Fachberichte

Crisis Mapping and the Nepal Earthquake: The Impact of New Contributors

David A. Parr, San Marcos, Texas, USA

Crisis mapping involves using open technologies and collaboration between those on the ground and volunteers around the world to identify critical areas and infrastructure for relief workers. After the April 25, 2015 Nepalese earthquake, the Humanitarian OpenStreetMap Team (HOT) and Kathmandu Living Labs received widespread media attention and held outreach efforts ("mapathons") to encourage new contributors to join. An overwhelming increase in new contributors led to a tension between the open, collaborative process in mapping and the need to ensure map accuracy and data quality in a crisis situation. This research looks at the impact of mapping efforts before and after the April 25 earthquake and the social process of collaborative mapping in OpenStreetMap. While new contributors added over one million new features, the number of their features determined inaccurate (as measured by the features that are subsequently modified or deleted) is lower than contributors that joined before April 25. To continue its impact and effort in relief work, the Humanitarian OpenStreetMap Team will need to balance the open nature of its contributor base and the need to develop standards and practices to ensure data quality.

Introduction

On April 25, 2015 at 11:56 am Nepal Standard Time, a magnitude 7.8 earthquake struck Nepal 50 miles west of Kathmandu, the capital city, at latitude 28° 08′ 49.2″, longitude 84° 42′ 28.8″ (United States Geological Survey National Earthquake Information Center 2015b). Known as the Gorkha earthquake, the devastation has left nearly 8,000 dead, over 16,000 injured, and displaced 2.8 million. The estimated economic losses total 10 billion US dollars, and over one thousand schools and 266 hospitals were damaged (International Centre for Integrated Mountain Development 2015). The relative shallowness of the earthquake and poor building quality accelerated the damage (Witze 2015). The earthquake occurred where the Indian and Eurasian tectonic plates meet to form the world's highest mountain chain, the Himalayas. Seismic monitors used in a project from the California Institute of Technology estimate that in some areas, the uplift as a result of the initial earthquake was as high as 1.8 meters (Sugden 2015). A large aftershock of magnitude 7.3 occurred on May 12, 2015 (United States Geological Survey National Earthquake Information Center 2015a). The earthquake and its aftershocks have impacted both the people and environment of Nepal.

For the capital city of Kathmandu, the disaster relief response began within a day as Nepalese military and aid workers dug through rubble and provided medical, food, and shelter assistance. The international response on the ground included organizations such as Doctors Without Borders, the European Union, Oxfam, USAID, Save the Children, Water Aid, and the Red Cross (International Centre for Integrated Mountain Development 2015). Over 10,000 tons of food and 260,000 temporary shelters were dispatched (International Centre for Integrated Mountain Development 2015). Due to Nepal's rugged, mountainous landscape and uncertain road conditions, getting aid to remote cities and villages was more difficult.

When a natural disaster hits a region, disaster relief workers need immediate geographic information (Parker 2015). Workers need to know which roads are passable, where populations in distress are, and where landslides have occurred. To fill this need, volunteer crisis mappers can work locally and remotely to identify locations of interest, update online map resources, and print updated maps for relief workers (Neis and Zielstra 2014; Elwood, Goodchild, and Sui 2012; Zook et al. 2010; Horita et al. 2013). Web projects like OpenStreetMap (OSM)[1], Ushahidi[2], and Tomnod[3] have used volunteers on the ground and around the world to collaboratively map the changed landscape of several prominent recent disasters: the Haitian and Chilean earthquakes of 2010 (Zook et al. 2010), the Ebola outbreak in West Africa in 2014, and the Haiyan typhoon in the Philippines in 2013 (Meyer 2015).

In Nepal, two organizations spearheaded the effort to map the devastation in Nepal locally and internationally. The Humanitarian OpenStreetMap Team[4] (HOT) organized an international group of volunteers while Kathmandu Living Labs[5] organized local efforts and working closely with the Red Cross and other humanitarian groups on the ground. These efforts attracted international attention, including articles in the *Atlantic, New York Times, and National Geographic* (Parker 2015; Meyer 2015; Sugden 2015; Sinha 2015). This attention has encouraged a surge in new volunteers for OpenStreetMap, but as new mappers joined the project, questions quickly arose regarding the accuracy of the data, credibility of the mappers, and reliability in the mapping process.

