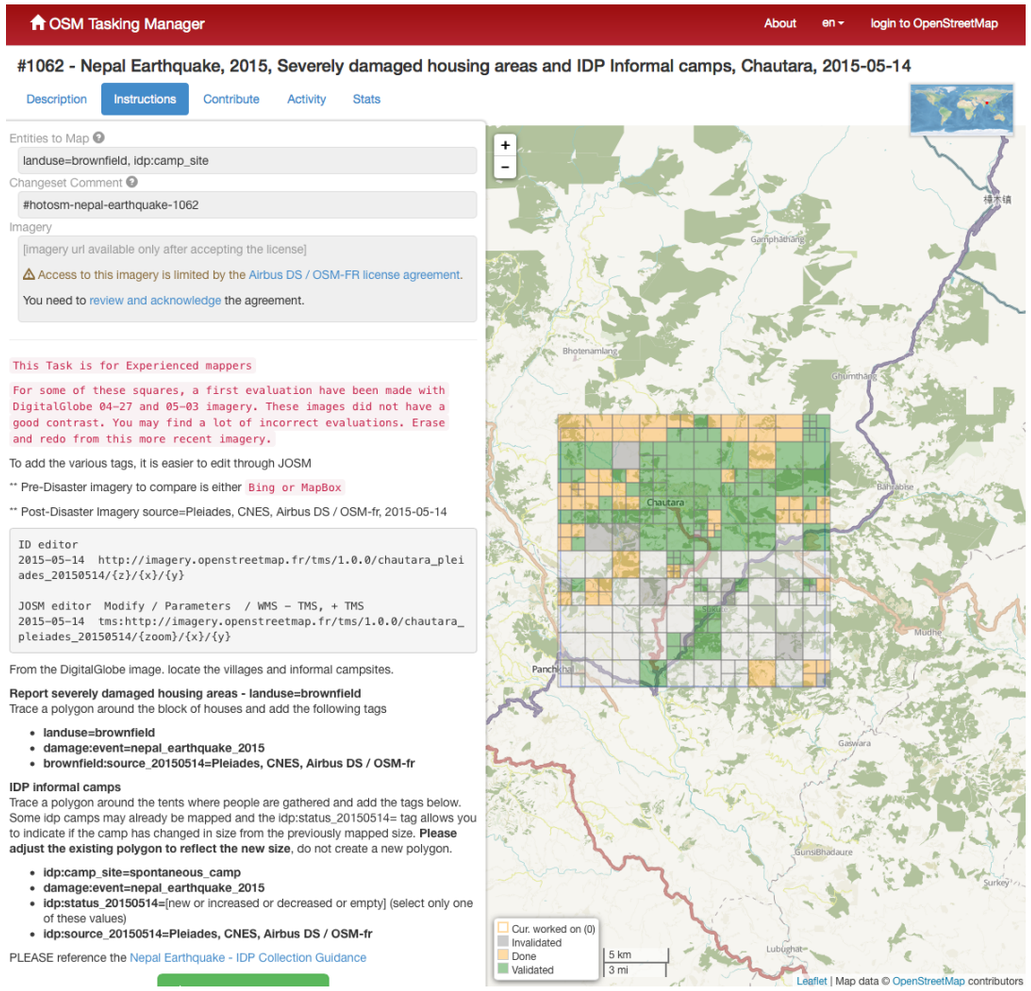
ICRI sustainable connected cities

A large-scale study of

Contributor Engagement in Humanitarian Mapping

Martin Dittus · ICRI Cities, UCL · @dekstop

18th June 2015



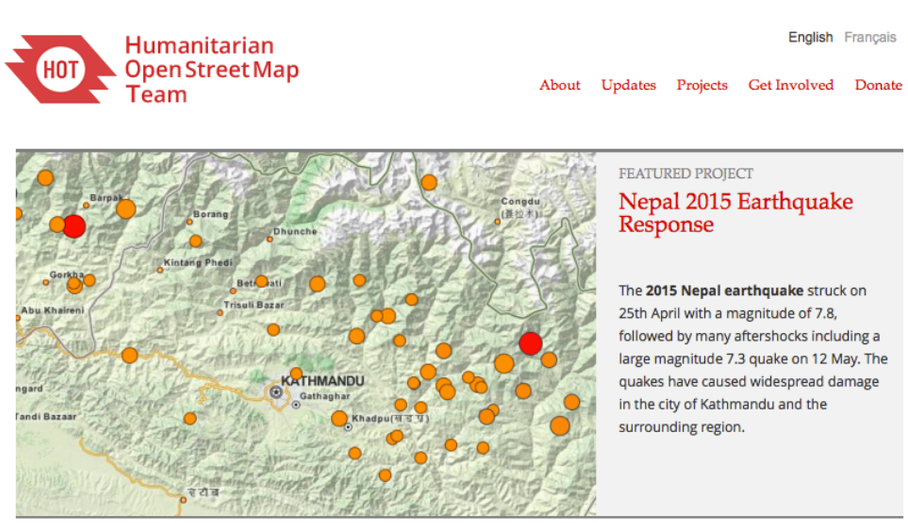
Humanitarian OpenStreetMap Team

MISSING MAPS

Volunteer mapping with the **Humanitarian OpenStreetMap Team** (HOT)

Coordinated by OpenStreetMap (OSM) and humanitarian aid organisations:

- **Updating maps** after a disaster
- **Producing new maps** for entirely unmapped areas



Thousands of participants, online or at mapathons.

Typically contributing by **tracing satellite images**.
All data ends up on OSM.

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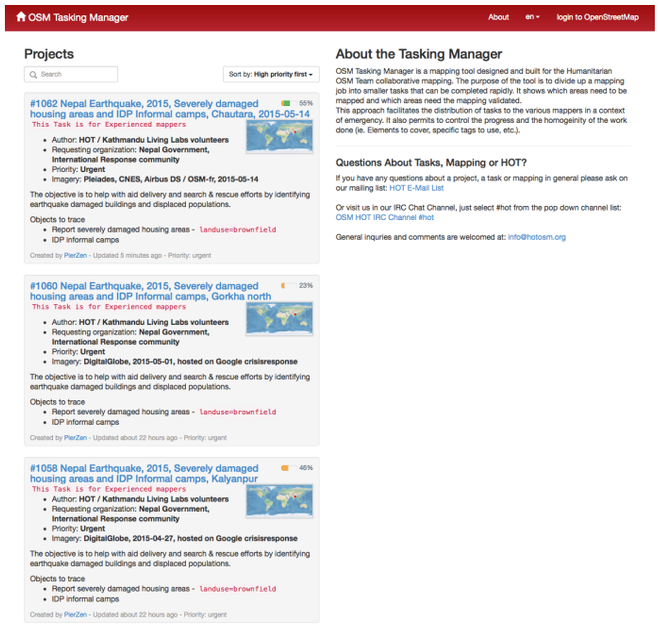
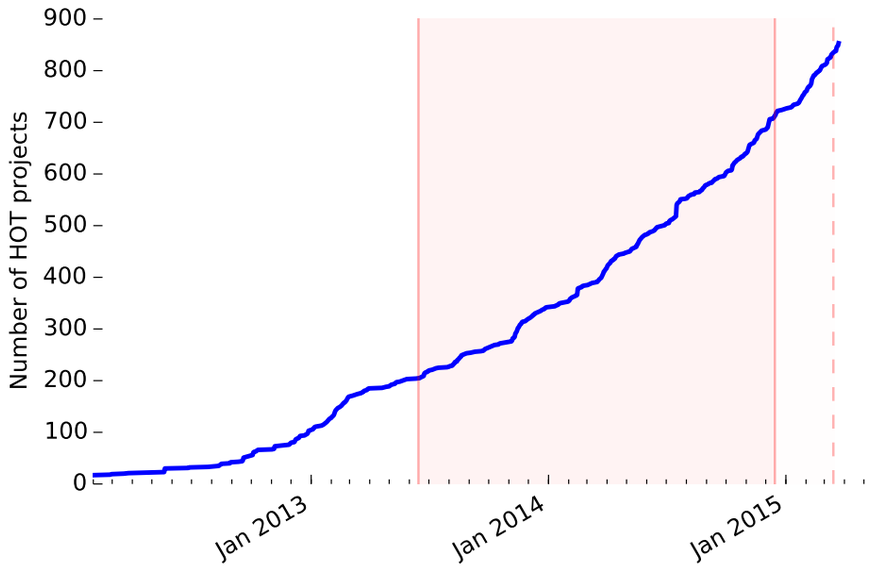
Rapid growth in projects and activity

