

# Climate Protests: More Harm than Good?

## Analysis of the effects of climate protests on the opinion and sentiment of the public

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# Motivation

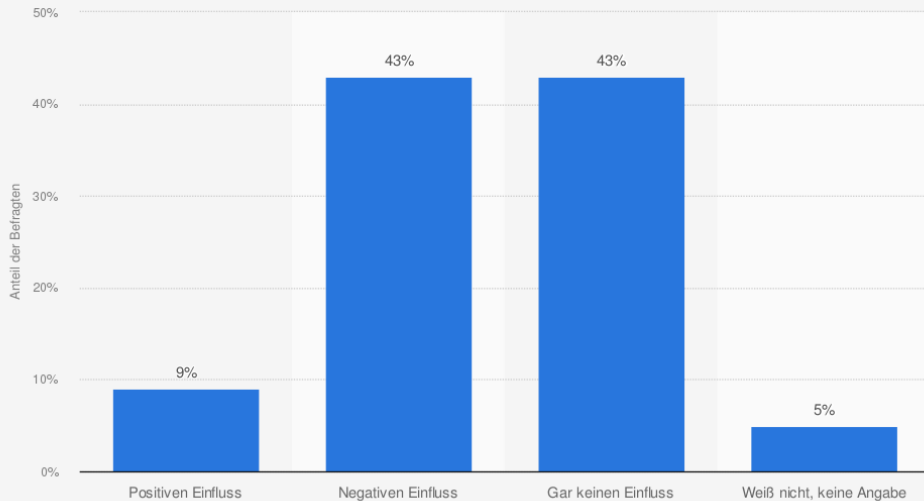
- Climate protests are all over the (German) news:
  - Letzte Generation, Fridays for Future, Klimakleber etc.
- Very high urgency climate crisis
- Political action is lacking → cause for climate protests
- Biggest problem humanity has ever faced?



# Problem

- Do the climate protests actually benefit the cause?

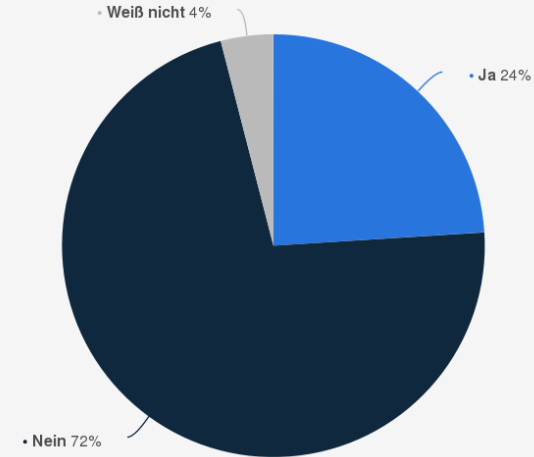
Welchen Einfluss haben Proteste und Aktionen der Klimaaktivisten auf Ihre Einstellung zu Klima- und Umweltfragen?



