

OpenStreetMap – Overview and Motivational Factors

Dr Muki Haklay

Department of Civil, Environmental and Geomatic Engineering, UCL

m.haklay@ucl.ac.uk

Nama Budhathoki, PhD Candidate

University of Illinois at Urbana-Champaign

nbudhat2@illinois.edu

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User Generated Geographical information

- Appeared because:
 - Increase accuracy of GPS (selective availability)
 - Capture devices - from GPS receivers to mobile phones with integrated camera and A-GPS
 - Decrease in storage costs
 - Increase in bandwidth with decrease in costs
 - Easy to use mapping websites, and wide availability of base mapping
- Results: User Generated Content - Flickr, YouTube

Flickr

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Cottage from 1800s by burbsblogger

burbsblogger's items (125).

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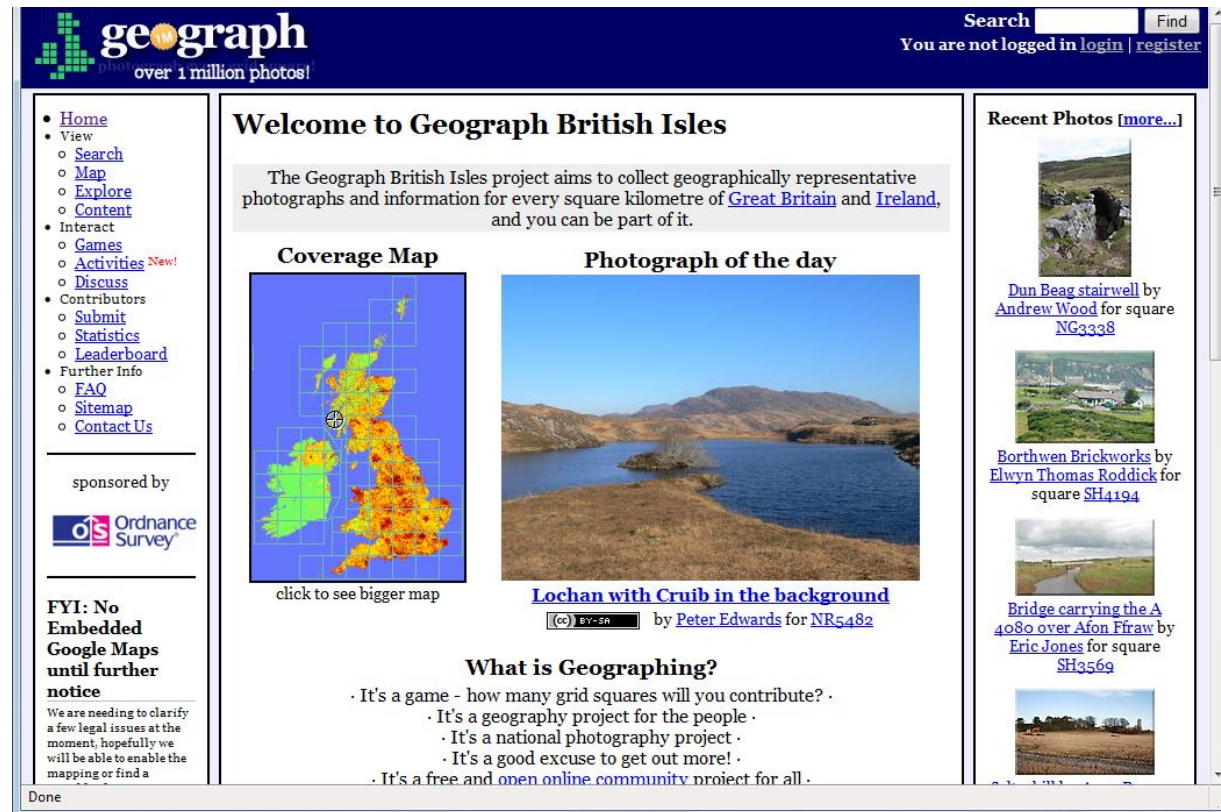
Search the map

© 2008 Yahoo! Inc.

Done

Geograph.org.uk

- 9,399 users
- 1.6m images
- 75.5% coverage
- Since last year, increase of 2600 users, 600,000 images and 4% in coverage



The screenshot shows the homepage of Geograph.org.uk. At the top, there is a search bar and a navigation menu. The main content area is divided into several sections:

- Welcome to Geograph British Isles:** A central banner with a grid overlay on a map of Great Britain and Ireland, and a photograph of a lake (Lochan with Cruib in the background).
- Coverage Map:** A map of Great Britain and Ireland showing the progress of the project's coverage, with a grid overlay.
- Photograph of the day:** A large photograph of a lake (Lochan with Cruib in the background) with a grid overlay.
- Recent Photos:** A list of recent photos with thumbnails and titles, such as "Dun Beag stairwell" and "Borthwen Brickworks".
- What is Geographing?:** A section explaining the project's goals and how to participate.

On the left side, there is a navigation menu with links like Home, View, Search, Map, Explore, Content, Interact, Games, Activities, Discuss, Contributors, Submit, Statistics, Leaderboard, Further Info, FAQ, Sitemap, and Contact Us. Below the menu, there is a sponsored by logo for Ordnance Survey and a notice about embedded Google Maps.

Google Map Maker

Google Map Maker

e.g., "Andheri, Mumbai" or "Theatre near Bangalore"

Search Search Map Maker

Search Results My MapMaker [Link to this page](#)

Results from the last 'search' or 'find'. [Learn more](#)

12 results near 35.549407,6.165594

- Intersection**
 Category: Intersection
[Edit](#) [Report this](#)
- Road section**
 Batna, Batna, DZ.
 Category: Road section
[Edit](#) [Report this](#)
- Road section**
 Batna, Batna, DZ.
 Category: Road section
[Edit](#) [Report this](#)
- Road section**
 Batna, Batna, DZ.
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[Edit](#) [Report this](#)
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 Batna, Batna, DZ.
 Category: Road section
[Edit](#) [Report this](#)

Map Maker interface showing a street map with several red location pins. A pop-up window for an 'Unnamed Intersection' is visible, containing a 'Help' link, 'Report this | Delete' buttons, and an 'Edit' dropdown menu. The map includes navigation controls, a 'Find to edit' search box, and an 'Add' menu with options for location, road, and building. A scale bar at the bottom indicates 200 feet and 100 meters. The footer includes 'POWERED BY Google' and 'Map data ©2008 Google - Terms of Use'.

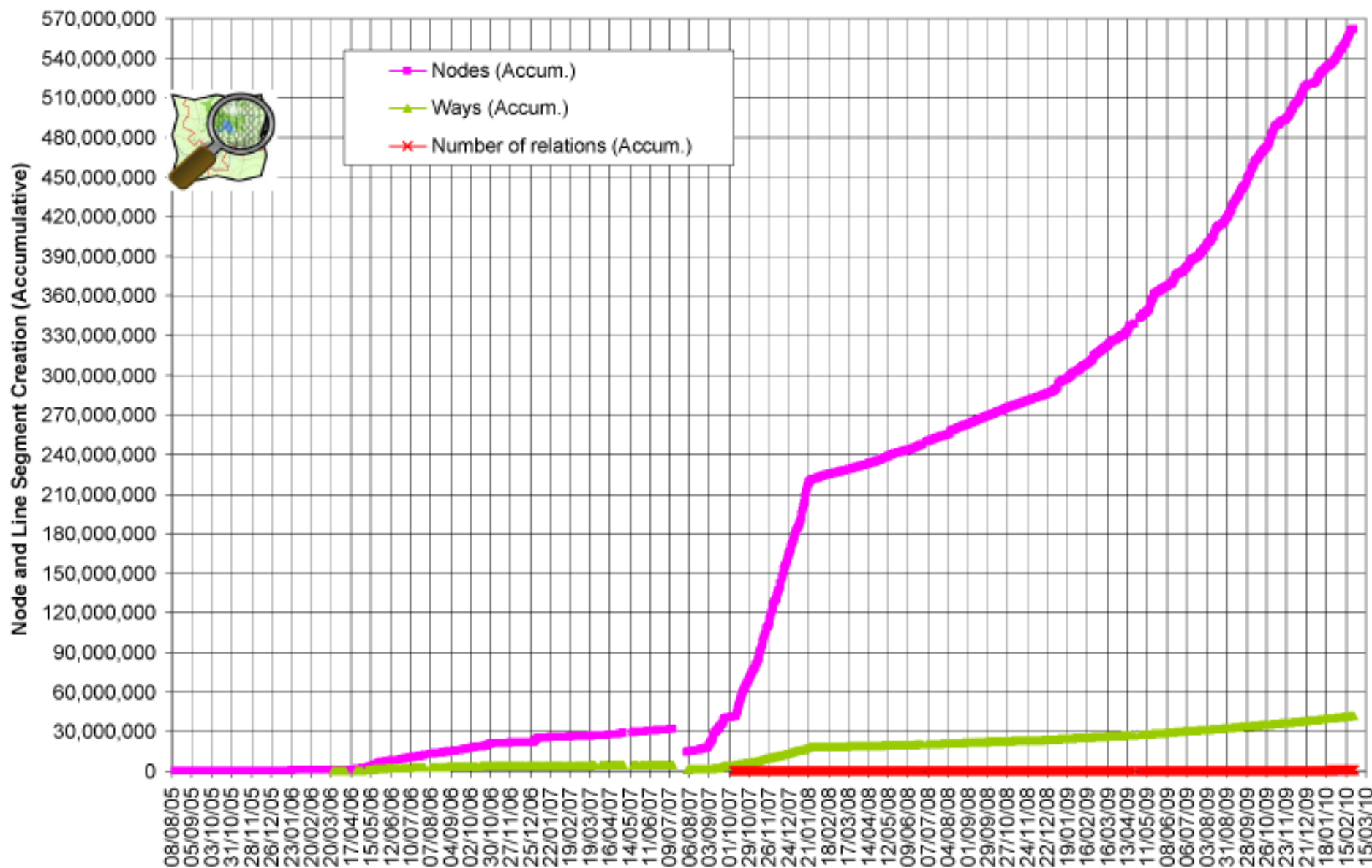
Done

OpenStreetMap

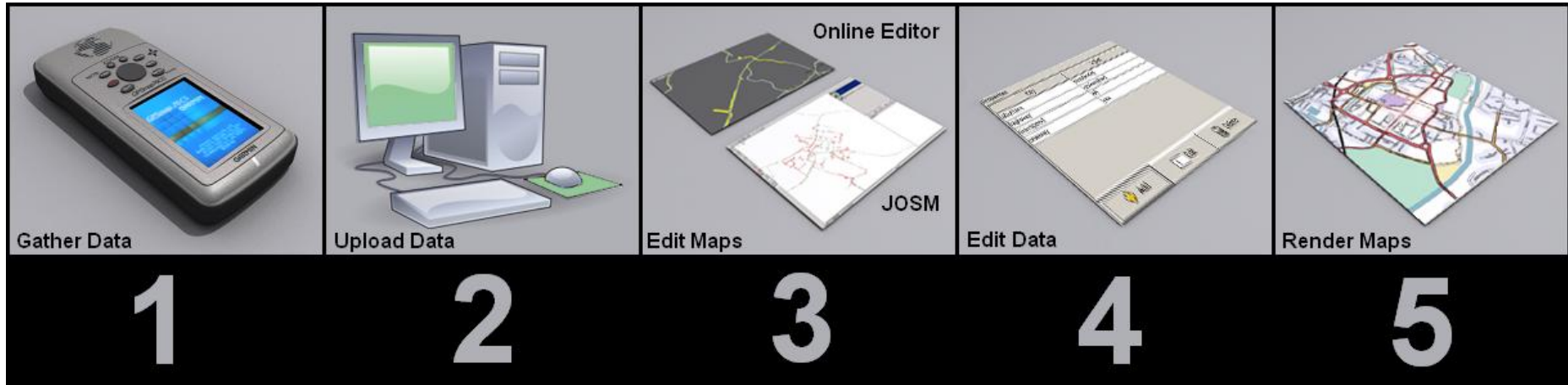
- Started at UCL by Steve Coast, in the summer of 2004, with the aim to create a crowdsourced street map of the world
- Many people joined in to help with the technical infrastructure and collect data. About 40-50 people form the core of the organisation

