

# Exploring the use of de-identified mobile phone data for national migration statistics

---

Shengjie Lai

*University of Southampton  
Flowminder Foundation*

*3 May 2019*



UNIVERSITY OF  
Southampton

**FLOWMINDER.ORG**

# Who are we?

---

## Worldpop research group at University of Southampton:

Research Program improving the spatial demographic evidence base for low and middle income countries, developing methods and producing data.

## Flowminder Foundation:

Improving national data systems to meet the needs of decision makers, providing insights, data, tools and capacity to improve the lives of vulnerable people

## WorldPop/Flowminder researchers pioneered

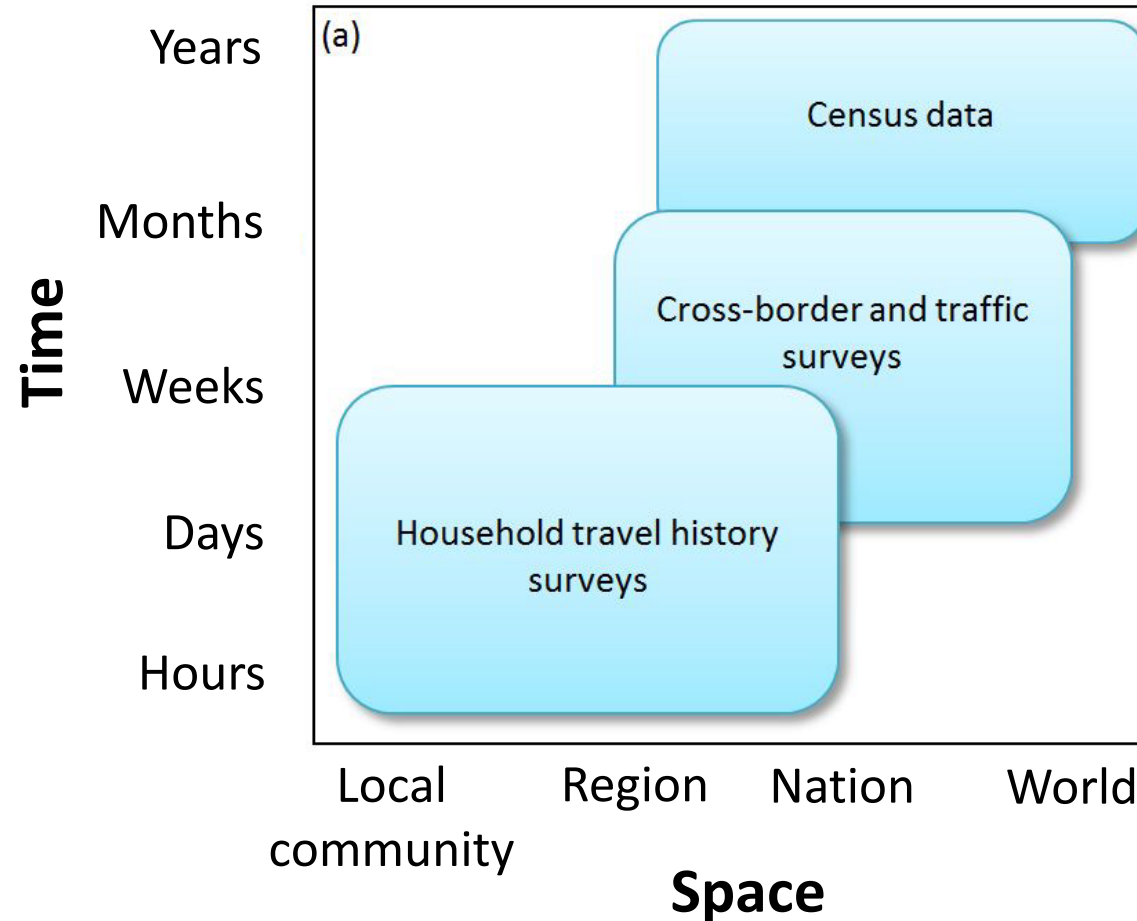
the use of mobile phone data for humanitarian and development applications (2008 and onwards).



