Janet Watson Meeting 2018: "A Data Explosion: The Impact of Big Data in Geoscience"

GeoSocial: Exploring the usefulness of social media mining in the applied natural geohazard sciences

Emma J. Bee[a], Rosa Filgueira[b], and Jacob Poole[a]

[a] *British Geological Survey, Environmental Science Centre, Nicker Hill, Keyworth, NG12 5GG, UK;*

b British Geological Survey, The Lyell Centre, Research Avenue South, Edinburgh, EH14 4AP, UK;

Correspondence: Emma Bee, British Geological Survey, Environmental Science Centre, Nicker Hill, Keyworth, Nottingham, NG12 5GG, UK.

Email: ebee@bgs.ac.uk

Tel: +44(0)115 9363044.

Abstract

Obtaining real-time information about a geohazard event as it unfolds, such as a flood or earthquake, used to be largely limited to the professional media. Nowadays, obtaining news stories from social media (e.g. Facebook, Twitter, YouTube, Flickr etc.), directly as they unfold, is becoming the 'norm' for many in society. The Haitian Earthquake in January 2010 and the Great East Japan Earthquake in March 2011, provided some of the first natural hazard examples, to really demonstrate the power of social media over traditional news sources for obtaining, live information from which people and authorities could gain situational awareness.

From an applied geohazard scientists perspective, we are generally (initially at least) remote from the hazard event/ disaster zone but are often called upon to provide advice for government(s), responders and humanitarian response agencies. Social media has potential to enhance risk-based models, real-time monitoring of vulnerability and hazard-related impacts, as well as to provide insights into local resilience which can help disaster preparedness and recovery, all of which could inform scientific response and improve situational awareness.

GeoSocial is an openly available tool which allows users, including natural hazard scientists, to view geo referenced posts about landslides, aurora, flooding, volcanic eruptions and earthquakes from social media (i.e. Twitter) on a map in near to real time (see Figure 1). It was developed following the success of a challenge, called 'Hazard Map' jointly submitted to the International Space Apps 'hackathon' event held at the Met Office, UK in 2012. 'Hazard map' showed quite quickly that when a volume of 'tweets' located in a similar location and containing the same keywords, such as 'earthquake' were displayed as a heat map, your eye was drawn to the 'heat' and thus the 'hazard event and its location, enabling the user to be alerted to the situation on the ground and its impacts. The ability to automatically retrieve such 'User Generated Content' (UGC) for a number of hazards is beneficial to the 24/7 operator in the Met Office Hazard Centre, but also to an associated natural hazards science team e.g. working at the British Geological Survey. Such scientists could potentially make use of the wealth of information, publically available through such sites as Twitter, and thus help advance scientific understanding and/or provide better, or timelier, information and/or advice to government.

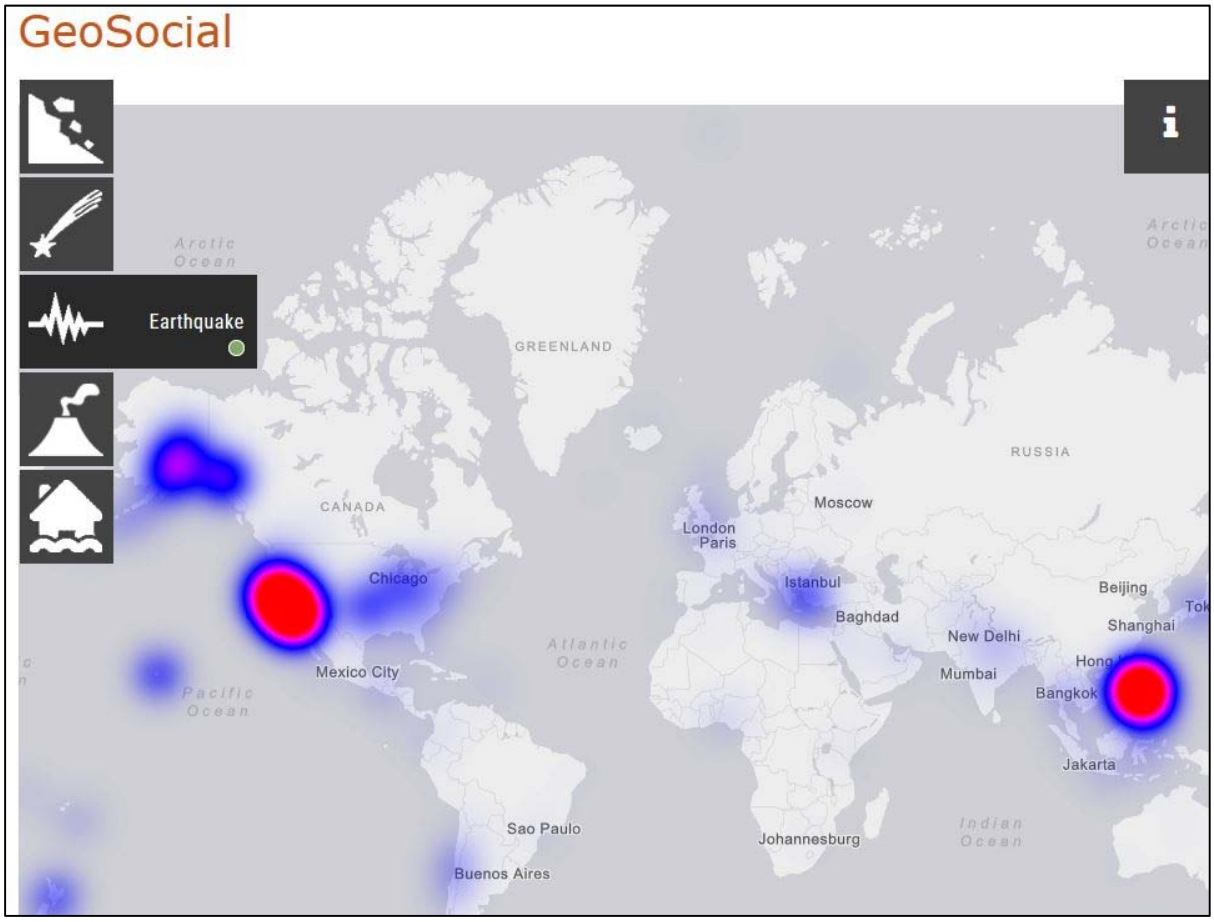

Figure 1: The BGS' 'Geosocial' heatmap showing people posting on Twitter tweets about earthquakes on 25th May 2017. There was a 5.3 magnitude earthquake in the Philippines at this time.

Whilst there are opportunities to obtain knowledge from social media, there are also many challenges. Obtaining reliable content that is accurately geo-located information is just one concern; ensuring that the information is not skewed by the sample demographic is another. There are also a number of ethical considerations around using this data that need to be explored. Whilst, the use of Big Data analytical tools such as machine learning can help resolve some of the challenges around usefulness of content, not all of the challenges are as easily resolved. This presentation explores the usefulness of such social media mining in the applied natural geosciences and discusses some of the opportunities and challenges faced in more detail.

Acknowledgements

The authors would like to acknowledge and thank Joanne Robbins at the UKMet office for her joint responsibility in designing the 'hazard map' challenge for the International Space Apps Challenge 2012 and thus the concept behind BGS' GeoSocial application.