Haiti earthquake, typhoon in Philippines, Nepal earthquake, … much need for map data.

- Initially most activity was reactive.
- Ebola 2014: many affected areas were on *no* map.
- Nov 2014 “Missing Maps” launch: **proactive mapping**.



http://tasks.hotosm.org/



Our study period is highlighted in red.
More details coming up in a minute.

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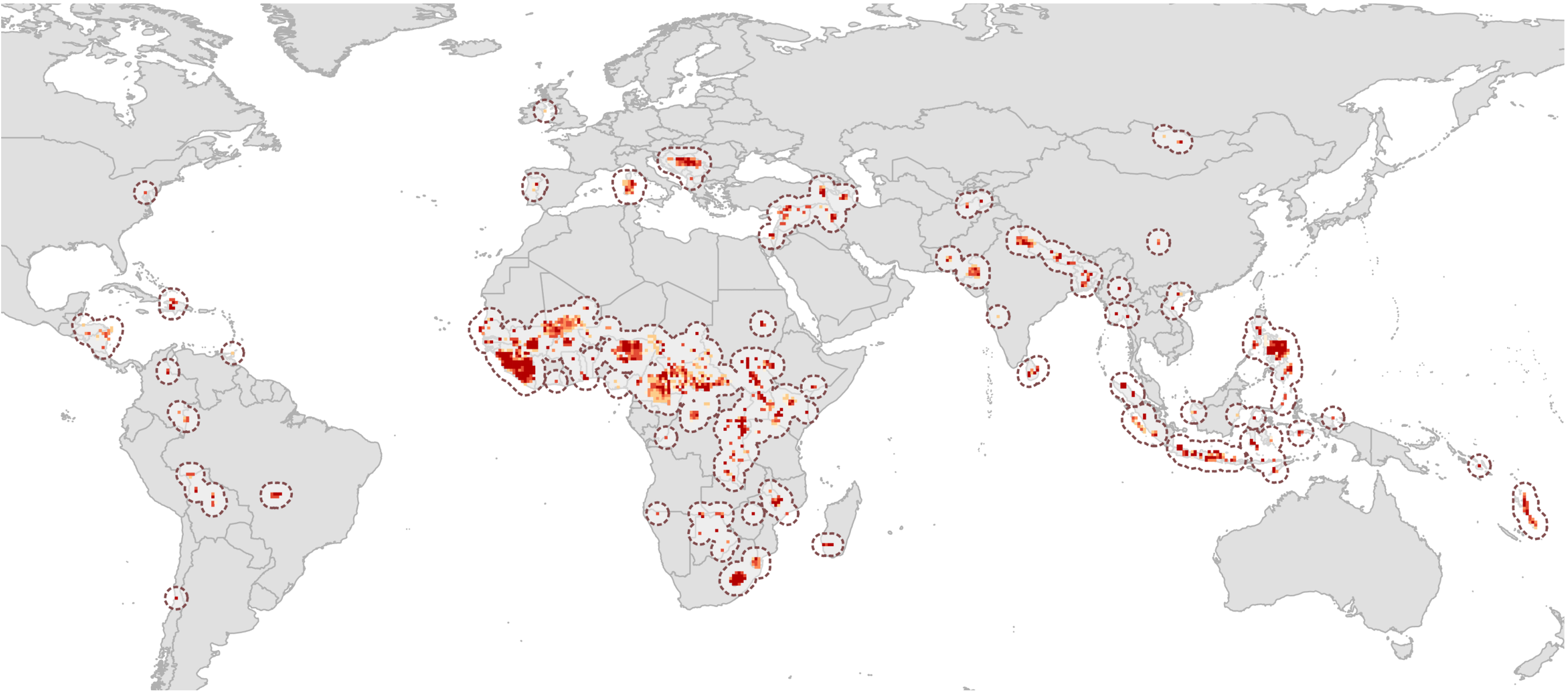
HOT map contributions, 2012-2015



