser	vær			
20	LDdwVZmPrb1Y	<a href="http://www.ifinnmark.no">www.ifinnmark.no</a>	mening	religion	håp			
21	J0dN97P46bLO	<a href="http://huslig.no">huslig.no</a>	livsstil	løsning	forskning / rapport	utslipp		
22	LDdwmKg0ma1Y	<a href="http://www.nettavisen.no">www.nettavisen.no</a>	mening	politikk	nasjonalt	valg	unge	
23	4zbq7IV13epr	<a href="http://www.naturpress.no">www.naturpress.no</a>	protest	politikk	nasjonalt			
24	9wdL8ZX1XdjP	<a href="http://www.stoffmagasin.no">www.stoffmagasin.no</a>	politikk	nasjonalt	valg			
25	WZdPZX9YAaKg	<a href="http://www.pinsj.no">www.pinsj.no</a>	livsstil	løsning	sport	utslipp	økonomi	

Figure 1: Screenshot from the labelling process in Excel.

new labels and re-considered some of the already existing ones. This process can be compared to that of using Qualitative Comparative Analysis (QCA) in that the approach “enables researchers to explore similarities and differences across comparable cases by pooling similar cases and comparing them as configurations” (Ragin, 2014, p. xxi). While Ragin’s (2014) approach is meant for finding the causation of a social problem or phenomenon, it is still comparable to this process in that it involves going back and forth to solve or reduce contradictions in the process (Ragin, 2014, p. xxii). An example of it in this process is the way in which the politics label developed throughout the process. In the beginning, this label was conjoined with the location tag such as ‘lokalpolitikk’ (local politics) and ‘norsk politikk’ (Norwegian politics). However, some articles were also labelled only with the tag politics and the location, but this was when politics or, for example, local politics were not the main topic or theme in the article, but rather when the content had a smaller political side to it. This however, changed during the process and I decided to go through the labels again and split the location and politics tag so that they were now two different labels. The label ‘klimatoppmøte’ (climate summit) was also added throughout the process, not for articles only mentioning the summit, but rather when the summit was part of the main theme of the article. ‘Løsning’ (solution) and ‘konsekvenser’ (consequences) was also developed as labels to use when something climate friendly was presented or discussed and when the articles’ main theme concerned something that was presented as a consequence of climate change.

A channel for communication (first Slack, then later Discord) was used between the supervisor for this thesis, Roy Krøvel, and the project participants, Dahlback, Fridman and myself, to be able to exchange thoughts, findings and discuss throughout the week between the weekly digital meetings. After getting through quite a few articles and labelling them, I noticed a label that had been suggested in the Slack-channel which I had not yet included. I then decided to skim through the articles again to include the label ‘fornybar energi’ (renewable energy), however noticed that there were surprisingly few articles so far in the dataset where the label was fitting. I also continued to consult Dahlback and Fridman, especially in the meetings, to discuss the labels and if some of them should be placed in combination with each other rather than to be two separate labels. This was the case with the labels ‘transport’ and ‘samferdsel’ (another word for transport), which encompass a lot

of the same things and I then decided to include them as a conjoined label: 'transport / samferdsel'. The same decision was made regarding the tags 'næringsliv / industri' (business / industry), 'forskning / rapport' (research / report), and 'jordbruk / landbruk' (both can be translated to agriculture or farming).

At this stage of the project the collaborative nature of the work can be said to move away from interdisciplinary and rather move towards a more transdisciplinary way of working. In transdisciplinary research the participants of the project work together in a more comprehensive manner and the disciplines transcend "in order to develop a shared approach to the research, building on a common conceptual framework" (Rosenfield, 1992, p. 1351). Working in this way we learnt a great deal from each other and both Dahlback and Fridman requested and valued opinions and feedback from each other and myself despite being secure in their own field of expertise. Being able to consult with Dahlback and Fridman was also important in that the labels didn't end up being difficult to understand and so that it was clear to me how I could label the articles to the best of my abilities so that they were the right format to train the zero-shot classifier. An example of where the labels became slightly intertwined in each other was when I had one label called 'mat' (food) and another called 'fisk (mat)' (fish (food)). It is not entirely clear, even to myself, from my own notes what was meant by these two labels, however they ended up being separated into the labels 'mat', 'fiskeri' (fisheries), and 'hav' (ocean).

Throughout the process of labelling the articles, there were a few tendencies I noticed about the climate articles. Firstly, what stood out to me was that a great number of the articles mentioned either the UN's climate goals or one or more of the IPCC's climate reports. This prompted the consideration of creating a UN-related label to label these articles with. However, I concluded that because of the great number of articles that would then have to be labelled as such, this would ultimately work against the intended purpose. Secondly, what was noticed while reading the titles and contents of these news articles, was how many of them were labelled with the politics label. Already while labelling, I noticed that this label was by far the most used throughout the process. Similarly, another finding that was apparent this early in the project, was that I encountered a great deal of opinion pieces in the dataset. This was something that surprised me during the process as I used the label

‘mening’ (opinion) so frequently and I therefore made sure to mention it in the weekly meeting and share it with Dahlback and Fridman.

Categories:
Økonomi, næringsliv og innovasjon
Politikk, regjering og storting
Kosthold, helse og livsstil
Klima og norsk politikk
Klima og internasjonal politikk
Klima og transport
Klima og fornybar energi
Klima og olje- og gassindustrien
Klima, mat og landbruk + diet/agriculture
Natural disasters
Fisheries
Forest health

**Figure 2:** The primary categories.

After about 150 articles had been labelled, we developed twelve primary categories (see Figure 2) that included what was deemed the most important tags. This was done to make sure that the articles I tagged covered a certain number of articles in each category so that the

```
df_supp_2 = pd.concat((df[df.description.str.lower().str.contains('fiskeri')].sample(20),
df[df.description.str.lower().str.contains('laks')].sample(20),
df[df.description.str.lower().str.contains('landbruk')].sample(20),
df[df.description.str.lower().str.contains('jordbruk')].sample(20),
df[df.description.str.lower().str.contains('naturkatastrofe')].sample(20),
df[df.description.str.lower().str.contains('ekstremvær')].sample(20),
df[df.description.str.lower().str.contains('flom')].sample(20),
df[df.description.str.lower().str.contains('skogbrann')].sample(20),
df[df.description.str.lower().str.contains('skog')].sample(20),
df[df.description.str.lower().str.contains('naturvern')].sample(20),
df[df.description.str.lower().str.contains('fornybar')].sample(30),
df[df.description.str.lower().str.contains('transport')].sample(20),
df[df.description.str.lower().str.contains('samferdsel')].sample(20),
df[df.description.str.lower().str.contains('helse')].sample(20),
df[df.description.str.lower().str.contains('livsstil')].sample(12),
df[df.description.str.lower().str.contains('internasjonalt')].sample(30),
df[df.description.str.lower().str.contains('biden')].sample(20),
df[df.description.str.lower().str.contains('guterres')].sample(20)))

df_supp_2.to_csv('./data/more_non_random_climate_articles.csv')
```

```
df_supp_2 = pd.concat((df[df.description.str.lower().str.contains('solenergi')].sample(10),
df[df.description.str.lower().str.contains('sykdom')].sample(5),
df[df.description.str.lower().str.contains('ernæring')].sample(7),
df[df.description.str.lower().str.contains('kosthold')].sample(10)))

df_supp_2.to_csv('./data/third_non_random_climate_articles.csv')
```

**Figure 3:** Screenshot of random sample search in Python. 42

zero-shot classifier had enough to go off to be able to do a sufficient enough job when it comes to labelling the whole dataset. After counting how many articles had been labelled to fit into the categories, it was clear that some of them needed more articles. I consulted with Fridman who guided me on how to create keyword-specific random samples from the dataset so that I could extract articles that would fit into these categories (see Figure 3). I then read and labelled these articles until all the categories had enough articles labelled, which was decided to be a minimum of 20 articles per category. After this, 211 articles had been labelled with minimum two and maximum six labels each. This resulted in a list of 45 different labels which had been created throughout the process of reading the articles (see Figure 4 for complete list of labels).

Labels	Counts		
Politikk	97	Helse	8
Nasjonalt	64	Ikke klima	7
Mening	61	Økonomi	7
Lokalt	61	Livsstil	7
Internasjonalt	58	Innovasjon	6
Næringsliv / industri	32	Valg	6
Utslipp	28	Utdanning	6
Olje- og gassindustri	26	Vindkraft	6
Energi	26	Denial	4
Natur	25	Krig	4
Forskning / rapport	24	Covid	3
Konsekvenser	24	Sport	3
Transport / samferdsel	22	Portrett	3
Løsning	22	Kosthold	3
Fornybar energi	20	Protest	2
Fiskeri	20	Aktivism	2
Klimatoppmøte	16	Kultur	2
Vær	16	Strømkrise	2
Mat	16	Hav	2



Jordbruk / landbruk	11	Dødsannonse	1
Ekstremvær	10	Håp	1
Naturkatastrofe	10	Mild denial	1
Unge	8		

**Figure 4:** Complete list of the 45 labels created.

Thereafter Fridman used the labels and the labelled articles to train the zero-shot classifier and presented examples from the test runs in the weekly meetings. This resulted in a series of test-runs with the classifier and discussions around the labels and to which degree they seemed to be working compared to the results they were giving. Over the course of the next few weeks, it was decided to remove some of the labels that did not work as intended, to change others and to add some new labels (see Figure 5).

This process of thoroughly analysing over 200 articles and creating suitable labels that can help categorise them before they in turn will be used to train the zero-shot classifier, can in

#### Label changes based on analysis

- Remove
    - Naturkatastrofe
    - Solenergi
    - Ekstremvær
    - utslipp
    - natur, kultur, helse, livsstil, portrett, protest, denial, unge, rapport, vær, valg
    - aktivisme
    - landbruk
  - Add
    - Forurensning
    - Demonstrasjon
    - Elektrisitet
    - Strøm (synonym for elektrisitet)
    - Weather words (to replace vær)
      - Rain - regn
      - Flood - flom
      - Fire - brann
      - Temperature - temperatur
      - Snow - snø
      - Hurricane - orkan
      - Storm - storm
      - Cyclone - syklon
- 
- Drought - tørke

this instance be characterised as a combination of two research methods. The procedure of creating labels and labelling the articles from the dataset, can be seen as a way of doing content analysis, while the aim and reason for doing the content analysis is based in the method where machine learning is used to count and categories the whole of the dataset. The first part of this process is similar to content analysis in that the method is used in media studies to “examine a sample of media

**Figure 5:** Screenshot of notes from shared document.

or communications output and to classify the content according to a number of predetermined dimensions” (Hansen & Machin, 2019, p. 98). However, because the aim of doing this method is anchored in a machine learning method, some steps of the process do vary from the ‘traditional’ content analysis. For instance, the labels that were created were not “predetermined dimensions” but rather developed while doing the method. This can be compared to piloting a study where variables are tested out and perhaps changed on a smaller set of the data, then reviewed before the full content analysis is done (Hansen & Machin, 2019, p. 108). Similarly to Schwebs (2023) where adjustments and fine-tuning were done during the content analysis rather than doing a pilot study before (Schwebs, 2023, p. 35), this was also the case when the articles were being labelled. In addition to this, a review was done by Dahlback after the labelling was finished to check the reliability of the work and if it is consistent when different people do the coding, or in this case labelling. When it comes to content analysis as a method, this is then called inter-coder-reliability (Hansen & Machin, 2019, p. 109). Majority of the labelling was approved by Dahlback and only a few articles needed a label added or removed, especially the ‘ikke klima’ label which was added to another 14 articles. In some ways, the whole content analysis part of this method can be said to be a pilot study in itself, as the majority of the adjusting, removing and adding labels took place during the testing and training of the AI. The result of the combination of the two methods is then the output from the zero-shot classifier which would not have been able to learn how to execute its task without the manual labelling of articles that was done first.

This section of the thesis where the content analysis and labelling process is described and discussed, could be located in the methodological part of the thesis. However, the reason why it is placed right here in the findings section is because the method itself and the collaboration that was part of this project, is a part of my research question. Therefore, this section acts as a finding because the quali-quantitative method of labelling of the articles which was part of training the AI and the inter- and transdisciplinary collaboration the project required, have helped develop the unique methods of this project. I find it highly important that this is presented and discussed as a finding for further development of methods and because of the learning process it has provided.

#### **4.1.2 Teamwork and moving methods**

A valuable aspect of interdisciplinarity in research that has been proven to be crucial in this project and Master's thesis, is the sharing and collaboration of knowledge, skills and resources across disciplinary boundaries. Firstly, the very foundation of this thesis and project, the data would not have been accessed had it not been for my participation in the interdisciplinary research. As Porter et al. (2007) states, one of the key concepts of interdisciplinary research is integration of theories, knowledge, tools, techniques and data to reach a common goal in which this integration is necessary (Porter et al., 2007, p. 119). This integration and sharing of data, skills, and techniques has meant a great deal for the outcome of this thesis, especially when it comes to the methods. The collaboration gave me access to the zero-shot classifier, not only the results but also the opportunity to take part in and learn how to train it. The interdisciplinary teamwork after the labelling process also gave a great insight into how this training works when taking part in the discussions surrounding the test results and the labels.

In addition to this, the programming that was done when analysing the data would not have been done to this degree without the sharing of techniques and guidance I received throughout the interdisciplinary project. The process of learning how to analyse data through programming was both complex and challenging, however it would have been considerably more so had it not been for the teamwork aspect of the project. As stated earlier, this can be viewed as practice-based research after the definition from Candy (2006). The method has provided me with new knowledge of how to use programming in journalism research through this practice and the outcome of the process (Candy, 2006, p. 3), however the method has also provided its challenges. At times of the process using a practice-based research method which in this case has been programming, meant that there have been times where I have not been secure in how I should proceed with the analysis of the data. Although the AI chat service ChatGPT has been helpful in understanding certain errors in the coding, the main guidance and assistance in problem solving was received from Fridman through the interdisciplinary teamwork. Another aspect of the challenging side to collaborating on such a project was that I was to some extent dependent on the other participants in the project. Both when I needed help to solve a certain coding issue to

proceed with the work or when I had to take time out from writing this thesis to participate in meetings, this presented its challenges along the way. However, being able to share thoughts and discuss findings and methods have been highly valuable throughout this project.

I am confident in stating that the combination of methods used in this thesis is rather unique and is not often done in the field of journalism studies. Nevertheless, this has brought on challenges when it comes to finding suitable references to the methodology. In the research to find suitable references, my perception is that programming has been used very rarely as part of a research method in journalism studies. What I have experienced throughout the process of doing this thesis, is that it is a challenge to use programming as a method without having professional considerable amounts of training with using the tool to begin with. It is therefore understandable to some degree as Sjøvaag and Karlsson (2016) states that this is the reason why AI and programming is so rarely used by journalism scholars, simply because they do not possess the skills necessary (Sjøvaag & Karlsson, 2016, p. 91). However, I would still encourage students and scholars to challenge the domain of methods in journalism studies in integrating more digitally born methods and automation. According to Schäfer and Painter (2021) surveys have thus far been the dominant choice of method in this field, and it is clear that “methodological diversity is lacking in research on climate journalism” (Schäfer & Painter, 2021, p. 15). In addition to challenging myself and developing my own skills and knowledge in automation and programming, this thesis shows just a small glimpse of what is possible to do with these tools. This project then situates itself in a shifting methodological landscape of journalism studies which is greatly dominated by qualitative methodology (Parratt-Fernández et al., 2021, p. 6), and partake in moving the methodological field towards a more digital and automated one.

## **4.2 AI label timelines**

Once the adjustments to the labels had been made so that the list was finalised and several test runs had been carried out by Fridman, she then ran the zero-shot classifier on the entire climate dataset. The results from the AI were analysed in several ways and combinations by

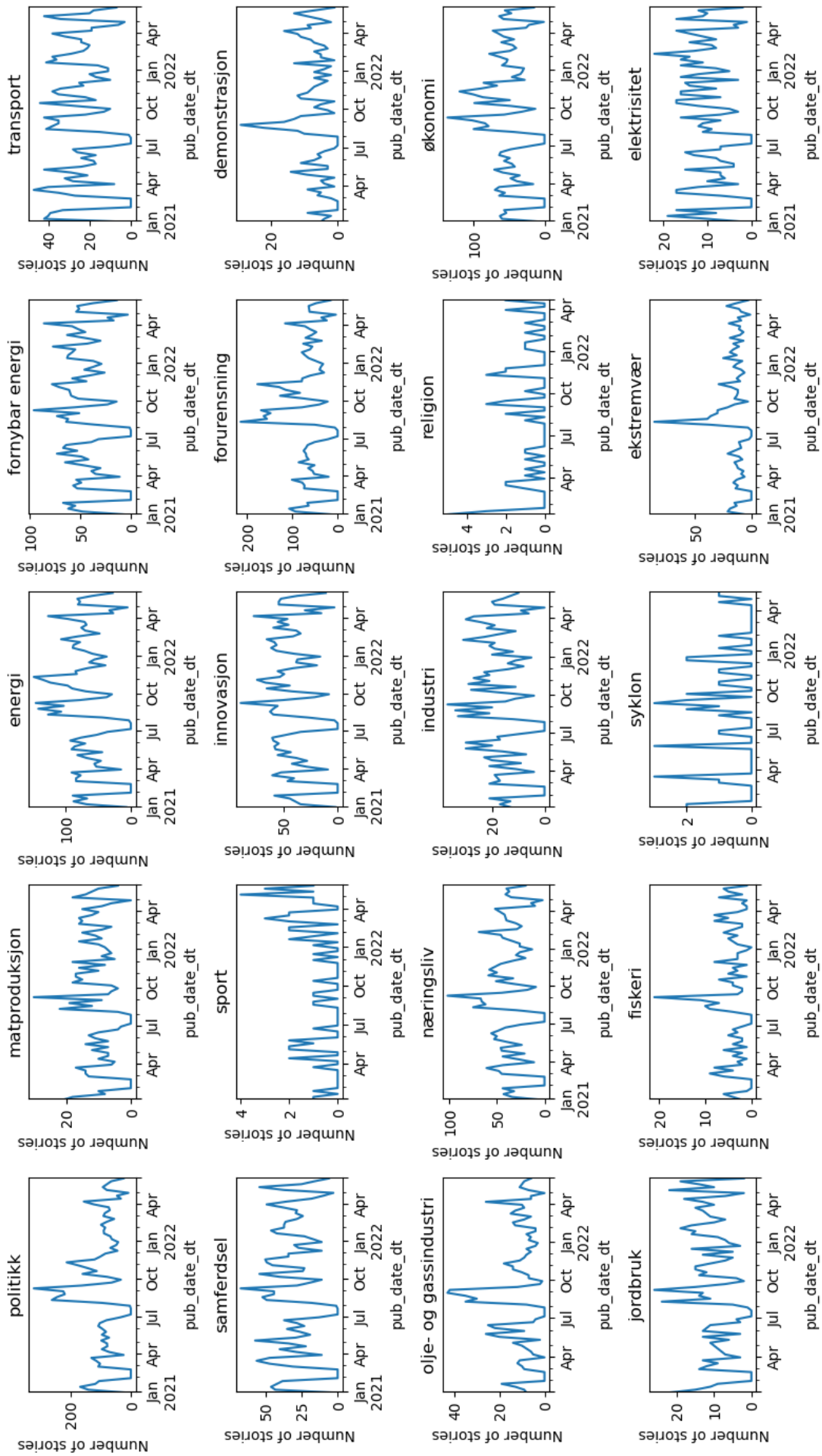


Figure 6: Timelines of 20 themes from the zero-shot classifier.