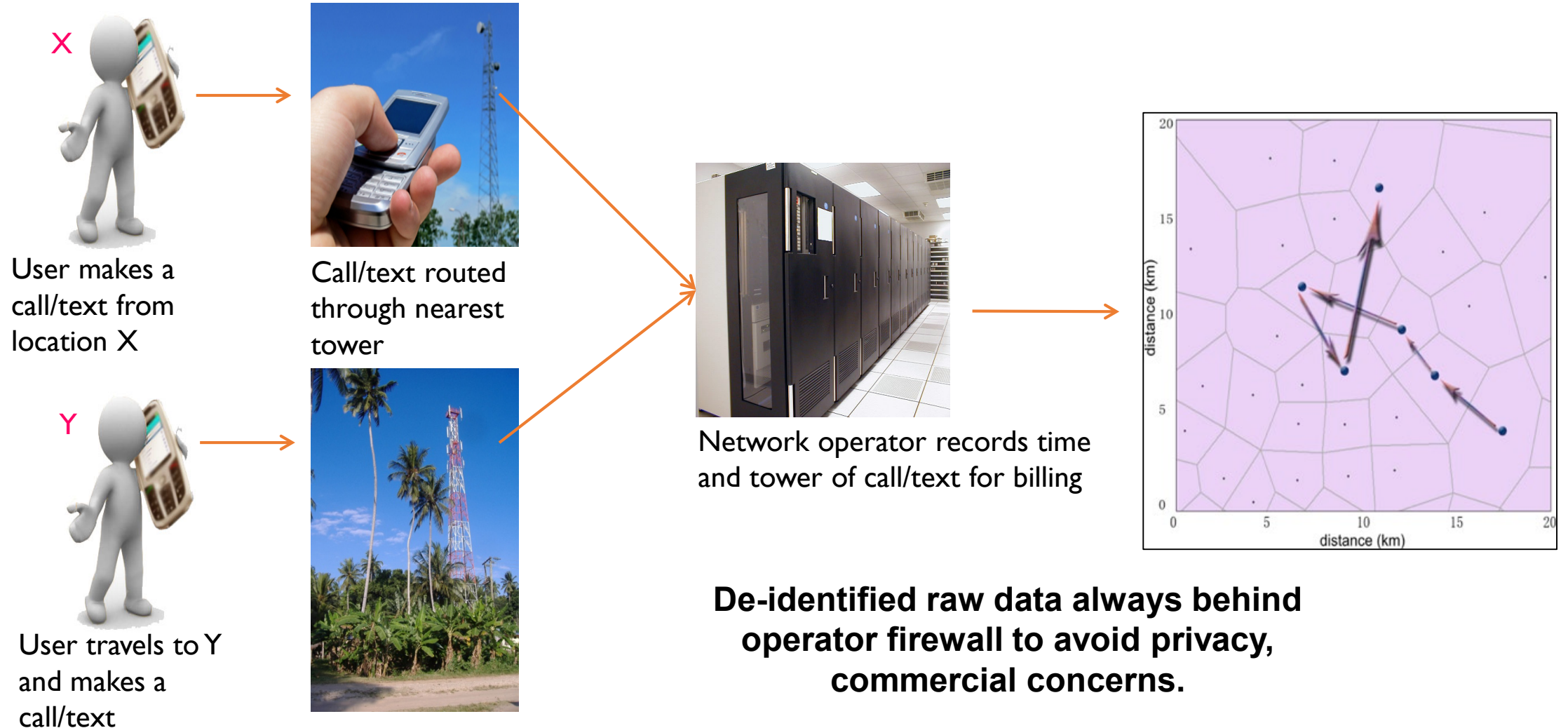


Global Airline Network

# Traditional data sources for measuring population movements