In a crisis, maintaining reliable and accurate map data and providing it to relief workers in a timely manner is critical. This paper examines the initial response to the 2015 Nepal earthquake in OSM. In particular, this research considers three questions in the first ten days in the immediate aftermath of the disaster:

- What was the measurable increase in mappers and increase in mapping activity after the April 25 earthquake?
- How did the social processes and email communication within the Humanitarian OpenStreetMap Team address the increase of new mappers after the April 25 earthquake?
- Did the increase in novice mappers have a net positive or negative impact to the project?

Background and Literature Review

Steve Coast began the OpenStreetMap (OSM) project in 2005 as an open platform to collect road network information (Haklay, Singleton, and Parker 2008). In most countries, geographic data was either classified, unavailable, or prohibitively expensive for the general public to obtain. The advent of Web 2.0 in the early 2000s allowed users to become contributors to websites, and Application Programming Interfaces (APIs) allowed websites to share data. Combined with the increased availability of low-cost GPS devices and the declassification of the United States' GPS, novice geographers (NeoGeographers) could produce geographic data with greater precision and portability (Graham 2010; Turner 2006). The goals of OSM were to enable a community of interested volunteers to produce map data with no restrictions on the distribution or use of the data and few restrictions on how the data could be created or

1 Http://www.openstreetmap.org.
2 Http://www.ushahidi.com.
3 Http://www.tomnod.com/.
4 Http://hotosm.org/.
5 Http://kathmandulivinglabs.org/.

Table 1: Twenty most frequently occurring terms on the HOT email list, April 25 to May 6

Term	Average appearance per email
Hot (HOT)	6.23
can	1.70
list	1.66
Nepal (Nepal)	1.62
data	1.30
next	1.02
imagery	1.02
will	1.00
people	0.99
osm (OSM)	0.98
one	0.91
mapping	0.91
task	0.87
html	0.87
scrubbed	0.86
references	0.81
reply	0.81
help	0.74
areas	0.74

modified. As a collaborative project, errors in the data should be rectified by the community. Since 2005, over one million contributors to OSM have contributed nearly three billion features to the dataset (OpenSteetMap Foundation 2015). Moving past road networks, OSM data now includes civic and commercial buildings, hiking and bike paths, environmental features, and other natural, man-made, and boundary data.

Research in OSM examines the quality of the data, the nature and motivations of the contributors, the uses of the data, and the relationship between the data, the contributors, and society (Budhathoki and Haythornthwaite 2013; Touya and Reimer 2015; Fan et al. 2014; Mooney and Corcoran 2012; Girres and Touya 2010; Haklay et al. 2010). Comparing the OSM road network to the UK Ordinance Survey, Muki Haklay found that OpenStreetMap data was as reliable as the official survey data (Haklay 2010). He also found that features with more edits were more accurate than features with fewer edits. Examining the process of contribution to OSM, Monica Stephens found that the overwhelmingly majority of contributors to OSM were male, and that this produced a bias in the representation of places in the data (Stephens 2013).

The open nature of OpenStreetMap and large, crowdsourced volunteer site is an important benefit in its use in crisis mapping (Zook et al. 2010). In the response to the Haitian 2010 earthquake, aid workers needed information on who needed help and where they were. Before the earthquake, Haiti had limited map information in OpenStreetMap and the national Haitian map agency was completely destroyed. Previous maps were useless after the earthquake (Roche, Propeck-Zimmermann, and Mericskay 2011). In the first two days, over 800 features were updated in OpenStreetMap, and DigitalGlobe and GeoEye provided free high resolution imagery that allowed the OpenStreetMap team to complete the map data of Port-au-Prince quickly. Since then, crisis mapping has expanded to include the preparedness, mitigation, and response phases of a crisis in disasters including fire, floods, volcanos, landslides, storms, and epidemics (Horita et al. 2013).