Fridman for the project, such as clustering the themes to see how they combine. However, for this thesis, I chose to create timelines of the labelled themes similar to the timeline of the complete dataset. This does not include labels pointing to opinion pieces or location as this is classified more as a characteristic rather than a theme of an article. The result is a series of plots with timelines of each of the themes (see figure 6. This figure only shows the first 20 labels, however all the themes with the highest number of articles can be found here. The figure with all the themes can be found in the appendix). The plots show the timeline representing the number of articles published which the zero-shot classifier classified with the specific label with a score of 0.35 or higher.

The timelines are generally quite different from each other, however some themes display the same spikes in publishing. Perhaps the most significant spike that can be found throughout several of the themes is the one that can be located around August. This coincides well with spike 3 of the overall timeline (which will be presented in a different section). Furthermore, there are some themes that are more prevalent or feature spikes in publishing that reach a higher number than others. When looking at the plots and the number of stories displayed on the y-axis of each plot, it is apparent that some themes reach a higher number than others. The theme that displays the highest number on the y-axis and therefore has the highest number of stories in a spike, is 'politikk' (politics). The second highest spike can be found in the plot for 'forurensning' (pollution) whose timeline looks fairly similar to that of 'politikk', despite having a slightly higher second spike which corresponds with spike 4 located in November from the full timeline. The plot with the third highest spike is connected to the 'energi' label. Although this timeline is more consistent than the two previous in terms of the size of spikes, the spike that reaches the highest number in this plot is the one located in November. However, the plot also shows a high number of articles published for this theme in August and the spike is almost as high in the number of articles published as the one following in November.

Another plot which shows high publishing frequency in both spikes, is the one concerning the theme 'økonomi' (economics). Once again, the highest number of articles published connected to this theme can be found in August, however the following spike in November reaches only a slightly lower number. The two spikes clearly stand out as the highest peaks

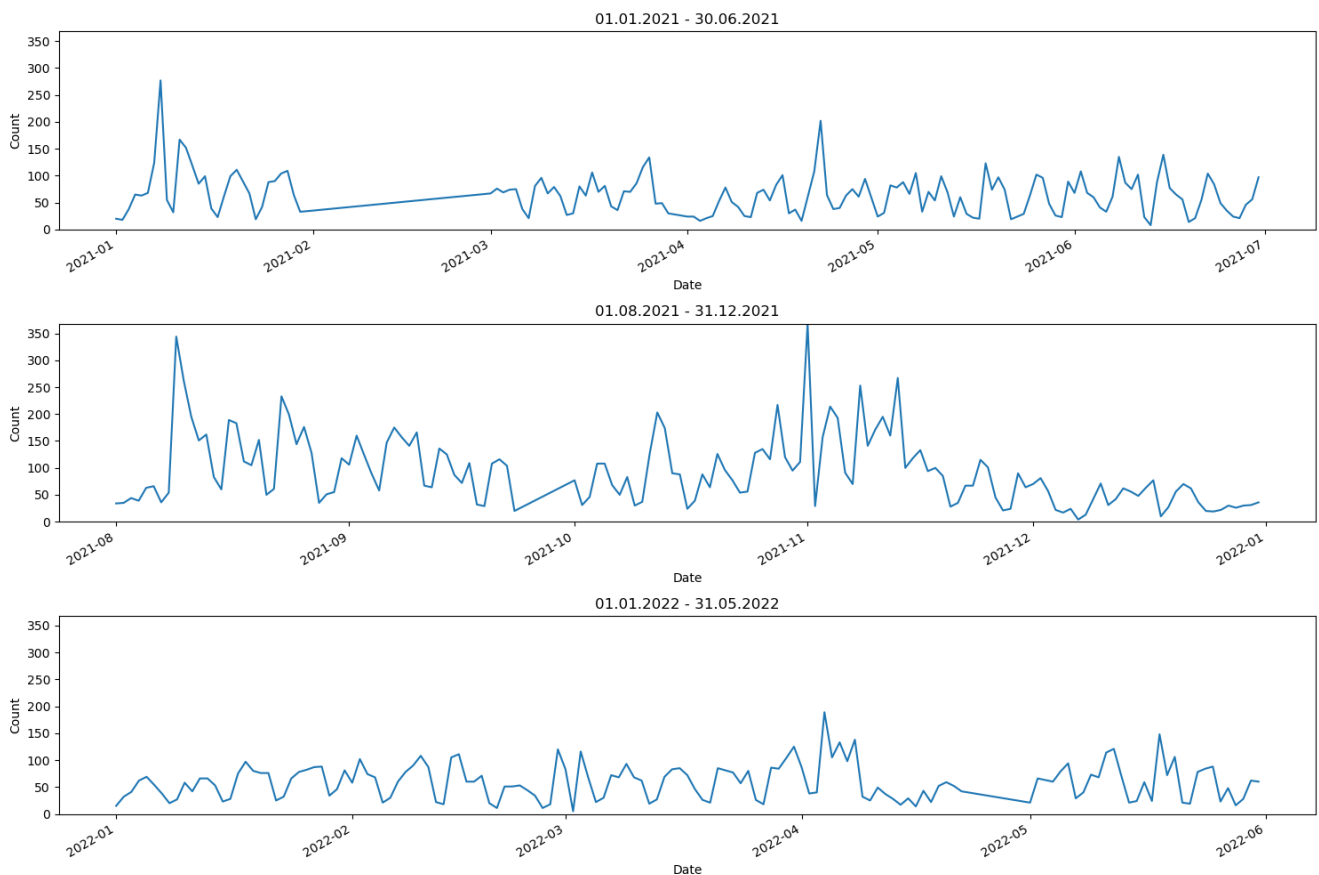
of publishing of this theme within the time-period. Lastly, the plot of 'fornybar energi' (renewable energy) is slightly more consistent overall, despite some deep valleys in between its spikes. Once again, the peak that reaches the highest number of published climate articles can be found in August and can therefore be connected to spike 3 from the full timeline containing all climate related articles.

### **4.3 Overall timelines**

The first significant finding from the quantitative programming analysis of the climate change articles dataset, is the overall timeline that shows the number of articles published over the whole time-period (see Figure 7). The timeline gives a macro perspective of the 32 037 climate change-related articles that make up the dataset. The timeline was divided into three sub-plots to give a better visual representation with more details of the whole time-period from 1<sup>st</sup> of January 2021 to 31<sup>st</sup> of May 2022. The reason for the timeline being divided into three segments is so that each sub-plot represents six months. This enhances the visualisation of the publishing frequency in the timeline and creates a more comprehensive overview of the whole period. Visualisation of data is, according to Aisch (2012) critical to the analysis which means that "in order to be able to see and make any sense of data, we need to visualize it" (Aisch, 2012). The possibilities for dividing the dataset into smaller sections to examine them further, is of course many and would present different opportunities for analysing them. This should be done in further research to extensively examine the full period in this manner.

When seeing the period of one and a half years divided into three, it is apparent that the second period contains the most published articles. In the dataset, this period contains 13 728 climate articles, while the first consists of 9 791 and the last 8 518 climate articles. What is noticeable at first glance, is where data is missing from the dataset, such as in February 2021, where the timeline shows a straight line from the end of January to beginning of March. It is therefore important to note that this is one of the weaknesses of this dataset and therefore also this study. The results would have been even more reliable if the dataset was complete with all news articles for the entire period. The publishing of

climate articles within the first two periods are more varied, the second period more so than the first, however the last one has a much more consistent pattern of publishing with no large spikes or clusters of articles.



**Figure 7:** The overall timeline of climate-related articles.

#### 4.4 Overall word clouds

The wordcloud library for Python has been used to make a wordcloud of the most frequently used words from the titles of all the climate articles in the dataset (see Figure 8). This gives a broad idea of the topics and themes that are most common in the climate articles. Not surprisingly, the word that is used the most in the title is 'klima' (climate). One of the reasons for this is that the dataset was filtered to contain articles about climate change and global warming and therefore most articles will contain the word 'klima' in some context. Other words that are prevalent in the titles are 'energi' (energy), 'må' (must), 'Norge' (Norway), 'co', which in this case refers to co2 as the number 2 have been removed as a stopword, and 'utslipp' (emissions). These words indicate that Norwegian climate journalism is concerned with Norway's position when it comes to the climate "debate" or climate







the first period, while the next two, the most significant ones, are located within the second time-period. Lastly, the fifth spike can be found in the last time-period and does not deviate all that much from the number of articles published throughout this time, especially compared to the four previous spikes. As this thesis aims to understand what the driving forces(?) behind Norwegian climate journalism is, it is essential to find out what has driven these five periods to stand out in the timeline and why there are significantly more climate articles published in these periods than in others throughout this one and a half year long time-period. Combined, the number of articles published in the top five days represents 4.5% of all the climate articles in the dataset.

### 4.5.1 Spike 1

The very first spike in the timeline of published climate articles can be found in January 2021. Figure 13 shows the month of January with a significant spike on one specific day followed by a drop in published articles the next couple of days before the number spikes again, however less this time. The whole ‘spike-period’ which is the month of January 2021, consist of 2455 published climate change articles, however the day with the most articles published during this period is the 8<sup>th</sup> of January where 277 climate-related articles were published in Norwegian news media. This is a significant spike compared to the rest of the

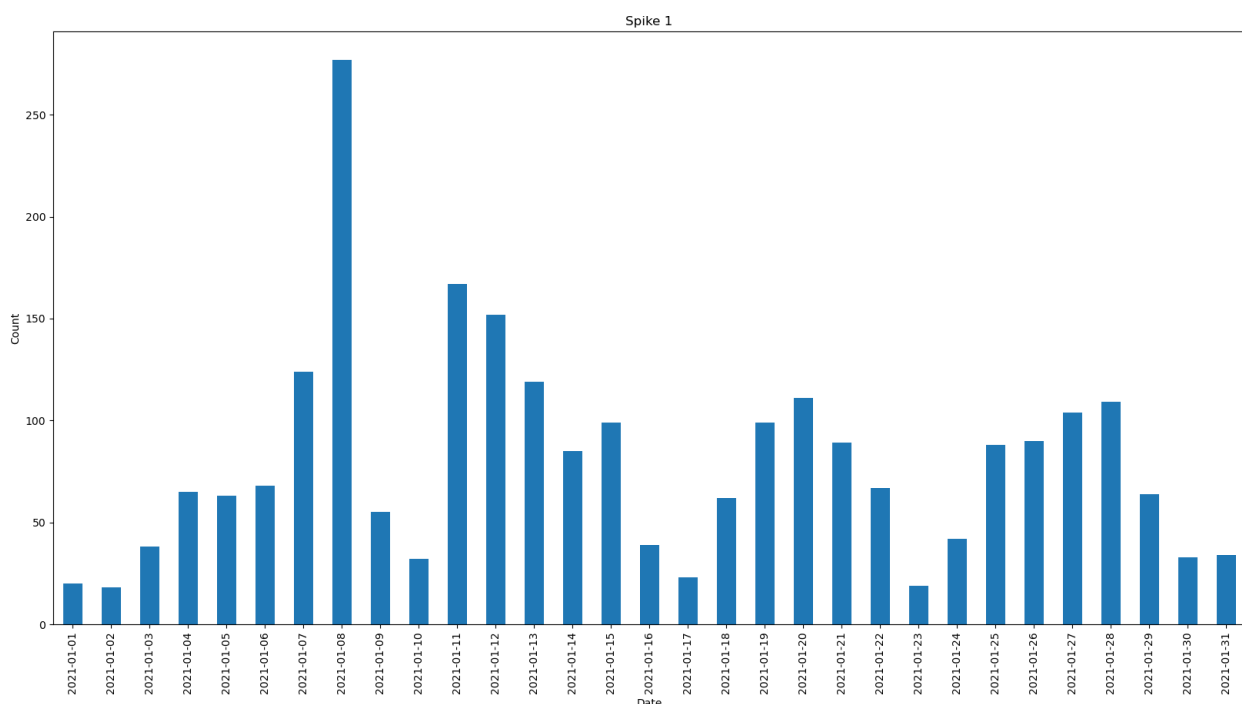
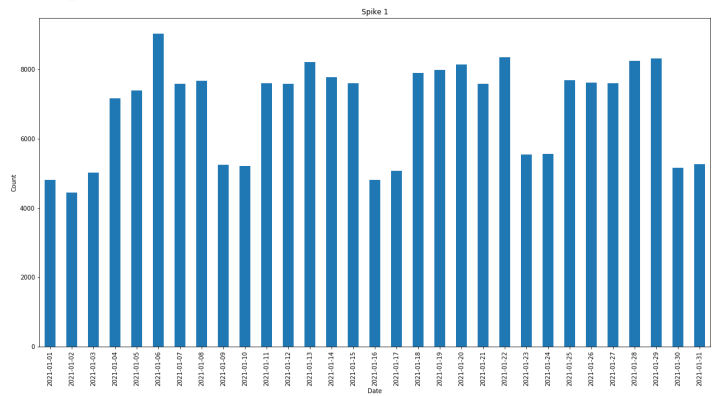


Figure 13: Spike 1.

Figure 14: All articles in Spike 1 period.



month where the number is more consistent between five and 150 articles each day. Further, the graph showing the climate-related articles in January 2021 can be compared to the graph showing all published news articles in the month of January (Figure 14). In this plot the 8<sup>th</sup> of January saw 7669 articles published, however this did not deviate from other days this month. Most of the days the publishing is quite consistent with this number, but the weekends show a drop in published articles, however consistent throughout the month. In fact, the day with the most published articles can be found a couple of days before the spike from the climate-related dataset, however this spike is not as significant as the climate-related spike when compared to the publishing throughout the whole period.

To be able to understand why there is a significant spike in the climate-related dataset in the month of January, the day in question must be examined. When printing just the title and description (ingress) of the first ten articles from the 8<sup>th</sup> of January 2021 (see Figure 15), it is clear that most articles concern the Norwegian government’s new climate plan. On this day the Ministry of Climate and Environment in the Norwegian government presented their climate action plan for the country for the years 2021 to 2030 before it was approved in the Council of State the same day (Ministry of Climate and Environment, 2021). This is also

reflected in the word cloud made from the titles of the spike day (Figure 16). The most frequently used word and therefore most prominent in the cloud is ‘klimaplan’ (climate plan) with 76 occurrences. ‘Co[2]’ appears 41 times,

```
In [68]: spikel = df[df.pub_day == '2021-01-08']

#Printing the first 10 titles and descriptions in
#a way that is easier to read.
for idx, row in spikel.head(10).iterrows():
    print(row.title)
    print(row.description)
    print('-----')

(+ ) Klimaplan varsler kraftig auke av CO2-avgifta
I den nye klimaplanen går regjeringa inn for ei skjerpning av CO2-avgifta til 2.000 kroner per tonn i 2030, mot 590 kr
oner i dag.
-----
Ja til «Norge først»
I klimapolitikken sier vi gjerne «Norge først», ellers vil landet og økonomien havne helt i baklekse. Regjeringens ny
e klimamelding bør danne utgangspunkt for et bredt forlik på Stortinget.
-----
(+ ) Etablerer el-båtpool i Bergen
Med seg har de den første helnorske, helelektriske skjærgårdsjeepen, med en toppfart på 40 knop. – Bevis på at nullut
slippsbåtlivet funker, sier gründeren.
-----
Etterlyser konkrete tiltak i Klimameldingen for å redusere utslipp fra jordbruket
Regjeringen kom ikke med noen konkrete krav om kutt i jordbruket da den la frem Klimameldingen om CO2-kutt frem til 2
030. – Vi burde fått en avgift på kjøtt, sier Naturvernforbundet.
-----
Miljøorganisasjoner ønsker seg en bredere klimaplan: – Den skjærer oljen
Greenpeace, Naturvernforbundet og Fremtiden i våre hender er glade for at regjeringen vil øke CO2-avgiften, men etter
lyser økte ambisjoner og flere tiltak i klimaplanen.
-----
RIF: – Regjeringen har lyttet til flere av våre klimaforslag
Regjeringen la fredag frem sin nye klimaplan og varslet at de nå vil sette ned et ekspertutvalg som skal se på de sam
lede rammevilkårene for å fremme klimavennlige investeringer. Liv Kari Skudal Hansteen i RIF er fornøyd med planen og
at regjeringen har fulgt flere av foreningens råd og mener det blir viktig at BAE- næringen blir representert i ekspe
rtutvalget.
-----
– Regjeringen har lyttet til flere av våre klimaforslag – RIF
Regjeringen la i dag frem
-----
Endelig! Regjeringens Store Klimaplan – på full kollisjonskurs med Frp
```

Figure 15: Screenshot from Jupyter Notebook.



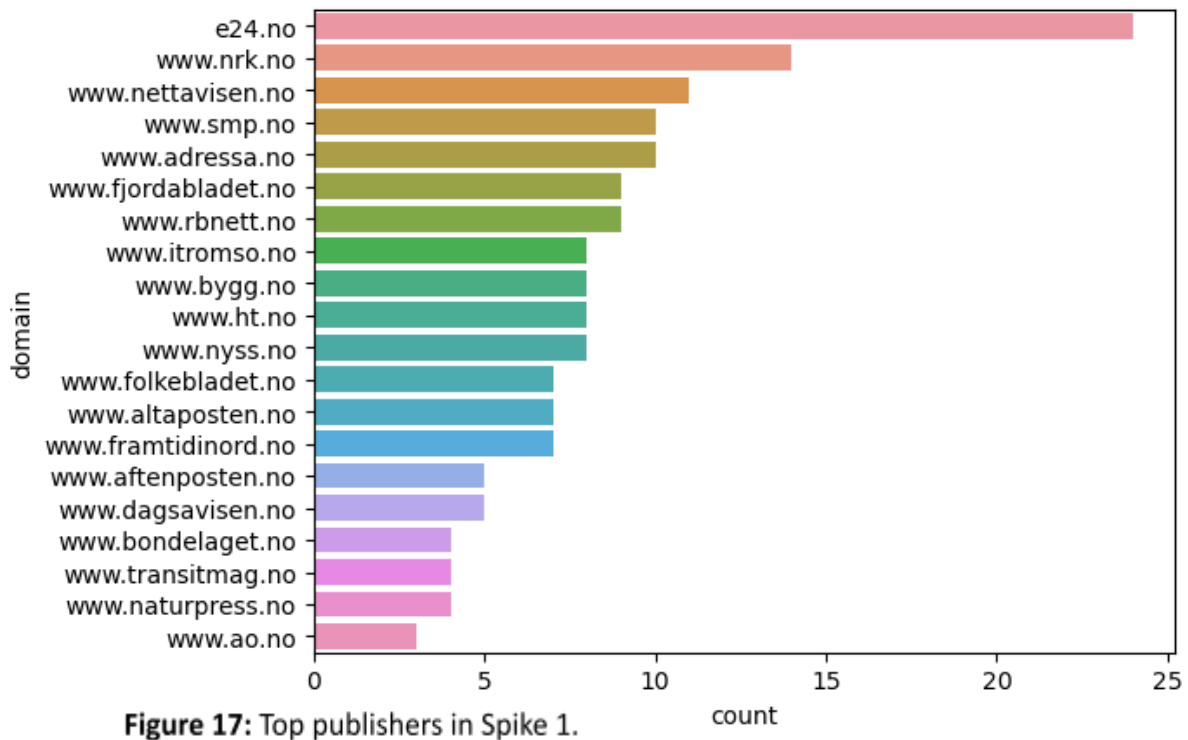


Figure 17: Top publishers in Spike 1.