OpenStreetMap Database Statistics

Node, Way and Relation Creation



Creating Maps for OSM





loading data

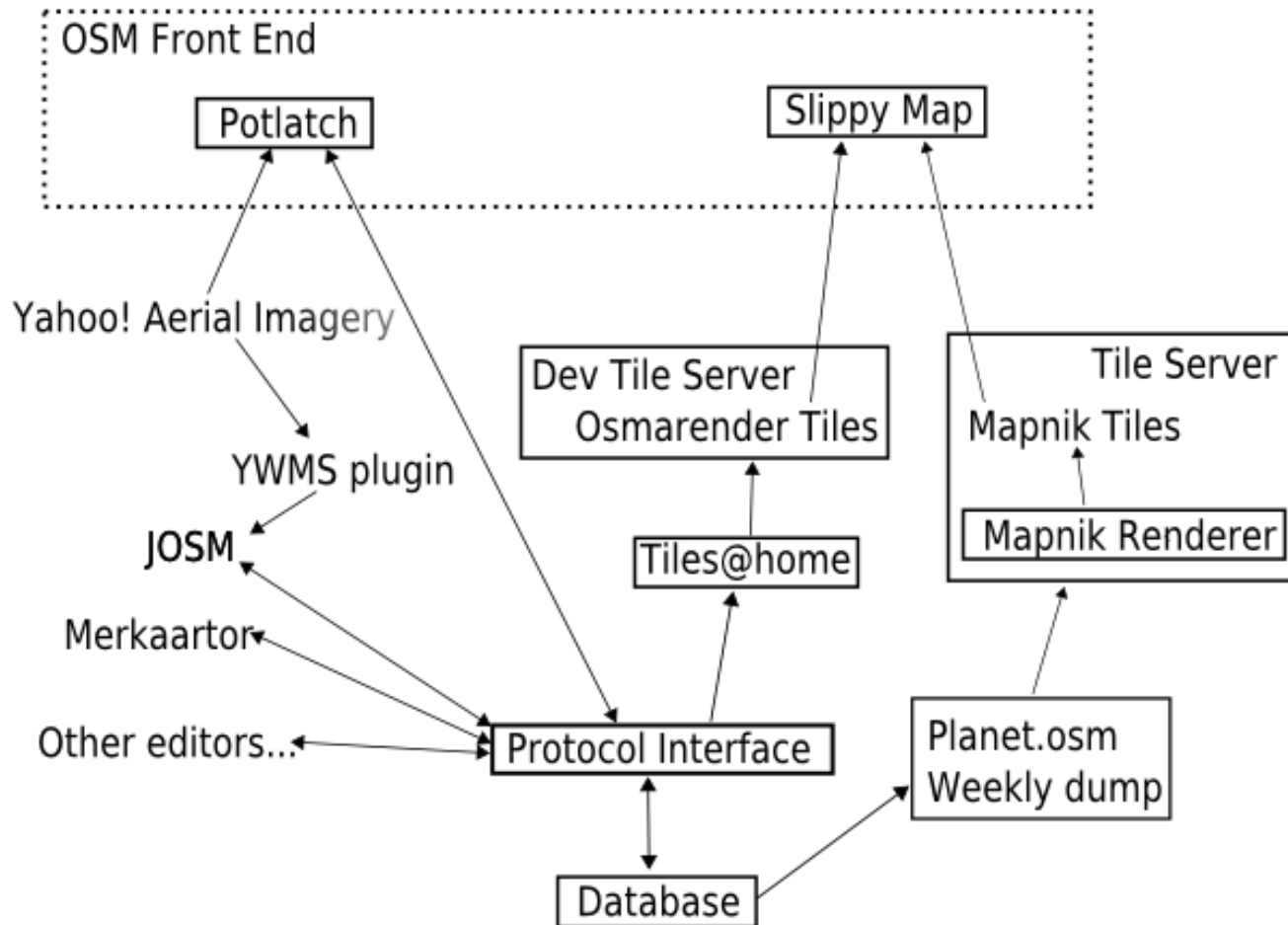
Potlatch 1.3e Drag and drop points of interest

- | | | | | | | |
|----------|----------------|----------------|-----------|--------------|----------------|---------------|
| Airport | Bus stop | Ferry | Parking | Rail station | Taxi rank | Bar |
| Cafe | Cinema | Fast food | Pub | Restaurant | Theatre | Convenience s |
| Hotel | Pharmacy | Postbox | Recycling | Supermarket | Telephone | Fire station |
| Hospital | Police station | Place of worsh | Museum | School | Haiti building | |

Mapping parties

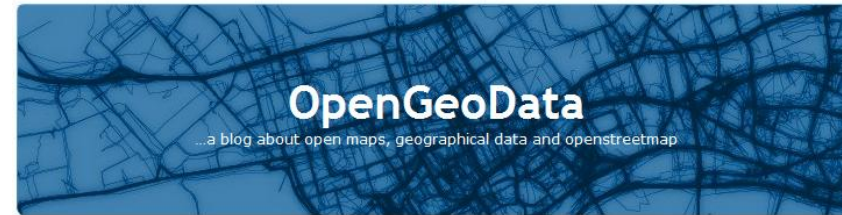


OSM technological stack (Geostack)



Infrastructure for Geographical Information

- Starting from scratch doesn't get you very far
- Imagery and public domain vector data are critical



[AutoCAD Map3D](#)

Try AutoCAD Map3D, 30-day free trial!
www.Autodesk.co.uk/Map3D



« RGS

[Digital mapping catalogue](#)

Roads, streets, vectors & rasters. All formats, UK, Europe & World.

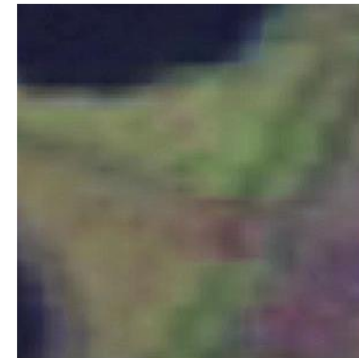
Ads by Google

OSMonth non-day »

Dec 2006

Yahoo! aerial imagery in OSM

Yes, really. Yahoo! have agreed to let OSM use their aerial imagery. Many thanks are due to Jeremy Kreidler and Scott Regan at Yahoo! for putting this together. On the OSM end, [Mikel Maron](#) has put a lot in and I've ([steve](#)) rewritten the applet tiling code to use Yahoo! Imagery. So what does it look like? Well this is what we could use before, Landsat:



It's about 15 meter per pixel and so not super useful for things like streets. This is the kind of imagery (actually the same area a bit zoomed in from the above) that Yahoo provides:



Simplified glue – OSM API vs. OGC WMS

- **OpenStreetMap API:**

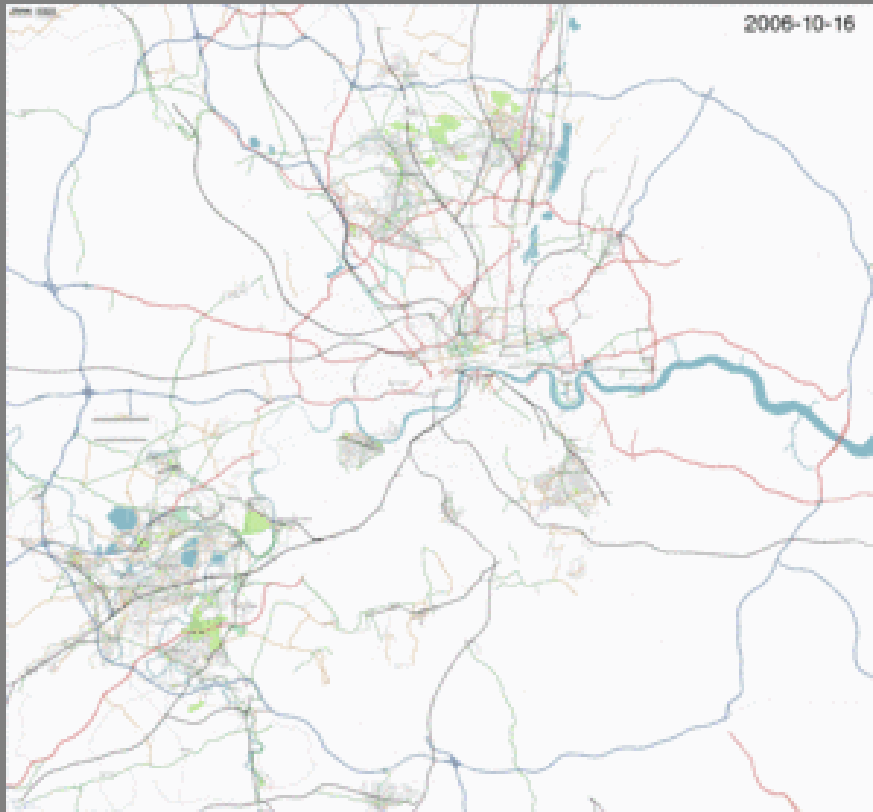
`http://api.openstreetmap.org/api/0.5/map?bbox=-71.00,42.00,-72.00,43.00`

- **OGC WFS API:**

`http://example.com/wfs?service=WFSSIMPLE&version=0.5&REQUEST=GetFeature&BBOX=-71.00,42.00,-72.00,43.00&TIME=2006-09-12/2006-09-22&OUTPUTFORMAT=text/xml`

Importantly, the output is also simple from OSM, while coming out as complex GML from the OGC variant.