Using crowdsourced labor, however, has raised concerns about the accuracy and validity of the OpenStreetMap data in crisis response (Zook et al. 2010). The question of expertise and training when used for map data is also a concern (Elwood, Goodchild, and Sui 2012). The philosophy of OSM allows any contributor to create, modify, or delete data. Changes may be monitored by the OSM community in order to validate and ensure data quality. The Humanitarian OpenStreetMap Team (HOT) formed to organize the efforts of volunteers in a crisis. To coordinate mapping activities, HOT creates a task list of key efforts needed for mappers which divides areas into small, manageable zones. The tasks include priority, the requested agency (for example, the Nepali government), the imagery source, and the objects included in the task. After completion, a senior HOT member should validate and publish the updates. On the ground in Nepal, the group Kathmandu Living Labs coordinated communication with relief workers and produced daily, updated maps for the Red Cross.

HOT membership is international, voluntary, and open to anyone. The primary communication medium is the HOT email list. Members sent 879 emails from April 25 to May 6. In addition, several "mapathon" events were scheduled immediately after the earthquake to encourage and teach new users how to contribute OpenStreetMap data (Möller and Fuhrmann 2015). Table 1 shows the twenty most common terms and their per-email frequency on the HOT discussion lists between April 25 and May 6. Personal names and frequent stopwords ("the", "and", etc.) have been removed.

Methods and Results

For this study, the daily OpenStreetMap change files for Nepal from April 15 to May 6, 2015, were collected and extracted into a PostgreSQL/PostGIS database. These dates account for the day of the earthquake (April 25) and 10 days before and after the primary event. The data includes creation, modification which may include changing attribute or positional information, and deletion events for points and "ways" and includes username, time and date, location in latitude/longitude, and attribute information. A "way" in OpenStreetMap corresponds to a vector line or polygon. A point in OpenStreetMap is a node (a feature with a location and optional attribute data) that does fall in a way (line or polygon).

Mapping activity in OpenStreetMap increased dramatically for the Nepalese region after the earthquake on April 25 as compared to activity preceding it. Table 2 shows the average amount of mapping activity in OpenStreetMap before and after the earthquake. The average daily features for create, modify, or delete increased around 100 times. Figure 1 shows the daily total of features created, modified, and deleted per day from April 16 until May 6. In total, 1,008,259 features were created between April 25 and May 6.

The increased media attention and outreach appears to have encouraged as many as 9,989 new members to join OpenStreetMap. Figure 2 shows the number of contributors who created, modified, or deleted Nepali map data from April 25 to May 6. Members who joined between after April 25 and May 6 outnumbered those who joined between the inception of OSM in 2005 and April 25 (8,725).

In the event of a crisis, map data that is complete and accurate is of critical importance (Möller and Fuhrmann 2015). The philosophy of OSM is to encourage contributors to create and edit data themselves and build data quality standards by consensus through the email discussion lists and the OpenStreetMap wiki[6] webpage. Contributors may make any style of contribution that they wish, and the aim is that other contributors will find and correct errors. While this has led to vandalization and incompleteness

Table 2: Comparison of mapping activity in OpenStreetMap for Nepal before and after the earthquake

	Average creates, modifies, and deletes per day before earthquake (April 14 to April 24, 2015)	Average creates, modifies, and deletes per day after earthquake (April 25 to May 6, 2015)
Points	9.1	903.9
Lines and Polygons	90.0	10942.9

6 Http://wiki.openstreetmap.org/wiki/Main_Page, accessed May 4, 2015.

for many locations, the Humanitarian OpenStreetMap, Team has created a process to ensure data quality and completeness. Crisis areas are divided into regions, and each region is given a particular task with a given need and specific set of instructions. For example, a given task might be to identify severely damaged housing areas and informal camps in a particular region in Nepal using a particular set of imagery. A contributor can "check out" the task to guarantee that multiple contributors are not impacting one another. Once a task has been completed, another mapper will verify that the task is complete. This method does not prevent contributors from bypassing this process, but it does present a framework for addressing the problems of inaccurate and incomplete data in a crisis.