Quelle:  
Das Österreichische Gallup-Institut  
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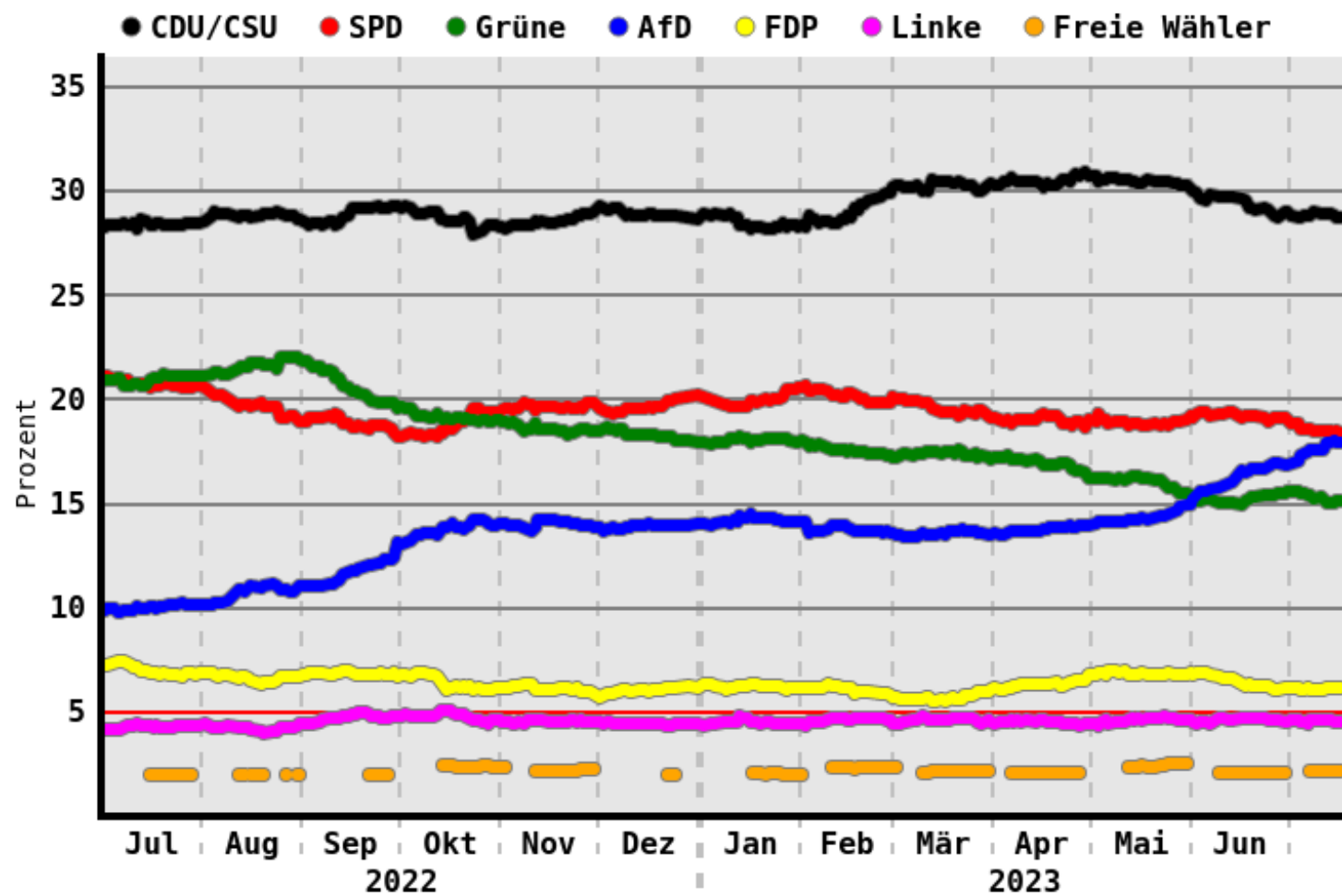
Weitere Informationen:  
Österreich; 17. - 20. Januar 2023; 1000 Personen; ab 16 Jahre; Computergestützte Webinterviews (CAWI)

Glauben Sie, dass die Politik in Deutschland aufgrund der Klima-Demonstrationen und Protesten (z.B. Fridays for Future) mehr für den Klimaschutz tun wird oder glauben Sie das nicht?



Quelle:  
ZDF Politbarometer  
© Statista 2023

Weitere Informationen:  
Deutschland; Forschungsgruppe Wahlen; 28.02.2023 bis 02.03.2023; 1.165 Befragte; ab 18 Jahre; Wahlberechtigte Bevölkerung



# Are climate protests useless?

- Potentially adverse effects
- Most big social movements were first met by resentment, but succeeded eventually
- Motivation to empirically research sentiment on Twitter, as this has not been done before

# Goals

- Be able to tell how climate protests affect public opinion and sentiment
- Find 'most effective' form of climate protests