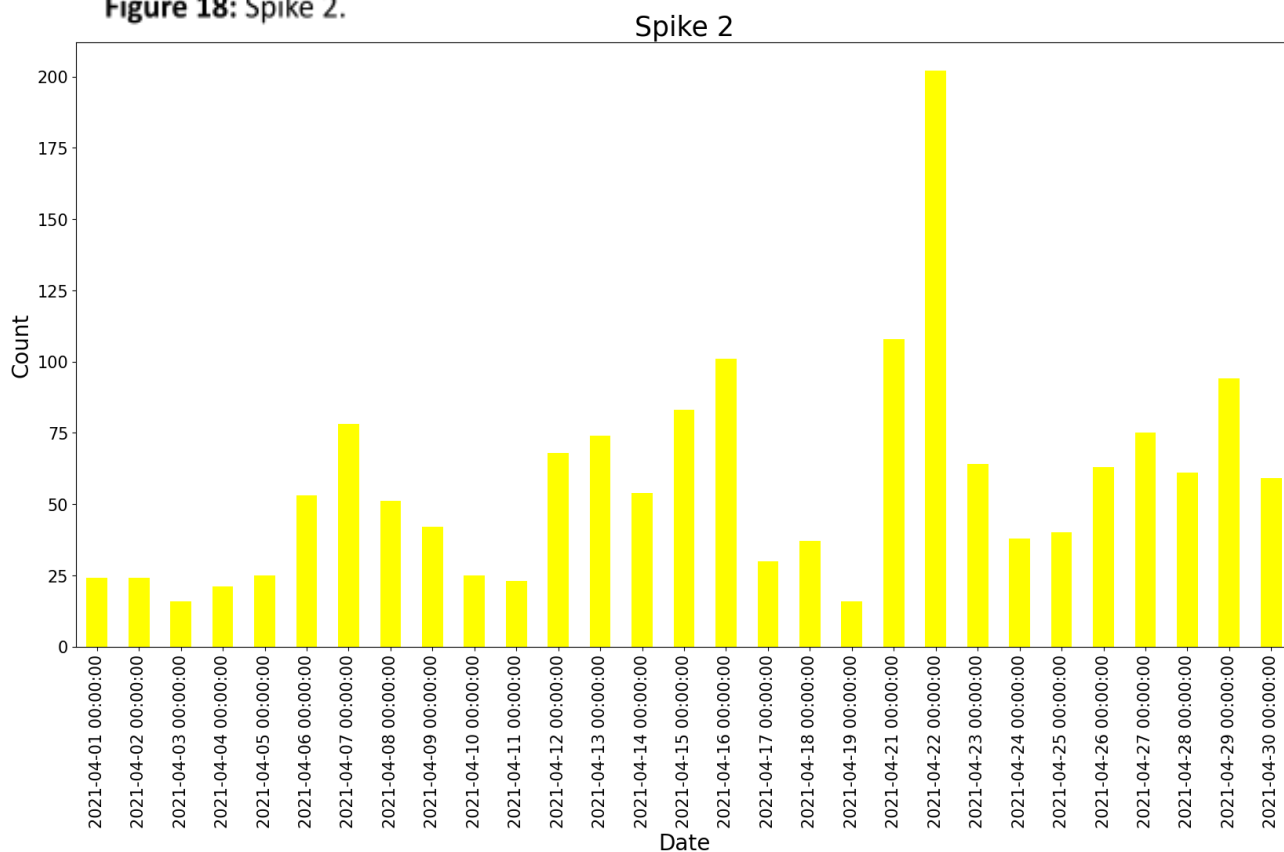
although the number is lower than what it appears to be from the graph. Aside from the top three domains which also includes Nettavisen, the rest of the graph is mostly dominated by local newspapers. Nationwide publishers such as Dagsavisen and Aftenposten are located further down the list with less published articles than the local newspapers above them. Not visible on this graph but with three articles each, national newspapers VG and Dagbladet can be found in the same spot as the bottom publisher in the figure.

### 4.5.2 Spike 2

The second spike of the timeline can also be found in the first of the three periods and more accurately in April 2021 (Figure 18). During this month there were less climate-related articles published all together than the previous month, with a total of 1649 published articles. According to the graph, the distribution of articles was also less consistent across the month as some days saw as little as 25 articles or less, and others ranged between 75 and 100 climate-related articles each day. This means that the spike day in April differs significantly from the rest of the month as on this day, the 22<sup>nd</sup> of April 2021, 202 climate-related articles were published. Comparing the graph to the one containing all published articles in April 2021 (Figure 19), it is evident that the 22<sup>nd</sup> of April does not stand out in the same manner here. Although it is one of the days with the most published articles of this period, that being 8352 articles, it does not deviate from the rest of the month in the



Figure 18: Spike 2.



same manner as the graph with the climate-related dataset shows. However, the data in this plot is not as consistent as the previous month, and there are more discrepancies throughout the period. This can be due to a number of different reasons, for example that there was an error in the scraping of the articles and therefore the numbers aren't correct. However, this does not mean that the graphs are not comparable to some degree because the data shows that the spike day in the climate-related dataset deviates from the rest of the month.

The first ten titles and their description from the 22<sup>nd</sup> of April 2021 in the dataset show an indication of why there is a spike on this day (Figure 20). Although there are a few different themes that can be found, most cover a climate summit which some refer to as Joe Biden's summit (Solvang et al., 2021), while others call it an online climate summit (Rønneberg, 2021).

According to NRK, Joe Biden invited

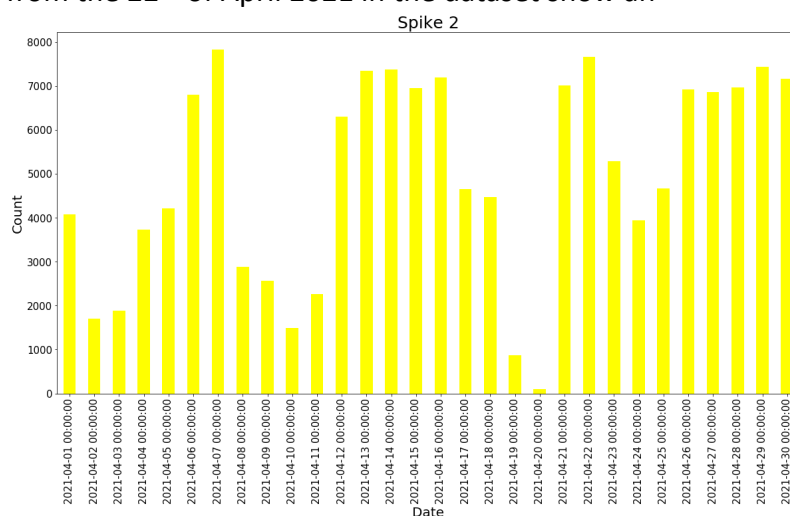


Figure 19: All articles in Spike 2 period.





climate-related words of a smaller scale to be found in the word cloud are ‘klimaløfter’ (climate promises), ‘klimasabotasje’ (climate sabotage), and ‘klimakampen’ (the climate battle).

The news publishers dominating the second spike day appear to display a similar pattern to that of the first day (Figure 21). Again, NRK can be found at the top with 22 articles on this day. Located second, both with 16 published articles each, the local newspapers Nyss and Fjordabladet can be found. After closer inspection by extracting all the titles from both the domains on this day (see figure 22), it is clear that all articles are identical to each other. Both Nyss and Fjordabladet are owned by Polaris Media (Polaris Media, n.d.-b) which can mean that the same articles are published on both newspapers’ platforms. This is similar to E24 in the first spike, however it looks like these articles have been published in separate newspapers and not just linked to one domain on different front pages. In fact, several of the publishers in the graph belong to the

company Polaris Media which can also explain why a few of them have published the exact same number of articles on this day. Similarly to the previous spike day, this graph also contains a majority of local newspapers. In addition to this, the online newspaper Resett can also be found among the top half of the publishers for this day. Although closed in December 2022, Resett can be said to have been a controversial online newspaper (Silvola, 2022), as their aim was to be an alternative to mainstream media rooted on the right side of the political spectrum (Garvik, 2023).

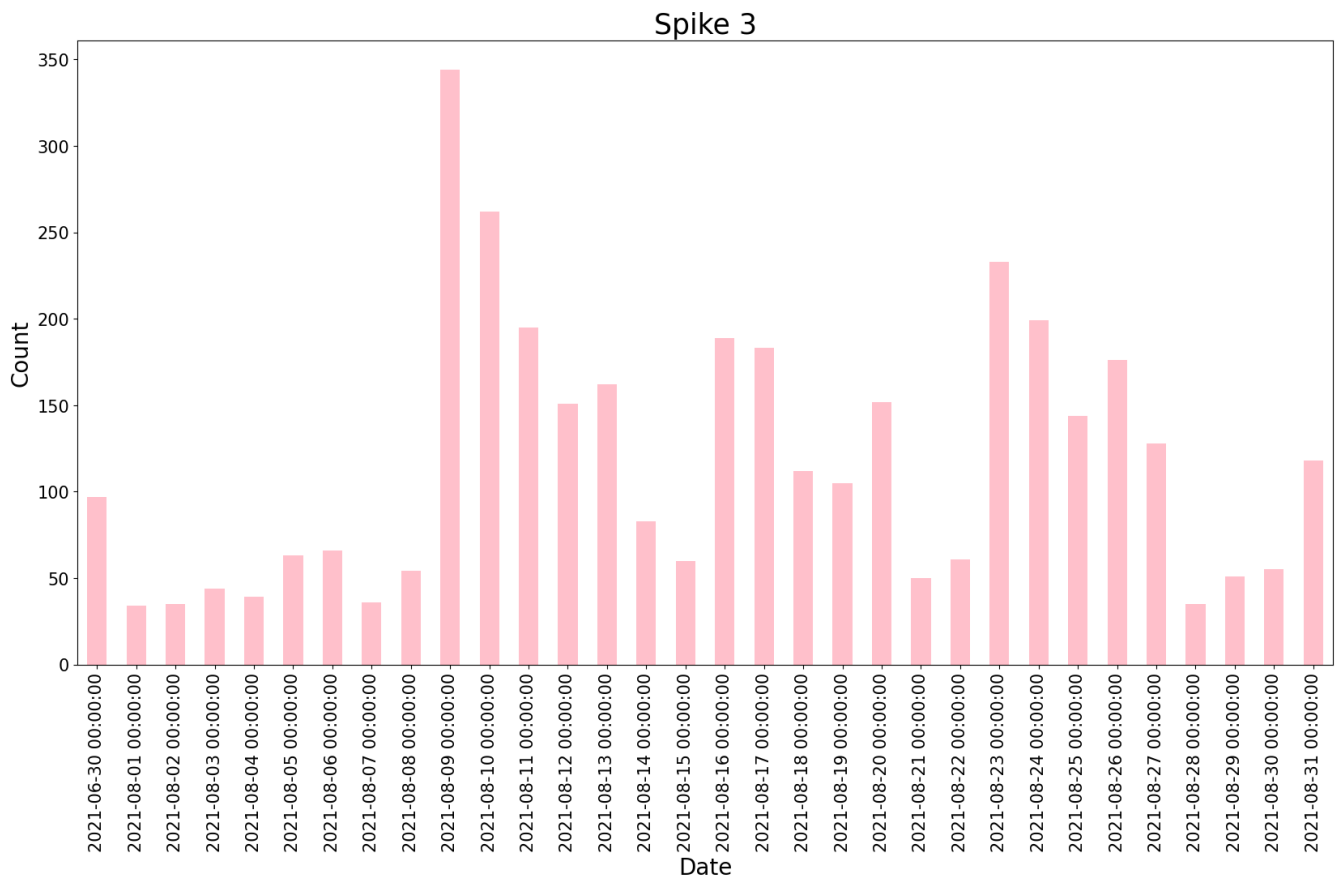
```

id
4zbqjzkzmpdpr      Ingen nye klimamål frå tre av dei fire største...
4zbqjkNzydpr       Thunberg rasa mot politikarar som «ignorerer k...
Mvbmw9JM3eYA       Greenpeace lét seg ikkje imponere over Bidens ...
JxboYgL6Legw       Putin etterlyser meir samarbeid mot klimaendri...
LDdwjqWRXblY       Bolsonaro seier Brasil skal vere klimanøytralt...
Mvbmw9ozEeYA       Solberg: USA melder seg igjen på som ei drivkr...
WPe98E5AxdLy       Xi Jinping stadfestar Kinas klimaløfte
4oeELVjZ0d0B       Biden høgnar klimamål for å utfordre verda til...
X7axGr3Vqeyv       Thunberg deltek i klimahøyering i Kongressen
46dBgYWlXe79       Haltbrekken: – Erna Solberg må gje USAs presid...
GRb48yOM2bBL       Japan skjerpar klimamål – vil kutte 46 prosent...
WZdP1VLDweKg       Sanner ser endringar til fordel for Noreg i EU...
KQeljvL30aJY       Biden håpar å kickstarte ny fase i klimakampen
jneg59ogZbwZ       SSB-tabbe kan gi nye tiltak for å nå klimamål
LDdwjqLzJblY       Vedforbruket kutta med ein tredel på ti år
GRb48y0ZkbBL       Lan Marie Berg fryktar norsk klimasabotasje
Name: title, dtype: object
---
id
APdRgV3V0eGy       Ingen nye klimamål frå tre av dei fire største...
8mepgjM0mdMy       Thunberg rasa mot politikarar som «ignorerer k...
MYer01072b0B       Greenpeace lét seg ikkje imponere over Bidens ...
Mvbmw9JXGeYA       Putin etterlyser meir samarbeid mot klimaendri...
JxboYgLJXegw       Bolsonaro seier Brasil skal vere klimanøytralt...
X7axGrDxneyv       Solberg: USA melder seg igjen på som ei drivkr...
J0dNx6qpDaLO       Xi Jinping stadfestar Kinas klimaløfte
y1aKOVpARaQG       Biden høgnar klimamål for å utfordre verda til...
WZdP1Vx6weKg       Thunberg deltek i klimahøyering i Kongressen
y5eVmVEJMdEP       Haltbrekken: – Erna Solberg må gje USAs presid...
4zbqjklgRdpr       Japan skjerpar klimamål – vil kutte 46 prosent...
M7e58zPvKd2v       Sanner ser endringar til fordel for Noreg i EU...
lNbWn9Vp4ayg       Biden håpar å kickstarte ny fase i klimakampen
pnel09wn7dKB       SSB-tabbe kan gi nye tiltak for å nå klimamål
4zbqjkbq3dpr       Vedforbruket kutta med ein tredel på ti år
ELe3lxD89a69       Lan Marie Berg fryktar norsk klimasabotasje
Name: title, dtype: object

```

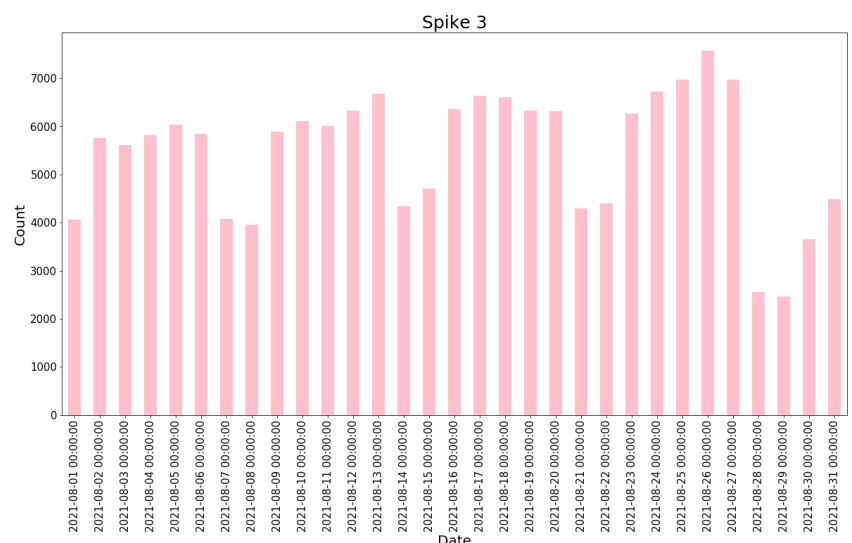
**Figure 22:** Screenshot of closer inspection of titles from Nyss and Fjordabladet.

### 4.5.3 Spike 3



**Figure 23: Spike 3.**

The third spike in the climate-related news coverage is located at the beginning of the second period which is the month of August 2021 (Figure 23). This whole period consists of 3619 climate-related articles. One day stands out with the highest number of published articles of the period, on the 9<sup>th</sup> of August 344 articles were published. The graph shows that days prior to the 9<sup>th</sup> all had a much lower number of published articles not deviating too far from 50 on any of the days. Therefore, the 9<sup>th</sup> shows a significant increase in published climate articles compared to the previous days, however, the following days shows a gradual increase in the number of



**Figure 24: All articles in Spike 3 period.**

articles over the next few days. Following this, the number of articles does vary quite a bit from day to day, however on a higher number than prior to the spike-day except from on the weekends where the number again drops to the same level as the beginning of the month. The figure showing all published news articles in August 2021 (Figure 24) is a much more consistent one, again showing the weekends quite clearly with a drop in publishing, while the weekdays generally keep to the same numbers. The 9<sup>th</sup> of August had 5888 news articles published, however this did not deviate from other days and was not among the days with the highest number of articles. The 26<sup>th</sup> was the day with the most news articles published, however the spike was not of a great significance compared to the spike shown on the climate-related articles graph.

