

Mapping the Geography of Data in Central Asia: *A View From Within*

Louis Pétiniaud

Kevin Limonier
Antonin Rosa-Martin
Loqman Salamatian



Mapping the (geography of the) Internet at three different levels

- Research Project carried out by GEODE reseachers
- Support from RIPE Project Funding
- **Broad objectives:**
 - Mapping the Internet of Central Asia at 3 different levels
 - Better understand the geopolitics behind the connectivity architecture
- Methodological question: What gaps can we fill by going on the field?
 - The choice of an “simple” case study: Central Asia/Kyrgyzstan

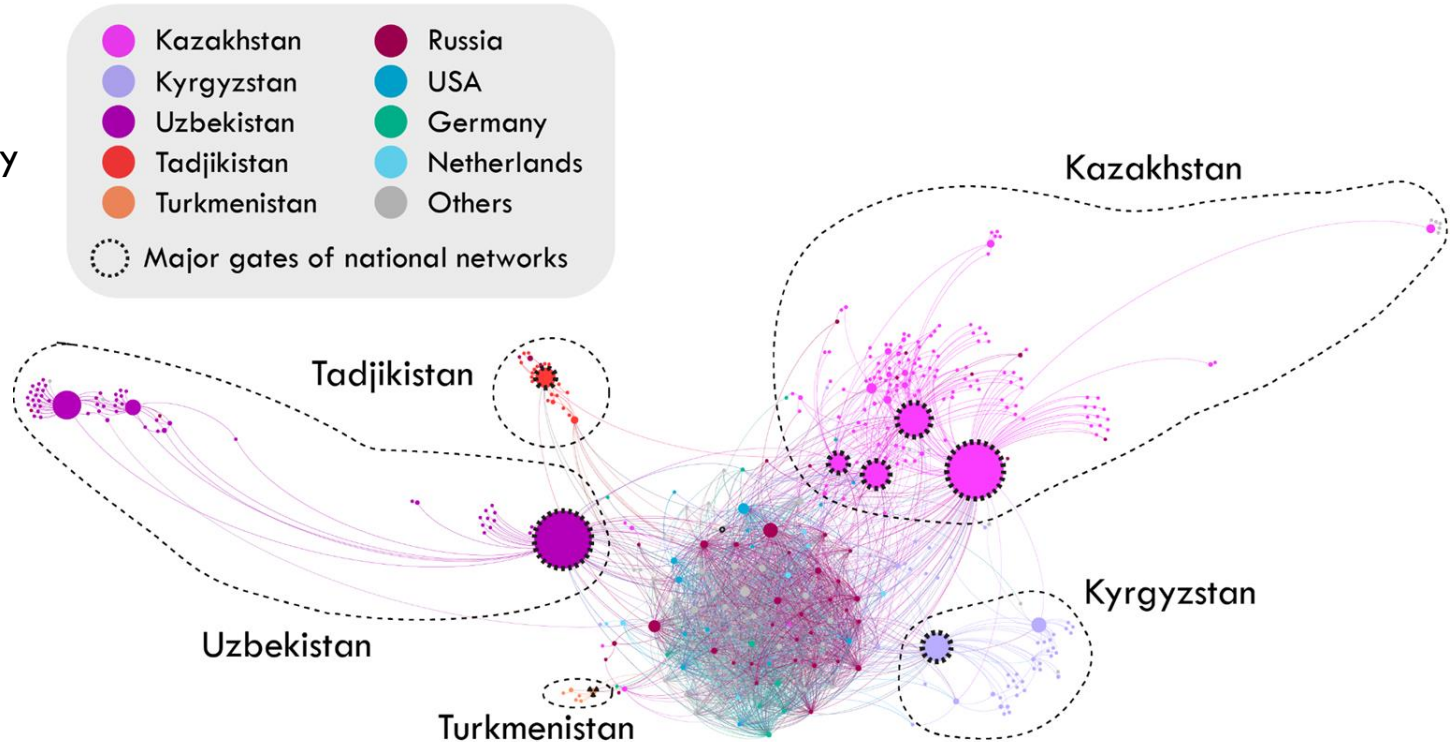
Mapping physical infrastructures: possible with caveats