The influx of new mappers after the earthquake increased the tension between experienced OSM mappers and the new contributors. In an email dated April 27 with the subject "AAAAAAAAAAAAAARRRRRRRGH!", Ralph Aytoun asked the Humanitarian OpenStreetMap Team to "change what we are doing and who we are letting in to do it. These Activations in response to a disaster means that people's lives are at stake here. I am finding totally inexperienced mappers (some with no completed tiles and others with only one or two completed tiles) messing around with validating tiles or unlocking already validated tiles and working on them… When I checked on the people that were doing this they were complete beginners" (Humanitarian OpenStreetMap Team 2015a, April 27, 2015). Of the 880 emails on the discussion list between April 25 and May 6, 56 (6 %) are a discussion specifically on this topic.

Others also expressed frustration with the process. In an email dated May 9, user "Extra Paul" wrote: "I'm quite worried about the quality of maps for task 1018. Many of mappers, obviously, did not check the instructions or even the tutorials. People want to help, and that's awesome, but maybe validation should be done my more experienced and meticulous mappers" (Humanitarian OpenStreetMap Team 2015b, May 9, 2015). Of the 880 emails on the list between April 25 and May 6, 50 emails (5 %) are discussing similar concerns.

In response, a discussion on the process of OpenStreetMap and the nature of crowdsourced data followed. On April 29, Jonathan Webb emailed: "I am one of the newcomers. I am not a GIS scientist & learnt on the job and am relatively lightweight, however I know that I am perfectly capable of making a contribution but the (HOT)OSM process is not clear" (Humanitarian OpenStreetMap Team 2015a, April 29 2015). Of the 880 emails on the discussion list between April 25 and May 6, 19 (2 %) are in direct response to this question.

A consensus appeared to emerge that while the mapping process should remain open, more detailed instructions and training should be available for new contributors. Pierre Béland summed up the exchange: "We have to adapt to an awesome contribution with this Nepal emergency. We need more people. At the same time, we need to adapt in various ways to crowdsourcing as we see various problems arising (*sic*)" (Humanitarian OpenStreetMap Team 2015b, May 9, 2015).

The perception that new contributors to OSM are primarily responsible for errors in the Nepal OSM data can be tested. Crowdsourced collaborative mapping encourages contributors to modify or delete inaccurate data themselves. If a modification or deletion of data represents fixing inaccurate data, then the percentage of data contributed after April 25 that has been modified or deleted may represent potentially inaccurate data. In Table 2, a comparison of features modified or deleted by contributors on data created between April 25 and May 6 is shown.

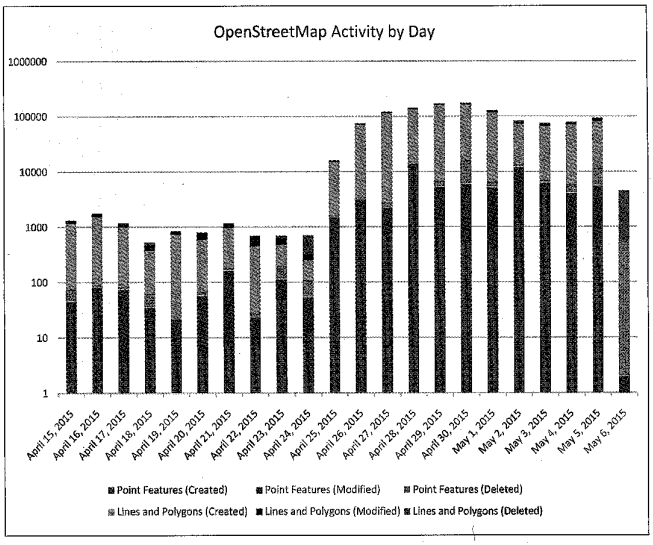


Fig. 1: Daily mapping activity for Nepal April 15–May 6 (Logarithmic scale)

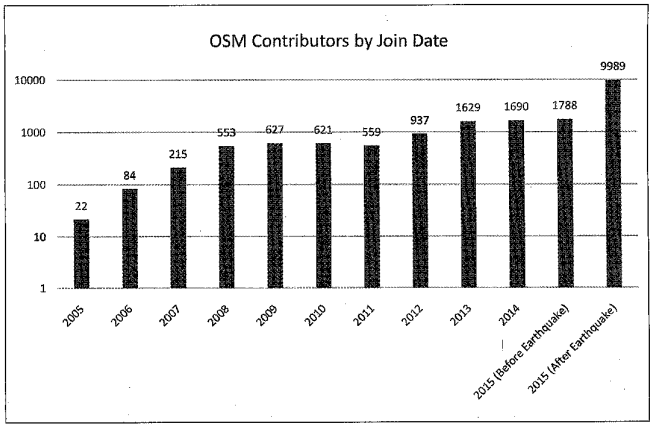


Fig. 2: Number of OSM contributors to Nepal from April 25 to May 6 by the date they joined OSM (Logarithmic scale)