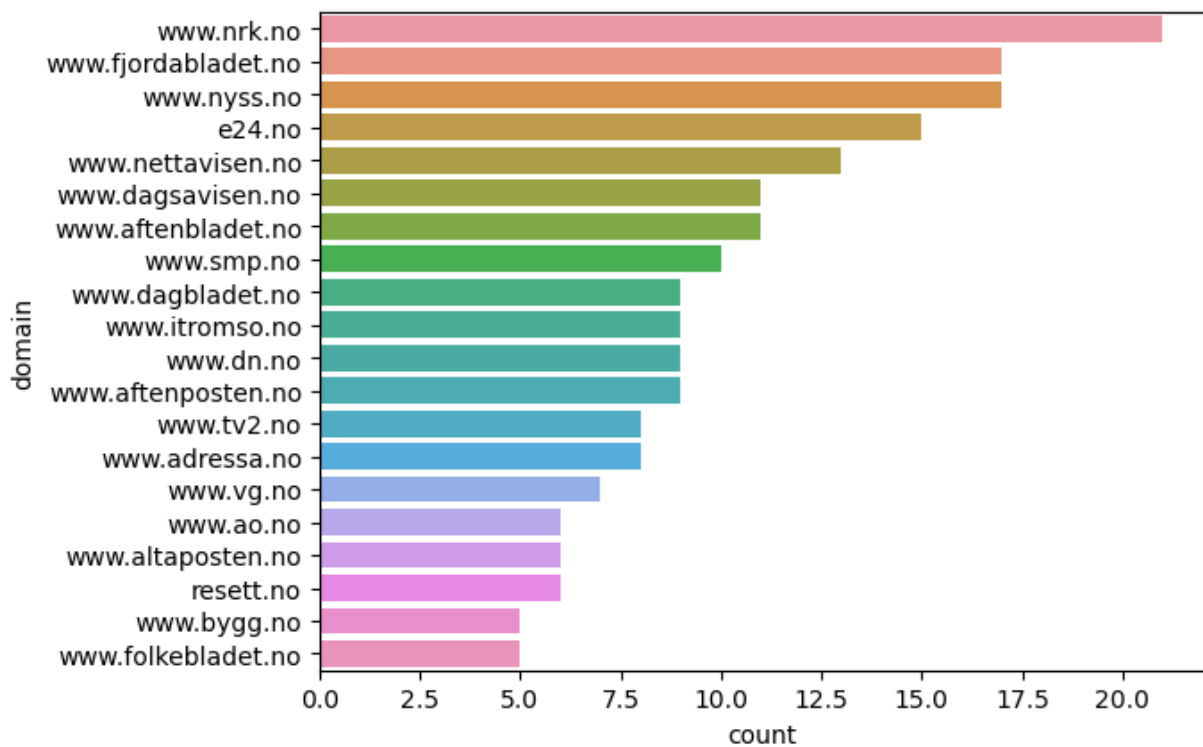
When examining the first titles and descriptions from the articles published on the 9<sup>th</sup> of August (Figure 25), most of them mention one of UN's climate reports regardless of the angle or topic of the piece. This is because the 9<sup>th</sup> of August 2021 was the day in which the IPCC released part of their Sixth Assessment Report, and the report in question focused on the physical science basis of climate change and the changes that climate change are creating (United Nations, n.d.). This also becomes evident when presented with the word cloud from the same day as 'FNs' (UN's) is the most used word in the titles appearing 61 times, and 'klimarapport' is the second biggest in the cloud with a count of 46 occurrences. Both of these words appear again in the top five words in different ways where

'klimarapporten' has a count of 38 and 'FN' appear 25 times, however another word which has been used 42 times in these titles, is 'må', which can point to the severity of this climate report. Other words such as 'energikilder' (energy sources), 'fossile', 'oljepolitikk' (oil politics), and 'oljedebatten' (the oil debate) can point to some of the themes and concerns



Figure 25: Word cloud from Spike 3.

featured in the articles in relation to the results from the climate report. This can also be said about less prominent words in the cloud such as ‘advarer’ (warns), ‘løper’ and ‘løpsk’ (together; running wild), ‘dystre’ (bleak), ‘utelukke’ (exclude), ‘endringer’ (changes), and ‘håper’ (hopes), which can point to the angling of the article.



**Figure 26:** The top publishers in Spike 3.

When examining the graph for the top 20 publishers on this spike day (Figure 26), it becomes apparent that the same three publishers can be found at the top of the table. NRK is at the top yet again with 21 articles, while Nyss and Fjordabladet again have published the same number of articles which is 17. Additionally, this graph displays a higher number of national news sources than the previous ones with newspapers such as Nettavisen, Dagsavisen, and Dagbladet amongst the top half of the graph. Further down the graph Dagens Næringsliv (DN), Aftenposten, TV 2, and VG are also present. This might allude to what the local and national newspapers deem as important for their publication, as this day featured mostly climate articles relating to or about the release of the newest part of IPCC's Sixth Assessment report on climate change.

#### 4.5.4 Spike 4

The fourth period to examine further has been determined slightly differently than the previous ones. Rather than encompassing one month from start to finish, the fourth period stretches from the 15<sup>th</sup> of October to 15<sup>th</sup> of November 2021 and consists of a total of 4161 climate-related articles. The period which can also be found in the second period when looking at the overall timelines, have been structured this way because the one day which shows a spike in the number of articles located at the very beginning of a month, 1<sup>st</sup> of

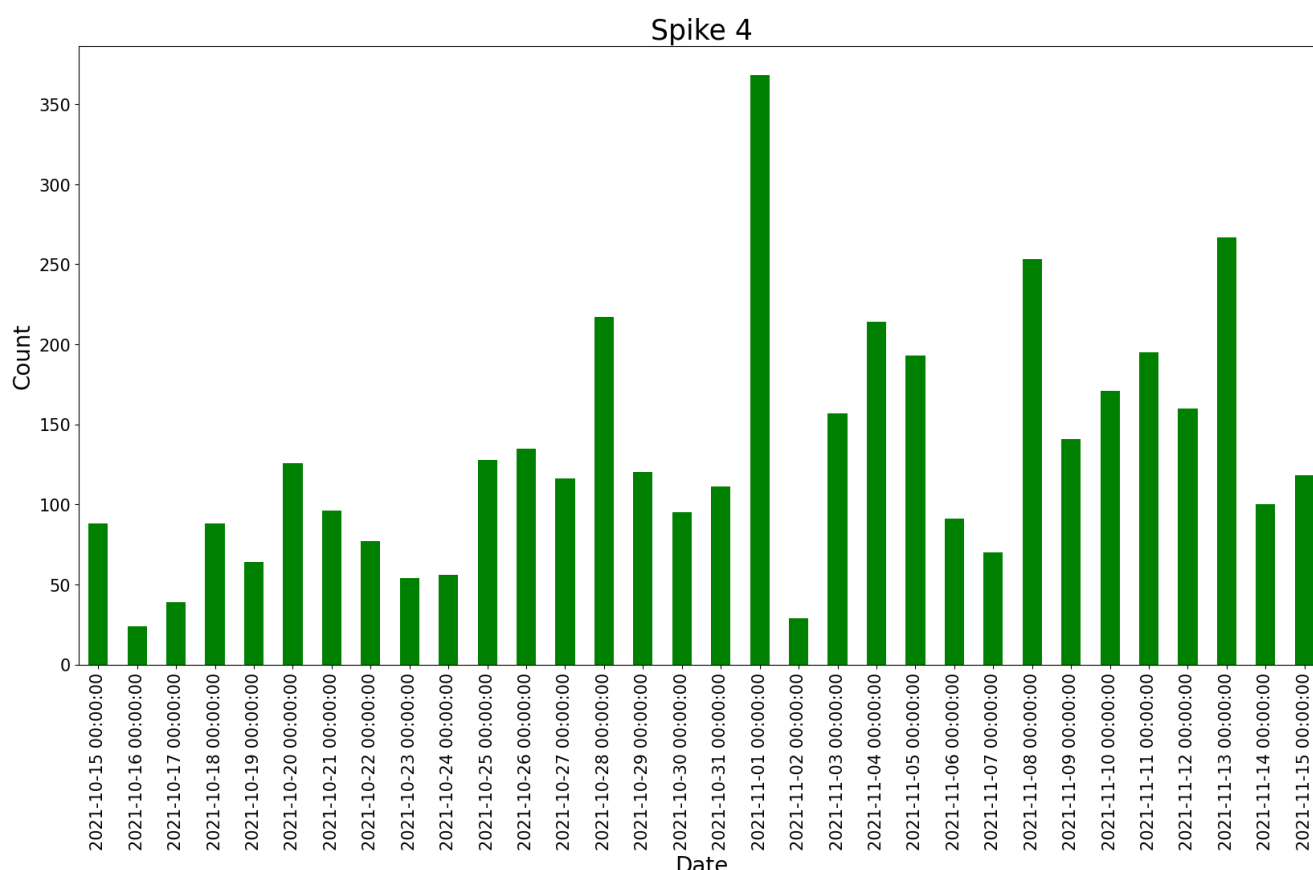


Figure 27: Spike 4.

November to be precise. Therefore, the period includes half of the month of October and November to be able to capture the tendency in publishing both before and after this day. In fact, the 1<sup>st</sup> of November is the day with the highest number of climate-related articles published in the whole of the dataset, with a number of 368 articles. Overall, the number of articles does vary quite a lot, however, the number is generally higher in the days following the 1<sup>st</sup> than the days prior to it. The exception to this is the very next day after the spike day which looks to have among the very lowest numbers of published articles across the whole period. Both a few days before the spike and two days during the following weeks after it,

there was a high number of climate-related articles published with the number reaching between 200 and 300. Comparing the graph to the made up from all published articles, the 1<sup>st</sup> of November had 6805 published articles, however, did not deviate from the rest of the period. Again, the figure shows the publishing as consistent across the period with a drop in publishing on the weekends. The only notable exception from this is the 2<sup>nd</sup> of November which has a very low number with just under a thousand articles. It is therefore reason to believe that this might be due to an error in the scraping of the articles.

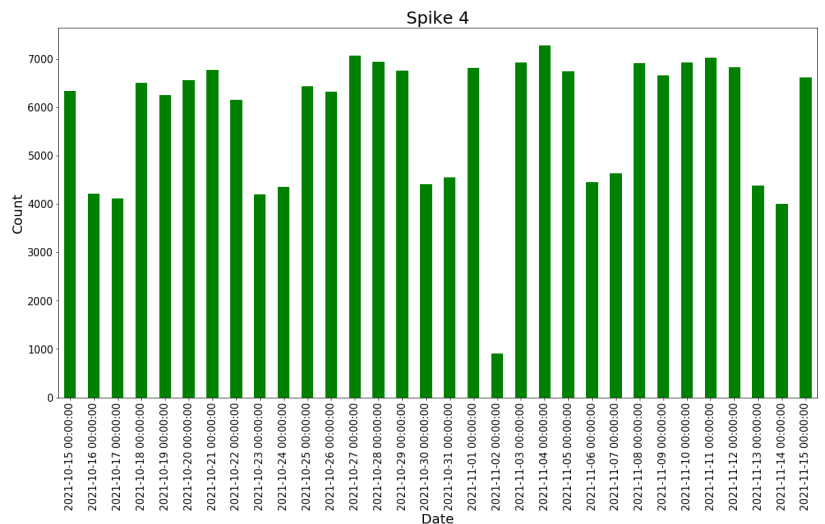


Figure 28: All articles in Spike 4 period.

From the titles and descriptions from the articles published 1<sup>st</sup> of November (Figure 29), it is clear that many of them mention COP26. The COP26 was held in Glasgow from the 31<sup>st</sup> of October to 12<sup>th</sup> of November (UNFCCC, n.d.), but officially opened on the 1<sup>st</sup> of November (NRK, 2021a). This is also reflected in the word cloud from the 1<sup>st</sup> of November with the word 'klimatoppmøtet' being mentioned 31 times in the titles. However, this is not the top word in the cloud, in fact both 'Biden' and 'Støre' have been mentioned more frequently appearing 41 and 36 times respectively. Furthermore, 'Boris' and 'Johnson' both appear 28 times, followed closely by 'Glasgow' with 27 occurrences and 'COP' with 22. Other world leaders and nations are again mentioned, but appear as smaller words in the cloud, including 'Paris', 'Macron', 'India', 'Trump', 'Skottland' (Scotland), 'Grønland' (Greenland), and, although not a nation but a continent, 'Europa' (Europe). Other less prominent words that can be found in the wordcloud are 'dommedags' (doomsday),

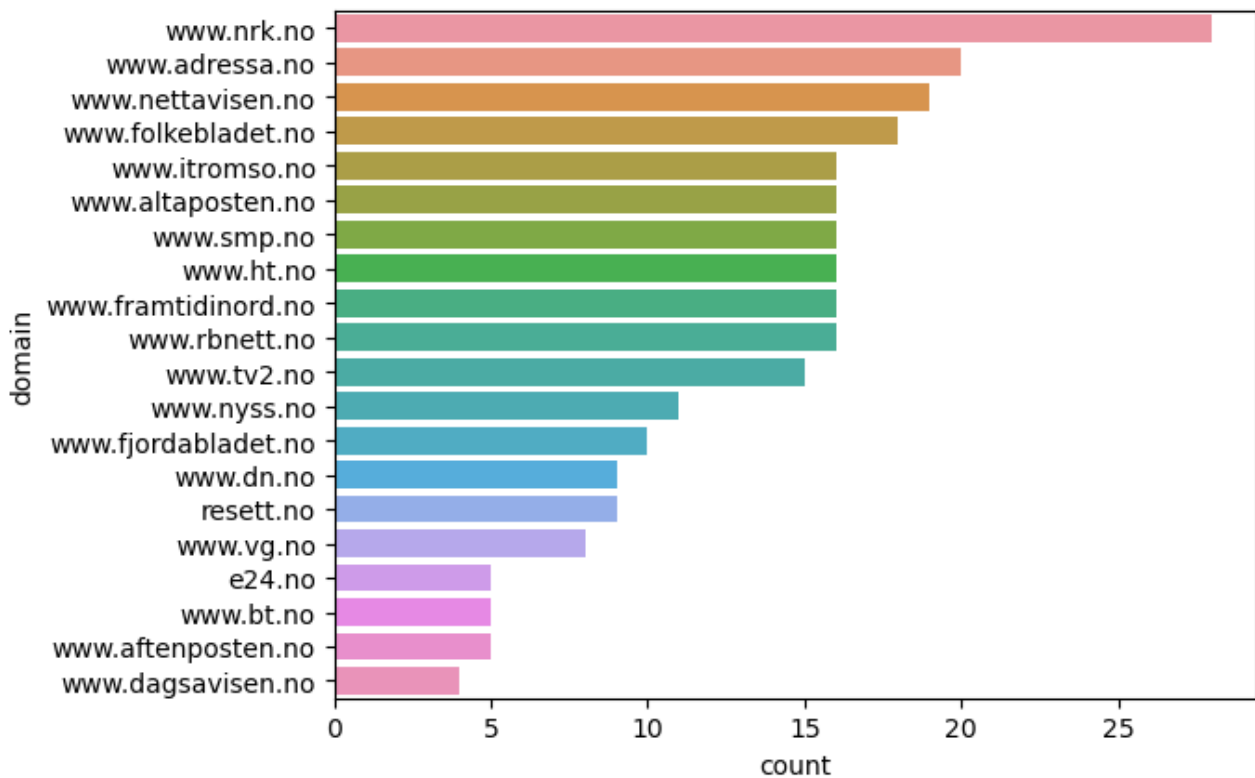


Figure 29: Word cloud from Spike 4.

'dommedags' (doomsday),

‘avskoging’ (deforestation), ‘unnskyldning’ (apology), ‘forpliktelser’ (commitments), ‘energikrise’ (energy crisis), and ‘skjerpe’ (tighten/enhance/intensify). Again, these are words that can point to the angle of the articles in the context of the COP26.

The graph displaying the news sources with the most articles published on this day (Figure 30), features some similar aspects to the previous one. Once again NRK can be found at the very top with a number of 28 climate-related articles published on the 1st of November 2021. Nettavisen can also be found near the top with 19 articles, however behind the regional newspaper Adresseavisen (Adressa) who published 20 articles. However, NRK’s number of articles is significantly higher than the rest of the news sources in the graph. When examining the count of each title from NRK in Python, it shows two titles that appear



**Figure 30:** The top publishers in Spike 4.

twice each and therefore are duplicates. This however is not a significant number, especially not compared to the duplicates that were found from E24 in spike 1. Nevertheless, it is worth noting that this might be the case for some of the NRK articles in this dataset. The other publishers in top half of the graph are majority local newspapers, however the second half features a few national titles such as TV 2, DN, VG, E24, Aftenposten, and Dagsavisen. In

a similar vein to what was discovered in spike 2, there are six publications in the middle of the graph that have published the exact same number of articles. After closer examination it is clear that the titles from all the articles in the six newspapers are the exact same, which is not a surprise when knowing that again, these are all newspapers owned and run by Polaris Media (Polaris Media, n.d.-b, n.d.-a).