L'espace centrasiatique: un enclavement numérique



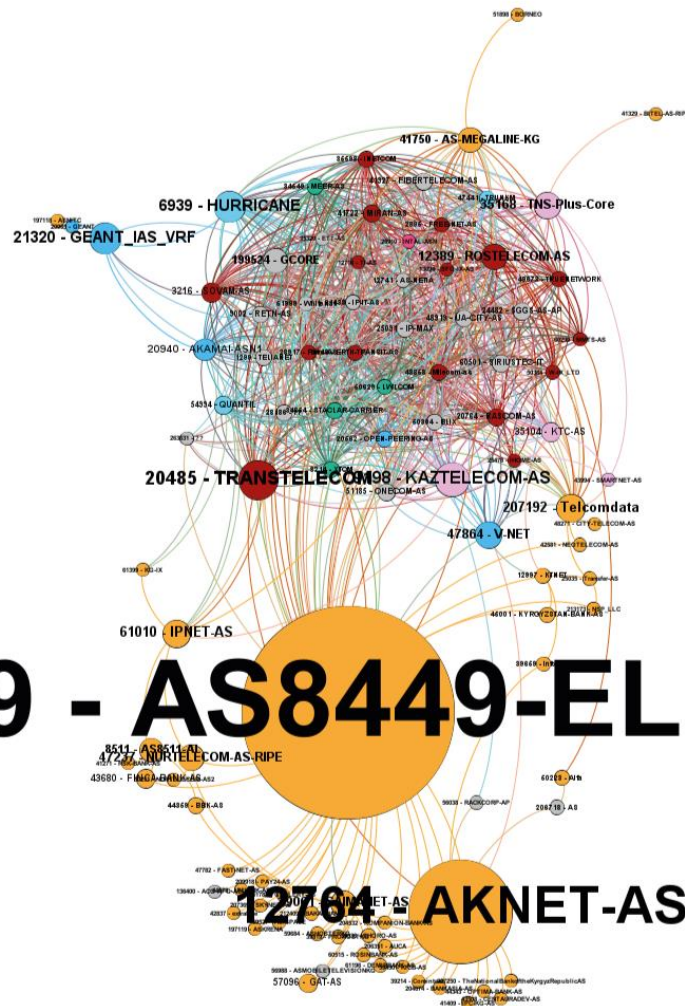
Mapping connectivity with BGP feeds

- Relative centralization of networks
- Very limited intra-regional connectivity



The connectivity of Kyrgyzstan

- Relative centralization
- Some dependencies identifiable (RU-KZ)
- Limited view
 - BGP feeds are incomplete
 - Data paths cannot be inferred



Mapping data with the Internet geographer's best friend

- Geolocated by design
- Can be leveraged to augment our knowledge of the geography of connectivity



Mapping latencies between Kyrgyzstan and its neighbours: more or less coherent patterns



Problem: Kyrgyzstan is a Ripe Atlas Far East



Fieldwork in Kyrgyzstan

Main goals:

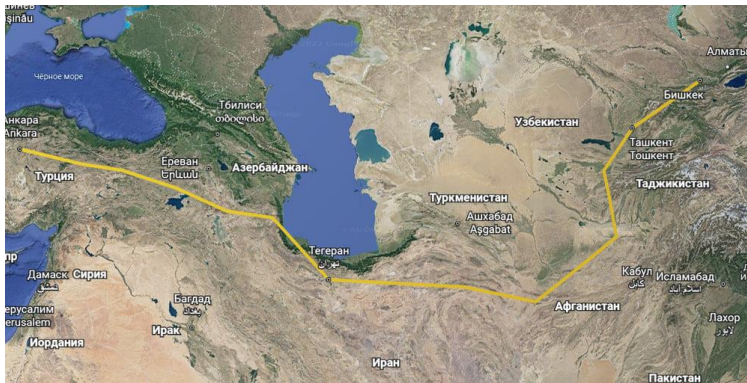
- Understanding connectivity through interviews with local stakeholders (Providers, IXPs, government)
- Create on-site measurements from remote connected places to improve granularity

Interviewing local stakeholders to understand the architecture of connectivity

- Lack of a shared understanding of the region's connectivity
 - Southern IXPs
 - Connectivity with neighboring countries
 - No regional coordination/cooperation or even contacts