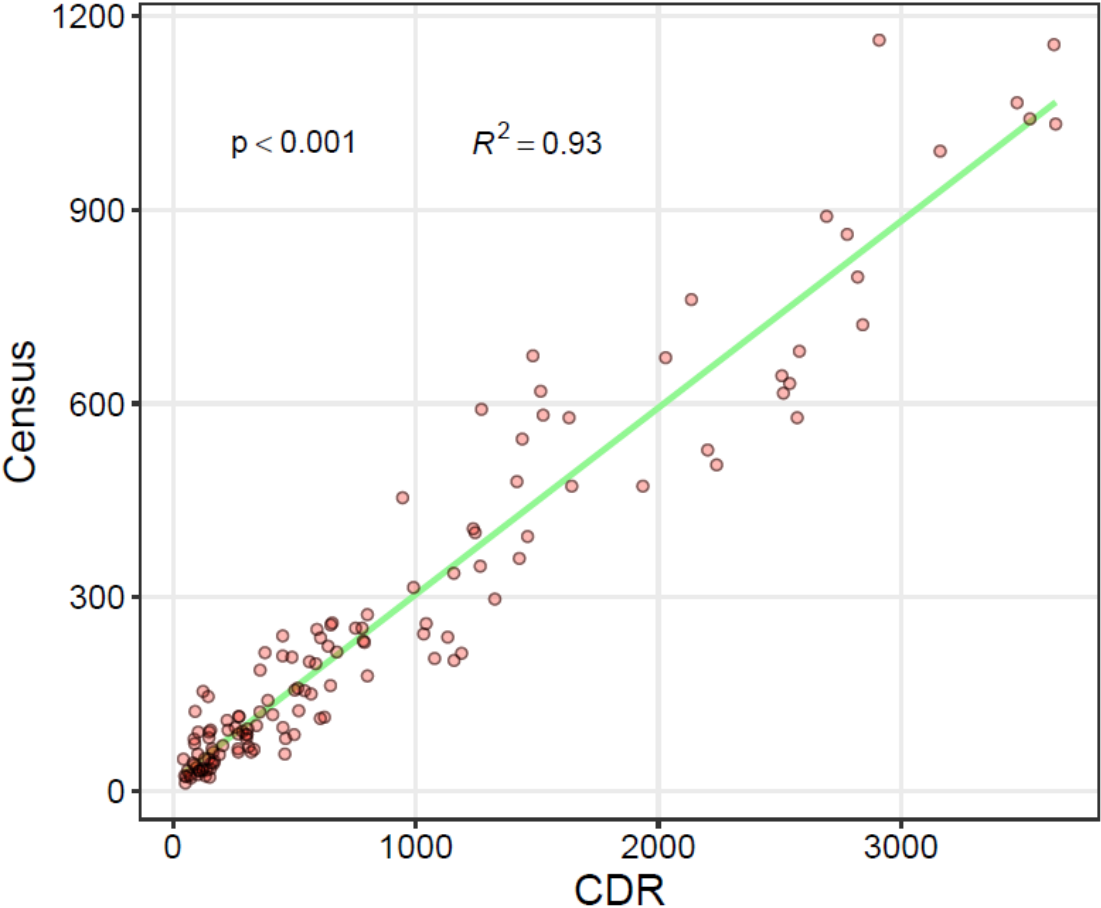


# Mobile phone call detail records (CDRs)

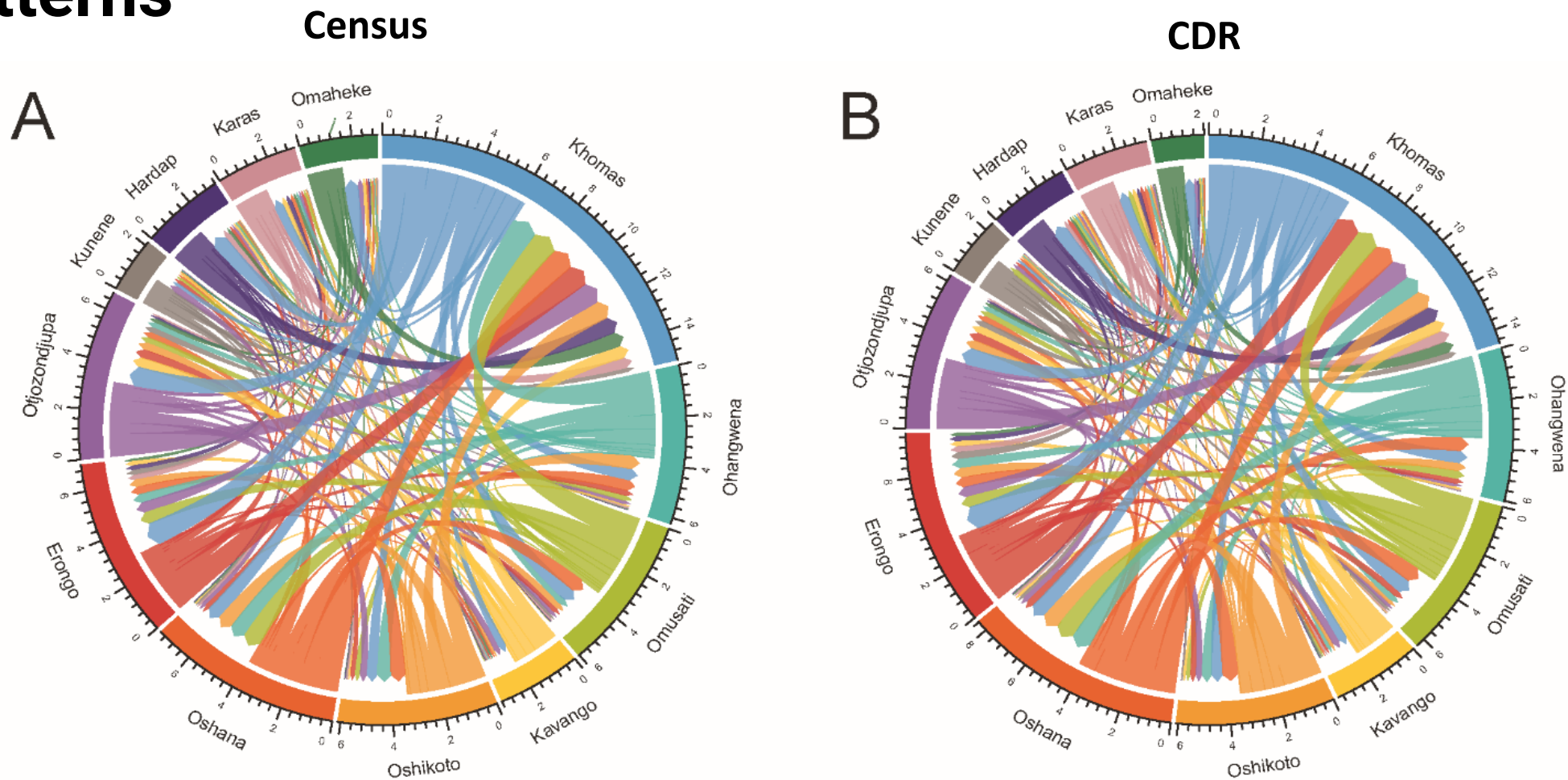




# Highly correlation between