### 4.5.5 Spike 5

The fifth and final spike is the only one to be found in the third period of the whole climate dataset (Figure 31). Because this spike is located towards the beginning of April, 4<sup>th</sup> of April 2022 to be specific, the period has been selected in the same manner as spike four, ranging from 15<sup>th</sup> of March to 15<sup>th</sup> of April 2022. This whole period contains a total of 2201, which is closer to half that of the period surrounding spike four. The spike day of the 4<sup>th</sup> of April does not deviate as much from the rest of the days in the period as the previous spikes and contains 189 articles on this particular day. Prior to the spike day, the publishing of climate-related articles was rather consistent, with some days including the weekends

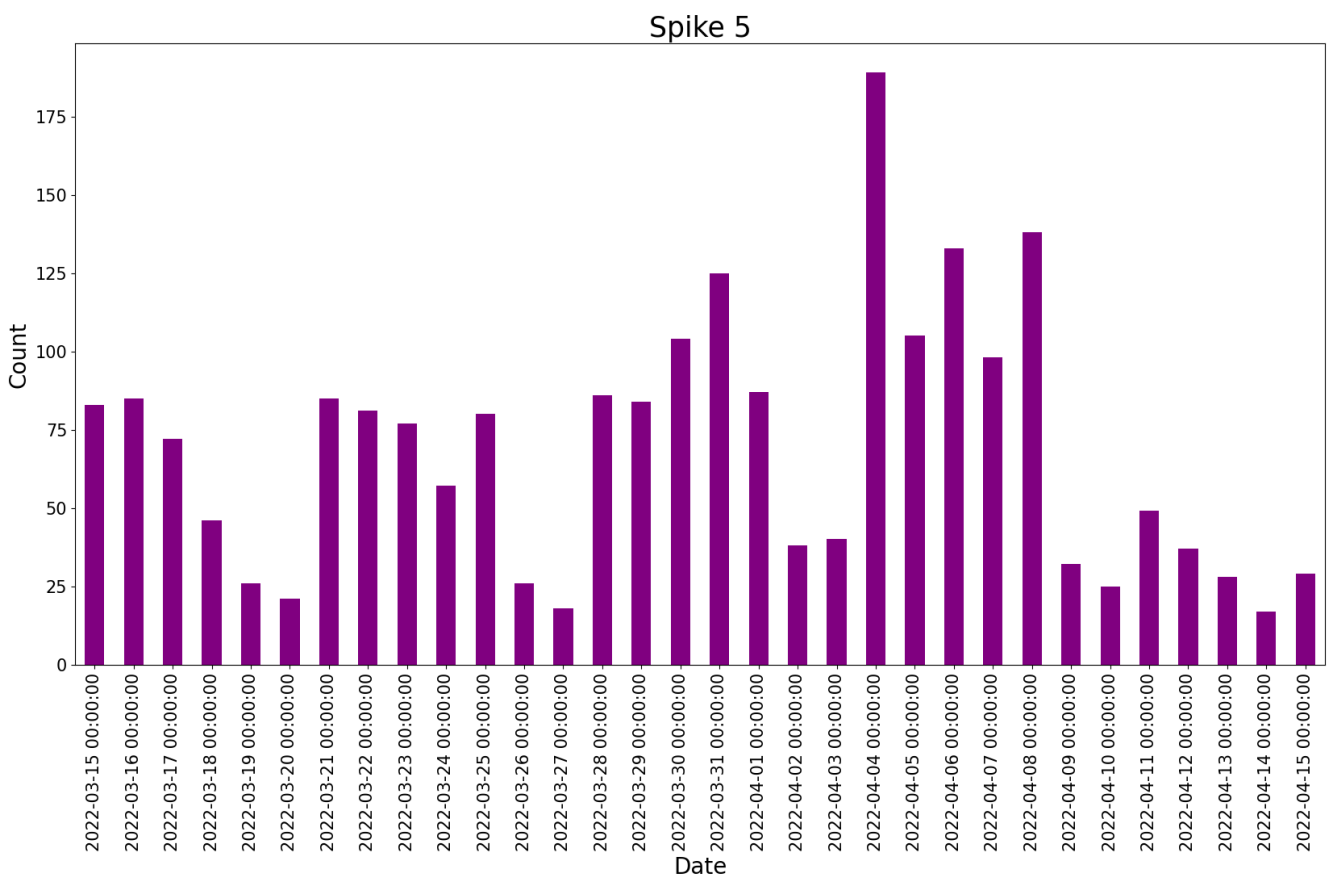


Figure 31: Spike 5.



showing fewer published articles, and a couple of days with a slightly higher number of articles. However, after the spike day the graph shows a slightly higher frequency of publishing for a few days before the number drops to the same level as the weekends for the remaining week or so. Nevertheless, a similar

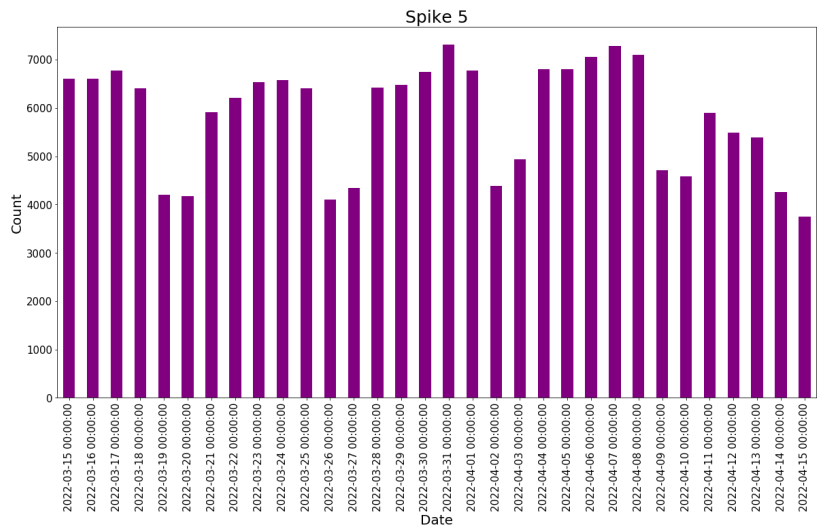


Figure 32: All articles in Spike 5 period.

trend can be seen during the last week in the graph showing all published articles in the same period (Figure 32). Aside from this, the frequency of publishing of all news articles is far more consistent in this period and no particular days deviate from the rest.

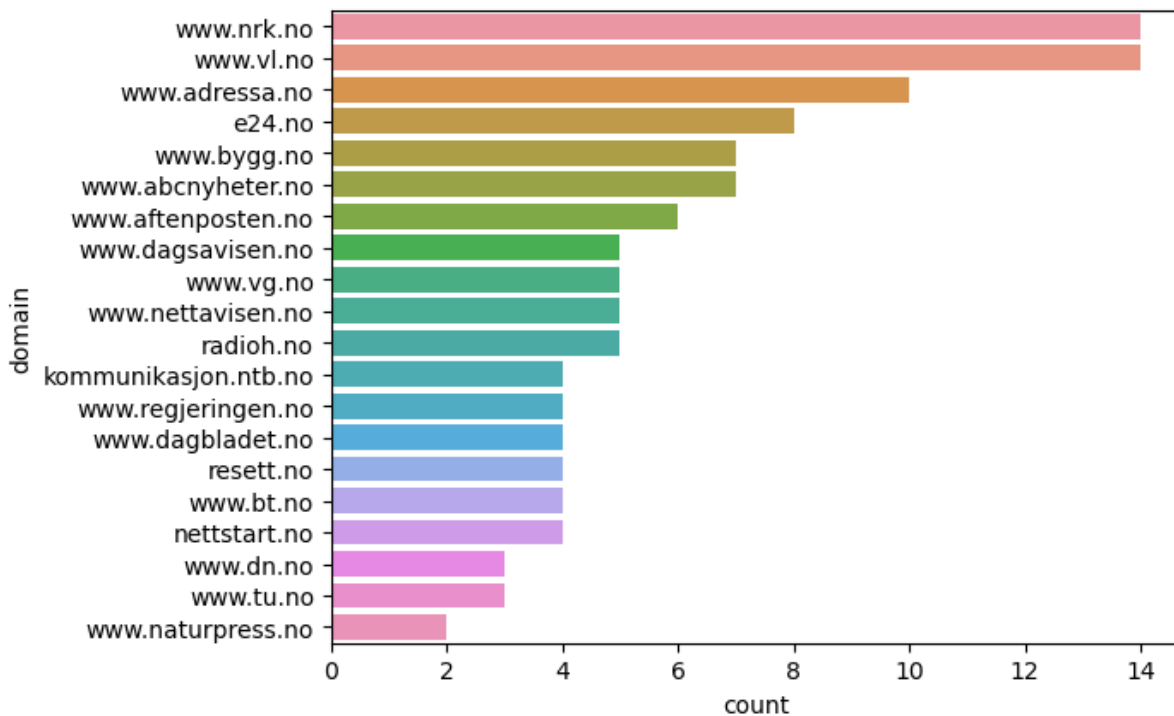
Studying the titles from the 4<sup>th</sup> of April (Figure 33) shows that most of the articles on this day revolve around another one of the UN’s climate reports. The IPCC’s “Climate Change 2022: Mitigation of Climate Change”, which is part of their Sixth Assessment report, was released on this day (United Nations, n.d.). It is no surprise then that the top three words from the word cloud of the titles in spike five are ‘FNS’, ‘klimarapport’, and ‘klimapanel’ with 34, 24 and 23 occurrences respectively. Other words that can be said to refer to the report and its message are ‘halveres’ (half), ‘innen’, ‘overtid (overtime), and ‘må’. Smaller words in the wordcloud are ‘skammes’ (ashamed), ‘symbolpolitikk’ (symbolic politics), ‘krangling’ (arguing), and ‘miljødirektoratet’ (the



Figure 33: Word cloud from Spike 5.

directorate of environment) which can all allude to the political conversation surround the publishing of this report.

The last and fifth spike day is no exception to the previous ones in that NRK is at the top of the graph yet again (Figure 33). However, in this instance the top of the list is shared with the christian newspaper Vårt Land (VL) as each news source has published 14 articles on the fifth spike day. Furthermore, this graph features a few domains which have not been present



**Figure 33:** The top publishers in Spike 5.

in previous spike days. In addition to this, the numbers of published articles are generally lower, which in turn can explain why new news sources have appeared here but are not visible in the graphs prior. Again, a few of the news outlets have published the same number of articles, which can point to the same article being published on different platforms of newspapers owned by the same company.

## 4.6 Survey findings

The questionnaire received 46 answers which were then analysed. The respondents were given both multiple choice answers (quantitative) and open text-based answers (qualitative). The quantitative answers were visualised using Python while the qualitative answers were thoroughly read through and a summary was written from each question where the most frequent characteristics in the answers was included in addition to some quotes that

highlight this. The questions from the questionnaire will be included as an attachment in the Appendix.

#### 4.6.1 Quantitative results

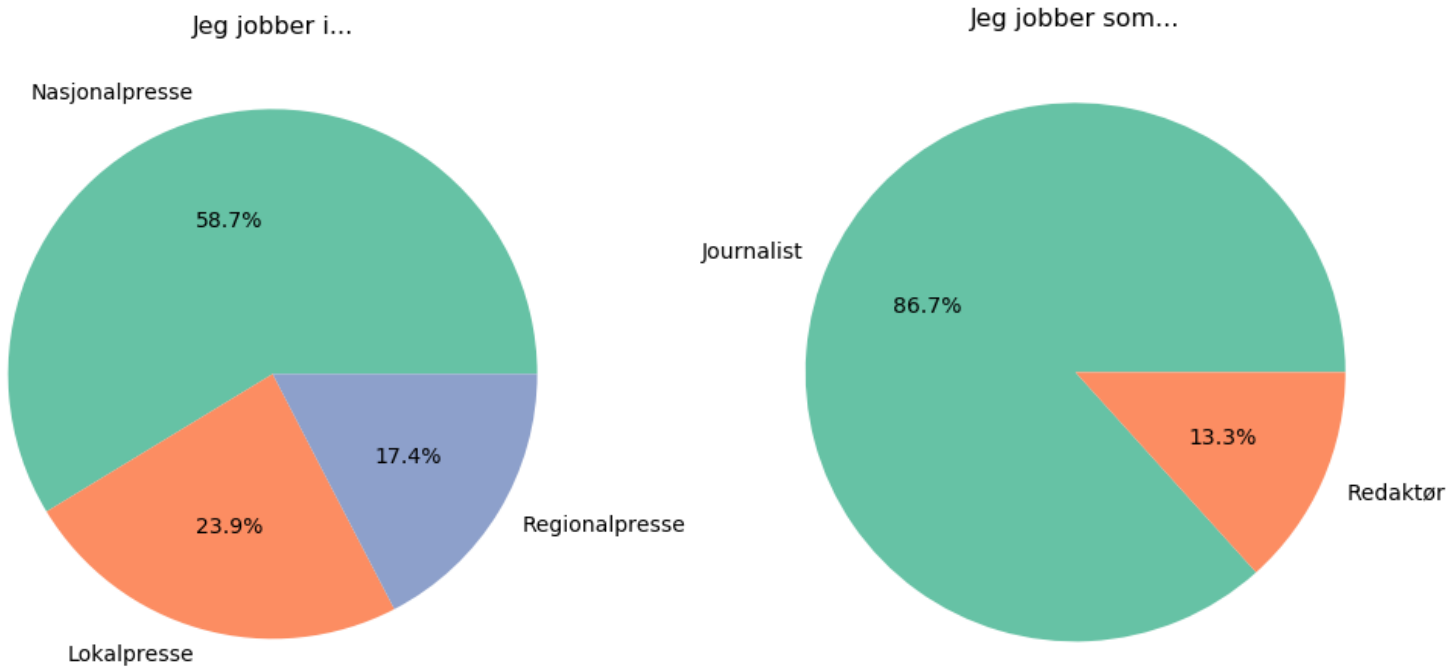


Figure 33: Responses to question 1 from survey.

Figure 34: Responses to question 2 from survey.

The first four questions of the questionnaire were structured so that the answers could provide insights into who they were. This meant that the questions centred around their professional identity, however without being private. The first question asked where the participant works with the options of answering national press, regional press or local press. The findings show that the biggest category of this question was by a long way nasjonalpresse (national press) with 58.7% of respondents working for a nationwide news company, while 23.9% works for a local newspaper, and 17.4% for a regional news source. Question two established what the respondent's role is and asked if they work as a journalist or an editor. The majority of respondents or 86.7% work as journalists, while only 13.3% stated that they have an editor-role.

Question number three determined the respondents' gender. The answers established that the distribution of respondents' gender was close to even, as 50% are women, 47.8% are

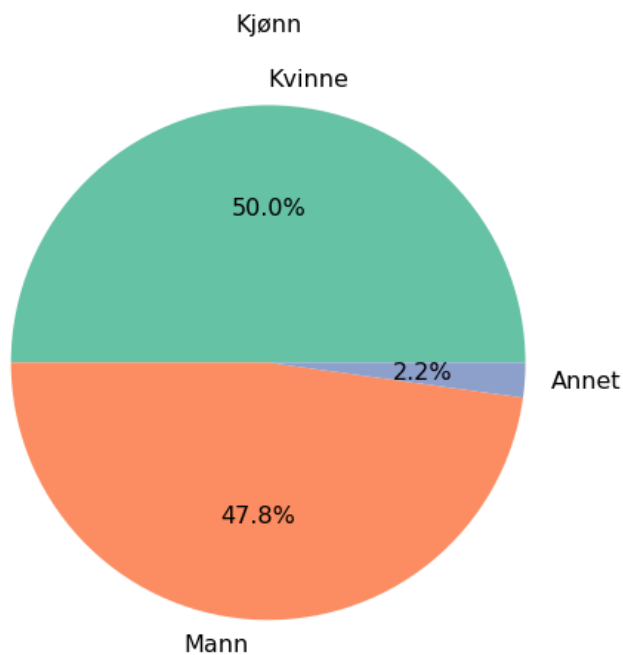


Figure 35: Responses to question 3 from survey.



Figure 36: Responses to question 4 from survey.

men and 2.2% answered 'other'. Further, the fourth question asked 'Is climate change one of your main areas of expertise in journalism?' where the majority of respondents, 78.3% answered no, which means that only 21.7% of respondents work with climate journalism regularly.

The next quantitative questions asked about the respondents' about their perceptions, experience and views on Norwegian climate journalism. The fifth question of the questionnaire first presented a quote from Bergskaug's (2022) thesis about her findings which was that in the run-up to the Norwegian general election in 2021 the

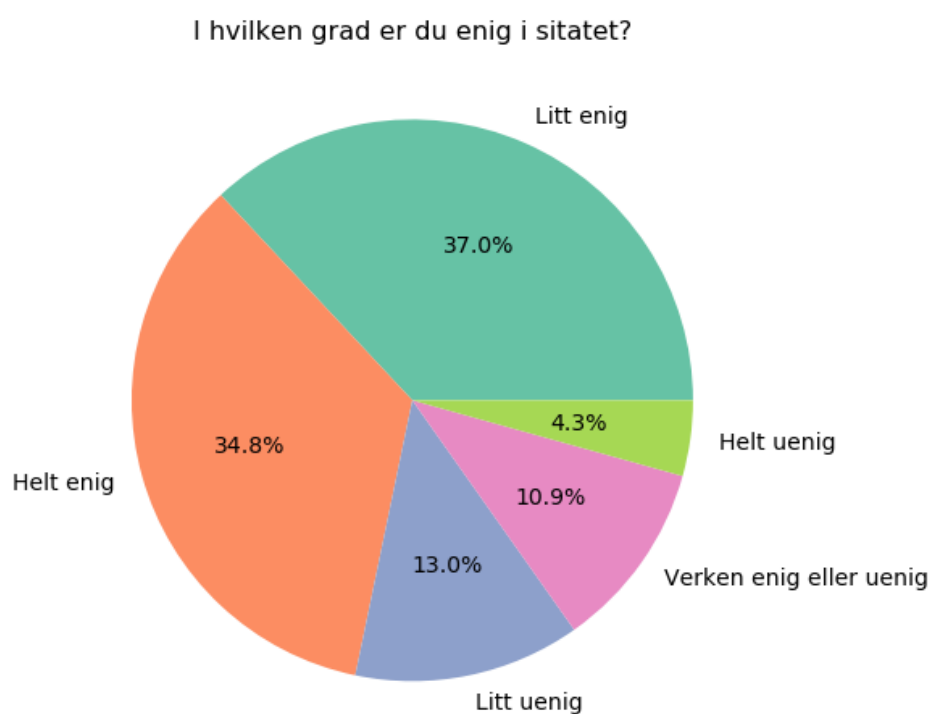


Figure 37: Responses to question 5 from survey.

Norwegian press published few front pages, few long articles, and few profound climate articles. She then states that the press should actively make decisions in prioritising resources for critical climate journalism (Bergskaug, 2022). The question following this was asking to which degree the respondent agreed to what was written in the quote. A majority of the respondents agreed to what was stated by Bergskaug with 37% answering that they agreed to an extent (litt enig) and 34.8% agreed (helt enig). 13% answered that they disagreed to an extent (litt uenig), 10.9% did not agree nor disagree (verken enig eller uenig), and 4.3% stated that they disagreed (helt uenig) to what the quote from Bergskaug said.

Question number seven in the survey started by briefly presenting one of the findings from the analysis that had previously been done in this thesis. The finding that the most frequent publishing of climate-related articles have been found to be connected to international and national political events was stated before the respondents answered to what extent this agrees with their perception of the production of climate stories in their own newsroom. Once again majority of the respondents agree to this with 40% stating that they agree to some extent (i noe grad), and 37.8% answering that they largely agree (i stor grad). Further,

I hvilken grad stemmer dette overens med din oppfatning av produksjonen av klimasaker i din egen redaksjon?