Humanitarian OpenStreetMap Team

MISSING MAPS

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Yet many areas of the world remain unmapped.

“To reach our goal, we need the Missing Maps Project to be the biggest instance of digital volunteerism the world has ever seen.”

http://www.msf.org.uk/missing-maps-project

How can we grow this to a million volunteer contributors?

Many questions.

- How can we best train newcomers?
- What are barriers to entry?
- How can we retain contributors once they've had first experiences?
- Etc.

Let's first learn from existing experience:

How does engagement compare across the different mapping initiatives *right now*?

Analysing volunteer engagement in humanitarian mapping: building contributor communities at large scale

Martin Dittus
ICRI Cities, UCL
London, UK
martin@dekstop.de

Giovanni Quattrone
ICRI Cities, UCL
London, UK
g.quattrone@cs.ucl.ac.uk

Licia Capra
ICRI Cities, UCL
London, UK
l.capra@ucl.ac.uk

ABSTRACT
Organisers of large-scale crowdsourcing initiatives not only need to consider how to produce outcomes with their projects but also how to build a volunteer community, and there is little knowledge about the impact of project designs on community growth. The initial project experience of contributors plays an important role in this, particularly when the contribution process requires some degree of expertise. We present a large-scale study of contributor engagement in a large crowdsourcing system, comparing different modes of organisation and different task designs, and observing their effects on the contributor activity and retention of first-time contributors. To this purpose we analyse 100 projects organised by the Humanitarian OpenStreetMap Team, a global volunteer effort with thousands of contributors. We find that different modes of organisation can have an impact on contributor activity and retention, but also that prior domain experience affects volunteer engagement in a number of ways. We close by providing recommendations about how to build and sustain volunteer capacity in these and comparable crowdsourcing systems.

Author Keywords
Crowdsourcing, volunteered geographic information, humanitarian mapping, peer production, task design, task analysis, socialisation, social computing

ACM Classification Keywords
H.5.3. Group and Organization Interfaces: Computer-supported cooperative work; Design

INTRODUCTION
It may be taken for granted that the maps used to navigate our urban spaces will be just as useful in other parts of the world, however the reality is different: when humanitarian aid teams attempted to trace the Ebola outbreak in summer 2014 they found that most affected settlements were on no existing map [18]. The Humanitarian OpenStreetMap Team (HOT) launched one of the key initiatives to change this, as they had done before for other regions in crisis: they coordinated thousands of volunteers to trace roads, waterways, huts and houses from satellite data. Many of their volunteers were newcomers to the practice [17]. In some cases, regional groups hosted mapathons to come together in a more social setting, but many contributors simply participated online.

HOT started as an informal network of experts and community organisers, and the organisation has gradually refined the necessary processes and technologies that allow it to scale [30]. It coordinated responses to typhoon Haiyan in 2013, the West African Ebola crisis in 2014, the 2015 Nepal earthquake, and many others [31]. In late 2014 several partnering organisations launched a "Missing Maps" initiative where the focus is on proactive mapping to ensure places are already well-documented before a crisis hits [28].

The promise of these initiatives is to achieve a greater volunteer capacity for disaster response and humanitarian aid by incorporating the help of a global online volunteer force. A 2014 report by Médecins Sans Frontières (MSF) discusses the impact such initiatives can have on the work of aid organisations: "Many interviewees commented that they were amazed by the speed at which the area was mapped with the help of the volunteers. On his own, the GIS officer would not have been able to produce these base maps during his mission." [16]. All contributions end up on OpenStreetMap (OSM), so in principle the outcomes are free for all to use. The maps produced by HOT volunteers are now in use by experts at MSF, the American and British Red Cross, the World Health Organisation, and a growing number of other institutions [7].

