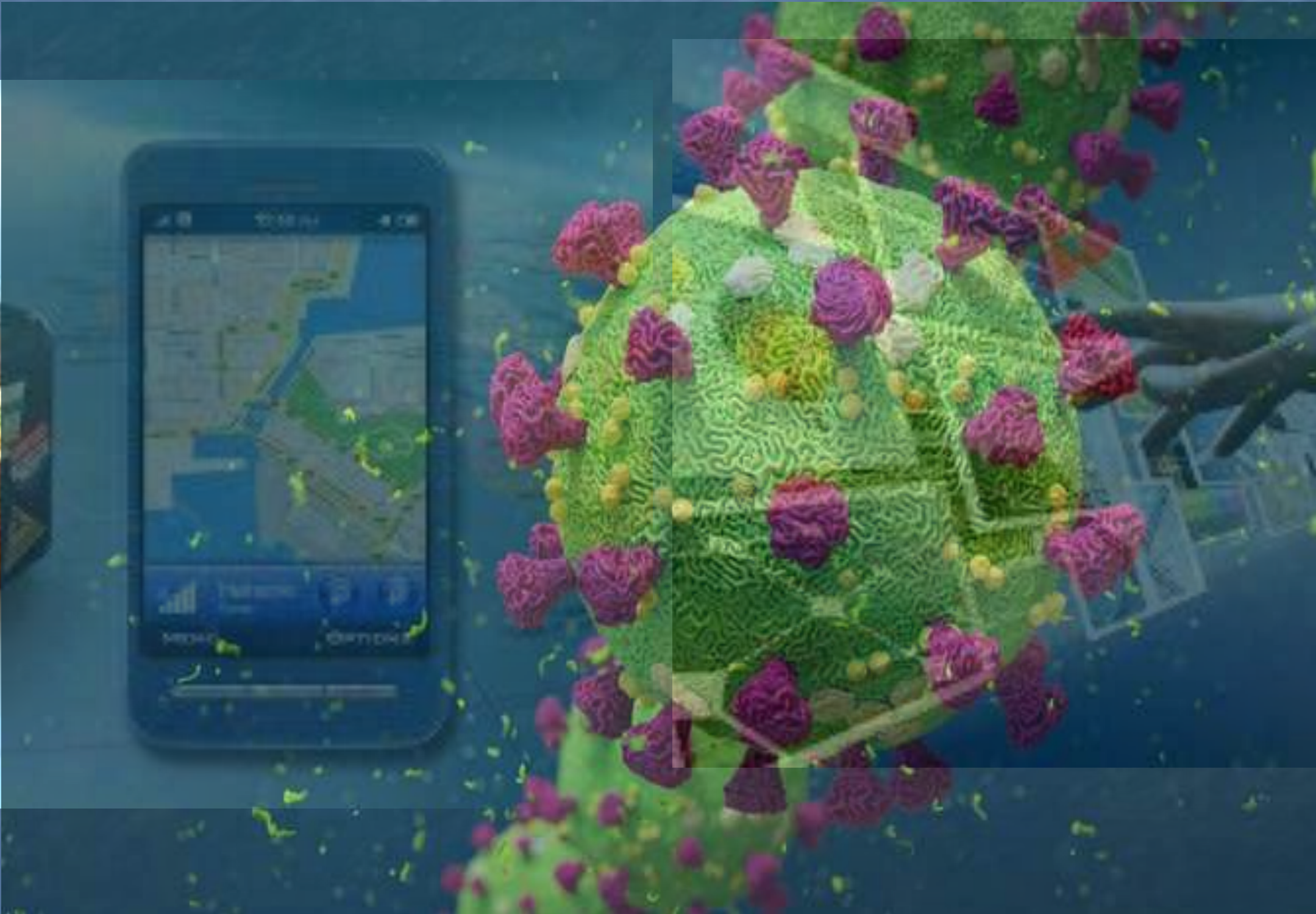




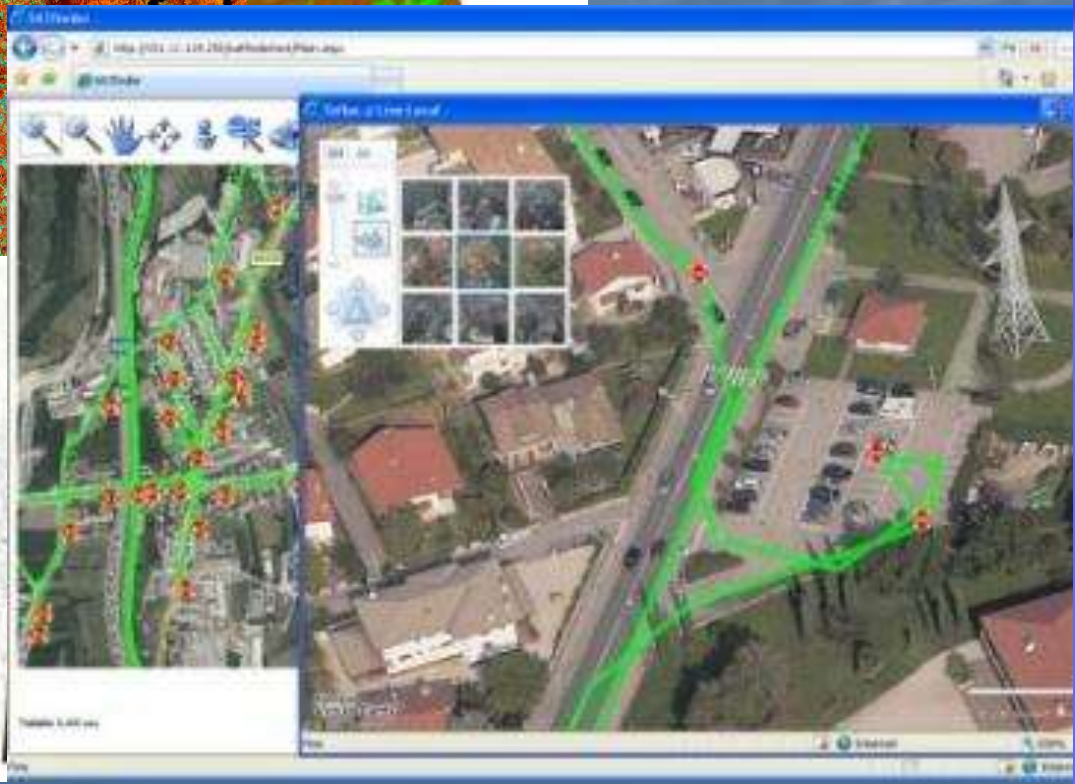
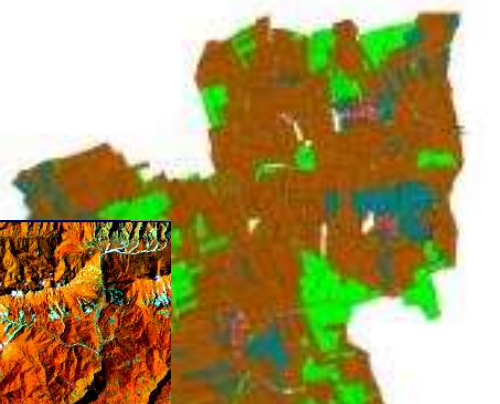