In Table 3, the results of a one-way ANOVA test on the total of the number of features modified or deleted per contributor are shown. The two groups are the older contributors (joined before April 25) and newer contributors (joined on or after April 25). The results show that there is a significant difference between groups at the .01 level. Newer contributors have a lower rate of having their features modified or deleted or their contributed features (12.6 %) compared to older contributors (20.1 %). Contributors who joined before April 25 added nearly twice the number of features to the OSM dataset for Nepal between April 25 and May 6 than those who joined OSM after April 25.

Discussion and Conclusion

This paper answered three questions about the immediate response by the Humanitarian OpenStreetMap Team to the April 25, 2015 Nepalese earthquake. Responding to the crisis, mapping activity in the OSM Nepal dataset increased nearly 100-fold, and nearly 10,000 new mappers joined OSM and contributed data to Nepal between April 25 and May 6. The increase in new contributors created a perception of problems with accuracy and reliability in the HOT process. It appears, however, that contributors who had joined before the April 25 earthquake were more likely to have their features modified or changed than those contributors who had joined between

Table 3: A comparison of features modified or deleted between contributor groups between April 25 and May 6, 2015

	Users joined before April 25, 2015 (from the start of OSM in 2005) (n = 8725)	Users between April 25, 2015 and May 6, 2015 (n = 9989)
Avg. Features per contributor (created, modified, deleted)	223.5	108.6
Total Features (created, modified, deleted)	1,864,772	1,084,519
Avg. Features per contributor (modified, deleted)	63.1	14.1
Total Features (modified, deleted)	375,432	136,256
Variance of Features modified or deleted	129,784.9	3,011.8
Percentage of features modified or deleted of the average user's total contribution	20.1 %	12.6 %

Table 4: Results of ANOVA on modified/deleted features between older and newer users
** indicates a p-value with a significance below .01

Source of Variation	df	F	p-value	F crit
Between Groups	1	172.8796	.000**	3.842054

April 25 and May 6. Between ten and fifteen percent of the communications on the email list between April 25 and May 6 are discussions about the quality and role that newer and inexperienced contributors to the HOT project should have. While the average new contributor added just over 100 features in the time frame of the study, contributors who had been members of OpenStreetMap previously contributed nearly twice that amount on average.

The methods presented in this paper do have some limitations. Because OpenStreetMap is an international project, contributors may use languages other than English, and discussions in languages other than English have not been included in the word frequency information or in evaluating the discussions. Contributors for whom English is a secondary language and variations in English spelling will have impacted this analysis. English is the primary language used on the HOT website and email lists. While the mailing list should be a good indicator of the social activity that guides the consensus for the HOT project, it is not the only source of discussions, which may also happen on other social networks (i. e., Twitter), in person, or through private communication. An email list will also favor the most vocal proponents but may not represent a true consensus. Contributors who communicate through other means or choose not to communicate are not considered in this analysis.

In evaluating the response in the increase of mappers and mapping activity, ten days of activity will present a limited window into the response compared to a longer time frame. For example, mappers who had joined before April 25 may have more experience with OpenStreetMap, and therefore may recognize when their data needs to be corrected when compared to more recently joined members. Errors in the data may take longer than the ten days used in the study to be found and corrected. A follow-up study may consider the longer-term impacts of the response to the earthquake.

OpenStreetMap contributors are usually not formally trained in mapping techniques, but OSM provides a means to improve those skills (Budhathoki and Haythornthwaite 2013). The tension in collaborative, open technologies like OSM or Wikipedia, is the desire to remain open and use collaboration to ensure accuracy over technological automation (Priedhorsky et al. 2007). This tension is apparent in OpenStreetMap after the increase of contributors. To be able to scale quickly, the HOT team intends to increase training available to new contributors.