However, mapping all the undocumented and crisis-stricken regions of the world is a formidable task: even after months of work by thousands of volunteers, the new maps of Central and West Africa are still not complete. An MSF article illustrates the scale of this challenge: "To reach our goal, we need the Missing Maps Project to be the biggest instance of digital volunteerism the world has ever seen." [10]

HOT project organisers thus not only need to consider how to produce these maps, but also how to foster a large global volunteer community in the process, and it is not always clear whether certain design choices may involve trade-offs. For example, in other communities there is some evidence that increased activity and increased retention may not always be achievable at the same time: in online citizen science projects it was found that more prolific contributors can have shorter retention periods [26, 27]. A similar effect was found for interventions that increase member productivity on Wikipedia,

Under submission to CSCW 2016.

PLEASE DO NOT SHARE. If accepted, this will be published in January 2016. (Yes, academia moves at a slow pace.) I also intend to find ways of sharing the findings with a wider audience asap. You can always contact me for a chat: martin@dekstop.de, @dekstop on Twitter.

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Volunteer engagement in humanitarian mapping: a first study of past outcomes

Comparing three key HOT initiatives:

- **Typhoon Haiyan (TH)** in Nov 2013:
  High-profile, urgent. A first “CNN moment”, many newcomers. One-off mapathons.
- **Ebola Response (ER)** throughout 2014:
  A high-profile, multi-month sustained effort. A large amount of media coverage. Monthly mapathons.
- **Missing Maps (MM)** from Nov 2014:
  A range of humanitarian causes. Proactive, low urgency, less media attention. Monthly mapathons, heavy use of social media for promotion.

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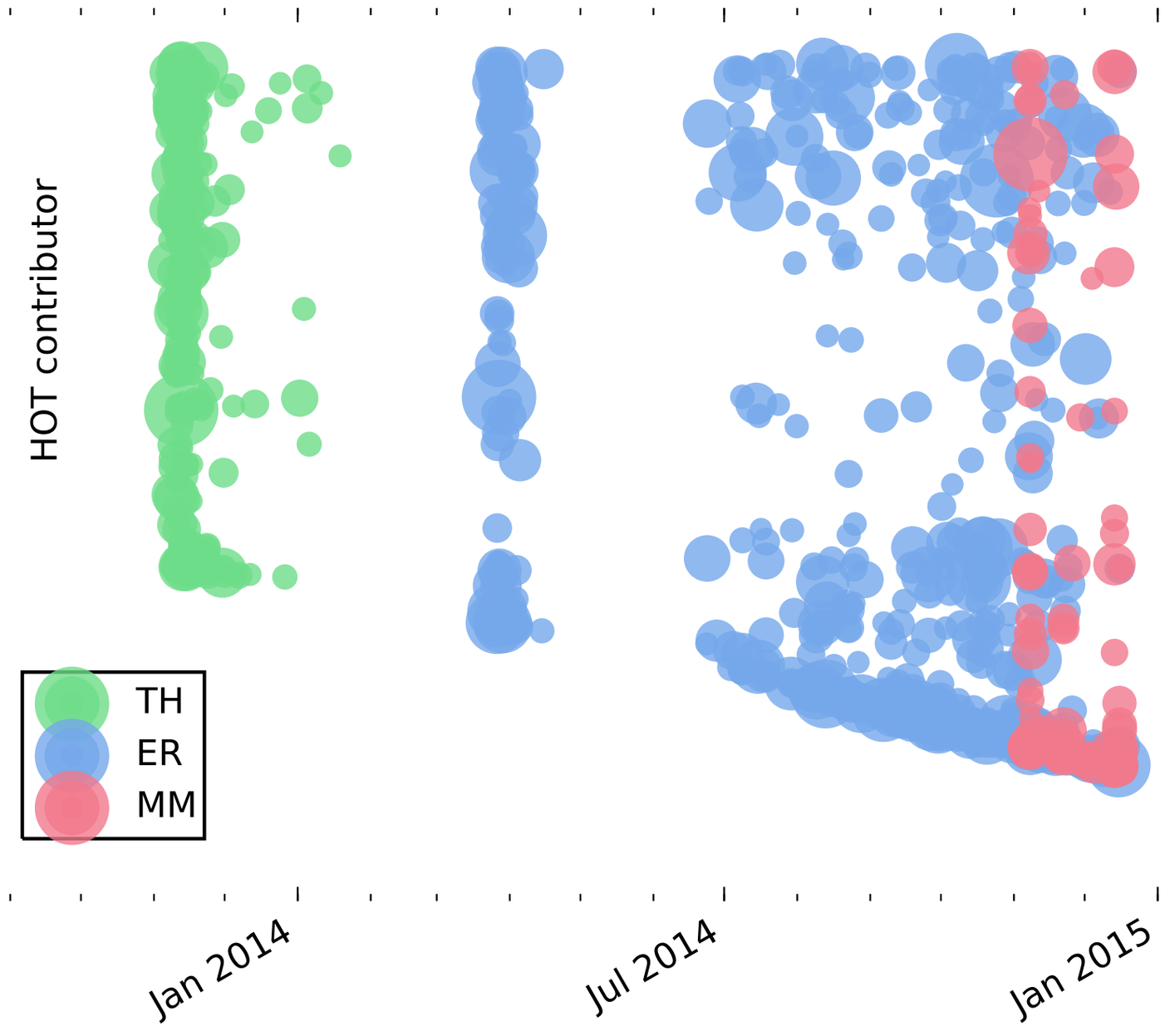
We observe first-time contributors.