Interviewing local stakeholders to understand the architecture of connectivity

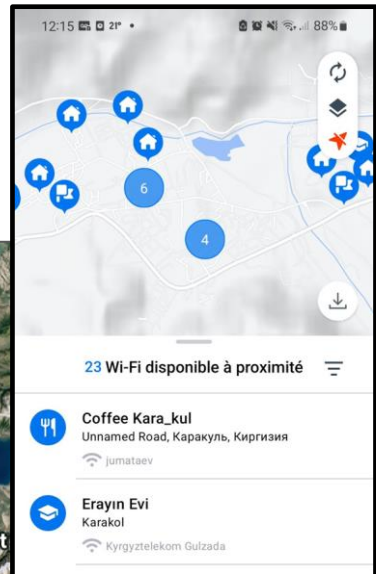
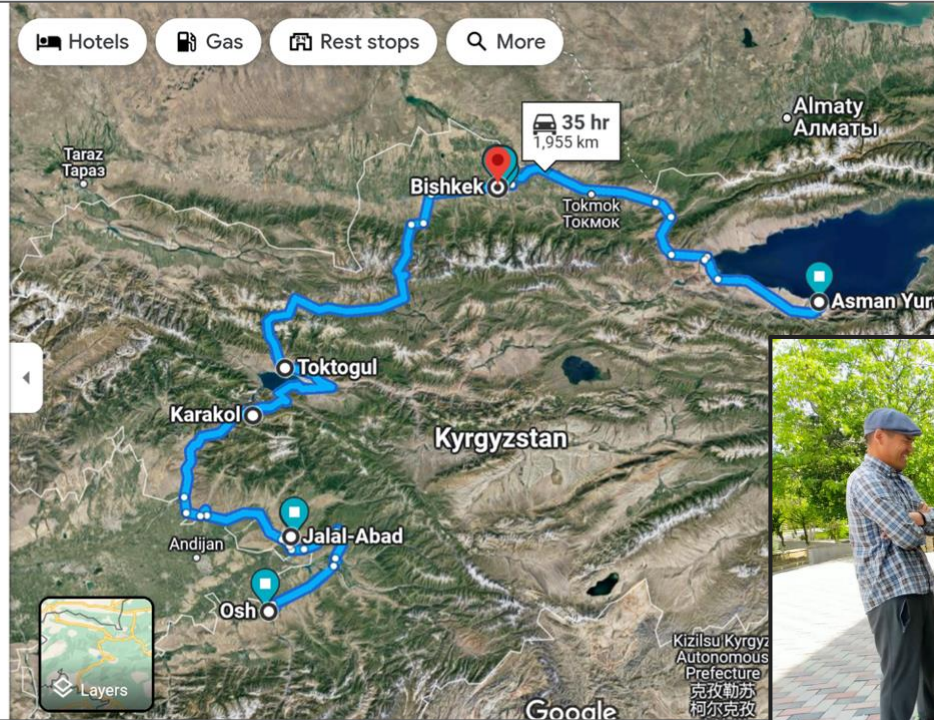
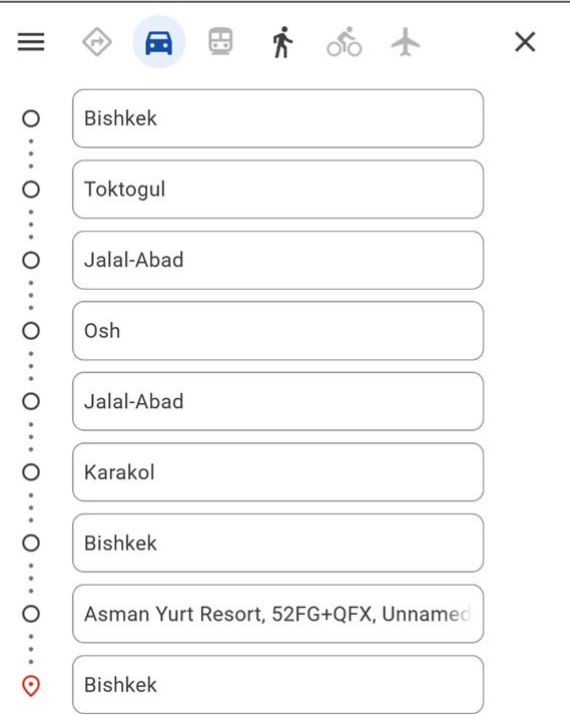
- A political environment with specific views on the network: “что такое цифровой суверенитет?”
 - Strong dependency on Kazakh and Russian networks
 - Redundancy and efficiency of networks are the responsibility of private operators
- The limited paradigm shift of the Russian invasion of Ukraine: how to escape structural dependencies?
 - Dependency to Russia as an “inescapable” fact
 - Some projects welcome : Turktelecom / Chinese infrastructures?



