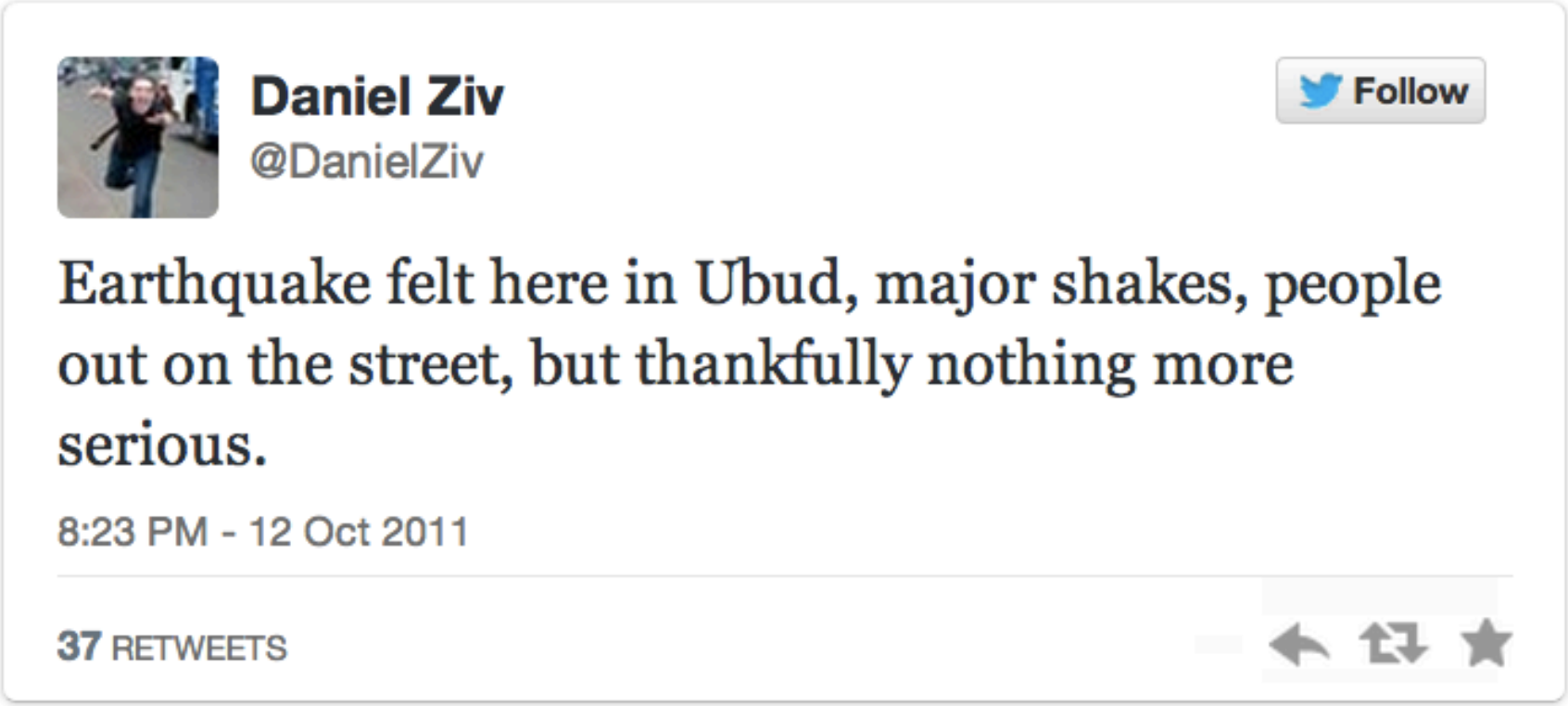
Problem

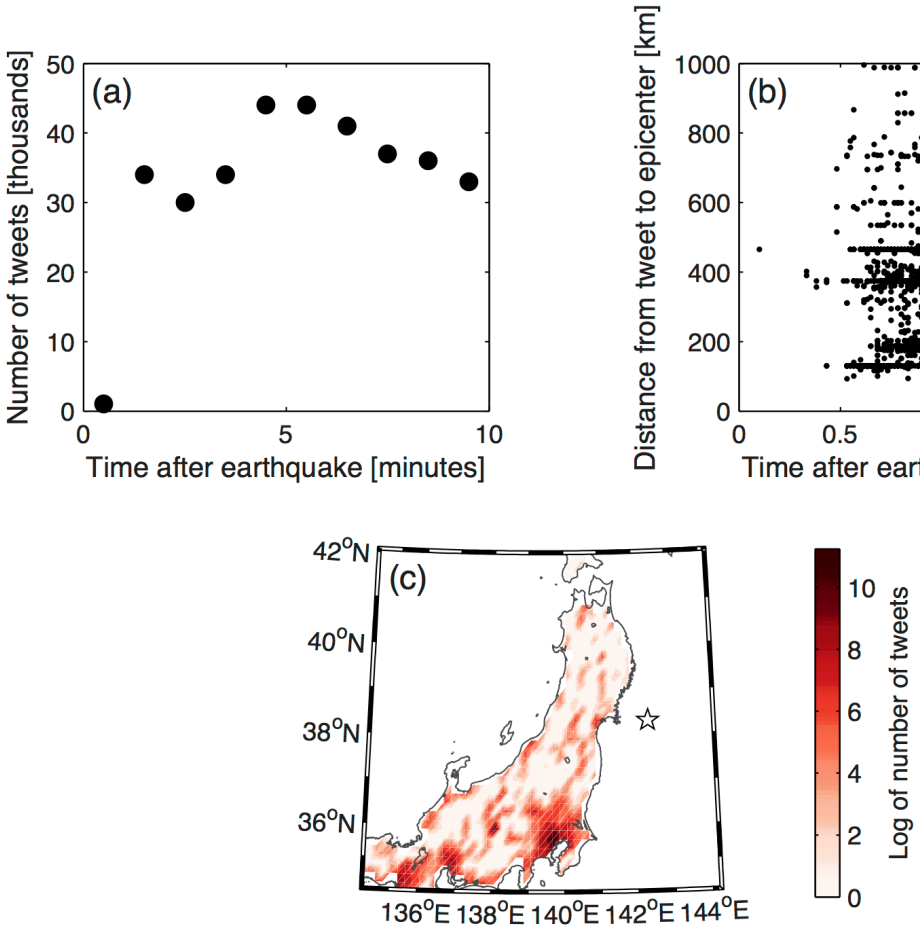
- Quick assessment of ground shaking needed for disaster response and allocating aid
- Sensor network may be sparse
- Human reports such as Did you Feel it? data may take a long time to receive