Here's a timeline of when they first joined.



18-month study period

1,582 first-time contributors

across 100 projects

Bubble size represents
labour hours in first 48h.

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We measure *engagement*.

Engagement has many aspects. I'm using quantitative measures such as…

- Short-term activity: **labour hours**, **contribution rate**
- Short- to long-term **retention** (% contributors who remain active on day 2, in month 2 and 3)

These are easy for me to produce across a wide range of projects.

Findings (1/5):

70 minutes of work in the first two days.

Many first-time contributors participate for multiple days in a row.

Median contribution activity: ~70 mins in first 48h.

- Sounds small for a volunteer org, but for an online project it's massive!

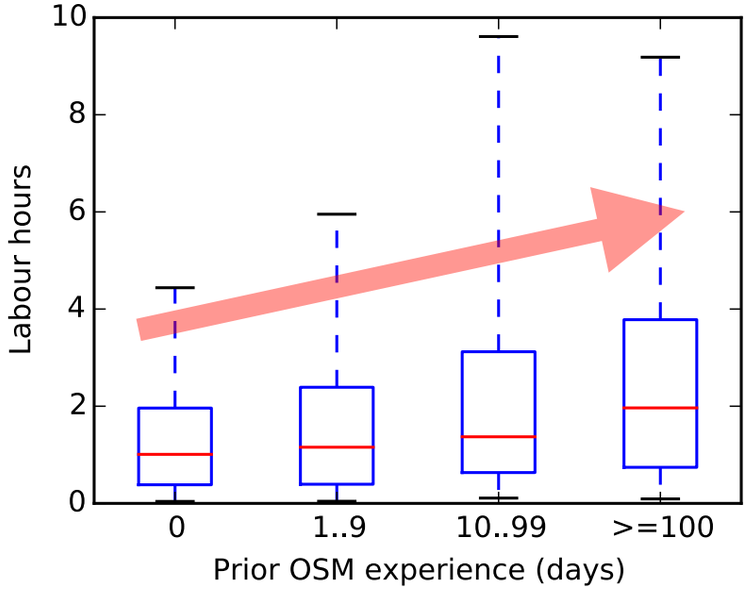
Cohort	l_{48h}	c_{48h}
TH	1.13	655.2
ER	1.15	622.6
MM	1.29	520.7