# Related work

- Climate Change Sentiment on Twitter: An Unsolicited Public Opinion Poll (Cody et al., 2015):
  - Dataset containing keyword 'climate' from 2008 to 2014
  - 'Hedonometer' to measure Happiness
  - Tweets containing 'climate' consistently yield lower happiness-scores
  - After natural disasters (Hurricane Sandy 2012): lowest happiness
  - Forward on Climate Rally (2013): Only time that happiness is above average happiness
    - Indicator for positive sentiment during climate protests

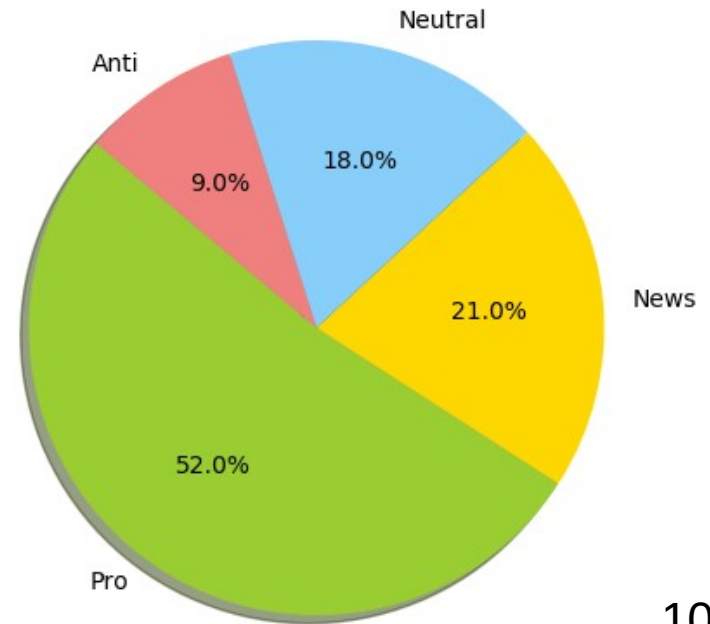


# Related work

- The climate change Twitter dataset (Effrosynidis et al., 2022):
  - Dataset containing 15 million tweets from 2006 to 2019
  - Geolocation, temperature deviation, gender, stance (believer/denier), aggressiveness, topic
  - Temperature higher than average → more aggressive tweets
  - Deniers use term 'global warming' more than 'climate change' and use more aggressive language
  - People connect warmer temperatures more with climate change than colder temperatures
  - Deniers more present in American Region, South Africa, Japan, and Eastern China, less present in Europe, India and Central Africa
  - Most concerned tweets when extreme weather is witnessed

# Twitter Climate Change Sentiment Dataset

- Best existing labeled dataset for belief in human-made climate change (used by Effrosynidis et. al)
- 43.943 tweets labeled by 3 reviewers