Tweets offer an additional data source for disaster damage assessment and recovery



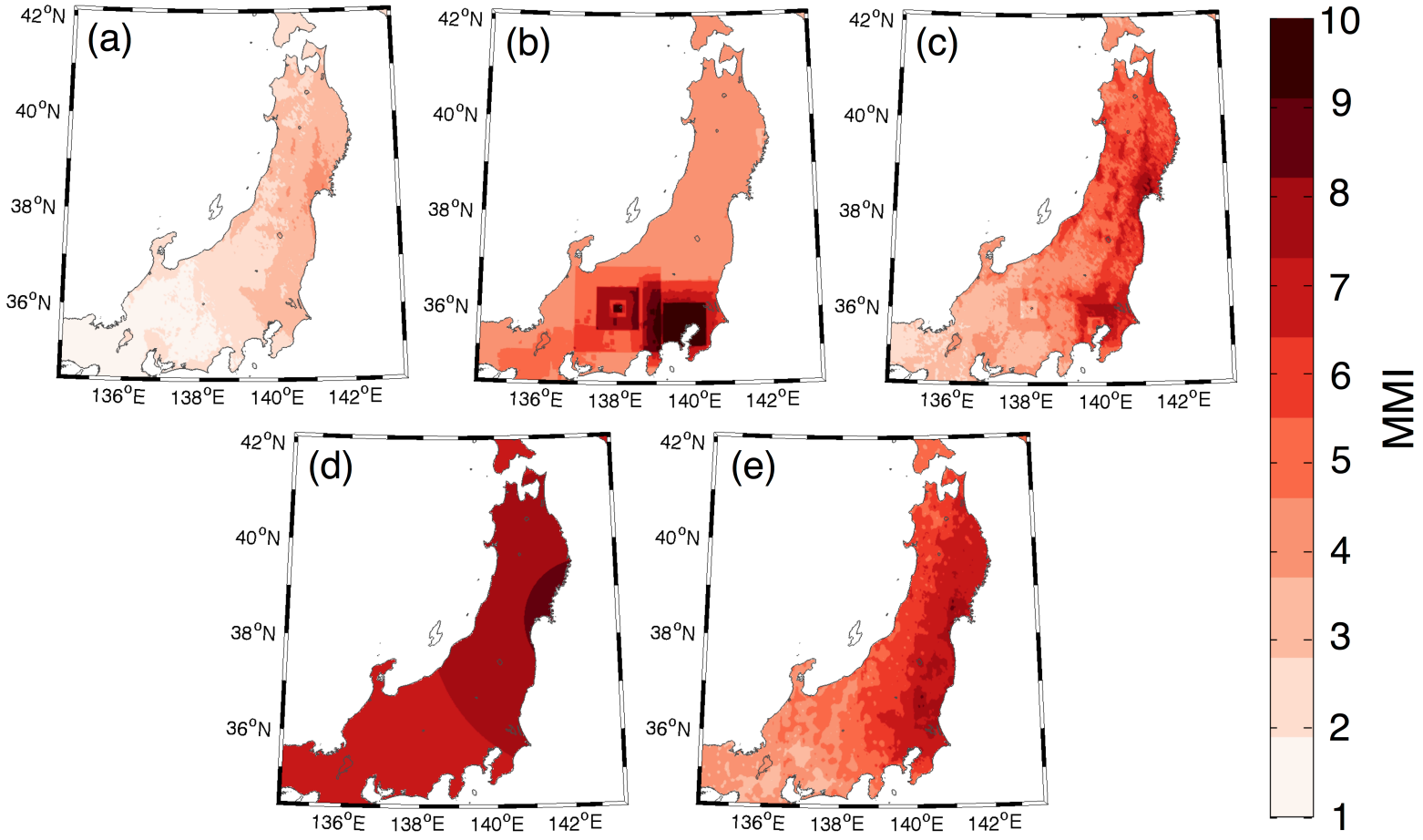
Sample tweet with time stamp, latitude/longitude coordinates and earthquake-related keyword