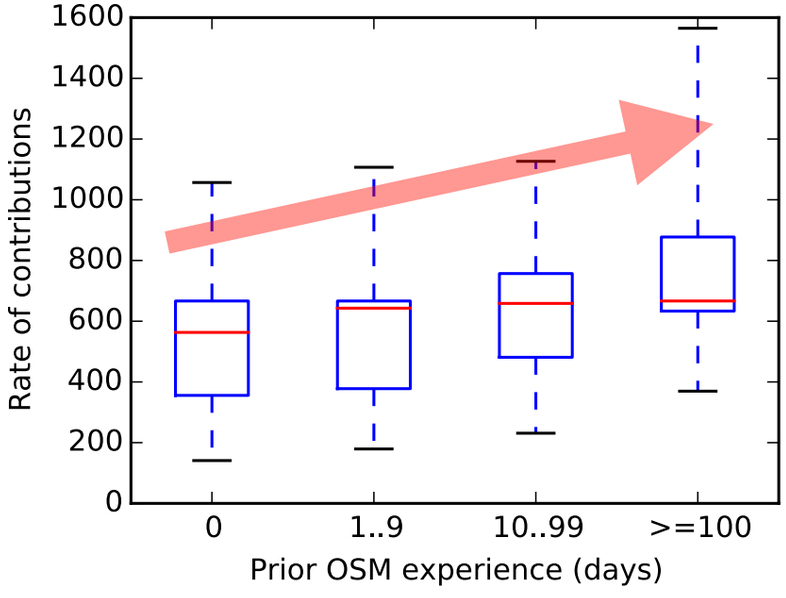
Table 6. Median contribution activity by cohort: labour hours and contribution rate in the first 48 hours.

Findings (2/5):

Prior experience affects performance.

People with more OSM experience tend to be faster and work more hours.





Findings (3/5):

MM contributors are OSM newcomers.

Segmenting participants by prior OSM experience:

- TH: mix of OSM experts & OSM newcomers
- MM: mostly newcomers to OSM

Experience d_{pre}	TH	ER	MM
0 days	30.9%	52.8%	72.8%
1-9 days	22.2%	24.3%	18.4%
10-99 days	20.3%	11.7%	5.3%
≥100 days	26.6%	11.2%	3.4%

Table 5. Share of participants with a given amount of prior OSM experience d_{pre}, measured in the number of days on which they contributed to OSM.

Findings (4/5):

These newbies are catching up quickly.

Contributors to MM start slowly, however they catch up with others: **many increase their pace of contributions** in the first 48h.

Change of pace	TH	ER	MM
Low	21.7%	27.9%	4.8%
Average	49.6%	49.2%	57.1%
High	28.7%	22.9%	38.1%

Table 12. Share of participants based on their change in contribution pace c_{d2}/c_{d1} between the first and second day.

Findings (5/5):

Retention matches org practice.

Activity and retention are shaped by organisational practice and project purpose:

- TH: much short-term activity in the first few days, but no longer-term retention at all!!
- **MM: people keep coming back**, not the next day but the next month and the month after.

Cohort	R_{d2}	R_{m2}	R_{m3}
TH	28.1%	0.0%	0.0%
ER	29.0%	8.1%	1.3%
MM	11.1%	10.5%	8.3%

Table 7. Median retention for day 2, and months 2 and 3.

Implications

MM seems to provide a better training experience for newcomers.

- **Welcoming social spaces**: regular mapathons in a growing number of cities, expert guidance, peer learning.
- **A more well-connected community**: Facebook, Twitter, email alerts, ...

Gradually reaching outside the OSM community

- **Most first-time contributors now have no prior OSM experience**. This was quite different in the beginning.
- This affects how we should approach & support HOT newcomers.

Next project: observing mapathons

Contribution environments likely play an important role:

- In-person training and guidance
- Safe spaces to make early mistakes

How do these social environments affect engagement?

Thank you.