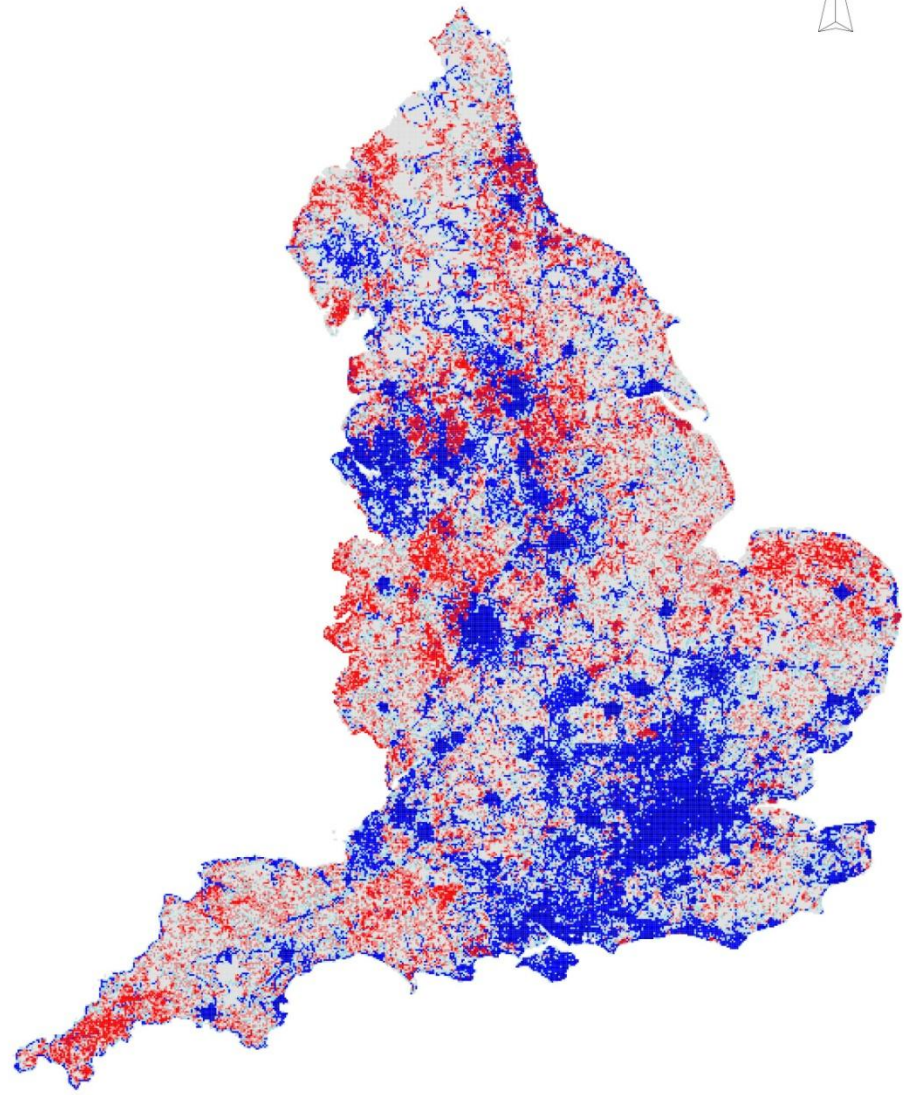
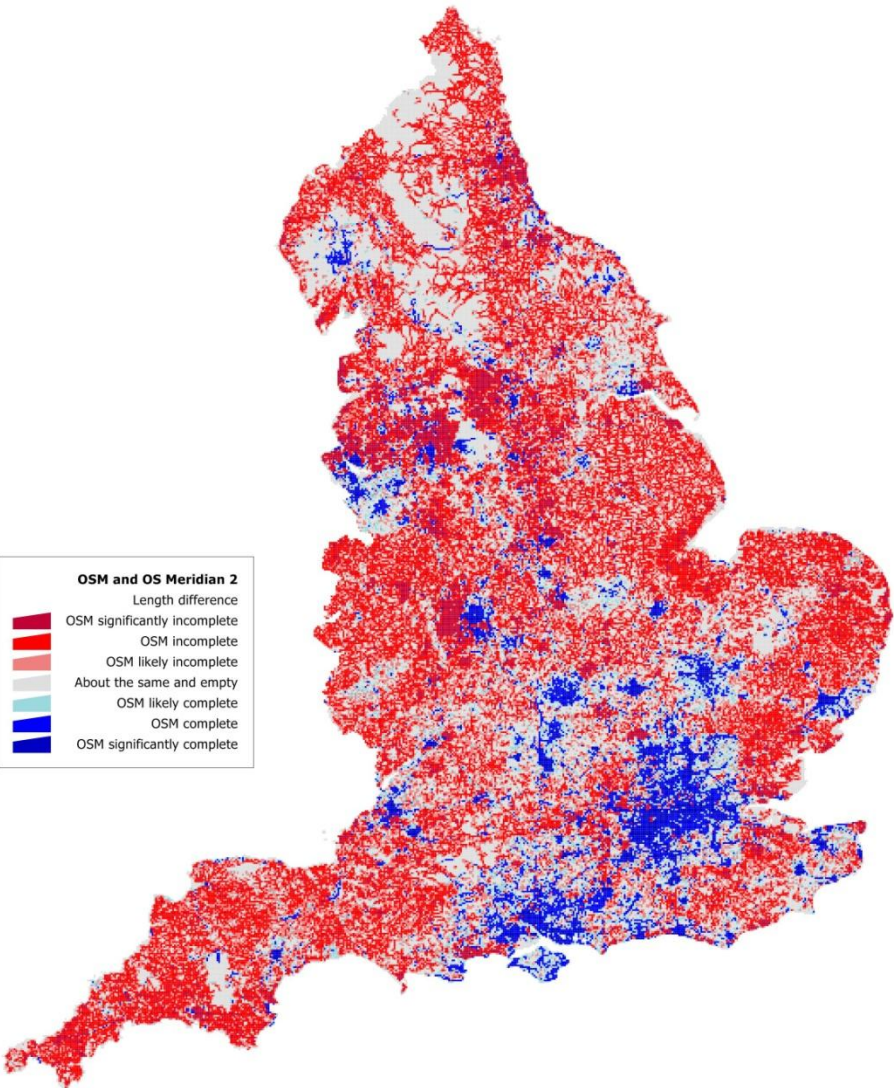
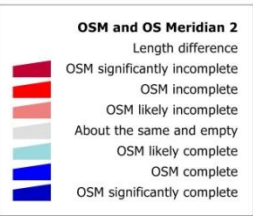
London after 6 months – 2006/2007



March 2008

October 2009

Results

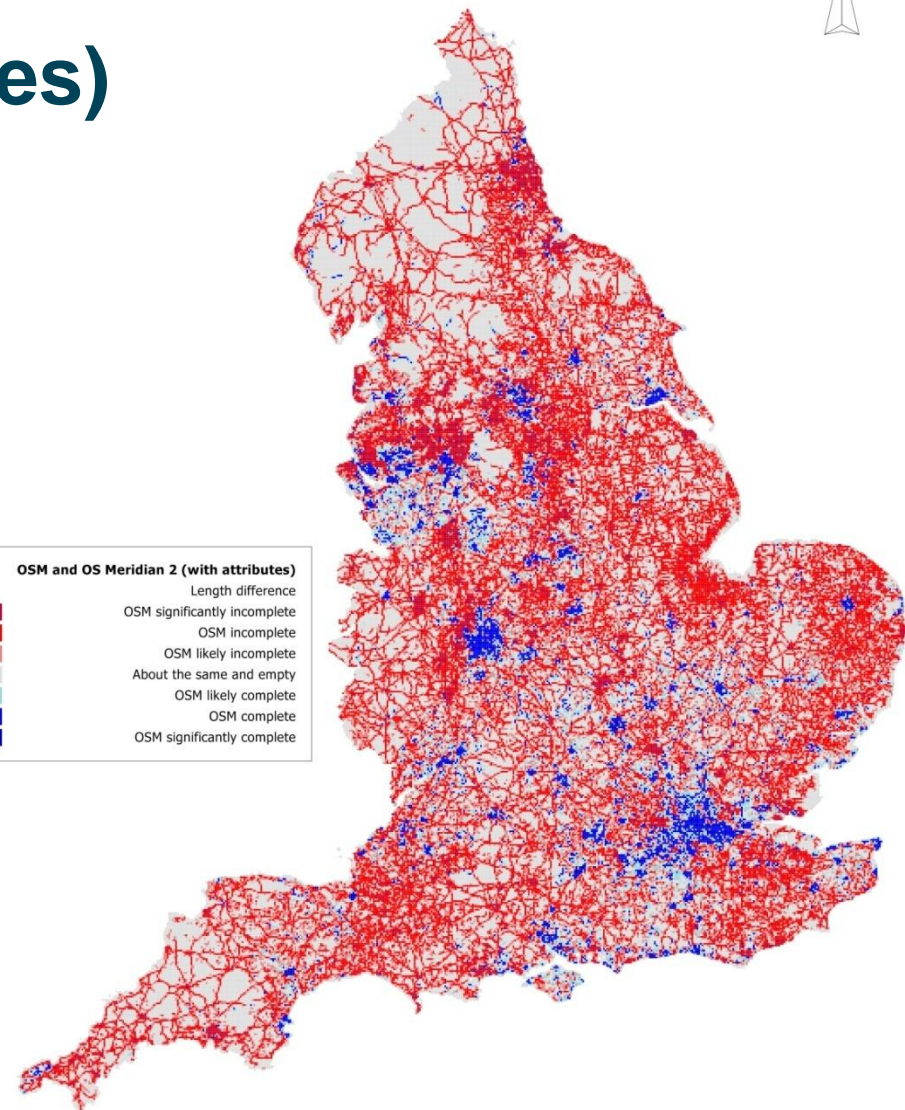
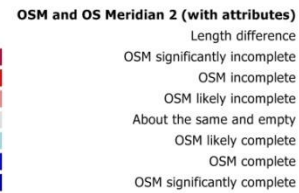
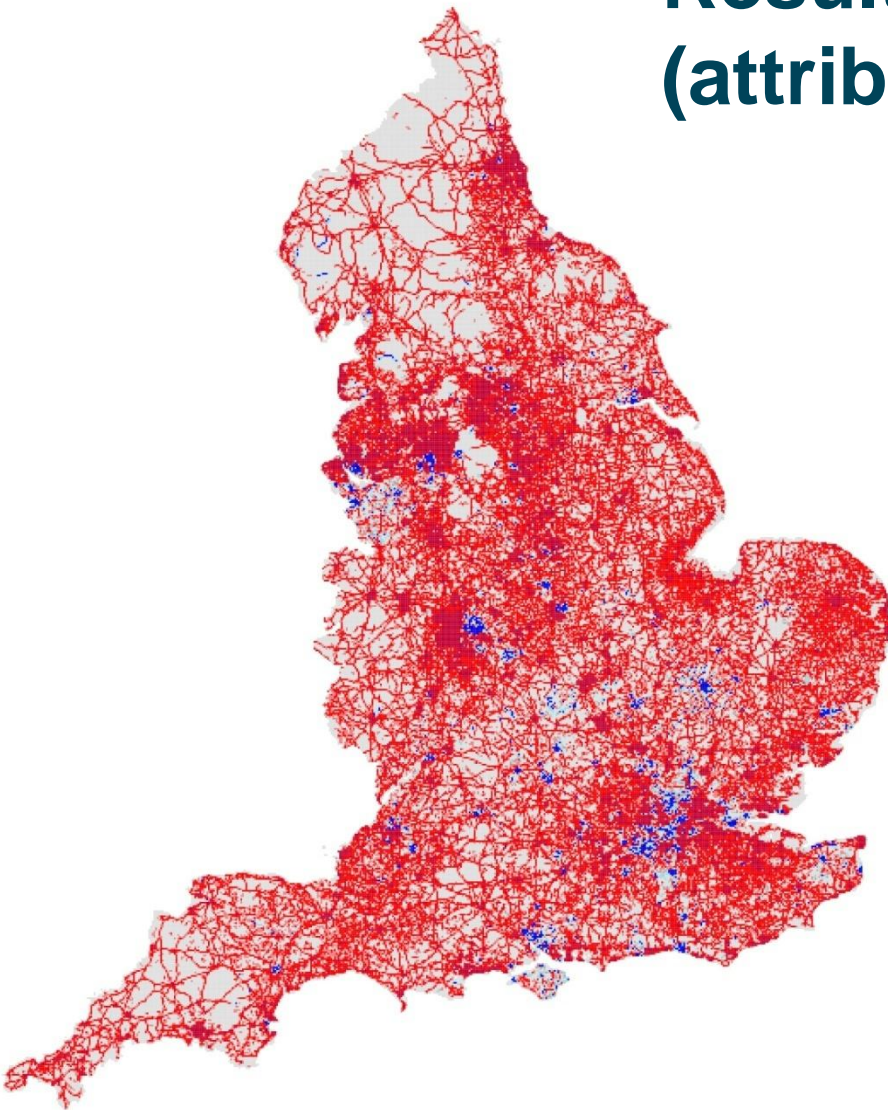