Interviewing local stakeholders to understand the architecture of connectivity

- Improving cooperation with RIPE: potential obstacles and overcoming them
 - Lack of interest
 - Lack of competent personnel
 - Overall lack of certainty over the cost/benefit ratio

Creating “local” measurements



A vizualisation platform fit for Geopolitics : Amethyst

OPEN OPTIONS

RESET

87.245.233.13

ASN9002

RETN-AS

United Kingdom

RETN Limited

45824 addresses announced

Rank 13

AS cone: 7928 AS

91800184 addresses

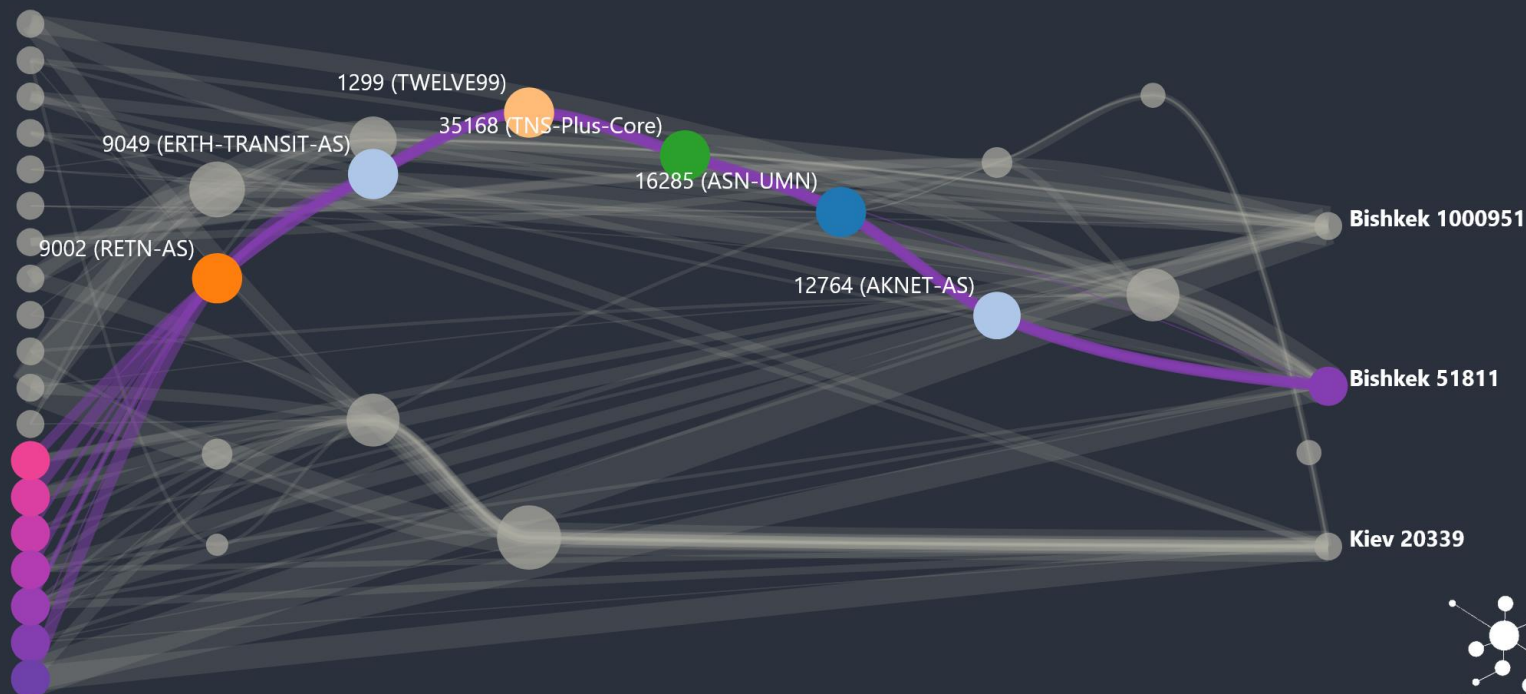
106301 prefixes