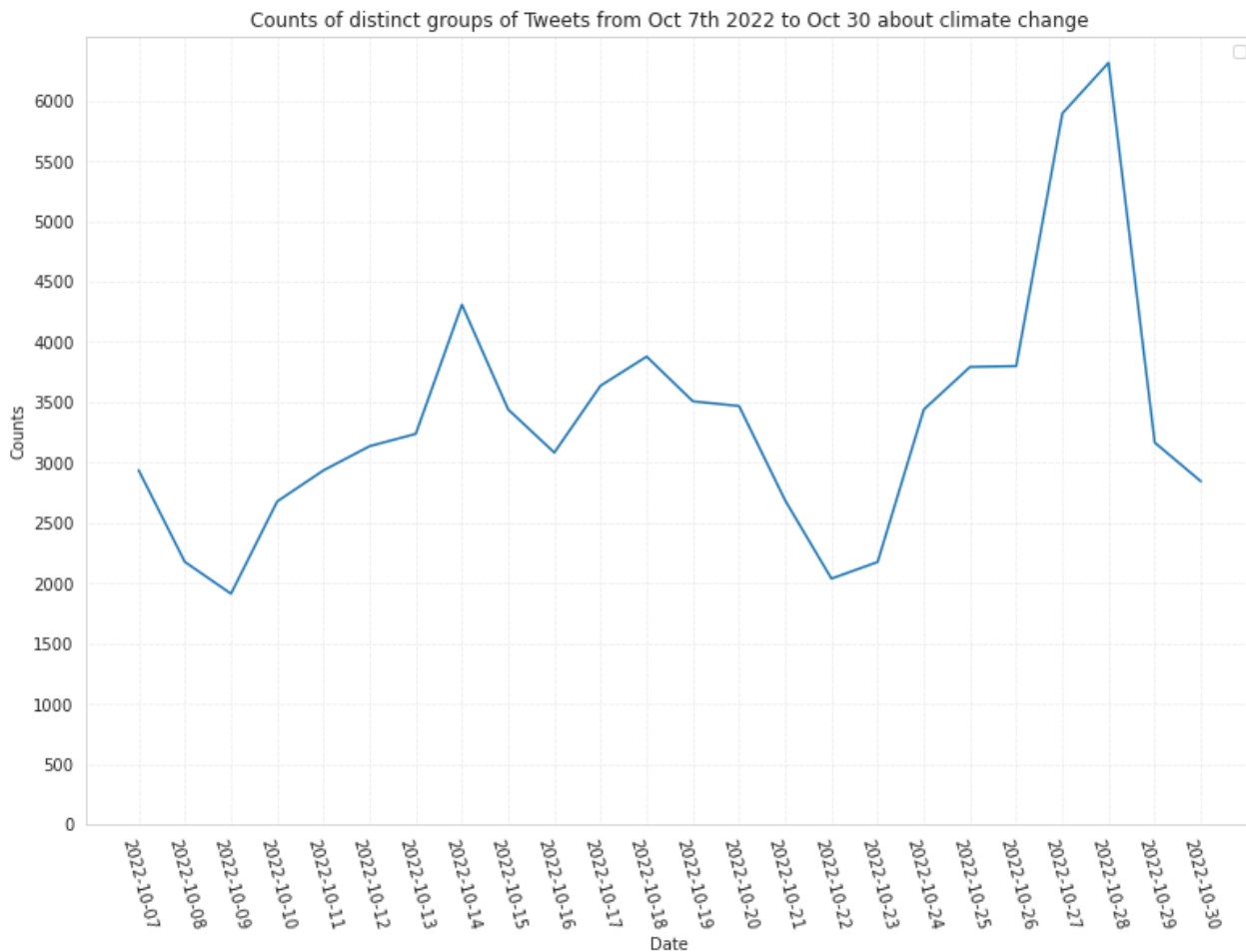
# Problem with previous work

- All focused on whether a person believes in human-made climate change or denies it
- My research interest:  
Does a person support climate action or not?  
→ new classifier is required