0 100 km

March 2008

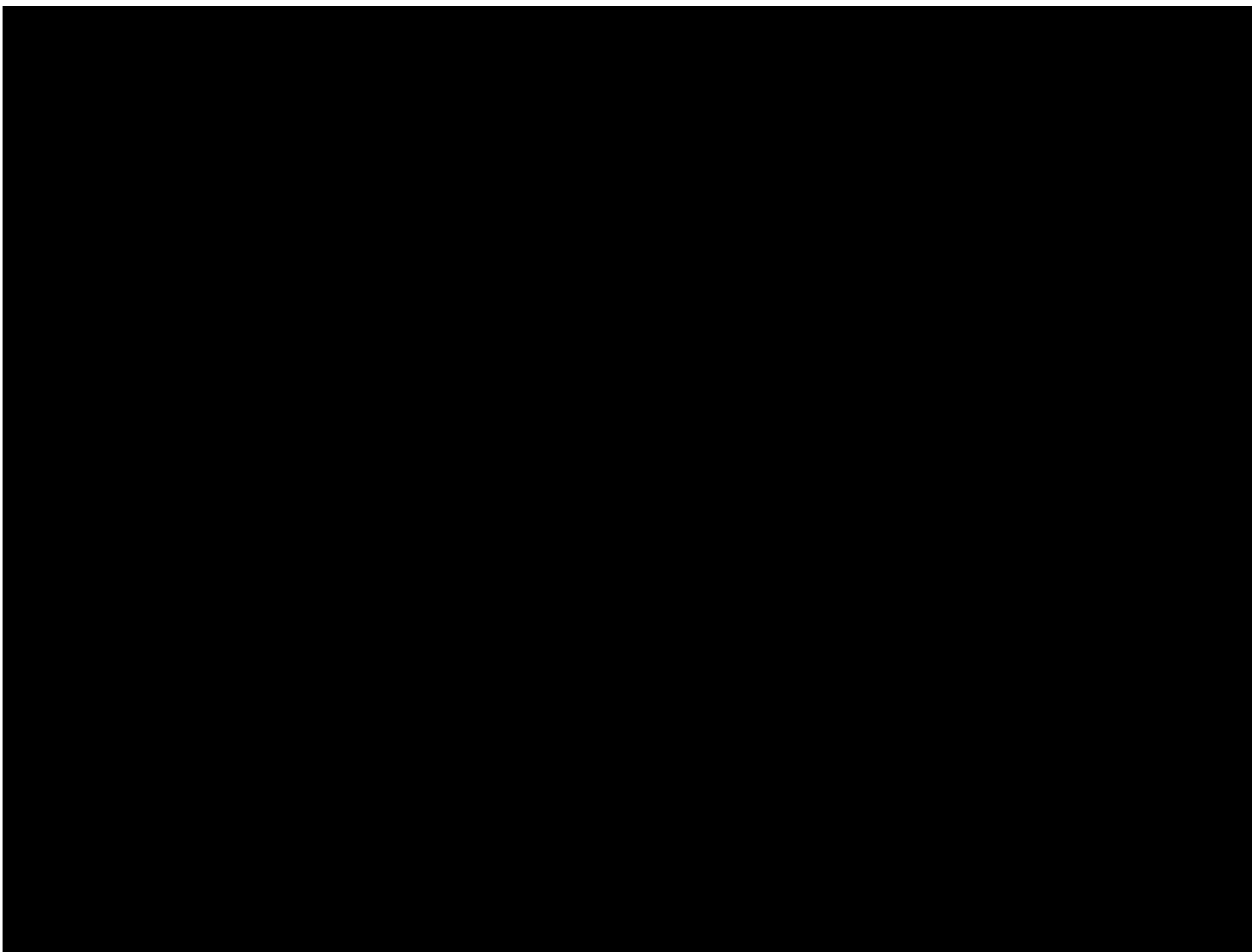
October 2009

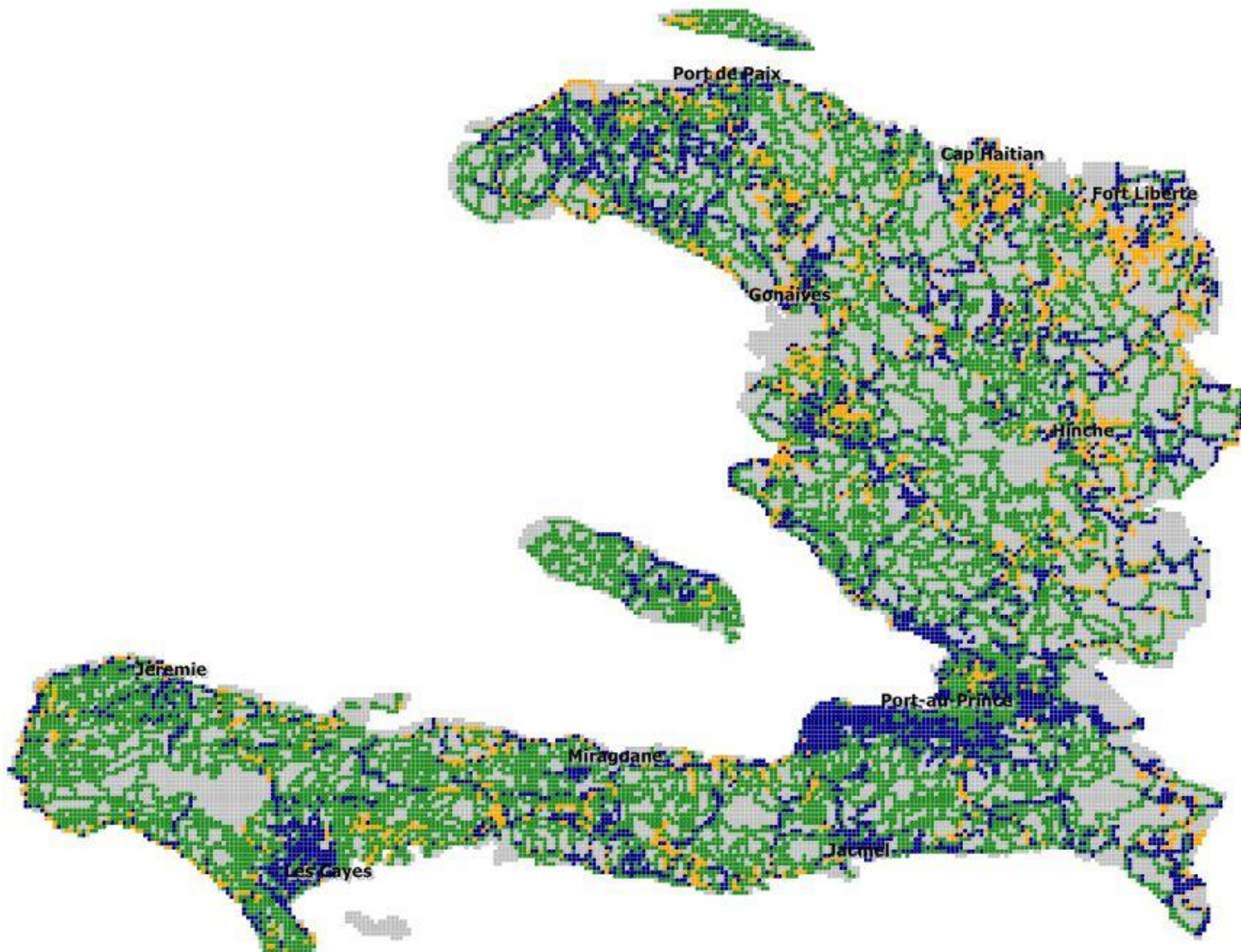
Results (attributes)



