

# Exploring the language of the climate change debate on Twitter

Evita Kourtza

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Public awareness on climate change has improved considerably, however there is still significant debate over climate change perceptions, with recent survey data suggesting that 12% of people in the UK deny that climate change is happening [1]. Online social media is a valuable source of information on public perception, although arguably this has not been explored enough for climate change [2, 3, 4].

We explored the language used on Twitter on climate change looking at:

- How different is the language used in tweets likely supporting climate action vs tweets likely supporting climate change scepticism?
- Is the language used by climate sceptics more negative compared to those supporting climate action?
- What are the most common hashtags used in the climate change debate?

We collected English tweets split in two groups based on hashtags: climate action and climate sceptics. For climate action tweets we searched for hashtags like: #climatechange, #climateaction, #climatecrisis. For climate sceptic tweets we searched for hashtags like: #climatehoax, #climatescam, #climatecult. Hashtags were selected based on work by [4, 5, 6]. We collected 1000 climate action tweets and 1222 climate sceptic tweets.

We analysed the frequency distribution of words in tweets. Figure 1 shows the frequency distribution for the 25 most common words in each group.

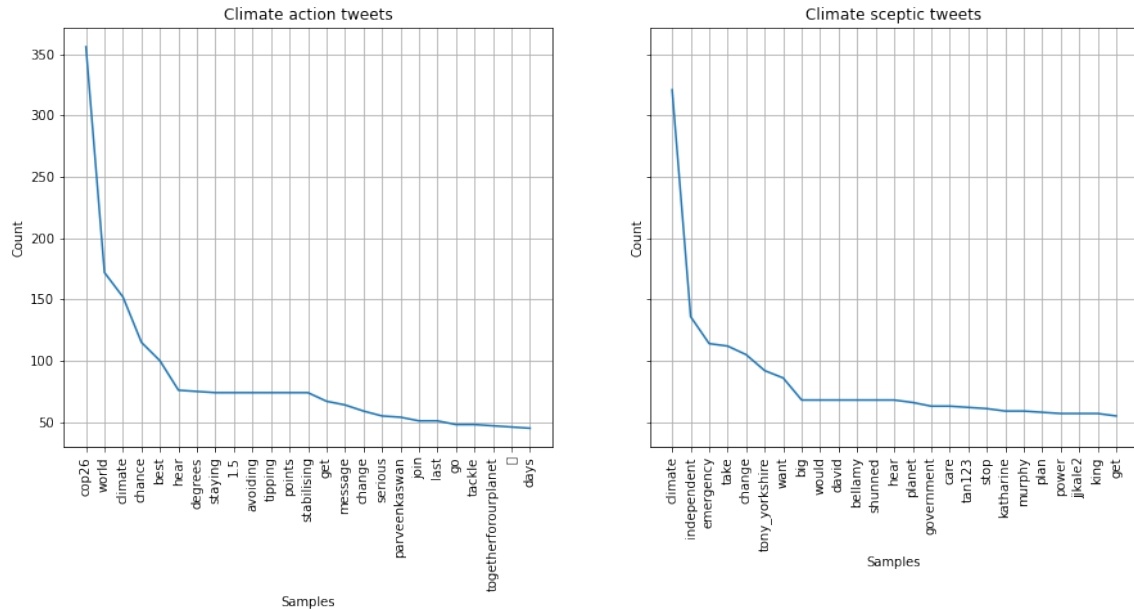


Figure 1: Frequency distribution for the 25 most common words in each group of tweets

The words *climate*, *change*, *get* and *hear* appear with high frequency in both groups, which makes sense as these are neutral words used by both sides of the climate change debate.

Looking at the most common words, we identify some public names and vocal Twitter users. In the

climate sceptic words, we see the name of *David Bellamy*; an English botanist and TV presenter who shifted towards climate change scepticism at the end of his career. Also, user *tony-yorkshire*, a vocal climate sceptic Twitter user, is mentioned a lot. In the climate action words, we see the name of *parveenkaswan*; an Indian forestry scientist and member of IUCN who is vocal on Twitter about climate change action.

Tweets also carry different sentiment. We notice that climate action tweets include slightly more neutral words: *world*, *chance*, *hear*, whereas climate sceptic tweets include neutral/negative words: *independent*, *emergency*, *stop*. A simple sentiment analysis on the average tweet polarity scores for each group also indicates that (Table 1). Scores range from -1 (negative sentiment) to 1 (positive sentiment).

Group	Average polarity score of tweets
Climate action	0.1740565
Climate sceptic	-0.045096

Table 1: Average polarity scores for each group of tweets.

Our results, although based on a very small sample, agree with the literature. A recent study [7] on the emotional content of Twitter messages on climate change, demonstrated that climate change “accepters” are more likely to tweet neutral messages. Also, climate change denier tweets are more likely to carry negative emotions particularly anger and sarcasm.

Finally, we examined the most common hashtags used, excluding hashtags used for data collection. Figure 2 shows the word clouds for hashtags used in each group, where the more frequent a hashtag the larger it is displayed.

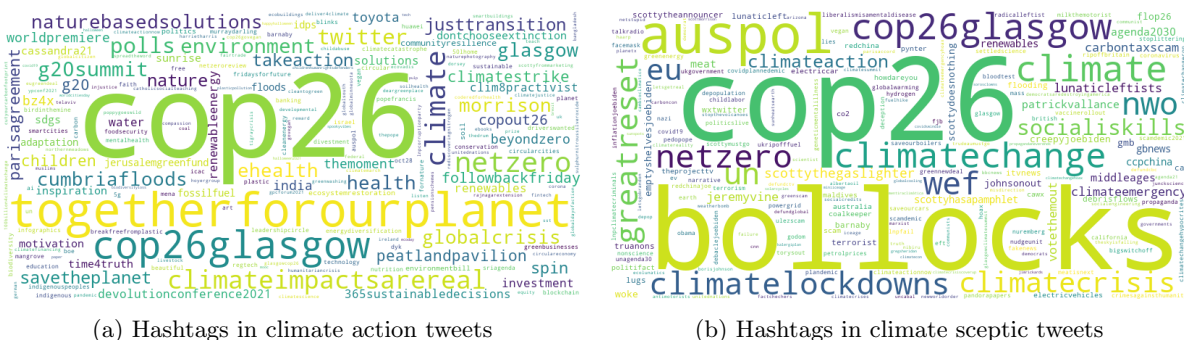


Figure 2: Word clouds for hashtags used in each group.

It is clear that the upcoming UN climate change conference in Glasgow is a popular topic. *cop26* and *cop26glasgow* are common in both groups, although looking at the specific frequencies, *cop26* hashtags appear 214 times in climate action tweets compared to 61 times in climate sceptic tweets. Finally, it’s interesting how different in attitude are the second most common hashtags of each group; *togetherforourplanet* vs *bollocks*!

In this post, we did an experimental analysis of the Twitter language on climate change using two small sets of tweets grouped based on whether they likely refer to climate action or climate scepticism. We looked at common words, sentiment and also common hashtags. Our analysis supports that Twitter is a useful source to understand public perceptions about climate change and the language used to support different attitudes.

599 words

## References

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