Degree: 68

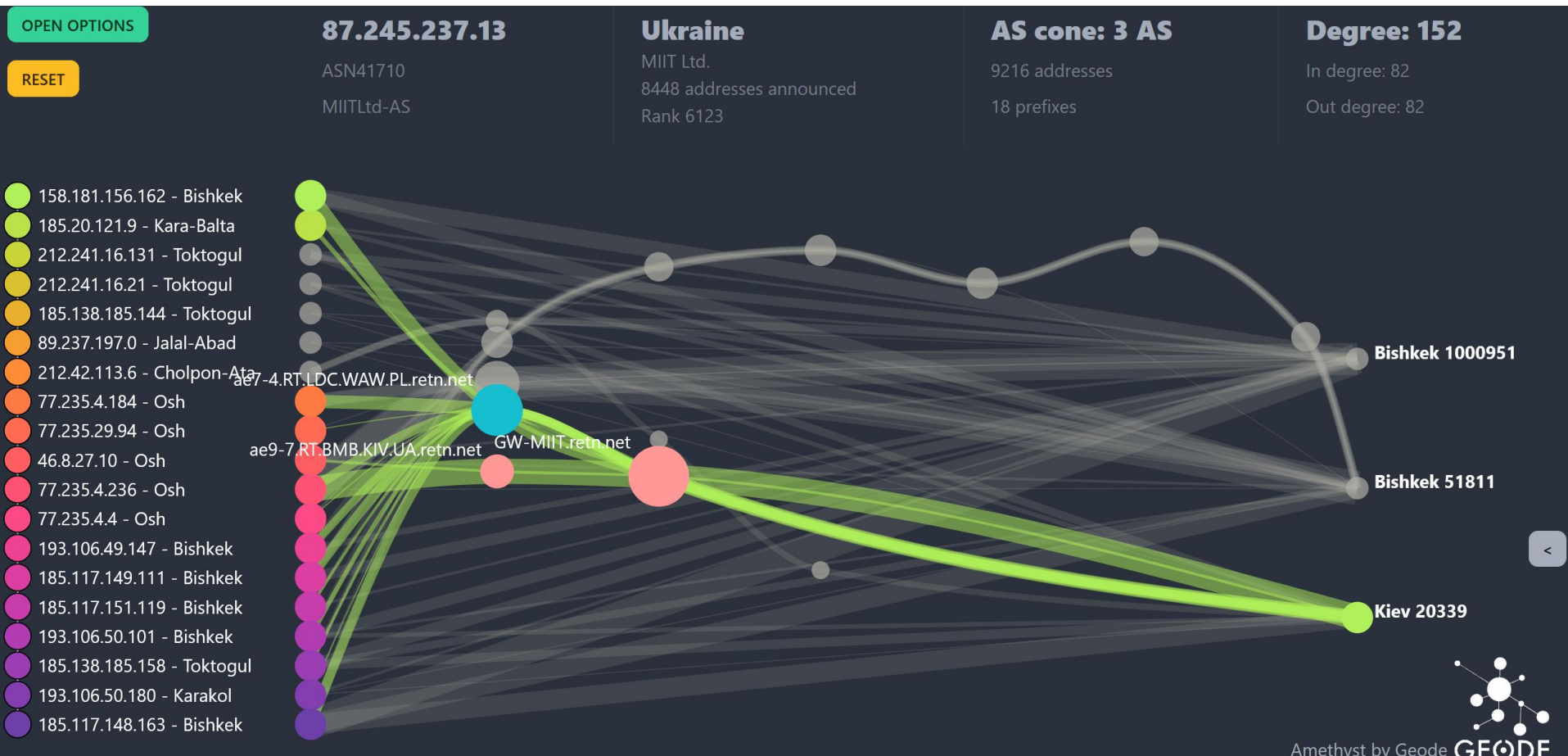
In degree: 40

Out degree: 40

- 158.181.156.162 - Bishkek
- 185.20.121.9 - Kara-Balta
- 212.241.16.131 - Toktogul
- 212.241.16.21 - Toktogul
- 185.138.185.144 - Toktogul
- 89.237.197.0 - Jalal-Abad
- 212.42.113.6 - Cholpon-Ata
- 77.235.4.184 - Osh
- 77.235.29.94 - Osh
- 46.8.27.10 - Osh
- 77.235.4.236 - Osh
- 77.235.4.4 - Osh
- 193.106.49.147 - Bishkek
- 185.117.149.111 - Bishkek
- 185.117.151.119 - Bishkek
- 193.106.50.101 - Bishkek
- 185.138.185.158 - Toktogul
- 193.106.50.180 - Karakol
- 185.117.148.163 - Bishkek