0 100 km

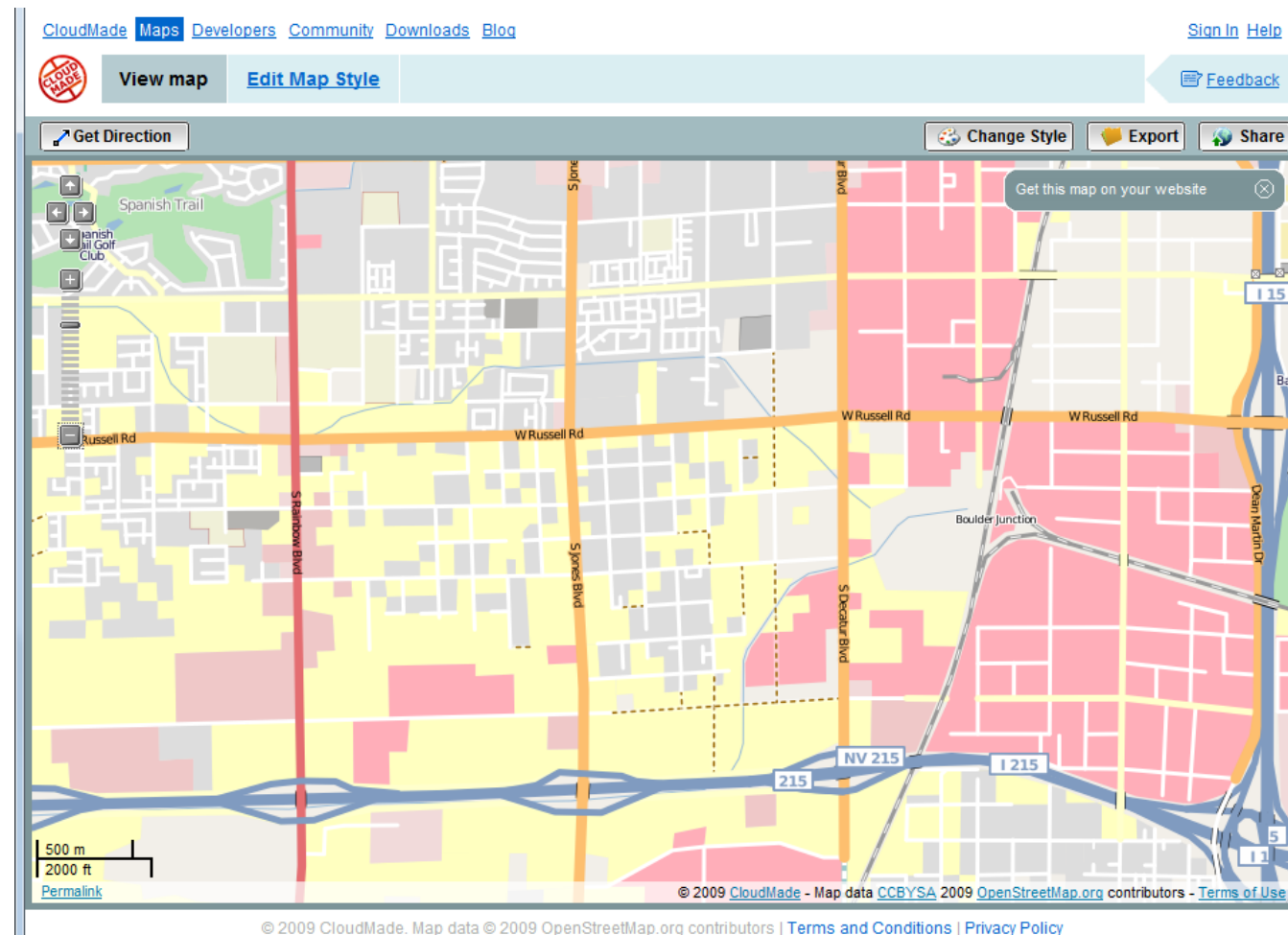
Haiti





Commercial offshoots: CloudMade / GeoFabrik / ITO! World

- Use OSM datasets
- Create information products on a commercial basis, without explicit profit sharing models
- Communal payback exist in all these cases



Business based on open geographical data:

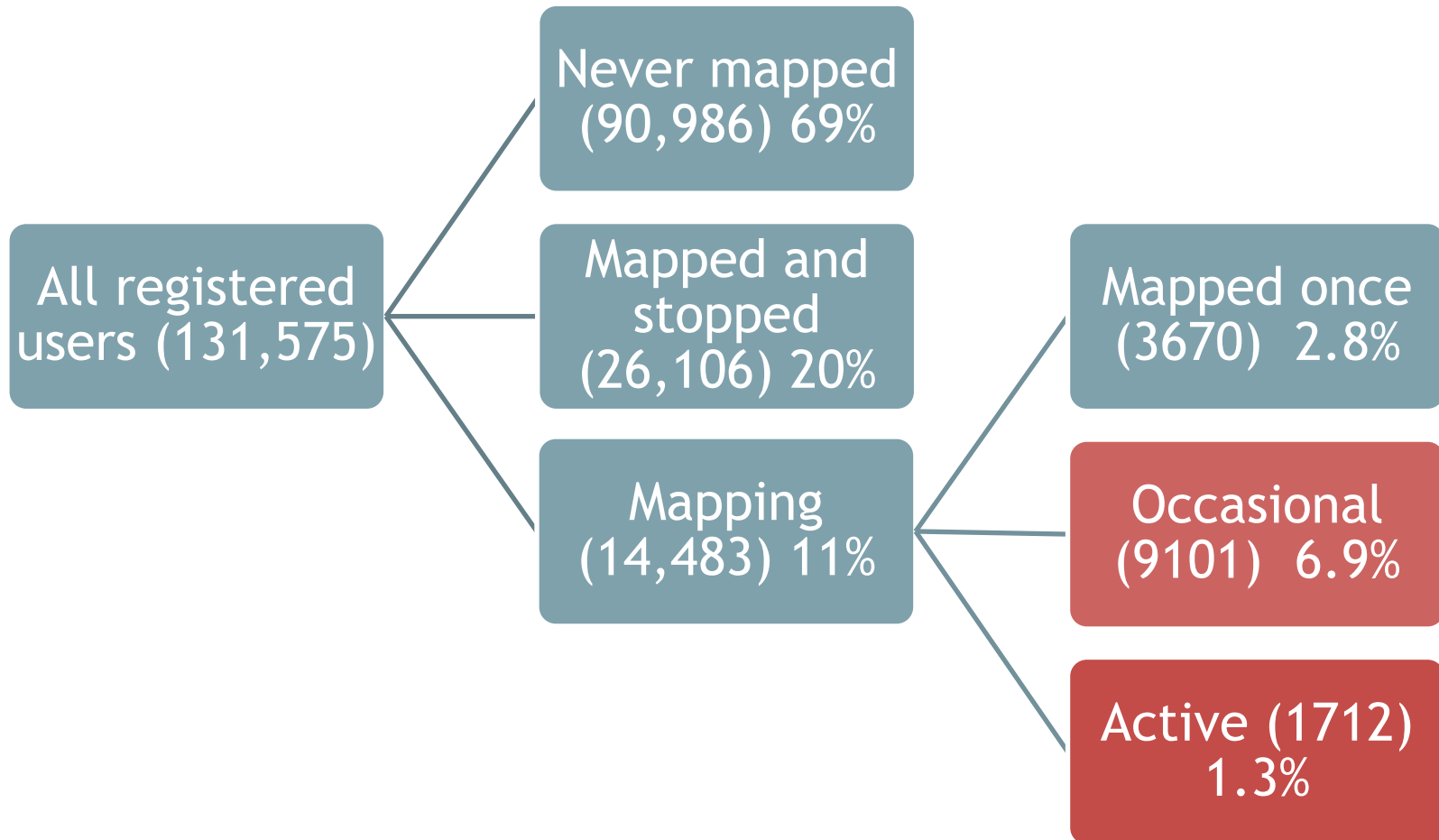
- New applications (CloudMade), VC backed, focus on growth areas - mobile
- Expertise in use of data (GeoFabrik)
- Niche specialism (Transport) leveraged by the use of free data (ITO! World)
- New products (Fluid Form) - Earring



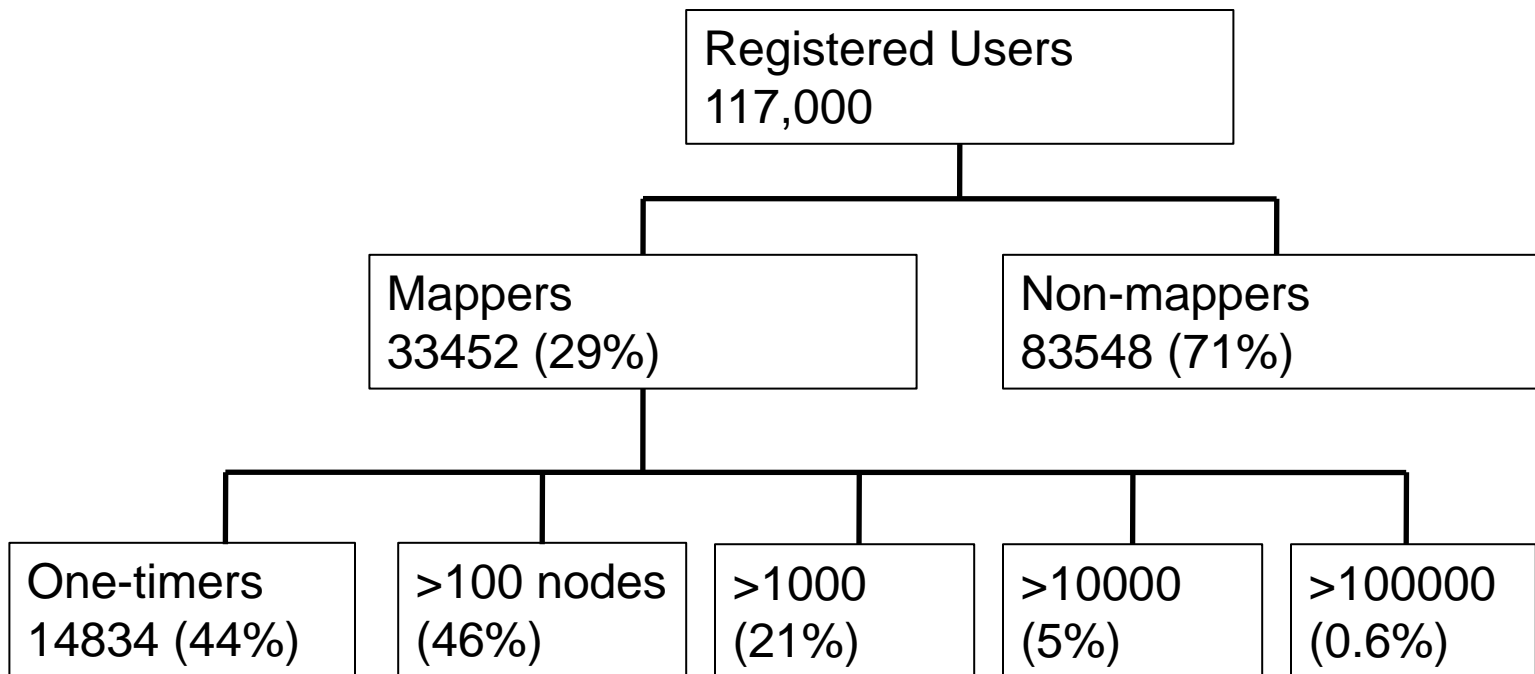
Theoretical framework for VGI motivation

- Unique ethos
- Learning
- Fun
- Instrumentality
- Recreation
- Meeting self need
- Altruism
- Recognition
- Career
- Reciprocity
- Community
- Monetary
- Socio-political