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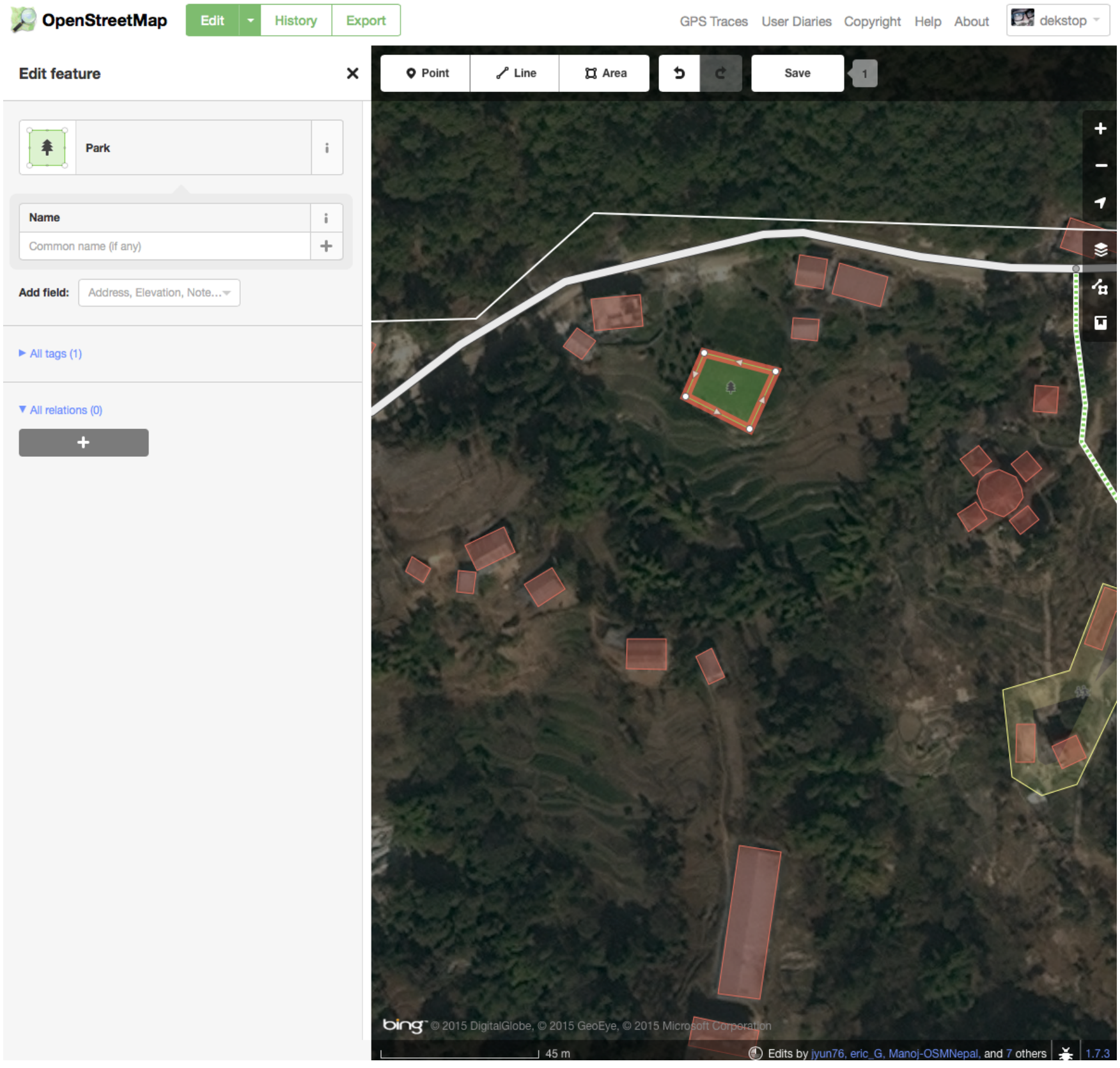
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Common name (if any)
Add field:
Address, Elevation, Note...
All tags (1)
All relations (0)
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