CDR and census-derived migrations



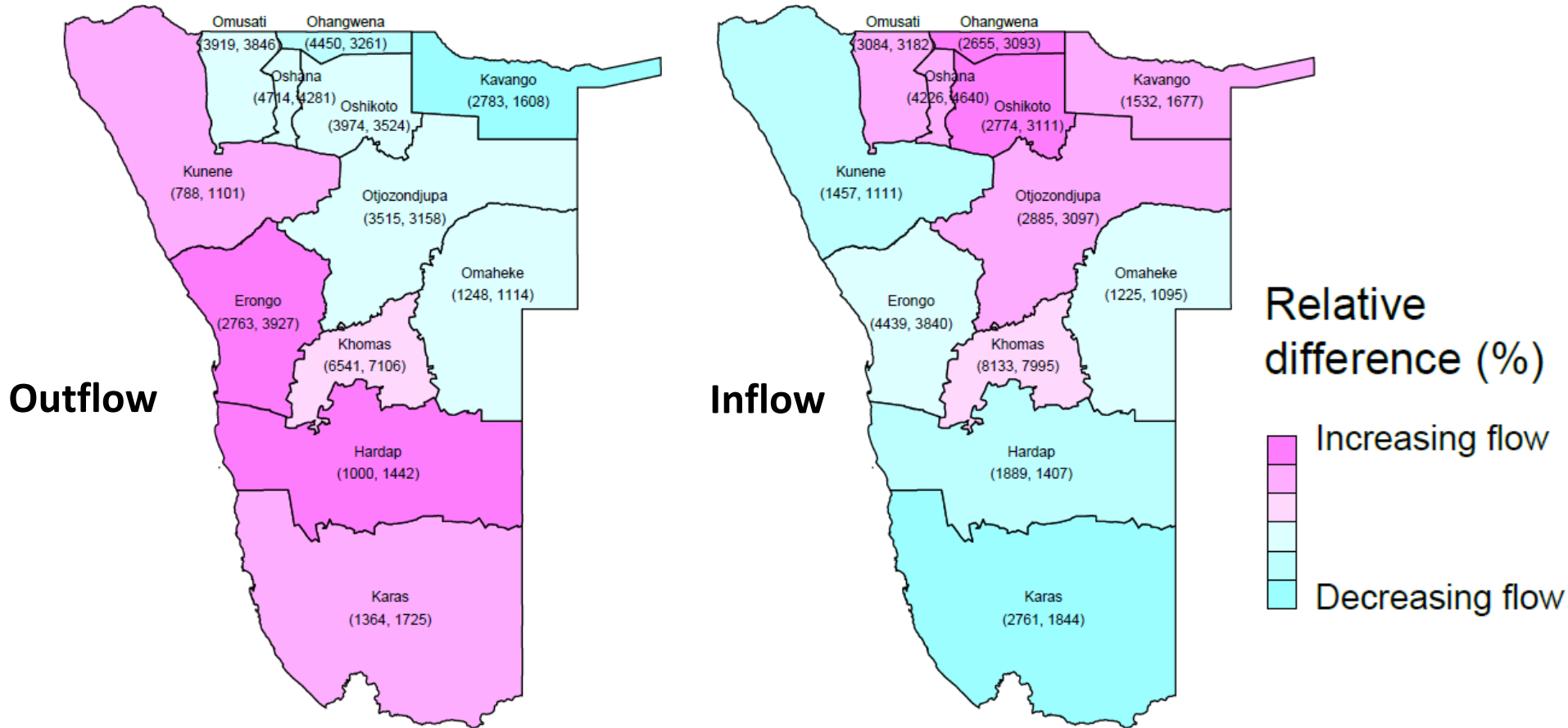
# CDRs and census data show very similar migration patterns