Patterns of engagement



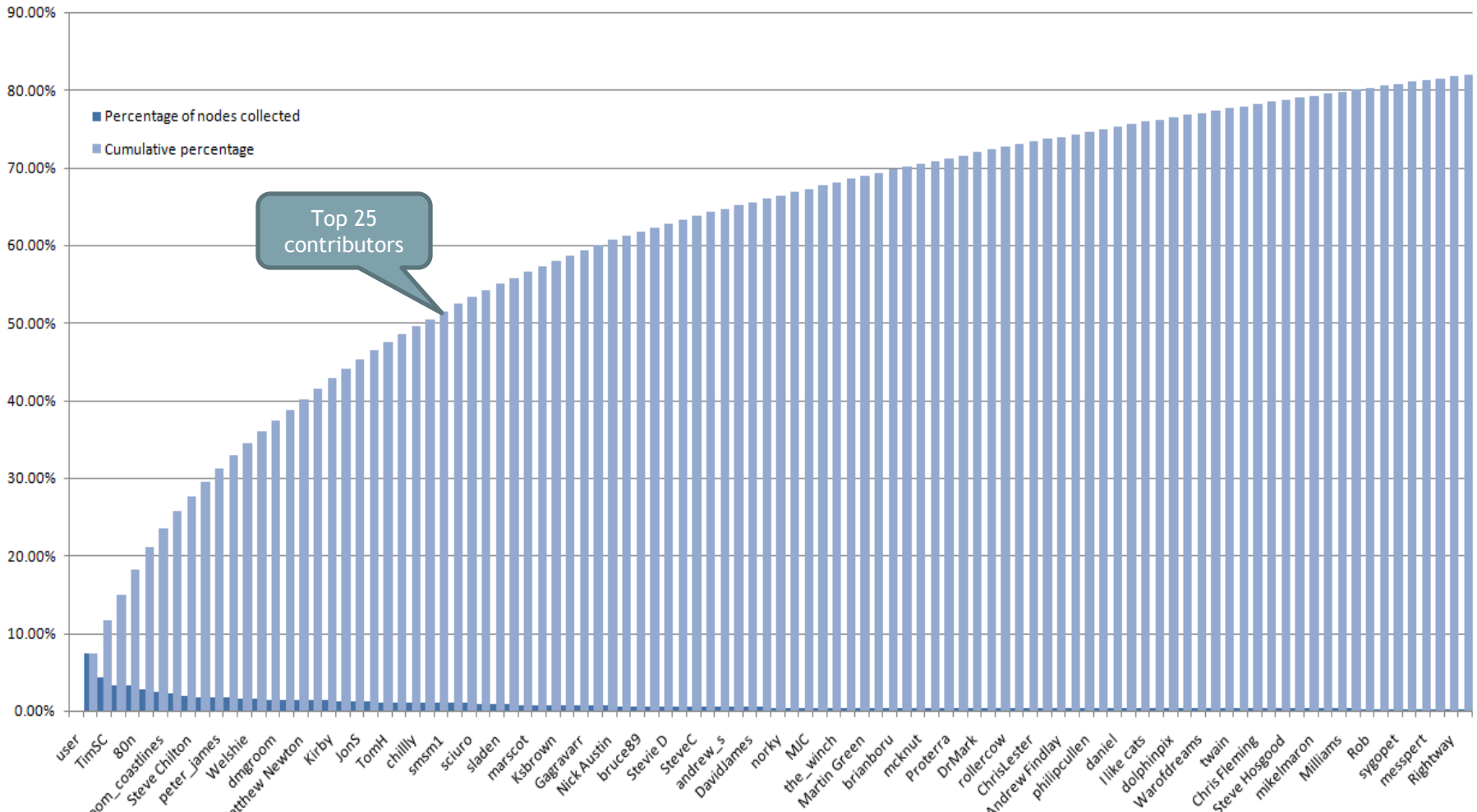
Contribution



Source: www.openstreetmap.org

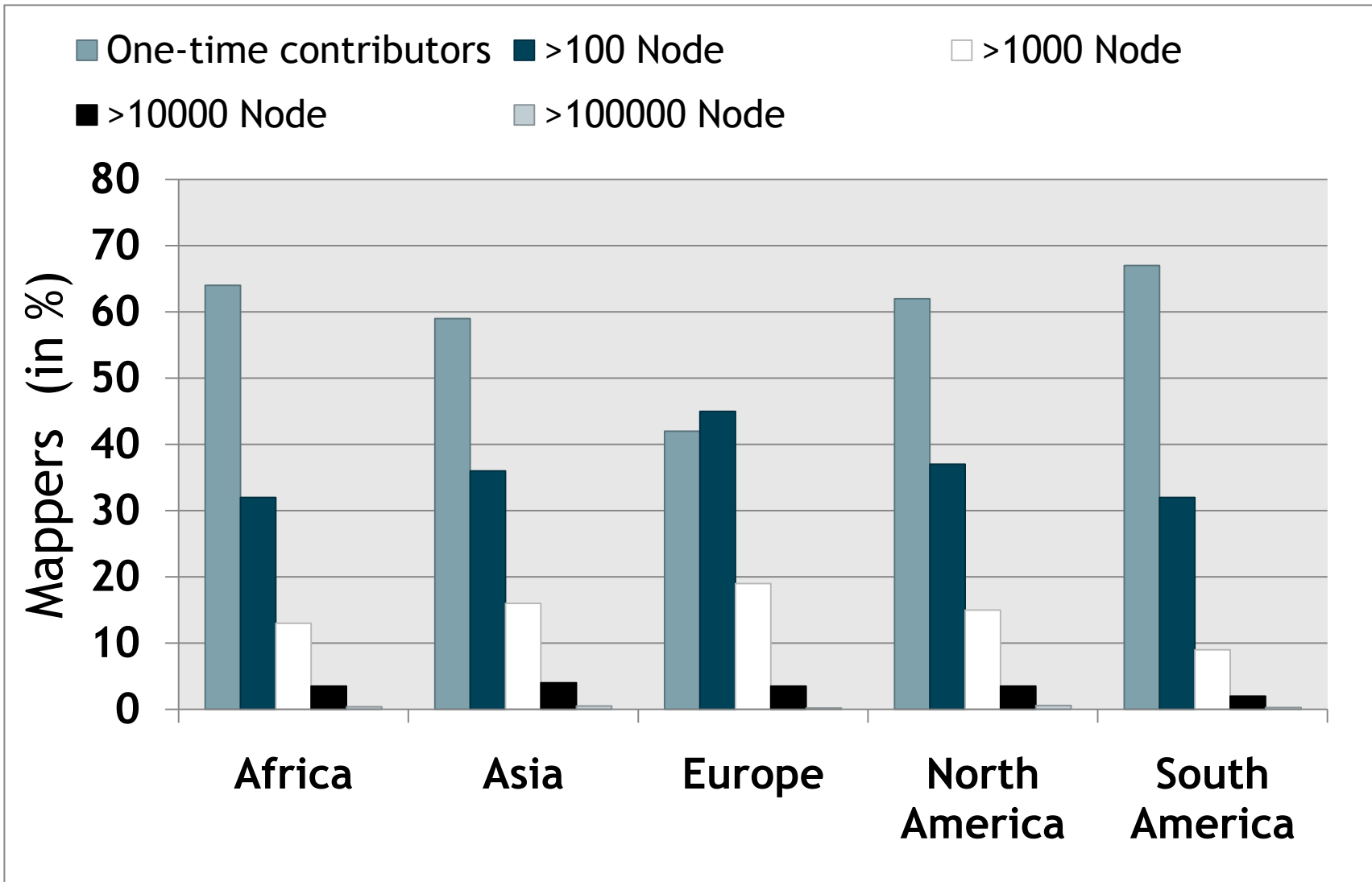
<http://downloads.cloudmade.com/> (Accessed on April, 2009)

Who collects?