Other platforms that rely on crowdsourcing information have differing methods of editor control. Wikipedia, for example, can lock pages that are in conflict or under frequent vandalism. A series of editors control key topics. The difference between Wikipedia and OSM, however, is that local knowledge and a basic understanding of mapping skills are essential in OSM. In a crisis, there may not be enough local mappers on the ground who can access all areas to ensure map quality. In times of crisis, OpenStreetMap should consider developing alternative editing or validation techniques to prevent errors that may impact relief work. Working closely with local organizations like Kathmandu Living Labs is essential for ensuring quality control and timely dissemination of map data in times of crisis (Budhathoki 2015).

References

Budhathoki, N., 2015. Nepal Earthquake: Report from Kathmandu Living Labs. *Kathmandu Living Labs Website. http://kathmandulivinglabs.org/blog/ (last accessed 5 May 2015).*

Budhathoki, N. R. and Haythornthwaite, C. 2013. Motivation for Open Collaboration: Crowd and Community Models and the Case of OpenStreetMap. *American Behavioral Scientist 57:548–575.*

Elwood, S.; Goodchild, M. F. and Sui, D. Z. 2012. Researching Volunteered Geographic Information: Spatial Data, Geographic Research, and New Social Practice. *Annals of the Association of American Geographers 102 (3):571–590.*

Fan, H., Zipf, A., Fu, Q. and Neis, P. 2014. Quality assessment for building footprints data on OpenStreetMap. *International Journal of Geographical Information Science 28 (4):700–719.*

Girres J.-F., and Touya G. 2010. Quality Assessment of the French OpenStreetMap Dataset. *Transactions in GIS 14 (4):435–459.*

Graham, M. 2010. Neogeography and the Palimpsests of Place: Web 2.0 and the Construction of a Virtual Earth. *Tijdschrift voor Economische en Sociale Geografie 101 (4):422–436.*

Haklay, M. 2010. How good is volunteered geographical information? A comparative study of OpenStreetMap and Ordnance Survey datasets. *Environment and Planning B Planning and Design 37 (4):682–703.*

Haklay, M. M., Basiouka, S., Antoniou, V. and Ather, A. 2010. How Many Volunteers Does it Take to Map an Area Well? The Validity of Linus Law to Volunteered Geographic Information. *Cartographic Journal, The 47 (4):315–322.*

Haklay, M., Singleton, A. and Parker, C. 2008. Web Mapping 2.0: The Neogeography of the GeoWeb. *Geography Compass 2 (6):2011–2039.*

Horita, F., Degrossi, L., Assis, L., Zipf, A. and de Albuquerque, J. P. 2013. The use of Volunteered Geographic Information and Crowdsourcing in Disaster Management: a Systematic Literature Review. *In Proceedings of the 19th Americas Conference on Information Systems, 1–10. Chicago, Illinois.*

Humanitarian OpenStreetMap Team. 2015a. Humanitarian OpenStreetMap Team Mailing List Archive. *OpenStreetMap Mailing List Archives. https://lists.openstreetmap.org/pipermail/hot/2015-April/date.html (last accessed 1 May 2015).*

———. 2015b. Humanitarian OpenStreetMap Team Mailing List Archives. *OpenStreetMap Mailing List Archives. https://lists.openstreetmap.org/pipermail/hot/2015-May/date.html (last accessed 6 May 2015).*

International Centre for Integrated Mountain Development. 2015. Nepal Earthquake 2015. *Main Website. http://www.icimod.org/ (last accessed 8 May 2015).*

Meyer, R. 2015. The Internet Mapmakers Helping Nepal. *The Atlantic. http://www.theatlantic.com/technology/archive/2015/05/the-mapmakers-*

helping-nepal/392228/ (last accessed 2 May 2015).