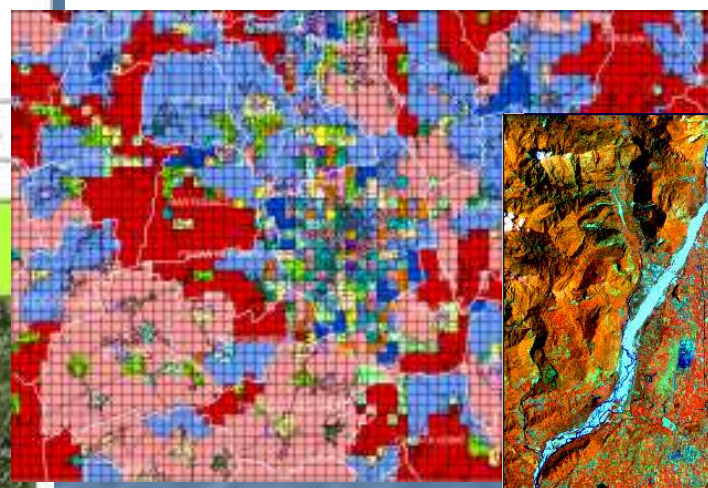
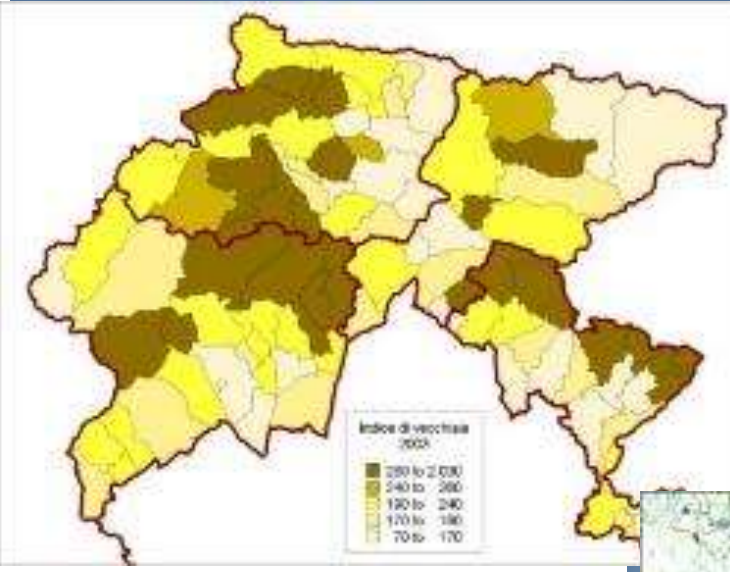
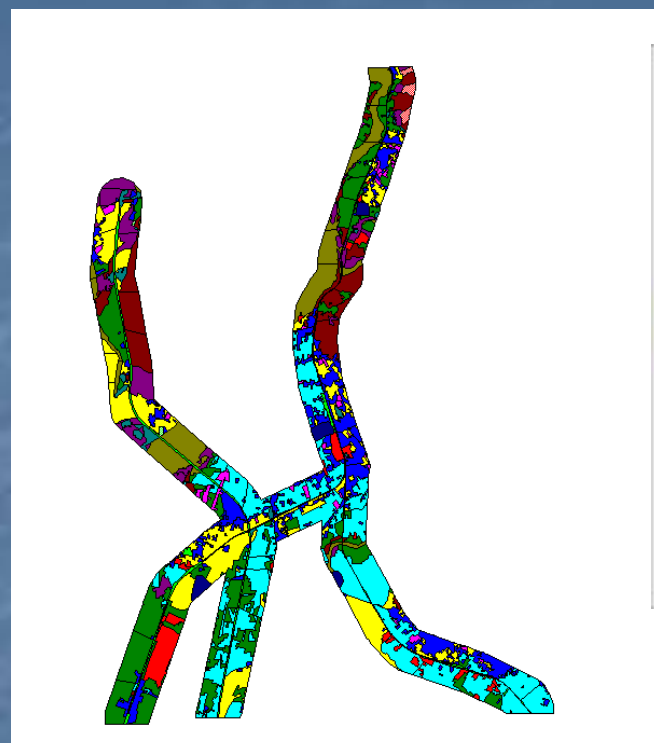
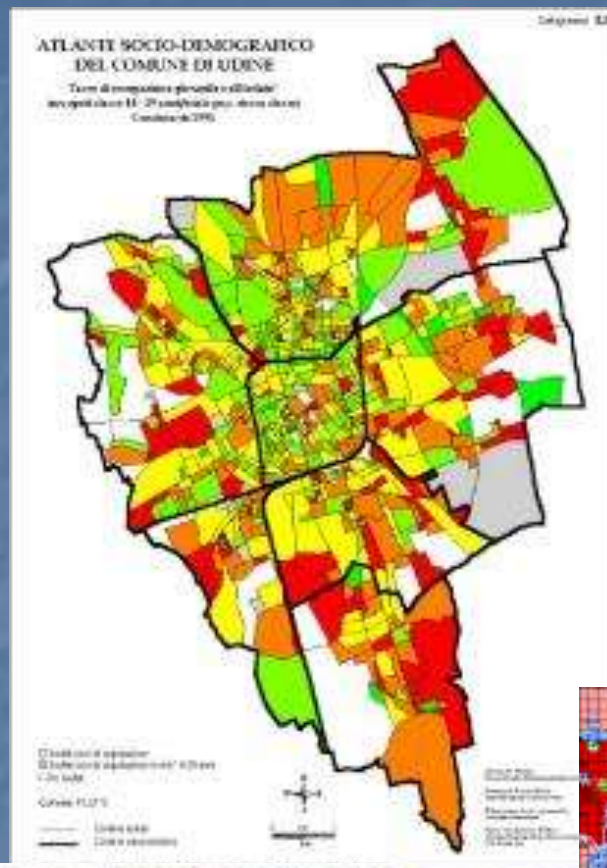
GeoBigData to analyze presences, movements and air quality during the different phases and "colors" of COVID19 pandemic