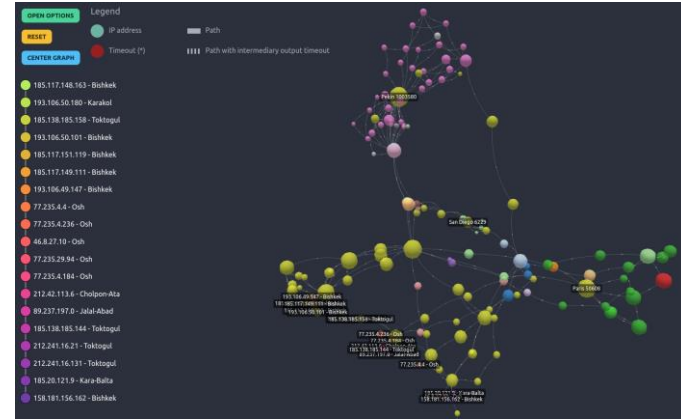


A vizualisation platform fit for Geopolitics : Amethyst



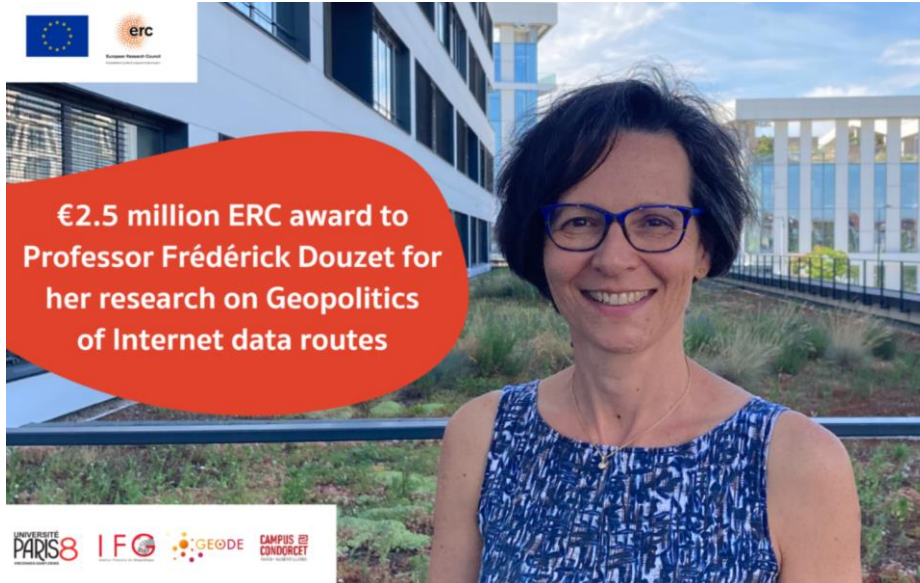
Potential for improvements and suggestions from WG?

- **Ripe Atlas dissemination:**
- How to increase the spread of RIPE Atlas probes, including in strategic areas
- Are “moving” probes efficient tools for other communities?
- **Facilitate the manipulation of measurements data**
- Work in progress: EasymapIT
- Geolocation data: how to prioritize the most reliable one?
- Develop new ideas for data vizualisation
- **On the replicability and reliability of fieldwork as a source of data: discussion is open**
- 2nd Fieldwork in Ukraine (February 2023) confirms the relevance for assessing the geopolitical causes and consequences of connectivity + geographical properties of the network



Future steps

- Other fieldworks: Ukraine, Canada, Pakistan, French Guyana...
- Increase cooperation with researchers from CS, STS, Mathematics
- 5 years project starting now



Thank you !

l.petiniaud@gmail.com

<https://twitter.com/LPetiniaud>

RIPE Labs articles

- 1/ First article for RIPE Labs on *The Geopolitics of Routing* (2019):
https://labs.ripe.net/author/louis_petiniaud/geopolitics-of-routing/
- 2/ The Central Asia fieldwork: https://labs.ripe.net/author/louis_petiniaud/the-human-factor-in-the-geopolitics-of-the-internet/
- 3/ Coming soon: Description and updates of the Amethyst platform
- 4/ The Ukrainian case: someday