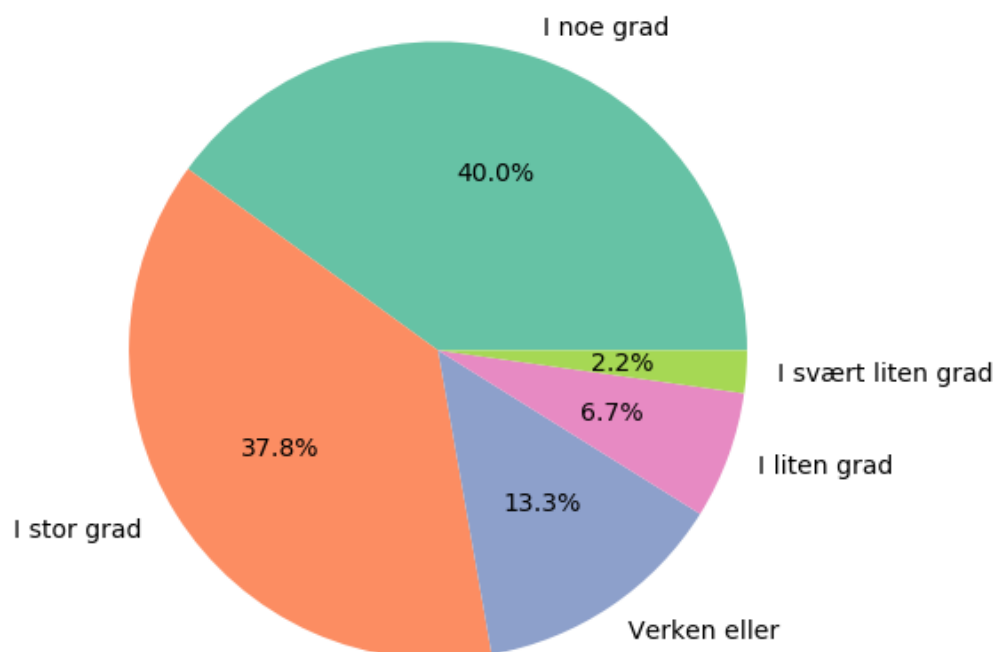
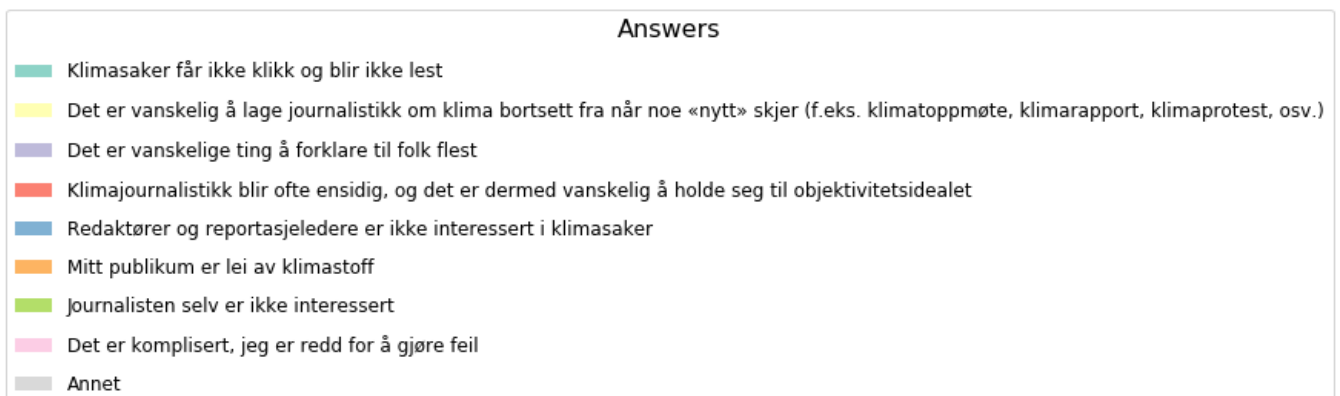
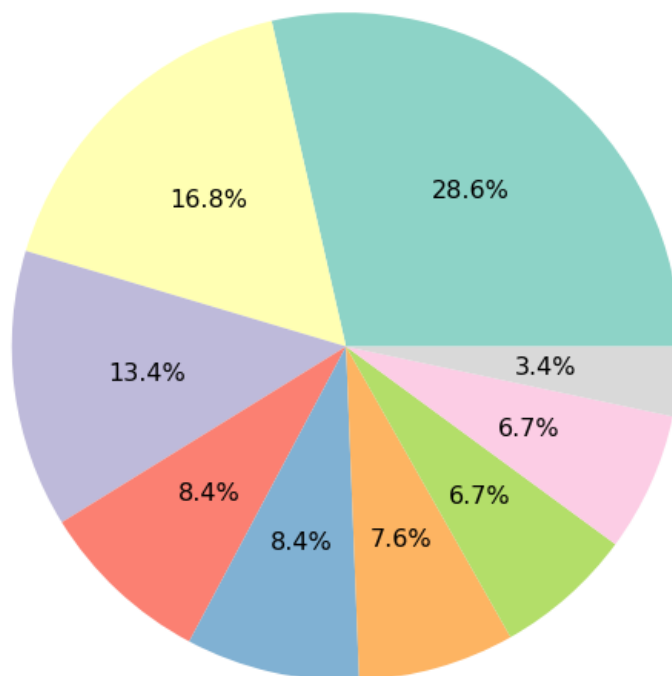


Figure 38: Responses to question 7 from survey.

13.3% answered neither (verken eller), 6.7% answered that their perception agrees with this to a small degree (i liten grad) and only 2.2% answered to a very small degree (i svært liten grad).

The eighth question of the survey was the only one to allow the respondents to choose several options as their answer without a limit of how many they could choose. The question posed was ‘What do you consider to be the Norwegian press’ biggest challenge when it comes to climate journalism?’. The most common answer from respondents with

Hva mener du er norsk presse sin hovedutfordring når det gjelder klimajournalistikk?



**Figure 39:** Responses to question 8 from survey.

28.6% of answers was that respondents' readers do not click on climate stories and that they generally don't get read. Following this, 16.8% answered that it is difficult to produce climate journalism on occasions where nothing 'new' (such as climate summits, climate reports, climate protests, etc.) occurs, while 13.4% answered that the issue is difficult to explain to people, or their readers. 8.4% of respondents consider it to be a challenge that climate journalism often ends up being one-sided which makes it challenging to stay objective, and further 8.4% chose to answer that their editors and lead reporters are not interested in climate stories. 7.6% stated that their audience is tired of climate stories, while 6.7% said that a challenge is that the journalists themselves are not interested in the issue. Another 6.7% stated that the issue of climate change is complicated and that they are afraid to make a mistake, while 3.4% chose to answer 'other', meaning that there are other reasons not given as an answer option that they deem to be the Norwegian press' challenge when it comes to climate journalism.

Hvem er oftest meningsbærerne i klimasaker fra din redaksjon?

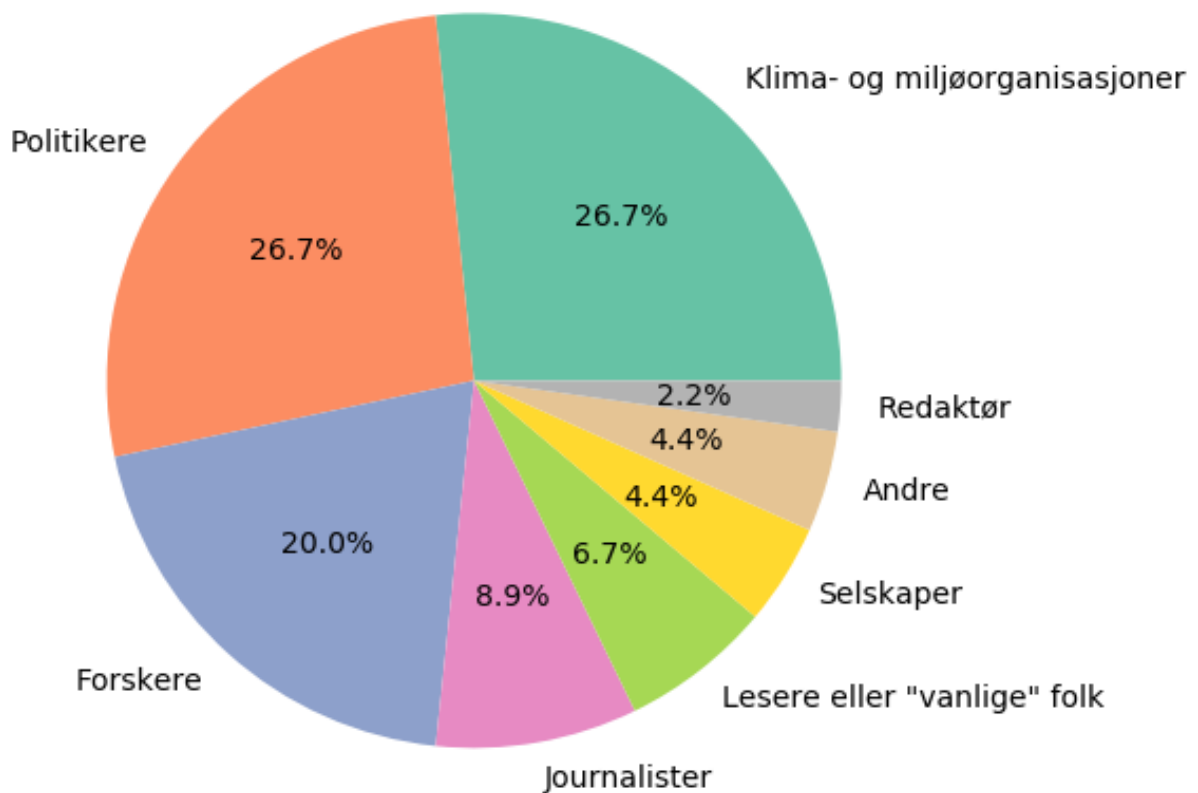


Figure 40: Responses to question 10 from survey.

Lastly, question number ten asked respondents who most often appeared as the author of opinion pieces about climate change in their newsroom. The two most prominent answers, both 26.7% are politicians (politikere), and climate and environmental NGOs (klima- og miljøorganisasjoner). Further, 20% of respondents state researchers (forskere) as they answer, while 8.9% answered that journalists most often are the opinion leaders in their newsroom. 6.7% answered readers or 'normal' people (lesere eller "vanlige" folk), 4.4% stated companies (selskaper), also 4.4% others (andre), and lastly, 2.2% answered that the editor is most commonly the author of opinion pieces about the issue of climate change.

#### **4.6.2 Qualitative results**

The qualitative results from this survey comes from the five text-based answers in the questionnaire. Additionally the questionnaire contained one more text-based answer, however this one asked if the participants could think of any examples of articles which reflect good climate journalism from their own newsroom. Here, the answers were varied in that some stated no, some yes, others provided links and some did not answer because they felt the question required them to state which news organisation they work for. The questionnaire was anonymous and therefore I do not wish to include which newsrooms came up in the answers, in addition to this question not being directly linked to the research question of this thesis which examines the drivers behind these climate articles.

Furthermore, the rest of the questions and a summary of what the respondents answered will be presented in this section. Although the questions ask about slightly different characteristics and reflections around Norwegian climate journalism, the answers draw the same lines and include the same characteristics.

The first text-based question is question number six which corresponds with question five which was presented in the quantitative results section. Here, the respondent is given the chance to state why they answered as they did in the previous question, why they do or do not agree with the quote from Bergskaug (2022). One thing that was commonly brought up by respondents in all of the answers was that the Norwegian press has to prioritise climate change more in their respective newsrooms which will require more resources, time and journalists specifically assigned to the issue. This will then allow for more critical journalism about climate change, in addition to new, innovative and interesting ways of producing and



presenting climate journalism which was desired by the respondents. According to the answers, these resources are especially needed in the local newspapers where producing journalism on the topic can be even more difficult and time-consuming depending on the location and therefore the physical visibility of climate change. One respondent highlights the importance of climate journalism in local newspapers by stating that the climate has to be put on the agenda in other news media, not just the national ones because local news media are much closer to people's everyday life and therefore they hold more credibility in a lot of instances. Furthermore, respondents also highlight the difficulty and complexity of producing stories about climate change and that this is a reason for why many journalists oppose writing about the issue. One respondent states that they think that most news media try, however that they find it difficult and that the stories can be difficult to angle because the issue is complicated. This in turn leads to them prioritising the more clear angles which the respondent illustrates by using an example of the activist Greta Thunberg and how often she is portrayed in climate stories. The complexity of the issue can also be reflected in the last feature that was commonly answered by respondents, which is that climate-related stories are not read by the audience. One respondent highlights this by saying that the number of readers and the time they spend reading means too much to the newsrooms and therefore dictate what kind of themes and stories they choose to publish. They then state that the press has to set the agenda when it comes to climate change and make the readers interested.

The ninth question of the survey also corresponds with the one prior to it as it asks respondents to elaborate on their answer of what they think the Norwegian press main challenge is when it comes to climate journalism. Many of the same features as the respondents articulated in the first text-based answer were also displayed in the answers to this question. Firstly, the notion of low numbers of readership was also brought up here with respondents stating that they feel their readers are tired and bored of reading about climate and that the stories are all very similar. This can also be due to what some respondents said is that it is difficult to relate climate change to concrete and visual examples in an interesting way. The complexity of the issue was once again brought up here as a challenge because the issue is so big. It is therefore highly time-consuming while at the same time it is difficult to keep the reader interested while making sure the journalist does not say anything that is

incorrect. Some respondents specified that reporting on the issue is most often one-sided which also makes it difficult to angle stories in an interesting way. Research reports were also brought up as being difficult to convey in an engaging way as the academic language can be too difficult for readers to understand. The editors' role was also brought up in the answer section where one respondent stated that many editors do not have enough knowledge on the field and what is needed of climate journalism. Therefore the decision makers in the newsroom often choose to go with the 'simple' climate stories which the respondent states can repress the critical stories on climate change, more so than when it comes to other beats of the newsroom. Lastly, climate sceptics and deniers are brought up as a challenge for journalists as some respondents state that they receive hostile emails from this group of people when their name is attached to a climate-related article. This is described as another reason for why many journalists are hesitant to work on climate stories.

Further, question number eleven briefly presents a finding from the interdisciplinary project between Faktisk.no and OsloMet which is that a large part of Norwegian climate articles are opinion pieces, before asking respondents why they think this is the case. Some respondents think that the reason for this is that the issue of climate change engages people, organisations, researchers as well as those who are sceptical or deniers. Some also state that opinions create debate which in turn draw more readers to the publisher, while others point to opinion pieces as a way to boost the public conversation by indicating newsworthy aspects of climate change. Once again, the issue of climate change being complex and difficult for journalists is brought up in this answer section. Some respondents say that publishing opinion pieces about climate change is much easier and a lot less time-consuming than when journalists write stories on it. In addition to this, it is less risky for the newsroom as they do not risk spending time and money on journalism that readers will not read and the journalists do not have to risk making a mistake about the complex subject or receiving hostile correspondence from readers who are sceptical of climate change. One respondent states that this trend can indicate laziness from the Norwegian press, while others think the complexity of the case makes it easier for the press when someone has an opinion on the topic rather than to search for connections and concrete examples of a complex issue.

Question 13 asked respondents how the issue of climate can be interesting and important across different departments and beats, such as in the department of culture, sports, economy, etc. The majority of respondents agreed that the topic of climate change does have a place in most, if not all beat and news departments across the newsroom. Some used examples from the field of sports journalism where the changing temperature has affected winter sports because of lack of snow, or how climate change can be a topic when it comes to the travel and the use of electricity by sports clubs. Others pointed to climate change in the field of economy, both for businesses and companies, but also people's private economy. Several respondents mentioned that climate change can be a topic across most beats when it comes to the consequences for people and what the changes will say for them whether it being economically, culturally, or other areas. Some of the answers also highlighted that climate should be thought of less as a separate field of journalism but rather more as something that affects the very framework of all activity, both from humans and in nature.

Lastly, the 14th question asked what respondents think the Norwegian press should do if they intend to be better at climate journalism. Some respondents articulated that the question was too big to answer in this survey, while others had concrete thoughts about how the Norwegian press can and should improve. The most common answer here was that newsrooms need more resources, time and journalists dedicated to climate journalism. Respondents stated that this will allow for more critical journalism in addition to more knowledgeable journalists on the topic. One respondent also stated that this will allow for climate journalism to act less as a microphone stand for researchers, the business world and organisations, and instead produce more of their own journalism on the issue. This is also reflected from other respondents who request less heavy and research based sources, and more concrete, realistic examples tied to climate change, including those that can be found internationally. The answers also reflect a need for newness and innovation in climate coverage and ways to connect other aspects and fields of journalism to the issue.

## 5. Discussion

Although to a slightly varying degree, there are five events throughout the one and a half year time-period that have been prioritised more than any others when it comes to climate change and the coverage of it in the Norwegian press. As shown in the previous chapter, these events were the Norwegian government's climate plan for 2021-2030 in January 2021, the digital climate summit on Earth Day in April 2021, the release of part of IPCC's sixth assessment report on climate change in August 2021, The COP26 in Glasgow in November 2021, and another part of IPCC's sixth assessment report which was released in April of 2022 and deals with mitigation of climate change. What is striking about these events is that four out of five are international, while only the first increase in published articles can be connected to a national event. Additionally, all five events are of political character, whether its climate summits where political leaders take centre stage, or the release of a new IPCC climate report where leading scientists provide strict guidelines or suggestions for policy makers, they all have political aspects to them. It has therefore become clear that certain events have driven journalistic interest which in turn have increased the publishing of climate related articles at these points in time. In addition to this, the findings reveal several drivers behind the Norwegian climate coverage across this time-period which encompasses the complexity of climate change and the challenges this brings for journalists covering the topic. This chapter will discuss these findings while drawing on findings and theories from previous research on climate journalism. First, the notion of newsworthiness and different aspects of the concept will be discussed in connection to the driving events found in this thesis. Thereafter, the political drivers of climate change will be discussed, and lastly the journalistic challenges of covering climate change will conclude this discussion chapter.

### 5.1 Driving events and newsworthiness

#### 5.1.1 Newsworthy climate change

The findings that have been presented in the chapter above, further support findings from previous research on this very topic. In fact, quite similar increases in publishing can be found in Boykoff et al.'s (2022, in Bergskaug, 2022, pp. 18–19) mapping of climate change

news coverage. Although the study examines news coverage from all over the world over a period from 2004 to 2022, striking similarities can be found. In her thesis, Bergskaug (2022) highlights five of the biggest peaks in publishing and briefly connects them with events at the time. All five points in the timeline can, amongst other events, be connected to climate summits and/or the release of a new IPCC climate report (Bergskaug, 2022, pp. 18–19). Similarly, Ytterstad and Bødker (2022) discuss the fact that climate summits have driven and created the biggest increase in climate coverage all over the world. The findings then support this in that the biggest increase in publishing of the dataset is Spike 4 which occurred when the COP26 took place in Glasgow. This increase of climate articles is significantly bigger than most of the other four points of the timeline, although the journalistic interest for climate change was almost as high in Spike 3 (which will be examined closer later in this chapter). It is therefore compelling that the climate summits are amongst the biggest drivers of climate journalism, which in itself is not surprising, however why are they covered to such a degree more than any other climate change related story, event or phenomenon?

When comparing the timelines created from the dataset consisting of all news articles and the ones presenting the climate-related articles, there is a striking difference in the frequency of publishing. The timelines with the climate-articles portray great discontinuity in publishing compared to all articles and therefore highlight the findings that climate news journalism requires something to happen for news articles to be produced. The findings also show how events such as the climate summits are in big part what drives the news coverage of climate change and global warming which has previously been found in research on international climate change news coverage (Boykoff & Boykoff, 2007; Boykoff & Yulsman, 2013; Painter & Schäfer, 2018; Schäfer et al., 2014). The findings from the questionnaire of Norwegian journalists can also give an insight into why this is the case when some respondents attributed the difficulty and challenges with climate journalism to the lack of ‘news’. Additionally respondents long for innovation because they perceive the current climate coverage to be repetitive and lacking in new angles and stories. This is both reflected in the findings from the dataset and in previous research on the topic, in addition to explain to some degree why journalists jump at the chance to write about events such as climate cummits, climate reports and climate policies, because these are occasions where

something 'new' occurs and it is therefore easier to write stories on the events about climate change. This has also been reflected in Ytterstad and Bødker's (2022) research where they state that "it is the relatively small number of such precisely defined events that lies behind the discontinuity of journalistic coverage of climate change" (Ytterstad & Bødker, 2022, pp. 1302–1303). The results from the timelines and word clouds then further this notion that climate journalism is dependent on a bigger, 'newsworthy' event to happen in order to publish news articles on the topic.

