Rain stops play!: Sensing global weather events using social media

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"Social sensing" has been demonstrated to be an effective way to detect and study real-world events and their impact. Here we consider the use of social sensing for observing natural hazards. In particular we use data from Twitter to attempt to detect, locate and understand societal impacts of heavy rainfall events, heat waves and cold waves worldwide.

We automate the processing of this large data set to perform bot removal, apply text filters and use location inference methods to greatly increase data volume. This gives us coverage across most of the world, with some regional biases. We show how to account for Twitter's prevalence in a particular location and perform extensive validation using a database of weather events that have resulted in societal impacts, collated by the Met Office in the UK. We find good performance, but also various statistical artefacts unique to social data – for example, a "rain stops play" event in an India-Pakistan cricket match cause a large spike of activity. By categorising relevant tweets we are also able to conduct sentiment analysis in an effort to understand the emotional changes expressed by Twitter users during and after an extreme weather event has occurred. Using this analysis social impacts from natural hazards in different regions of the world can be determined.

Our method provides a new way to collect natural hazard forecast validation data, as well as a way to collect detailed social impact information at a global scale.