Möller, M. and Fuhrmann, S. 2015. Cloud-Mapping im Krisenmanagement. *Kartographische Nachrichten 2015 (1).*

Mooney, P. and Corcoran, P. 2012. How social is OpenStreetMap? In *AGILE 2012.*

Neis, P. and Zielstra, D. 2014. Recent Developments and Future Trends in Volunteered Geographic Information Research: The Case of OpenStreetMap. *Future Internet 6 (1):76–106.*

OpenSteetMap Foundation. 2015. OpenStreetMap Statistics. *OpenStreetMap Wiki. http://wiki.openstreetmap.org/wiki/Statistics (last accessed 1 May 2015).*

Parker, L. 2015. How "Crisis Mapping" Is Shaping Disaster Relief in Nepal. *National Geographic. http://news.nationalgeographic.com/2015/05/150501-nepal-crisis-mapping-disaster-relief-earthquake/(last accessed 1 May 2015).*

Priedhorsky, R., Chen, J., Lam, S. T. K., Panciera, K., Terveen, L. and Riedl, J. 2007. Creating, destroying, and restoring value in Wikipedia. In *Proceedings of the 2007 international ACM conference on Supporting group work, 259–268. ACM.*

Roche, S., Propeck-Zimmermann, E. and Mericskay, B. 2011. GeoWeb and crisis management: issues and perspectives of volunteered geographic information. *GeoJournal 78 (1):21–40.*

Sinha, S., 2015. 3 Ways Nepalis Are Using Crowdsourcing to Aid in Quake Relief. *New York Times. http://www.nytimes.com/2015/05/02/world/asia/3-ways-nepalis-are-using-crowdsourcing-to-aid-in-quake-relief.html?_r=1 (last accessed 1 May 2015).*

Stephens, M. 2013. Gender and the GeoWeb: divisions in the production of user-generated cartographic information. *GeoJournal 78:981–996.*

Sugden, J. 2015. Scientists Race Against Time to Gather Nepal Earthquake Data. *Wall Street Journal. http://blogs.wsj.com/indiarealtime/2015/05/08/scientists-race-against-time-to-gather-the-nepal-earthquake-data/?mod=e2tw (last accessed 8 May 2015).*

Touya, G. and Reimer, A. 2015. OpenStreetMap in GIScience eds. Jokar Arsanjani, J., Zipf, A., Mooney, P. and Helbich, M.: 81–99.

Turner, A. J. 2006. *Introduction to Neogeography ed. A. J. Turner. O'Reilly Media, Inc.*

United States Geological Survey National *Earthquake Information Center. 2015a. M7.3 – 18km SE of Kodari, Nepal. Earthquake Hazards Program. http://earthquake.usgs.gov/earthquakes/eventpage/us20002ejl#general_summary (last accessed 12 May 2015).*

———. 2015b. M7.8 - 34 ESE of Lamjung, Nepal. *Earthquake Hazards Program :1. http://earthquake.usgs.gov/earthquakes/eventpage/us20002926#general_summary (last accessed 8 May 2015).*

Witze, A. 2015. Major Earthquake Hits Nepal. *Nature | News. http://www.nature.com/news/major-earthquake-hits-nepal-1.17413 (last accessed 8 May 2015).*

Zook, M., Graham, M., Shelton, T. and Gorman, S. 2010. Volunteered Geographic Information and Crowdsourcing Disaster Relief: A Case Study of the Haitian Earthquake. *World Medical & Health Policy 2 (2):6–32.*

About the author:

David Parr is a doctoral candidate in the Department of Geography at Texas State University in San Marcos, Texas. His research interests include collaborative cartography, location-based social media, and geographic citizen science. Contact details: Department of Geography, Texas State University 601 University Dr., San Marcos, TX 78666, USA Tel. +1-512-245-2170, Fax +1 512-245-8353 Email: david.parr.geo@gmail.com

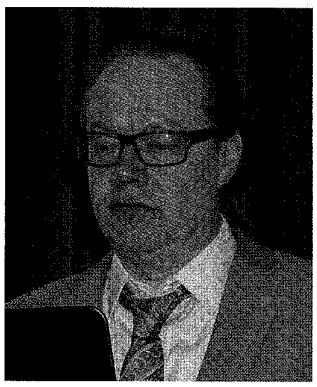
Ereignisse

■ Tagungsbericht Symposium Angewandte Kartographie – Geovisualisierung

Königslutter am Elm, 11.–13. Mai 2015



Bereits zum zehnten Mal lud die Kommission „Angewandte Kartographie – Geovisualisierung" zum Symposium nach Königslutter am Elm ein, um technologisch interessante sowie marktrelevante Entwicklungen einem interessierten Fachpublikum aus der öffentlichen Verwaltung, dem Dienstleistungssektor, der Industrie sowie den Universitäten