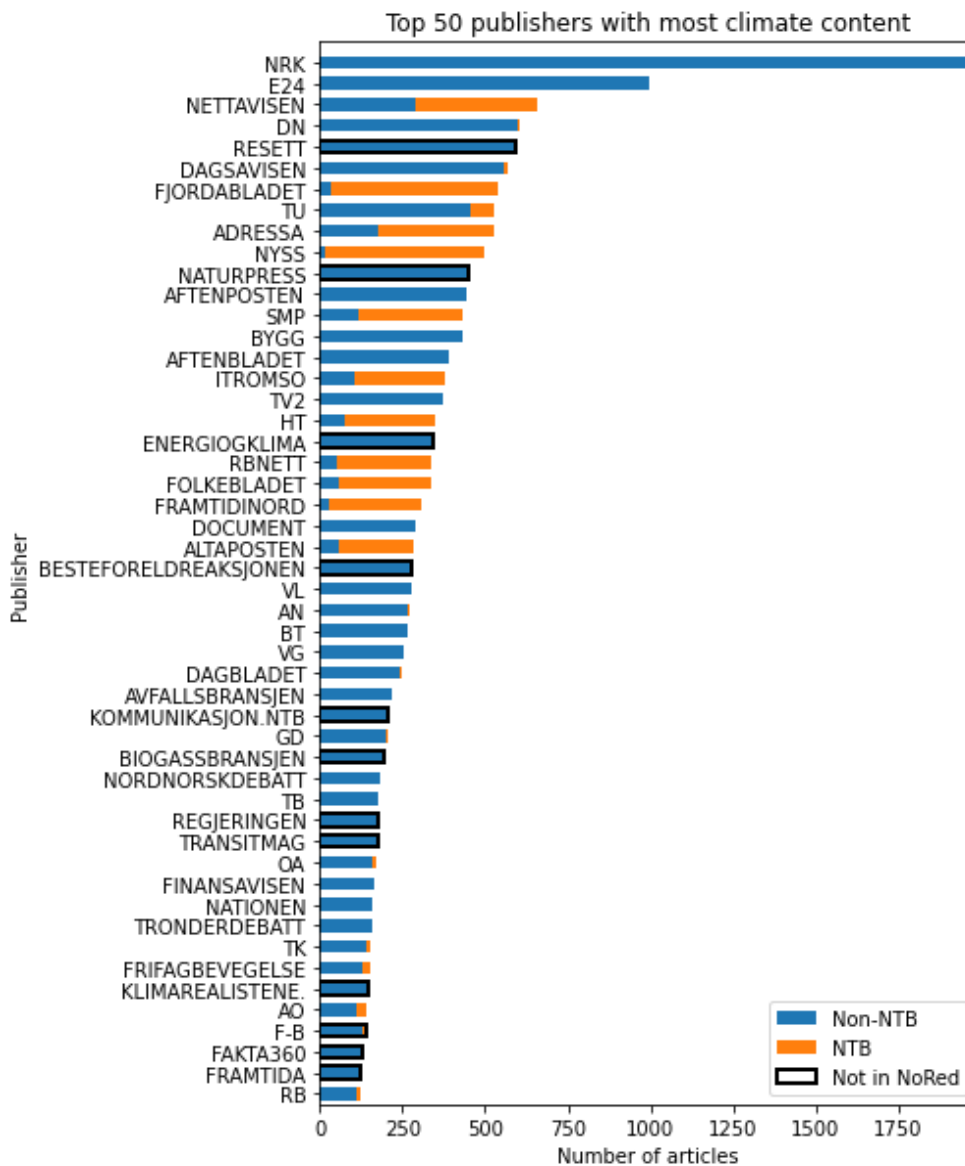
This can also be examined through agenda setting theory, whereby the mass media sets the agenda for what people deem as more important issues than others (Coleman et al., 2009, p. 147). This way, Norwegian news media seem to favour bigger political, and in most cases international events as the most important when it comes to climate change. In the case of Spike 5, the last of the days with the highest number of climate articles published in the dataset, the journalistic interest is much lower than that of the previous four peaks in publishing. Located in April 2022 it can be seen in connection with the release of part of IPCC's Sixth Assessment report on climate change, which is the same as the event connected to Spike 3 which saw a previous part of the report being released. However, the number of articles in Spike 5 is far less than that in Spike 3, in fact the whole of the third period of the timeline contains significantly less articles than the two periods prior. One reason for this drastic difference in publishing number can be viewed in connection with a rather big conflict in Europe, the escalation of the conflict between Russia and Ukraine which escalated when Russia started a full scale invasion of Ukraine on 24th of February 2022 (FN-Sambandet, 2023). A big escalation of conflict like this can be described as newsworthy to say the least, and therefore overshadow other topics, especially if we think of journalism as "a reflection of the passions of the day ...and news is whatever is 'most newsworthy on a given day'" (Boykoff & Yulsman, 2013, p. 367). This can then be viewed as part of the reason why Spike 5 is sufficiently smaller than Spike 3 despite the driver being similar, the invasion of Ukraine was at this time a more pressing and newsworthy event than yet another part of IPCC's Sixth Assessment report. However, some respondents of the survey emphasised the importance of the Norwegian press in setting the agenda by giving greater attention to climate-related issues than what they do today. As Ytterstad, et al. (2021) states that the press is an important actor and have the power to influence policy making on an issue such

as climate change, respondents stated that newsrooms should not be driven by what they think readers will want to read, but rather set the agenda and create interest in the issue instead.

### **5.1.2 Climate publishers**

However, the answer to my previous question as to why these five events are much more frequently covered than others related to climate change, might not be as straightforward since there are several aspects of climate change and climate journalism that need to be considered when interpreting the findings in this research. Firstly, it has to be said that this research does not consider the single and perhaps longer in-depth stories that some Norwegian news organisations spend a great deal of resources and time on. An example of this is the visually presented long-read article “Blålys for havet” from Nord and Fossåskaret (2021) in NRK. This article is not visible in the timelines of this research, however this is not to say that this single article could not have made a great impact on its readers. In addition to this, the timelines don’t explicitly show the frequency of publication from each news source nor when or if they publish climate-related articles at a time when others do not. However, one graph from the interdisciplinary project created by Marina Fridman, displays indications of which publications prioritise climate journalism in general. The figure shows the top 50 publishers in the dataset who have published the most climate content within the time-period. The figure demonstrates that a substantial number of local newspapers appear in the top 50 list, nevertheless, the local newspapers comprise less than half of the publications listed. Furthermore, local and some regional newspapers stand for most of the NTB (Norsk Telegrambyrå, translates to Norwegian Telegram Agency) articles. NTB is an independent Norwegian news agency which delivers international and national news to newspapers, news organisations and other organisations (NTB, n.d.). This means that the news sources that publish a lot of NTB stories, create less original climate content.

When it comes to the news sources toward the top of the list, this still displays their interest in publishing climate-related news articles despite the source of the story coming from NTB. One example of this is the local newspaper reaching the highest number of articles on this list, which is Fordabladet located seventh from the top of the figure. Although most of the



**Figure 41:** Graph made by Marina Fridman in interdisciplinary collaboration.

articles are linked to NTB, the publication still displays a high interest in publishing climate-related articles. The prevalence of NTB articles among local newspapers can however be an indication of the complexity of the issue that is climate change in that it is difficult to create climate journalism on a local level. This was reflected in the findings from the survey where respondents highlighted some of the challenges with producing local climate change coverage. Firstly, the lack of time and resources in the local newspapers were something that journalists in the questionnaire mentioned as a hindrance for producing more climate-related stories. Secondly, some respondents stated that the location of the newspaper and to what degree the consequences of climate change are visible in the local area, has a great impact on the climate coverage. These findings show that areas that are more prone to the changes that have come with climate change and global warming find it easier to connect the topic of climate change to concrete examples and events locally.



Nonetheless, these findings are highly interesting and important to be able to portray the full image of Norwegian climate journalism and should be examined further and in more detail. Further research should look into the frequency and continuity of different local newspapers in more detail to examine who publishes when others do not and where original climate journalism is produced most frequently.

### **5.1.3 Climate change visibility**

Nevertheless, in addition to climate change being an issue of great complexity, it is clear in this analysis that it is also one that poses temporal challenges. This aligns well with Ytterstad and Bødker's (2022) notion that visibility of climate change and global warming presents a challenge as it does not add up with the frequency of journalism. The fact that it is difficult to see and feel the changes of climate change from day to day, can impact this as the theme is not 'newsworthy' enough. The issue with frequency can be seen in connection with news being framed as episodic rather than thematic (Weathers, 2013). The timelines in the findings present this rather well in that there is little continuity in the publishing and the journalistic interest peaks and then decreases rapidly in most instances which then displays the episodic framing of climate journalism rather well. In the findings from the questionnaire this was also apparent when respondents explained that one challenge with climate journalism is to be able to relate the issue to people's everyday life when it is not noticeable on a daily basis and it is therefore difficult for journalists to keep the continuity in publishing climate-related stories. Explaining what this does to its recipients, Weathers (2013) states that "citizens exposed to a steady stream of episodic frames fail to see the connections between problems" (Weathers, 2013, p. 21), which is displayed in these findings to be one of climate journalism's big challenges. When examining the word clouds from the titles of the articles in the top five days with the most published climate articles, it is clear that the focus is on the events they portray, what needs to be done, and the players who are deemed accountable at the moment in time. Within these peaks of publishing, there is little that connects these single events to others, and although consequences are discussed to some degree in terms of the rise in temperature and the future of energy sources, there is less focus during these events on how climate change can be connected to other pressing crisis, conflicts and aspects of life.

In fact, the dataset shows surprisingly few connections to visible consequences of climate change and global warming that have been detectable to most people over the last few years such as extreme weather conditions. The figure showing the timelines from all the themes categorised by the AI, the themes connected to extreme weather display generally low numbers of published articles. 'Syklon' (cyclone), 'ekstremvær' (extreme weather), 'tørke' (drought), 'ras' (avalanche), 'hetebølge' (heat wave), 'regn' (rain), 'flom' (flooding), 'brann' (fire), 'snø' (snow), 'orkan' (hurricane), 'storm', 'skred' (also avalanche). None of the themes mentioned reach more than 30 articles on any given day, with the exception of 'ekstremvær' which reaches its peak just under 100 articles. This increase however, is located in August 2021, the same as Spike 3 which could mean that the word has been used as an example of consequences of climate change discussed in the Assessment Report and not connected to specific instances of extreme weather. One example of extreme weather is the forest fires in the south of Europe, especially in Greece during the summer of 2021 which was presented in the news at the same time as the increase in publishing seen in Spike 3. In an article from VG the forest fires in Greece were discussed the same day as the IPCC climate report was released (Sfrintzeris & Bergland, 2021), however there are no traces of these fires being connected to climate change in the word cloud.

There are two reasons for why this might be, which is either that climate change or global warming is not mentioned in these articles that present the forest fires and therefore they do not exist in the climate dataset. The other reason could be that there are not enough of these articles to appear in the word clouds, although a word does not need to be repeated more than four times to appear in small font. These findings support those of previous research such as Schäfer et al.'s (2014) where the research found that such extreme weather events had little to "no detectable effect on media attention for climate change" (Schäfer et al., 2014, p. 167). Similarly, when examining the connection between extreme weather events and climate change in Norwegian newspapers, Duarte (2014) found that only about 20 percent of the articles made this connection (Duarte, 2014, p. 308). When considering this, there is one aspect of peace journalism presented by Cottle (2021) can be relevant in this instance as he highlights the importance of journalism to present the worlds' crises and conflicts such as the Covid-pandemic, droughts, famine, and wars in connection with each other rather than isolated instances (Cottle, 2021). From the examples in the findings, this

does not seem to be the case in the periods where a high number of articles have been published, but rather that these articles focus on one main event connected to climate change and global warming.

#### **5.1.4 International climate events**

An interesting observation from the findings is also that most of the events that can be connected to higher journalistic interest and therefore an increase in climate articles published, are international. In fact, all the main driving events from the findings, excluding the first one, are international and connected to the UN and its climate panel IPCC. These are two parts of the Sixth Assessment report on climate change, one climate summit, COP26 in Glasgow, and one digital pre-summit meeting of world leaders. The only event that is nationally located can be found in the first peak of published climate articles when the Norwegian Government released its new climate plan. Findings from the survey showed some respondents stating that much of what they would consider news about climate change takes place internationally. Thus journalists stated in the answer-section that it can be challenging to connect these news to 'us' and make it relatable to people in Norway. These particular findings from the survey do not support those of Kunelius and Yagodin (2017) who found that news media often portrayed domestic political sources in their coverage of the 2013 and 2014 releases of IPCC's Fifth Assessment report, however when the last part of the report was released, this had slightly shifted and journalism was "trying to take a more global perspective on the issue and increase pressure for transnational political conclusions to be drawn" (Kunelius & Yagodin, 2017, p. 78). This thesis does not examine the sources of the articles nor the framing of them, however this gives an indicator when analysing the number of climate-related articles over time and the events that can be seen as drivers behind the journalistic interest.

In addition to this, the international events like COP-summits and the release of the IPCC reports are, as Nossek and Kunelius (2012) describes them, "an exceptional example of systematized and partly routinized events for gathering and distributing news and information, they are events saturated by discourse about transnational, multi-level interdependency" (Nossek & Kunelius, 2012, p. 71). In other words, these findings highlight the spectacle that is the climate summits and what follows the releases of the climate

reports in that they deliver extensive amounts of information in a short space of time. However, what does this signify about climate journalism when the majority of the coverage is centred around specific events and releases curated for political discussions and policy making on the climate change issue?

## **5.2 Climate coverage driven by politics**

It has been made clear that four out five of the days where the most climate-related articles were published are connected to international events. However, all five events can be said to be politically focused. This is also portrayed in the timelines of the themes classified by the AI, where 'politikk' is by far the theme that appears most frequently in the dataset throughout the entire time-period. This finding also supports that of previous research which is articulated in Painter and Schäfer's (2018) study when they state that one of the central drivers of climate journalism "is when aspects of climate change—the science explaining it, its impacts or the policy responses to it—are heavily contested in the political sphere" (Painter & Schäfer, 2018, p. 47). This can be said of all the events connected to the highest points of publishing as they are all associated with policy making political discussion.

These findings also support those of Bergskaug (2022) who found that the political game or the political manoeuvring was the most prevalent aspect of climate journalism in the lead up to the Norwegian general election in 2021 and even outweighed other climate-related themes (Bergskaug, 2022, p. 66). The findings from the questionnaire reflect this notion as one respondent highlights the challenge with politics and climate change in the press when they emphasise single political events and stories in the lead up to an election rather than a comprehensive overview of the climate politics. Another respondent states that these single, 'simple' stories on Norwegian climate politics and politicians undermine the real problem. This finding supports those of Eide and Naper (2014) who state that a known critique towards climate journalism is indeed that the focus is often directed too much towards the political game which in turn can undermine the actual issue at hand. Additionally this was reflected in their study of Norwegian climate journalism before the general election in 2013 where a large part of the articles engaged in the political game

between the parties and politicians before the election (Eide & Naper, 2014, pp. 53–55). Furthermore, supporting findings can also be demonstrated by Eide and Ytterstad (2010) in their study of Norwegian news coverage of the climate summit in Bali in 2007 where they found that “much of the coverage focused on the political games at the actual conference and their immediate outcome as opposed to the foreseeable future” (Eide & Ytterstad, 2010, p. 249).

The findings from both the overall timelines, the timelines of the themes, and the word clouds support this notion in that politics and the political discussion surrounding climate change and climate policies are dominating this dataset. Although the quantitative results can only indicate this trend based on the events and numbers of articles, the word clouds can further display the notion of the political game in the most used words from the titles of the climate articles. Names of politicians, parties and countries prevail in most of the word clouds, in addition to words such as ‘oljepolitikk’, ‘klimapolitikk’, and ‘oljedebatten’. This displays that the focus of the articles are most often veered towards the political game and political figures. One example of the political game taking centre stage is a TV 2 article from Spike 5 where the opposition parties criticise the parties in Government for not doing enough following the release of an IPCC climate report (Eidhamar, 2022). Further, an *Aftenposten* article from Spike 4 displays how the domestic political figures, such as the Norwegian prime minister Jonas Gahr Støre, is the central figure in the article summarising the day’s events at COP27 in Glasgow (Gausen et al., 2021). These examples demonstrate how the political debate about climate change and the political figures are the aspects of interest surrounding climate change rather than the issue itself.

Other words and phrases that can be connected to the political game are words that can be seen in conjunction with political topics like the Government’s budget plans are ‘kutte’, ‘avgift’, ‘kroner’, and ‘dyre’. The political focus is also often rooted in policy making and how the Government budgets their money to reduce climate emissions such as in this article from E24 where the Government’s new climate plan is presented with details about new climate policies, taxes and fees (Hovland & Rustad, 2021). This is not to say that this is not good or necessary journalism to inform the public of the Government’s new climate policies, but rather that the journalism should not stop there. As mentioned before, this thesis does

not examine in detail the contents of all articles and what coverage appears between the peaks in publishing. However, based on the findings from the questionnaire, it is not difficult to believe that most journalists have a better grasp on what these policies mean for the different political parties than what it means for the climate. A common answer to several of the questions in the survey is that a big challenge when it comes to climate journalism is that the issue is so complex and big that journalists do not have the time or resources to gain enough knowledge about it and therefore they do not create in-depth stories on the topic in fears of making mistakes and being wrong.

Amongst the five driving news events throughout this time-period, there are two rather large differences in the number of articles published in Spike 3 and Spike 5 despite both increases in publishing being linked to the same type of event. These events are the releases of part of IPCC’s Sixth assessment report, one taking place in August 2021 and the other in April 2022. It is therefore natural to speculate if the reason for this is because the first climate report generated more political discussion than the second. This could also be the case because August 2021, when the first climate report in the time-period was released, was merely a month

before the general election in Norway the same year which took place on the 13th of September (Tjernshaugen & Tvedt, 2023). Nevertheless, after comparing the two word clouds and the most used words in the titles, this did not appear to be a sufficient explanation as the two clouds display fairly similar words as the most frequently used (see Figure 42). The reasoning

	word	frequency		word	frequency
0	fns	61	0	fns	34
1	klimarapport	46	1	klimarapport	24
2	må	42	2	klimapanel	23
3	klimarapporten	38	3	ny	22
4	fn	25	4	innen	14
5	klimapanel	24	5	rapport	13
6	fossile	22	6	halveres	12
7	mer	21	7	klimautslippene	12
8	ny	21	8	må	11
9	rapport	19	9	olje	10
10	energikilder	18	10	dager	10
11	brå	18	11	klimatiltak	8
12	generalsekretær	18	12	kaller	8
13	nye	18	13	fn	8
14	dødsstøtet	17	14	står	7

**Figure 42:** Word frequency in word clouds from Spike 3 and 5.

for the difference in publishing numbers on the days of the IPCC report releases is then more likely to be due to the war in Ukraine which was previously discussed in this chapter.