Note: The Zambezi region as an outlier is excluded.



# Updating migration statistics across years



**Migrants departing and arriving in 2012 compared to 2011**

The Zambezi region as an outlier is excluded.

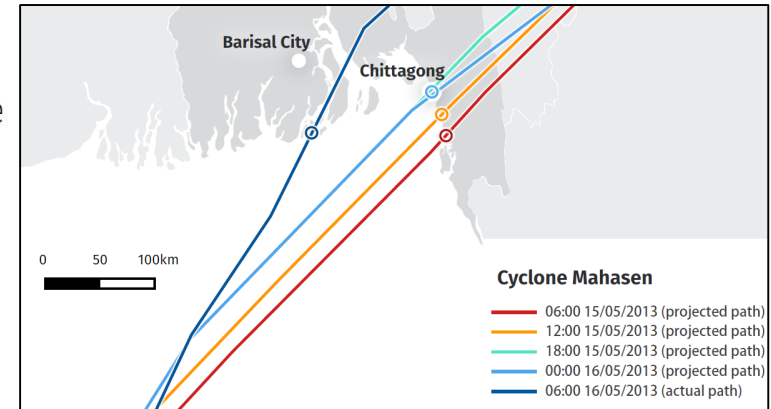
# Ongoing work

We are:

- Replicating in other countries
- Improving understanding of biases and adjustment
- Improving understanding of internal displacement patterns
- Supporting statistics agencies



**Bangladesh:**  
**Lu X et al. Global Environmental Change 2016.**

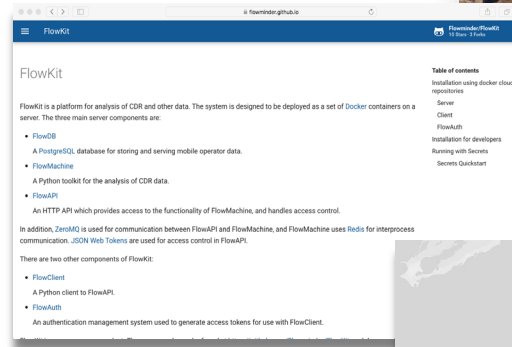
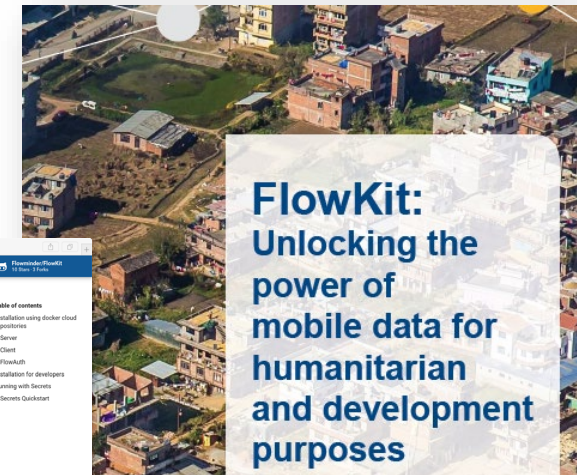