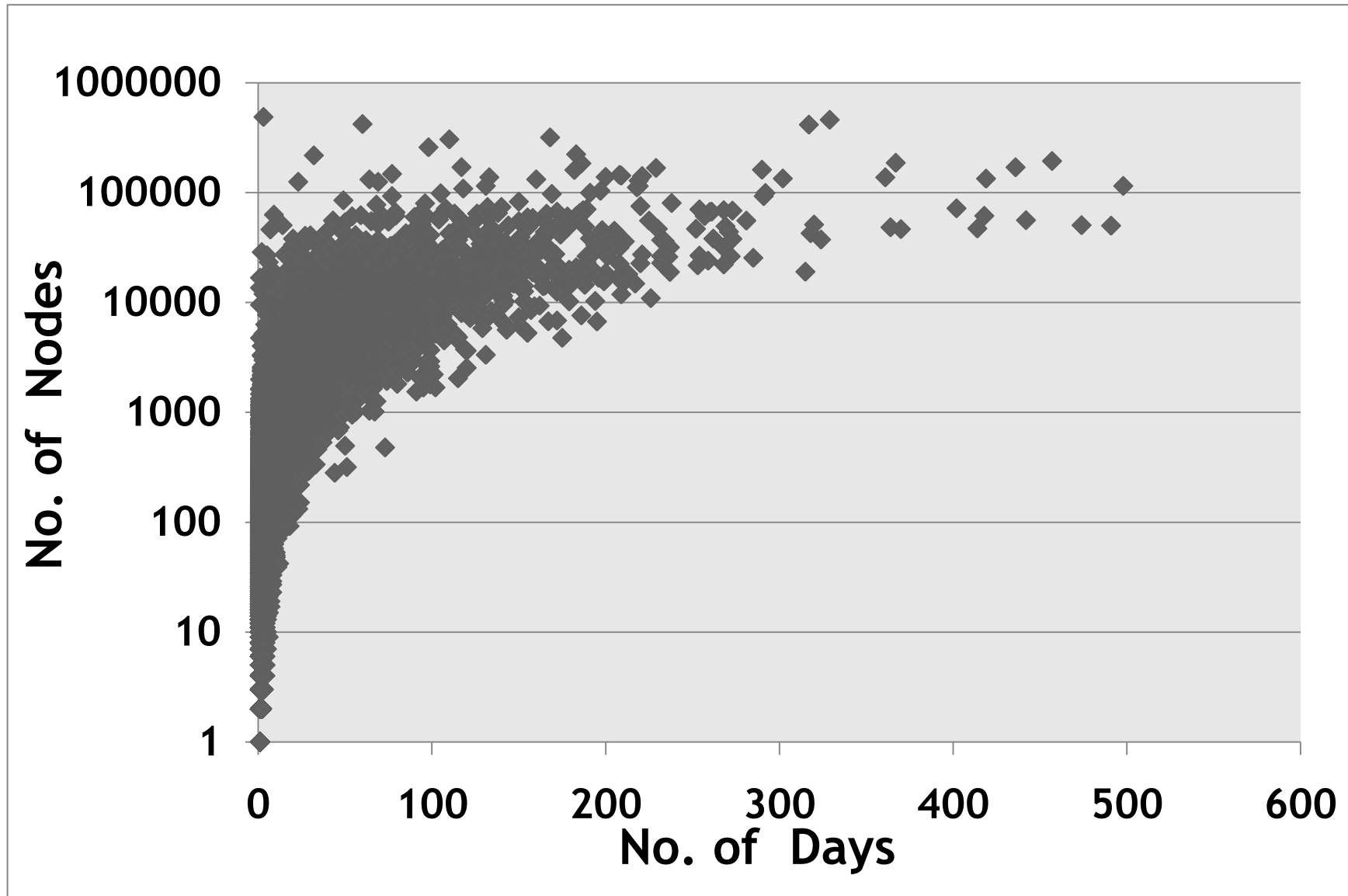


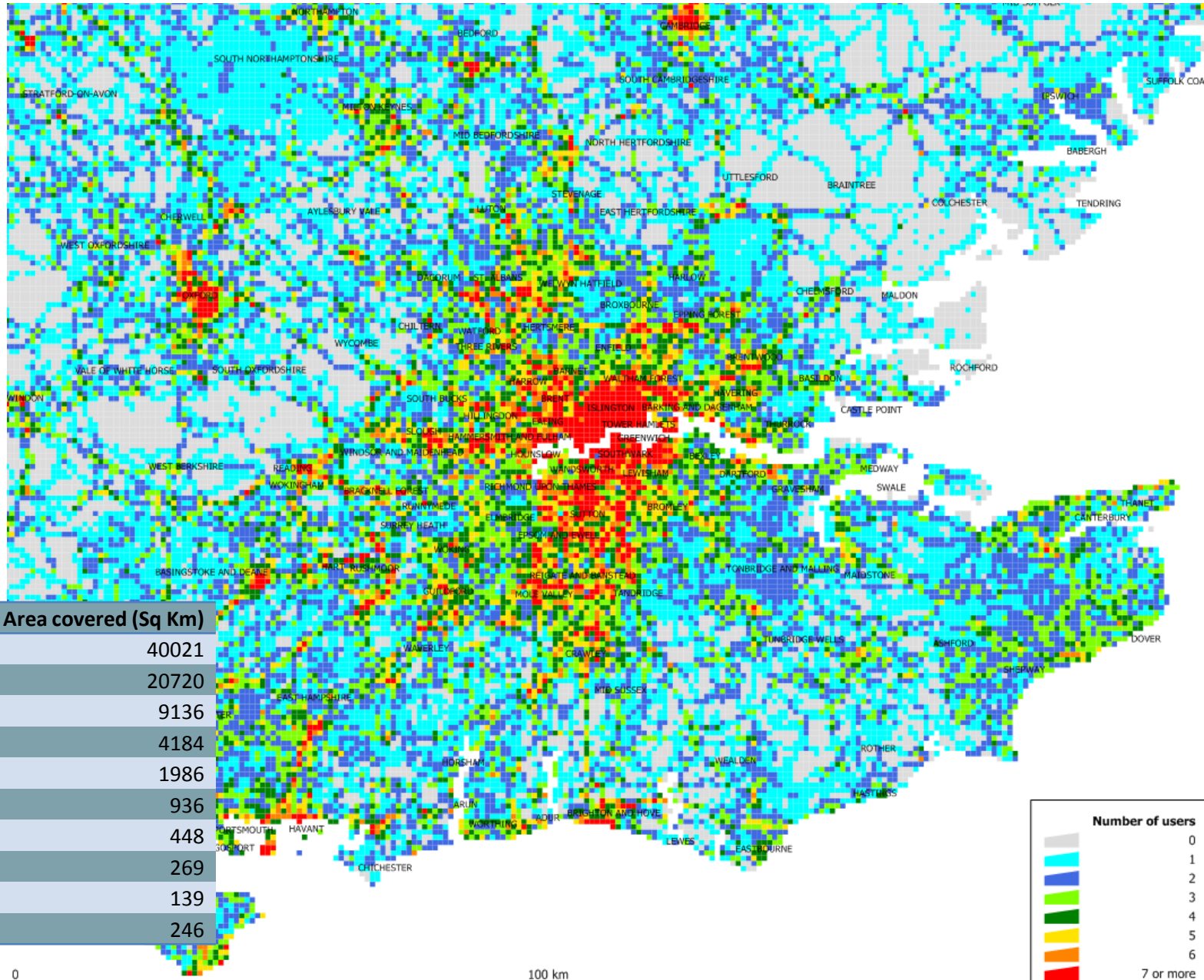
Data for England, March 2008

Contribution by Continent

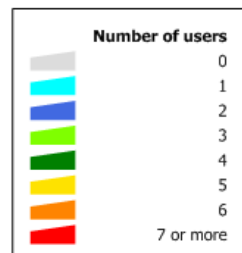


Contribution behaviour (Europe)





Number of Users	Area covered (Sq Km)
1	40021
2	20720
3	9136
4	4184
5	1986
6	936
7	448
8	269
9	139
10 and above	246



Who collects?