Many people worldwide tweet about earthquakes that they feel in the seconds and minutes after the event



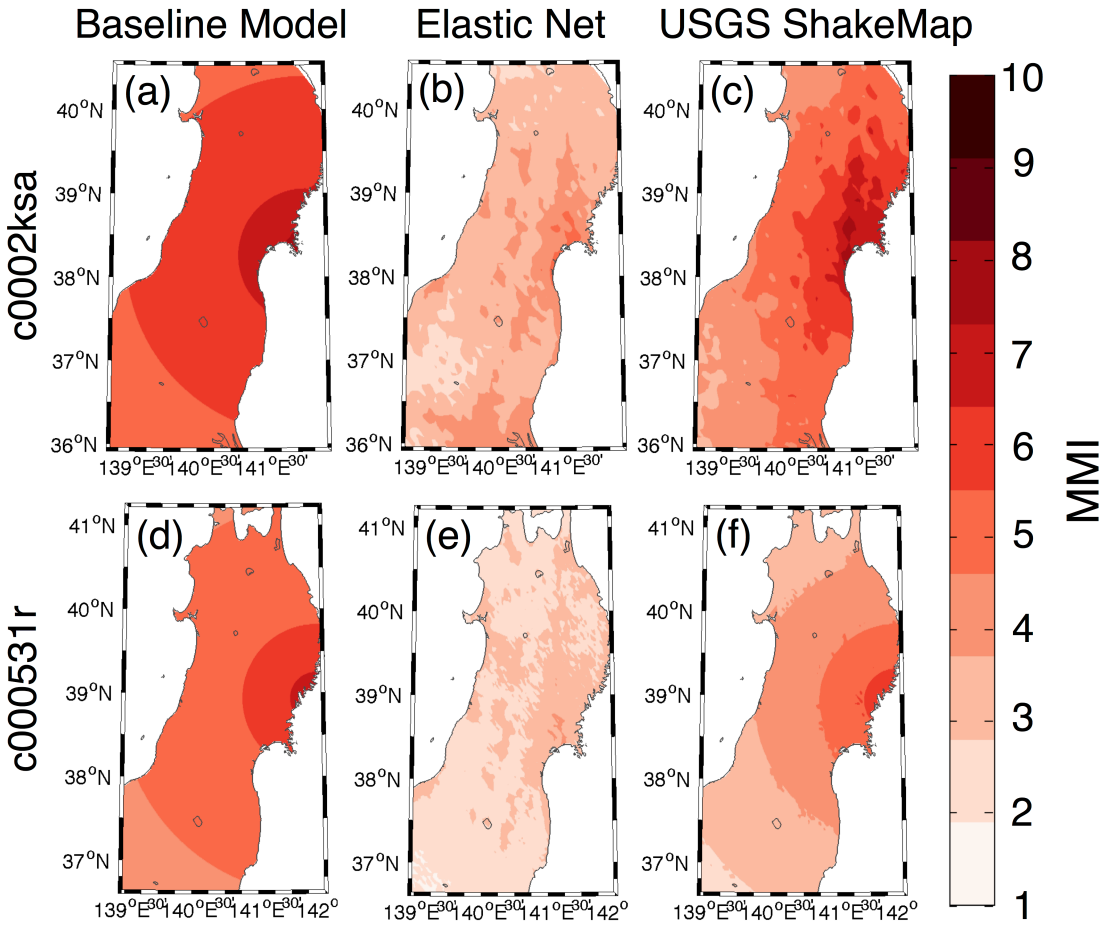
For the Tohoku (c0001xgp) earthquake: (a) number of geo-tagged tweets containing an earthquake keyword per minute after the event, (b) tweet-to-epicenter distance as a function of time, and (c) map showing the number of tweets (star at epicenter)

Model combining tweets and earthquake features produces reasonable, quick estimate of shaking intensity



Estimated MMI maps for the Tohoku earthquake (c0001xgp) by (a) elastic net regression using earthquake-based features only, (b) elastic net regression using tweet-based features only in first 10 minutes, (c) **elastic net regression using both earthquake- and tweet-based features**, (d) baseline ground motion prediction equation model, and (e) USGS ShakeMap Version 14

The model is robust to rare events and offers particular potential for events with few recording stations



Estimated MMI maps using different models for a more common event (top) and one with just 6 recording stations (bottom). Each row represents an earthquake event and each column represents a model. Our proposed Elastic Net model is calculated with tweet-based and earthquake-based features (first 10 minutes). “Baseline” uses a USGS ground motion prediction equation.