**Haiti: Dejby et al. 2019 (in preparation)**

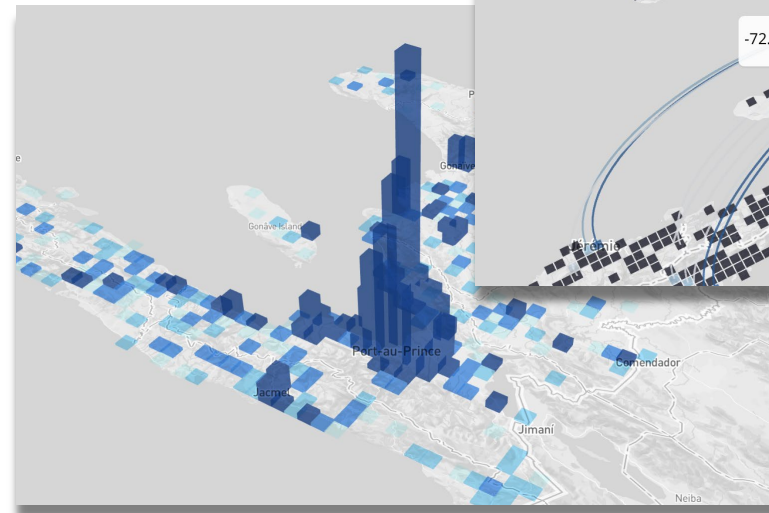
# Flowkit: open source codebase for mobile operator data analysis

FlowKit provides a secure platform to process mobile phone data.

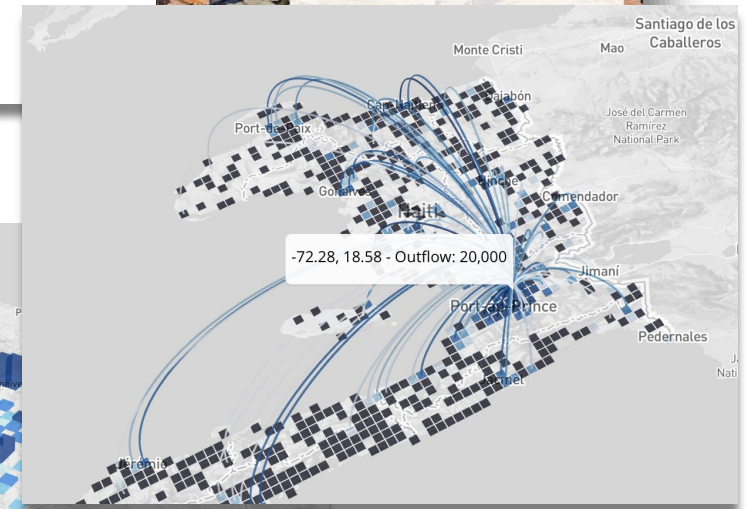
- Supports NSOs and others to use data from mobile operators in low- and middle-income countries.
- Humanitarian and development focus
- Growing over time with method development
- Strong focus on security and privacy
- Training material under development



Documentation



Haiti subscriber nocturnal pop map, underlying data produced with FlowKit prototype



Haiti population flows, underlying data produced with FlowKit prototype



# Acknowledgements

Andrew J. Tatem, Linus Bengtsson, Tracy Li, Alessandro Sorichetta, Nick W. Ruktanonchai, Tom J. Bird, Elisabeth zu Erbach-Schoenberg, Catherine Linard, Forrest R. Stevens, Andrea E. Gaughan, Natalia Tejedor, Carla Pezzulo, Andres J. Garcia, Xin Lu, Erik Wetter ...

For more details:

Lai S, Erbach-Schoenberg Ez, Pezzulo C, Ruktanonchai NW, Sorichetta A, Steele J, Li T, Dooley CA, Tatem AJ. Exploring the use of mobile phone data for national migration statistics. *Nature Palgrave Communications* 2019; 5(1): 34.

<https://www.nature.com/articles/s41599-019-0242-9>



world  
pop   
**FLOWMINDER.ORG**

[www.worldpop.org](http://www.worldpop.org)

 [@WorldPopProject](https://twitter.com/WorldPopProject)

[www.flowminder.org](http://www.flowminder.org)

 [@Flowminder](https://twitter.com/Flowminder)

E-mail: [Shengjie.Lai@soton.ac.uk](mailto:Shengjie.Lai@soton.ac.uk)