(c) Dair Grant

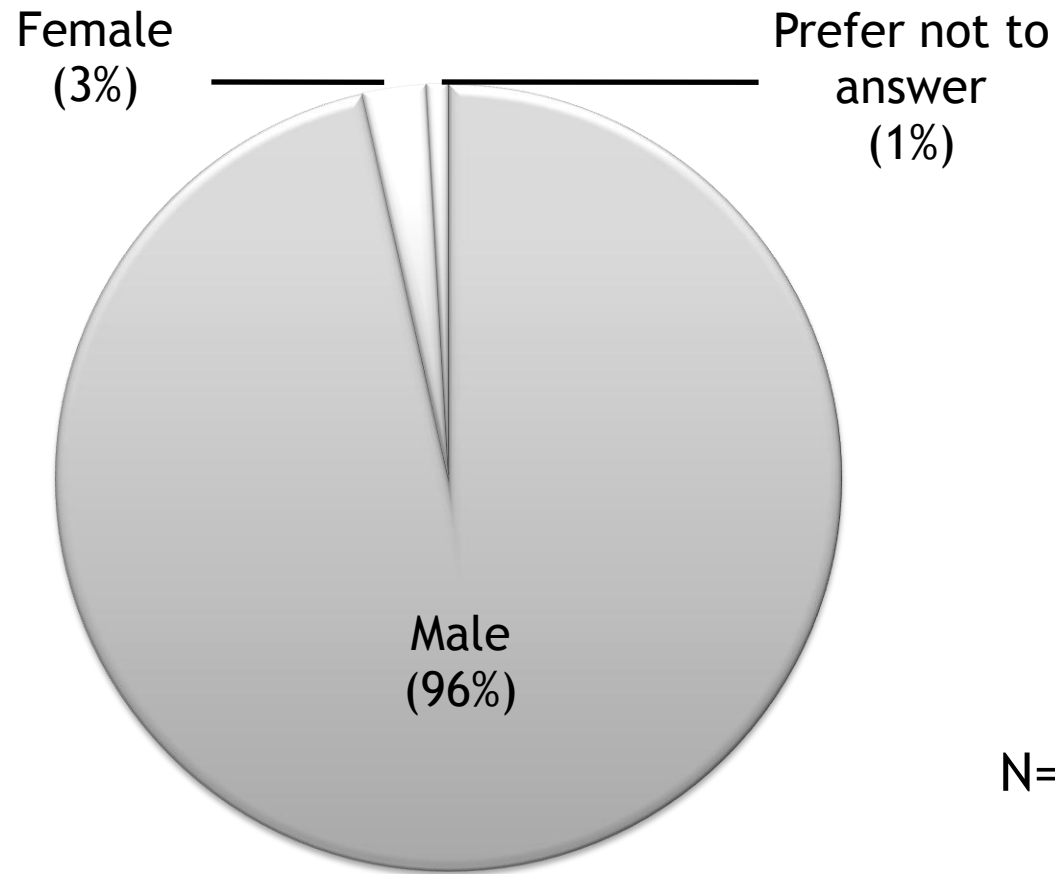


(cc) Shaun McDonald

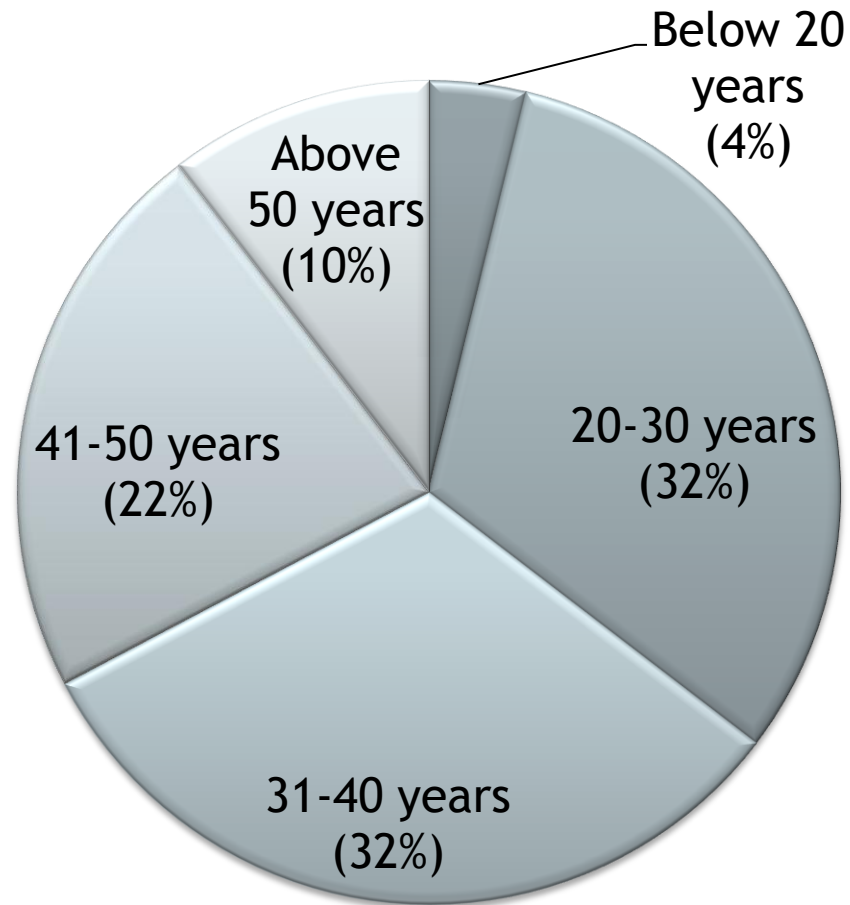


(cc) Chris Fleming

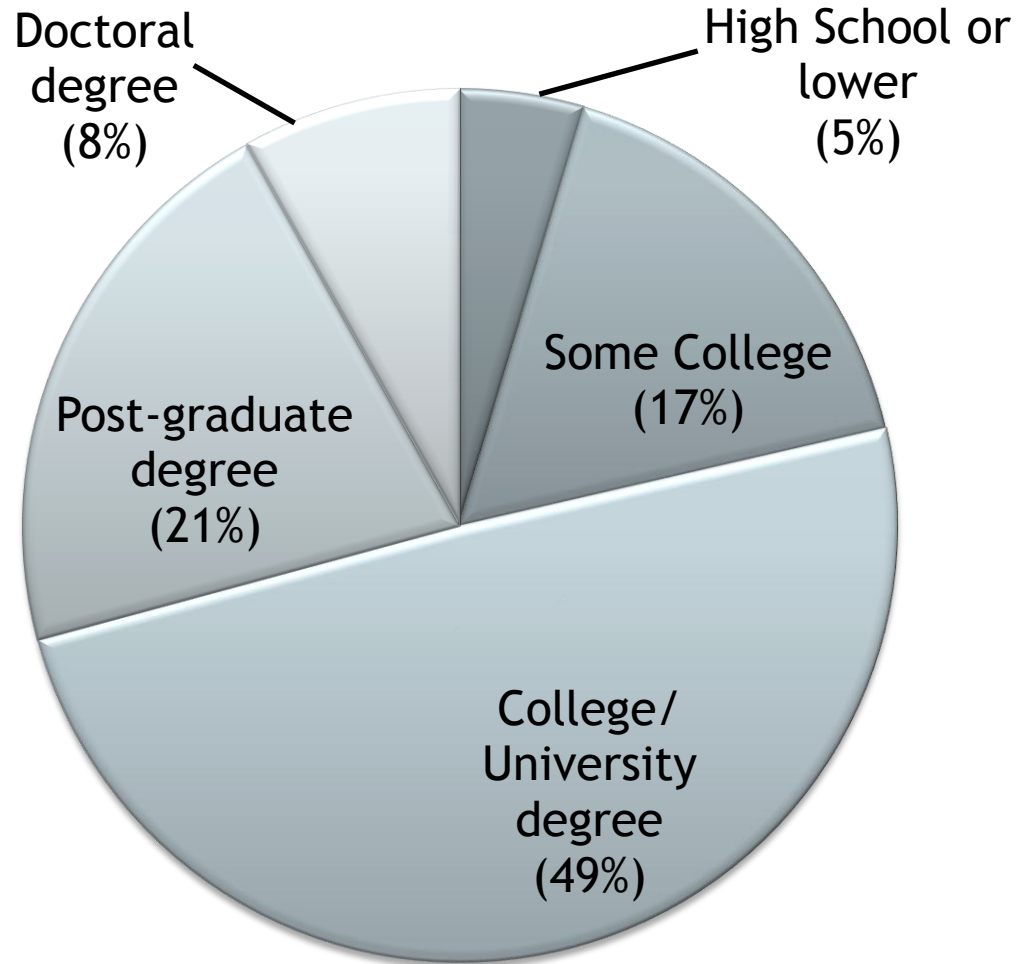
Gender



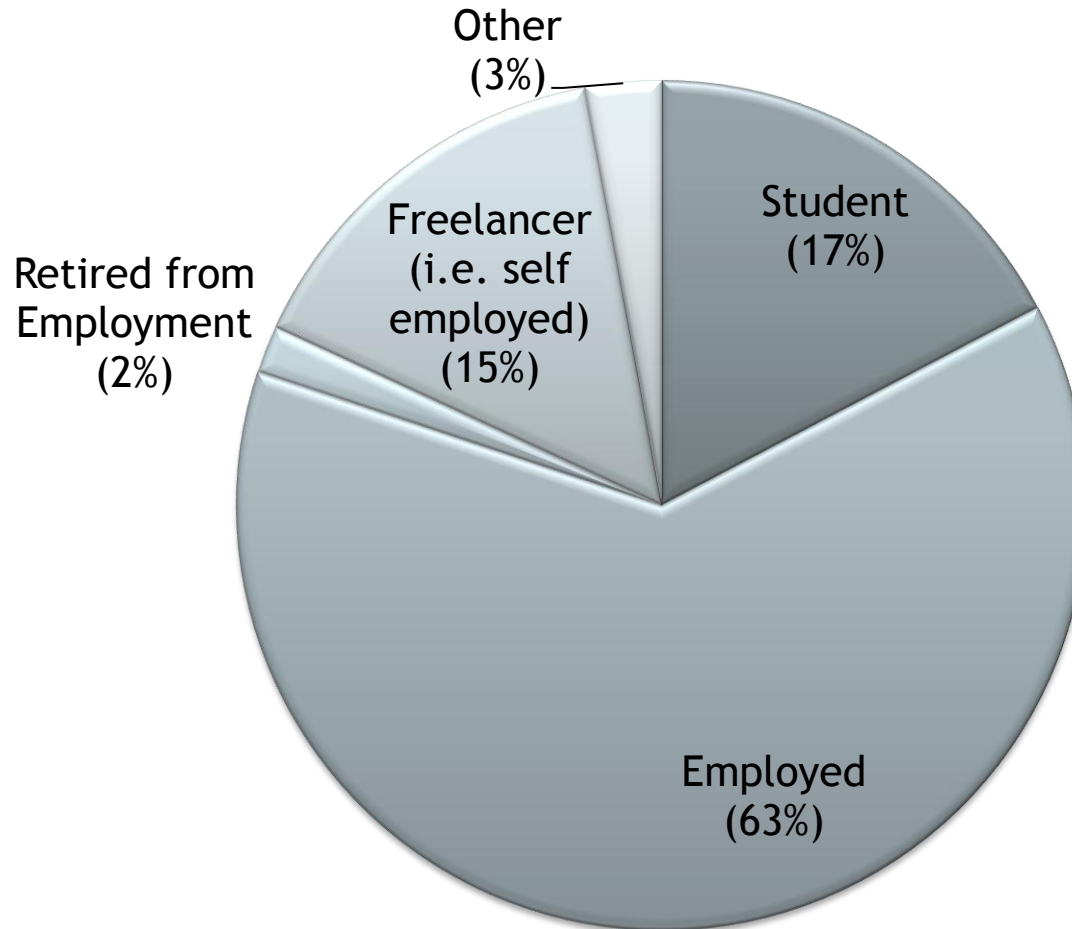
Age



Education



Occupation



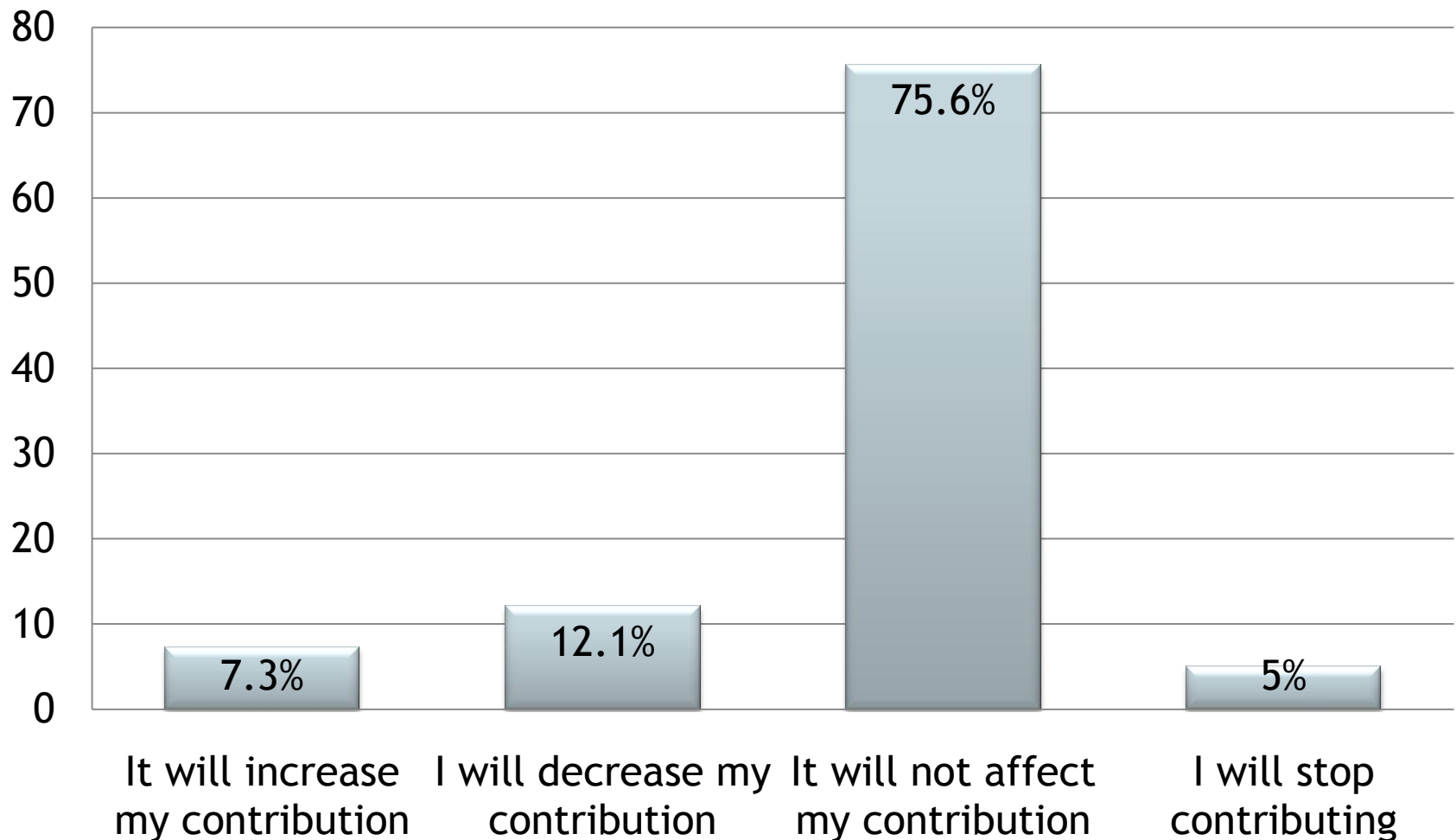
Motivations

.....commercial mapping products are constantly failing us up here in rural Quebec. On a number of occasions my husband and I have both wished that we could just upload our own GPS data to fix the existing maps.

It's all frustratingly out of date--showing non-existent logging roads as real streets, and not showing major interurban routes. I suspect that in many rural parts of Canada neither government nor industry has any motivation to verify old data.

Mapper A

How will the involvement of commercial companies affect your contribution to the project?



Conclusions – Users (and impact on quality)

- Participants are mostly man, in their 20-40, with significant education and technology related jobs
- Participation inequality is a core attribute of all User Generated Content (UGC), and VGI too
- However, VGI suffers from the ‘tyranny of Geography’ - i.e. you must be at a certain place to record it. This is a unique problem to VGI

Conclusions – applications

- Applications - few that are new (due to reduction in costs) but most are benefiting from reduced entry costs
- Licensing (commercial vs. egalitarian)
- Update happen and similar to Wikipedia, Apache and other open source projects

Further reading

- Haklay, M., 2008, **How good is OpenStreetMap information? A comparative study of OpenStreetMap and Ordnance Survey datasets for London and the rest of England**, submitted to Environment and Planning B.
- Haklay, M. And Weber, P., 2008, **OpenStreetMap – User Generated Street Map**, *IEEE Pervasive Computing*.
- Haklay, M., Singleton, A., and Parker, C., 2008, **Web mapping 2.0: the Neogeography of the Geoweb**, *Geography Compass*
- Haklay, M., 2008, **Open Knowledge – learning from environmental information**, presented at the Open Knowledge Conference (OKCon) 2008, London, 15 March.
- Haklay, M., 2007, **OSM and the public - what barriers need to be crossed?** presented at State of the Map conference, Manchester, UK, 14-15 July.
- Budhathoki, N. R., and Nedovic-Budic, Z. (2007). **Expanding the SDI Knowledge Base**. In H. Onsrud (Ed.), *Research and Theory in Advancing Spatial Data Infrastructure* Redlands: ESRI Press.
- Budhathoki, N. R., Bruce, B. (Chip), and Nedovic-Budic, Z. (2008). **Reconceptualizing the role of the user of spatial data infrastructure**. *GeoJournal* 72(3-4), 149-160.
- Budhathoki, N.R., Nedovic-Budic, Z., and Bruce, B. (Chip) (Under Review). **A framework for volunteered geographic information: Proposal and illustration**. *Geomatica, Journal of Geospatial Information Science, Technology and Practice*.
- To get a copy, write to m.haklay@ucl.ac.uk , or nbudhat2@illinois.edu