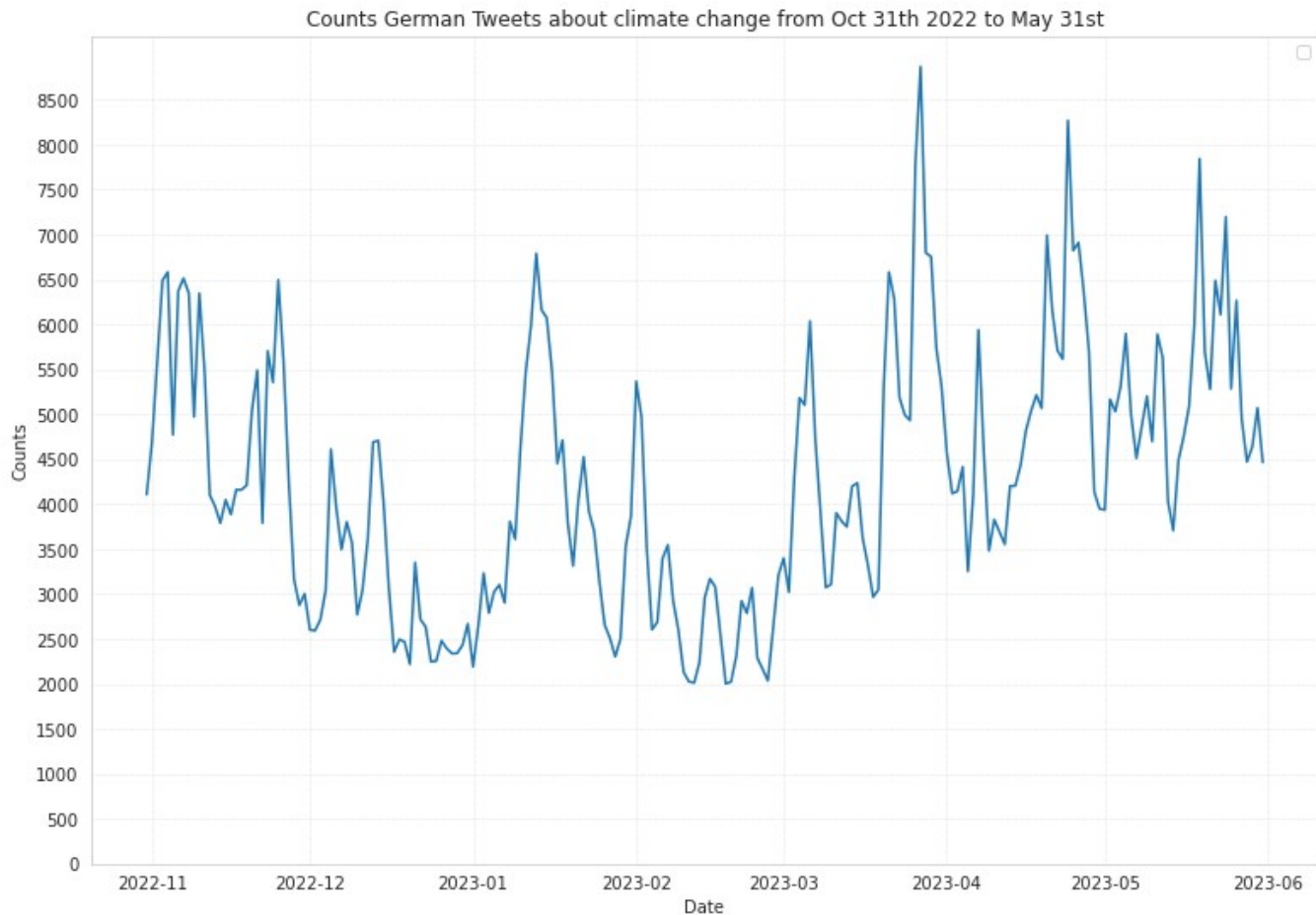
# My collected data

- [snsrape library](#) was used for scraping tweets
- English and German tweets from Sep 1 2022 to May 31 2023
- Keywords:
  - Klimawandel, Klimakrise, Erderwärmung, Klima
  - Climate change, climate crisis, global warming, climate
- ~1 million German tweets, ~4 million English tweets
- Very tedious and troublesome task, over 30 runs of scraping