Dr. Erik Theile. Foto: Mark Vetter

und Hochschulen zu präsentieren. Die siebzig aus Deutschland und der Schweiz angereisten Teilnehmer wurden durch Erik Theile, dem Leiter der Kommission, und Alexander Hoppe, Bürgermeister von Königslutter am Elm, herzlich begrüßt. Prof. Manfred Weisensee, Präsident der DGfK, spannte in seinem Grußwort vor dem Hintergrund des Internationalen Jahres der Karte einen Bogen vom Symposium in Königslutter über die Internationale Kartographische Konferenz im August in Rio de Janeiro bis hin zum Kartographentag im September in Stuttgart.

Das Symposium Königslutter begann mit Eröffnungsvorträgen von Dragos Andronic (TELENAV) zur Navigation im Web und auf dem Smartphone, Peter Schmidhuber (ADAC) zur Evolution der digitalen Karte und Prof. Jörg Blankenbach (RWTH Aachen) mit einem Überblick zur Indoor-Positionierung in Abhängigkeit von Genauigkeit und Reichweite. Peter Schmidhuber gab in seinen Ausführungen einen interessanten Überblick über die gigantischen Veränderungen in der Kartographie, die schon in Königslutter Anfang 2000 angedeutet und sich im letzten Jahrzehnt bewahrheitet haben. Anfangs wurde Navigation zur Massenware, gedruckte Stadtpläne wurden unwichtig und das junge Internet bot noch keine Alternative. Es folgte die Internetphase und die Karten wurden immer performanter. Anschließend wurden Karten mobil und waren in Apps verfügbar. Mittlerweile sind Navigationsdaten „lebenslang" kostenlos auf Smartphones nutzbar. Dabei dienen die verschiedenen Endgeräte als „Schaufenster", um die Daten zu visualisieren und im Hintergrund werden – vom Benutzer unbemerkt – Ortsbezüge und Personalisierungsattribute an die Betreiber übermittelt. Eine schöne Daten-Welt!

Anschließend wurde mit kurzen Präsentationen der Sponsoren die *Fachfirmenausstellung* durch die beteiligten Firmen eröffnet. Nach der Pause stellte Armin Retterath (GDI Rheinland-Pfalz) die Integration von Geoinformationsressourcen in das rheinland-pfälzische Open Government Data Portal vor. Ziel sind referenzierbare Datenbestände, in denen jedes Objekt eine eigene Identifizierung (URI) erhält. Anschließend referierte Carina Kaufmann (metropoleRuhr) zum gleichnamigen Geonetzwerk und dem Gewinn durch openData für die dichteste Städteregion Deutschlands mit 5,1 Mio. Einwohnern bei der Schaffung eines Netzwerks zur Bereitstellung von Geoinformationen unter Verwendung der OGC-Standards im Sinne der GDI Deutschland und INSPIRE. Roswitha Murjahn (LGV Hamburg) stellte das Hamburger Transparenzportal, den Vorreiter in Sachen OpenGeoData, vor, das durch die Volksinitiative „Transparenz schafft Vertrauen" mit dem Slogan „Hamburg öffnet die Aktenschränke" im Jahr 2012 online ging. Heute verzeichnet das Portal monatlich ca. 1,8 Mio Seitenaufrufe, davon 84.000 Zugriffe auf Geodaten mit einem Datenvolumen von 9.000 GB bei gesunkenen Erlösen und gestiegenem Support für die Nutzer von Geodaten, aber einer intensiveren Nutzung der Daten in Wirtschaft und Verwaltung. Jens Wille (Ubilabs) aus Hamburg präsentierte mit Google-Technologie erstellte Projekte. Aktueller Trend ist z. B. das Erzählen von Geschichten (Storytelling) mithilfe von Geodaten, wie bspw. im Magazin „National Geographic". Durch das Projekt „Live-Tracking der Tour de France" sind die