The clear presence of the names of political leaders and figures in the word clouds display their prevalence in Norwegian climate news coverage. Their widespread presence can also mean that political figures are frequently used as sources in Norwegian climate journalism. Elite sources such as leading politicians and scientists are a commonplace in climate journalism, Schäfer and Painter (2021) even state that journalism is heavily dependent on such elite sources and that they are important to the field (Schäfer & Painter, 2021, p. 12). Findings from the survey reflect the heavy use of such elite sources in climate journalism, however, several respondents also express a desire for a less research heavy field where researchers are often used as sources in climate stories. One respondent stated that climate politics consist to a large extent of conflicts of interest, a struggle for hegemony and different political agendas, and it is therefore important to produce critical journalism on the topic, not just dissemination of research. This answer alludes to the importance of digging deeper into climate politics rather than the press covering the surface level political debates and disagreements or a mere summary of the latest climate research. The quantitative findings from the survey also gives a glimpse of the use of elite sources in the Norwegian press where 20 percent of respondents answered that researchers are most often the source of opinion pieces in their newsroom. However, climate and environmental NGOs, and politicians were each answered by 26.7 percent of respondents. This is similar to what Eide and Kunelius' (2010) found in the news coverage of two climate summits where national and transnational politicians represented near half of the sources in the study, civil society covered 28 percent and scientists 14 percent of the sources (Eide & Kunelius, 2010, p. 23). Nevertheless, The prevalence of political names in the findings again supports the notion of the political game and political events and discussions and drivers of climate journalism where the focus of the journalism is aimed towards the faces of known actors and their opinions.

### 5.3 Climate challenges for journalists

Climate change is, as mentioned already, an issue of great complexity. Not only can the science behind the physical phenomena be extremely difficult to understand, but beyond this “emerges another complexity of cultural, social and local conditions and experiences” (Kunelius & Eide, 2017, p. 7). The difficulty of communicating the complexity that is climate change to readers was found in the findings of the survey to be one of the most commonly referred to challenges of climate journalism in the text-based answers in addition to being among the top three most common answers of the quantitative question asking the same thing. The resolution to this, most of the journalists in the survey stated, would be to give them and the newsroom more resources and time to work on stories about climate change and global warming. Some of the respondents also highlight that reading and summarising long, complicated reports written by academic researchers, can be both challenging and time-consuming, especially attempting to communicate it in a way that can be understood by all readers. This is an example of areas of journalism where AI could be utilised to a much higher degree than it is today by assisting journalists in time-consuming and mundane tasks (Stray, 2019). If the newsrooms can provide AI-tools for journalists that can assist them in summarising long research reports and help them simplify the language, this could resolve the problem of the time-consuming task of understanding the full extent of these reports. Additionally, the use of AI in journalism can create opportunities for new forms of journalism.

A similar statement was made by *Aftenposten*’s prominent climate journalist Ole Mathismoen in Duarte and Eide’s (2018) study where he stated that you used to have to have a great deal of background knowledge about the issue to be able to understand the IPCC reports, however that in recent years the reports have become easier to understand. Additionally, researchers call for more depth in the way journalists communicate climate stories, while the newsrooms lack the resources to do so (Duarte & Eide, 2018, p. 16). As most of the respondents from the survey agree that the Norwegian press is in need of more, critical, in-depth and complex stories on the issue, they also state that they need the time to acquire the adequate knowledge to do so which requires sufficient backing from the editors of the newsroom. This is, perhaps, especially important in the local newspapers



where Solberg (2014) found that climate articles that were embedded strongly in the local community engaged readers the most, however local newspapers had a low frequency of published climate articles (Solberg, 2014, p. 210). As mentioned earlier in this chapter, the survey found that respondents experience it as highly challenging to root the complexity of climate change to local contexts without enough time to produce the journalism and read up on the field.

Another finding from this thesis and the interdisciplinary project with Faktisk and OsloMet, is that quite a large part of the articles are opinion pieces. This finding was first discovered during the content analysis that was done when manually labelling articles to train the AI. This was then taken into consideration within the project and Marina Fridman used the AI-determined labels and created an overview of some of the most prominent publications and the difference in how many opinion pieces, original stories, and articles from NTB they published within the climate dataset (see Figure). The figure shows that especially the bigger national and regional news outlets publish a relatively large amount of opinion pieces. It is also worth mentioning that ‘Midtnorskdebatt’ is the shared name for the debate and opinion section of local newspapers located in and around Trøndelag in Midt-Norge, and

### Climate coverage stories

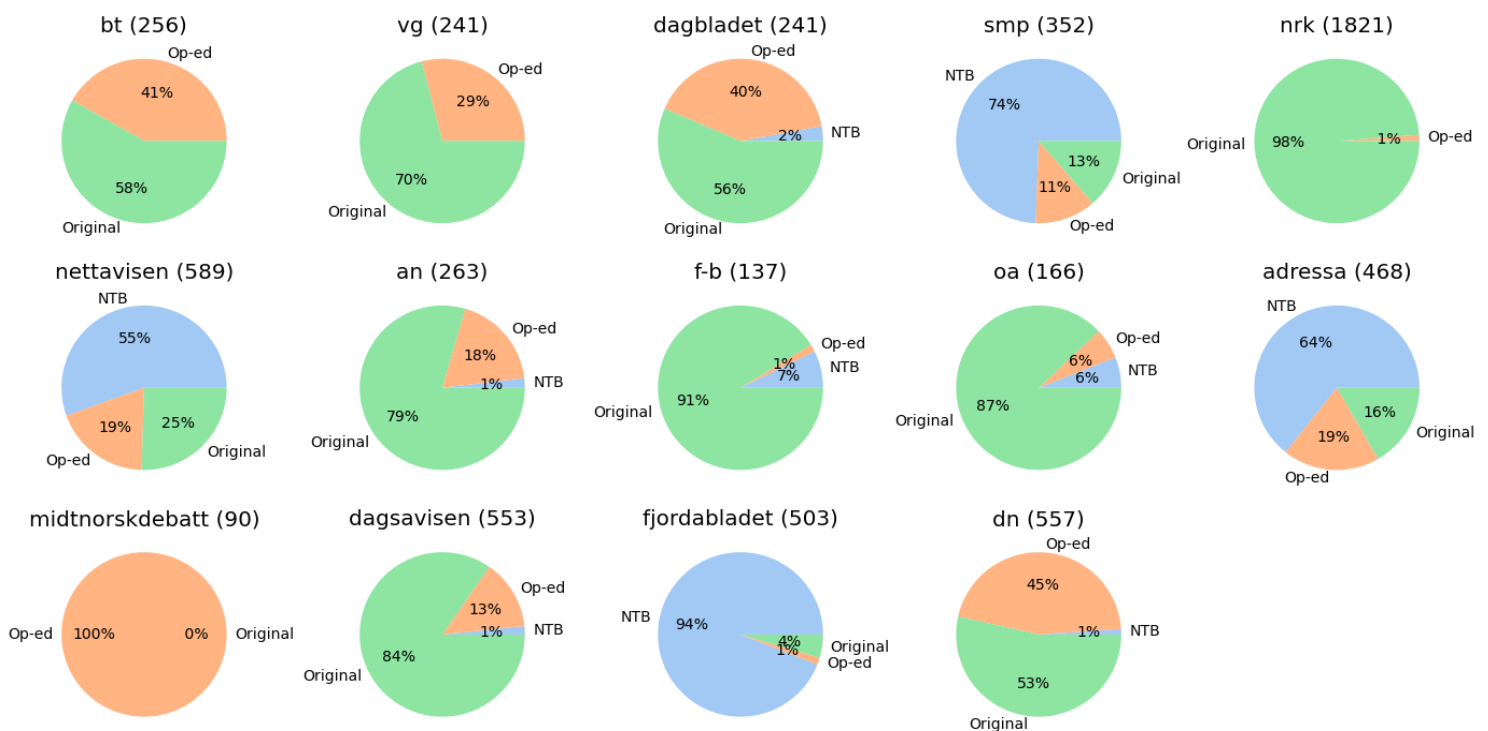


Figure 43: Graph made by Marina Fridman in interdisciplinary collaboration.

therefore this 'publication' displays 100 percent opinion pieces. Further, findings from the survey show that according to the journalists who responded, most of these opinion pieces are written by elite sources being politicians, NGOs and researchers. These findings support those of previous research on the field such as Bergskaug (2022) and Eide and Naper (2014). Both these studies examine the news coverage before Norwegian general elections and it is therefore natural that one questions the press' prioritising of climate change as an issue in this context and that the political game takes centre stage above climate change rather than the hunt for news about the issue (Eide & Naper, 2014, pp. 49–51). Survey findings on the topic of opinion pieces also present journalists challenges with climate coverage in that the most commonly referred to reason for this is that the climate change and climate politics is a field filled with opinions which makes it much easier for newsrooms to published already written pieces of opinion on the topic rather than spending resources and time producing news journalism about it. One respondent also pondered whether this points to a degree of laziness from the Norwegian press on the topic of climate change. Again, the findings circle back to how the press choose to prioritise climate news in that they choose the 'easy' way out while the journalists themselves call for more knowledge and time to be able to produce news journalism on the topic. However, a relatively new report from Medietilsynet (2022), the Norwegian state's administrative and supervisory body within the media field, found that 'klima' (climate) was among the sub themes of politics with the most volume of text, which Medietilsynet suggest could be because the field is consist of such complex issues that requires in-depth explanations (Medietilsynet, 2022, p. 38). This displays the Norwegian press' understanding of the complexity of climate change and somewhat the will to communicate it beyond the scope of the political game and climate summits.

According to the journalists who responded to the survey, the biggest challenge for the Norwegian press when it comes to climate change journalism is that their audience is not interested in reading climate-related stories. This supports what Eide et al. (2014) have found that both politicians and the media blames 'most people' for not being interested in the issue of climate change (Eide et al., 2014, p. 80), while Ytterstad (2011) argues that the need to please the public opinion at all times is a challenge for Norwegian climate journalism (Ytterstad, 2011). In the case of the monumental issue that is climate change, is a sufficient argument for why newsrooms do not produce more critical and in-depth climate

journalism more frequently because the public doesn't want to read it? Perhaps the different challenges have to be seen in connection to each other, could more time and resources spent on climate journalism lead to more critical and in-depth stories which again could lead to an audience more interested in reading these stories because they understand more of the issue? The press is responsible in setting the agenda for what is important in and to a society and thereby, as one respondent answered in the questionnaire, the stories published should not be decided by which headlines the public chooses to click on or not.

## 6. Conclusion

This thesis has aimed to examine the drivers of Norwegian climate journalism and the challenges it poses for journalists. In addition to this, I asked how interdisciplinary collaboration and AI can be facilitated as methods in this thesis. The experience of being a part of an interdisciplinary project, have provided great insight into the benefits this can provide on the process and findings of a research project. Firstly, the collaboration provided the opportunity to share our different skill sets and knowledge which gave valuable insights into different aspects of the process. The results from the project have been presented by Faktisk at two industry conferences where, according to Dahlback, media organisations have displayed great interest in learning more of what Norwegian climate journalism actually looks like, what they can learn from it, and how they can better their practices. To me, the collaboration has been priceless in that I have received much needed guidance in the tools used for the research, in addition to the opportunity to further discuss the findings of the project and their meaning. Additionally, I have been given great insight into what AI as a research tool can look like, how the zero-shot classifier functions and what it can be used for. On the basis of this, I will argue that interdisciplinarity in journalism studies should be utilised to a larger extent, especially as the field itself is highly interdisciplinary in its nature (Steensen & Ahva, 2015). Furthermore, the utilisation of quantitative programming as a method, was made all the more possible to a more advanced level through the participation in the interdisciplinary project. Again, I will argue that programming and the use of AI should be implemented in journalism research to a much larger extent, especially because they also are valuable tools within journalism. With this experience in combining a unique set of tools and methods, this thesis will argue that broader diversity of methods within the research field should be considered and that the field of journalism studies should look more to the digital humanities to widen the methodological landscape.

When examining the timeline of the articles from the climate change news dataset, it was apparent that there is great discontinuity in Norwegian climate journalism. Five peaks in the publishing displayed the main driving events that were connected to five political events, four of them international, and encompassed two climate summits and two climate reports

from the IPCC. This demonstrates the need for newsworthiness in climate journalism and the issue with frequency (Ytterstad & Bødker, 2022) that climate change poses to journalism. Findings from the survey and the interdisciplinary project, further this notion and display the challenges it poses for local news publishers. This also demonstrates the great complexity of climate change which can provide additional challenges for local newspapers and locations where the public cannot relate the climate changes to concrete, visible phenomena. In addition to this, the findings display a focus in Norwegian climate journalism around international, political events which supports previous research on the topic. Survey results and findings from the word clouds further the notion of the political game in the focus of climate journalism (Bergskaug, 2022; Eide & Naper, 2014), to a degree that can potentially overshadow the issue itself. The findings from the survey support the other findings of this research in addition to previous research, in that climate change is a difficult, challenging and complex field to cover in journalism. This was also evident through the high number of opinion pieces which was found in the interdisciplinary project and further supported by survey findings.

It is clear, not only from these findings but the way in which they support previous research in the field of climate journalism, that climate change is challenging for journalists to cover. This is apparent when the main drivers are political, climate-centred events, majority of which are also international. How can the Norwegian press meet these challenges head on and work through them to provide a more diverse and consistent climate news coverage? One aspect is clearer than others if we are to believe the respondents from the survey, it needs to start with more resources, time and support from the newsroom and editors. Thereby, the drivers of climate journalism might change accordingly.

## **6.1 Further research**

There are many aspects of climate journalism that should be researched further based on the findings of this research. Firstly, this thesis examined the drivers in Norwegian climate journalism on a quantitative level and did not note when and where the critical and more in-depth climate stories from the Norwegian press are located, not their numbers or

frequency. This should be researched further to develop a more comprehensive view of what Norwegian climate journalism encompasses. Furthermore, research should be carried out regarding local newspaper coverage to further examine which additional challenges they face when it comes to climate journalism compared to regional and national newsrooms. Additionally, in the light of the findings from the survey, the readership of climate journalism should be researched and the reader numbers from different news publishers should be examined to find what stories readers find engaging, what this means and why. Lastly, the use of AI in journalism should be explored to find what opportunities there are, how they are or are not utilised in different news organisations, and why AI is or is not used by journalists.

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# Appendix

## Appendix 1

### Survey questions:

1. Jeg jobber i...
  - Lokalpresse
  - Regionalpresse
  - Nasjonalpresse
2. Jeg jobber som...
  - Journalist
  - Redaktør
3. Er klima ett av dine hovedområder innenfor journalistikk?
  - Ja
  - Nei
4. Hva er ditt kjønn?
  - Kvinne
  - Mann
  - Annet
5. I hvilken grad er du enig i dette sitatet når det gjelder norsk klimajournalistikk generelt?

*Elisabeth Bergskaug (2022) skrev i fjor en masteroppgave som undersøkte norsk presses dekning og prioritering av klimaendringene ved stortingsvalget i 2021.*

*«(...)Men selv da klima var viktigst for velgerne og sto høyt på mediernes dagsorden, var mediernes prioriteringer i klimadekningen blandet. Det er få forsideoppslag, få lange saker, og få dyptgående reportasjer om klimaendringene i utvalget.(...) Mediene bør også ta aktive valg om å prioritere ressurser til kritisk klimajournalistikk».*

- Helt enig
- Litt enig
- Verken enig eller uenig
- Litt uenig
- Helt uenig



6. Kan du begrunne svaret ditt over?
7. I min masteroppgave har jeg blant annet laget en oversikt over antall norske klimasaker over en periode på ett og et halvt år. Funnene viser at den hyppigste publiseringen av klimasaker befinner seg på tidspunkt som kan knyttes til internasjonale og nasjonale politiske begivenheter.
- I hvilken grad stemmer dette overens med din oppfatning av produksjonen av klimasaker i din egen redaksjon?
- I stor grad
  - I noe grad
  - Verken eller
  - I liten grad
  - I svært liten grad
8. Hva mener du er norsk presse sin hovedutfordring når det gjelder klimajournalistikk? Her kan du velge flere svaralternativer. Du må velge minst ett svaralternativ.
- Klimasaker får ikke klikk og blir ikke lest
  - Redaktører og reportasjeledere er ikke interessert i klimasaker
  - Det er vanskelig å lage journalistikk om klima bortsett fra når noe «nytt» skjer (f.eks. klimatoppmøte, klimarapport, klimaprotest, osv.)
  - Det er komplisert, jeg er redd for å gjøre feil
  - Det er vanskelige ting å forklare til folk flest
  - Mitt publikum er lei av klimastoff
  - Klimajournalistikk blir ofte ensidig, og det er dermed vanskelig å holde seg til objektivitetsidealet
  - Journalisten selv er ikke interessert
  - Annet
9. Vennligst utdyp svaret ditt over og/eller legg til noe hvis du føler det mangler.
10. Hvem er oftest meningsbærerene i klimasaker fra din redaksjon? Her menes klimasaker i form av meningsstoff (f.eks. kommentar, kronikk, debatt, etc.).
- Journalister
  - Redaktør
  - Forskere

- Politikere
- Lesere eller "vanlige" folk
- Selskaper
- Klima- og miljøorganisasjoner
- Andre

11. Nye funn gjort av Faktisk.no og OsloMet viser at en stor del av klimasaker i norsk presse er meningsinnhold. Hva tror du er grunnen til dette?
12. Kjenner du til noen nyhetsaker fra din redaksjon som du mener er eksempler på spesielt gode klimasaker?
13. Hvordan mener du klima kan være interessant og viktig på andre stoffområder (f.eks. kultur, sport, økonomi m.fl.)?
14. Hva mener du norsk presse bør gjøre hvis de vil bli bedre på klimajournalistikk?

## Appendix 2

The full graph of the timelines from the labels.



## Appendix 3

Here is the link to my GitHub account and the repository 'master'. Here you can find the Jupyter Notebooks of all the code written in this thesis. Where code has been written by Marina Fridman as a guidance, it is stated in the cell of the code. There are six files in the repository and they are named accordingly.

GitHub link: <https://github.com/kajsagar/master>

**All\_articles\_plots:** The plots from all the articles in the full, unfiltered dataset.

**Survey:** The quantitative analysis of the survey results

**article\_tagging\_031122:** The notebook used to examine the articles during the content analysis and labelling process and create new files when needed.

**news\_coverage\_by\_topic (1):** Where the results from the AI were used to create timelines of the themes.

**timeline:** All the plots of the timelines, the spikes and the top publishers, and further examining of the dataset.

**title\_wordcloud:** The scripts for all the word clouds.