# Preliminary results

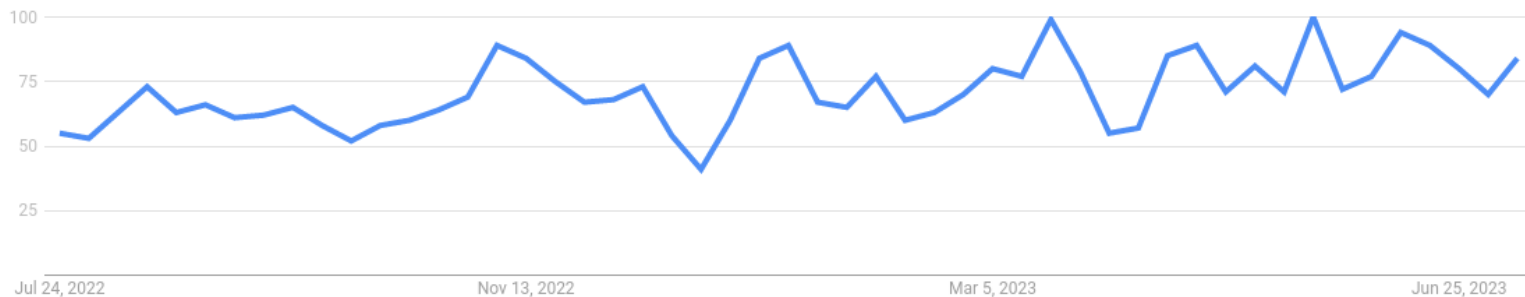


# Preliminary results



# Google Trends

- Klimawandel



- Climate action



# Methods

- BERT was most successful approach for classifying stance in previous work (Effrosynidis et. Al, 2022)
- Will focus on Transformer-Based approaches like BERT
- Trained one Albert model with existing labeled dataset (<https://huggingface.co/robookwus/climate-change-belief>)
- Plan to use larger models (Flan-T5-XXL) to improve results



# Transfer Learning

- Abundance of pre-trained models that classify Tweets, e.g. [huggingface.co/cardiffnlp](https://huggingface.co/cardiffnlp)
- Great opportunities for transfer learning
- Fine-tuning, experimenting, finding best approaches

# Roadmap

July	August	September
Literature review, scraping Twitter Dataset	Train classifier (climate action) with self-set labels. Compare sentiment before/after climate protests	Add further information with transfer learning, find correlations between data points
October	November	December
Finish up experiments, start writing	Writing	Writing

# Roadmap

- 3 different Classifiers:
  - Believer/Denier of human-made climate change
  - Supervised classifier based on self-labeled data
  - Create clusters of persons that either always support climate action or are always against it, use all their tweets to train classifier

# Roadmap

- Labeling samples of my dataset in a binary fashion (pro/against climate action)
- 100 English, 100 German labeled Tweets first
- 1000 English, 1000 German labeled Tweets next
- Train different models with the labeled data
  - find the best model
- Compare Zero-shot, Few-shot learning results with my supervised models

# Zero-Shot Learning

F

Is the following text written by a person who supports climate action, or is against climate action (simply answer YES, if in support, or NO if against climate action):

@Voltzman1 @CodeRedEarth Won't do anything to stop climate breakdown. Action is needed to slash emissions NOW.



YES (in support of climate action).



F

Is the following text written by a person who supports climate action, or is against climate action (simply answer YES, if in support, or NO if against climate action):

@RNCResearch Kerry is part of the Government Mafia. They use to call it "global warming" 😏 they had to change it to "Climate Change" what ever they are spewing out of their mouth is for their own benefit. Greed and power



NO (against climate action).



# Few-shot learning

- Small dataset (1-100 labeled examples) can be used to fine-tune existing models
- Comparisons between many different approaches to be made
- How 'smart' are current language models (e.g. ChatGPT)? Do they even need further information and fine-tuning?

# Roadmap

- Add further information to my dataset, e.g. sentiment of tweet, aggressiveness, hate-speech
- Use pre-trained models for this task
- Correlations between stance and e.g. sentiment can be made

# Roadmap

- Check sentiment before/during/after climate protests
- How do protests affect public sentiment/opn
- Find correlations between data points
- Check and cross-reference with other sources (News and Reddit)



# Bonus Goals

- Find the most effective climate tweets (e.g. that has the most likes, or most positive responses)
- Create a chatbot that is trained with these most effective tweets and also grounded in climate science ([chatclimate.ai](https://chatclimate.ai))

# Conclusion

- Aggregated big Twitter dataset in a time of frequent climate protests
- Predict if a person supports climate action
- How climate protests affect results
- Check correlation with other data points