Salvatore Amaduzzi
salvatore.amaduzzi@uniud.it
Geomatic Lab, University of Udine (Italy)



Geotechnology Lab of University of Udine

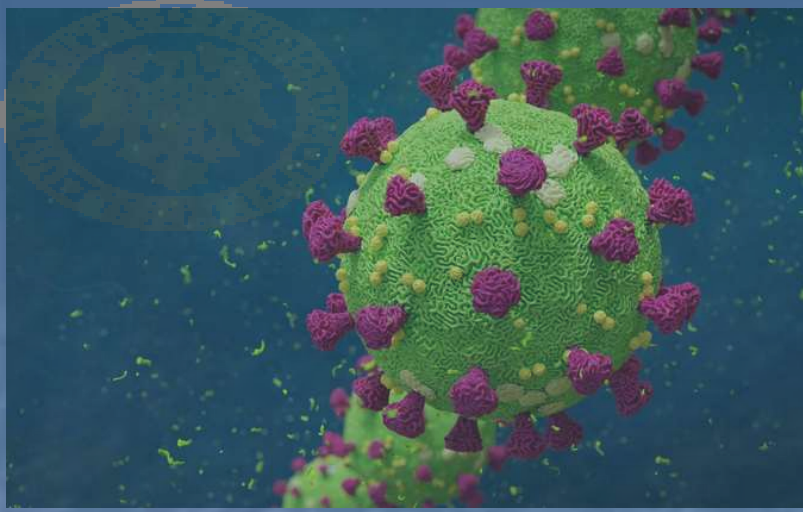




Goal of the study

- Describe 3 very useful sources of Open Data (Google, Apple, AQI) and the great value they have in the analysis of the mobility
- Analyze the correlation between mobility and pollution
- Describe a very new and powerful type of data for presences and mobility analysis: CELL PHONE DATA

Covid-19 in Italy



End 2019
Wuhan
Cina



OMS
31/12/19
Covid-19



MWC
cencelled
Barcellona



20/02/2020
First victim
in Italy

4/05/20
Phase 2



9/03/20
Lockdown
in Italy



4/03/20
Schools
suspended





18/05/20
*Some activities
restarted*



11/06/20
Fase 3



6/11/20
*Coloured
regions*



8/12/20
*Pfizer
vaccine*



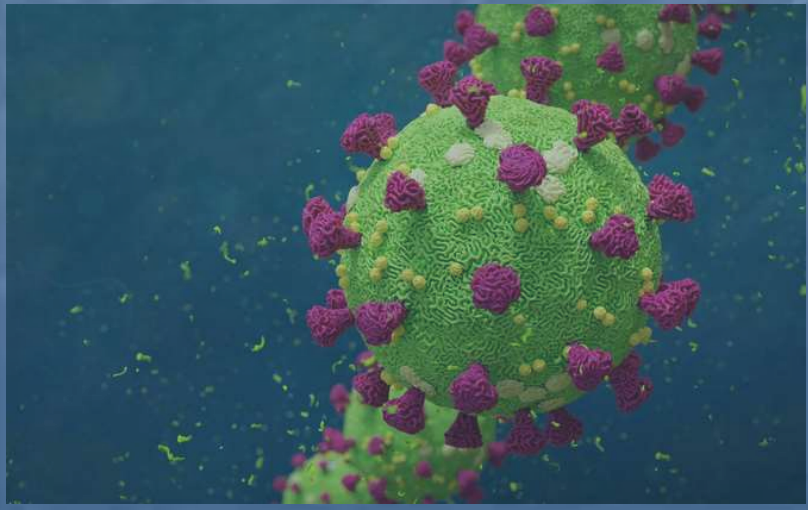
*Covid
variants*



1/07/21
*Green Pass
in Italy*



16/09/21
*Green Pass
mandatory for all the
workers in Italy*





Open data



Mobility:

Car

On foot

Public Transport



Presences:

Retail,

Supermarket,

Pharmacies, Parks,

Transit Stations,

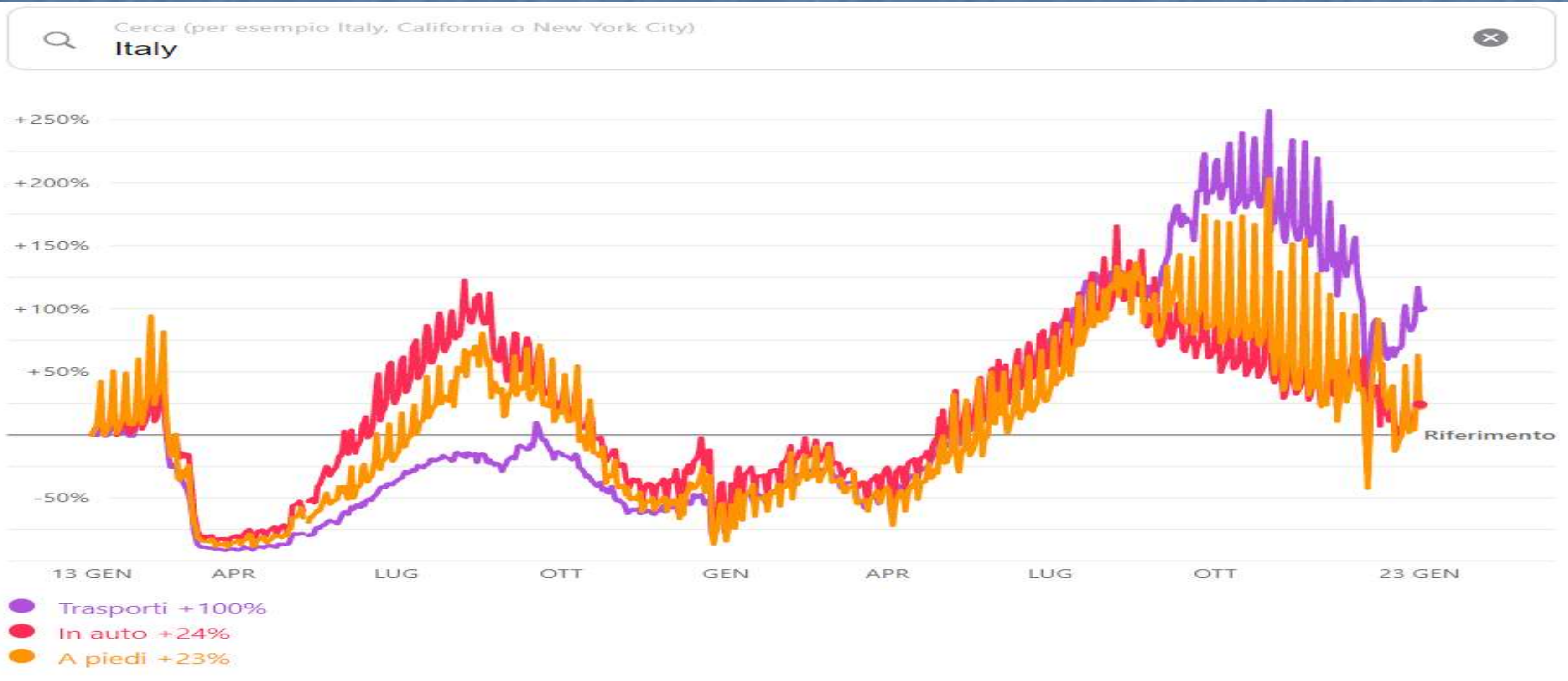
Workplaces,

Residences

AQICN

Air Quality: PM25







Retail e tempo libero

-21%

rispetto al riferimento



Tendenze degli spostamenti relative a luoghi quali ristoranti, bar, centri commerciali, parchi a tema, musei, biblioteche e cinema.

Alimentari e farmacie

+15%

rispetto al riferimento



Tendenze degli spostamenti relative a luoghi quali supermercati, magazzini per prodotti alimentari, mercati agricoli, negozi di specialità gastronomiche, parafarmacie e farmacie.

Parchi

-12%

rispetto al riferimento

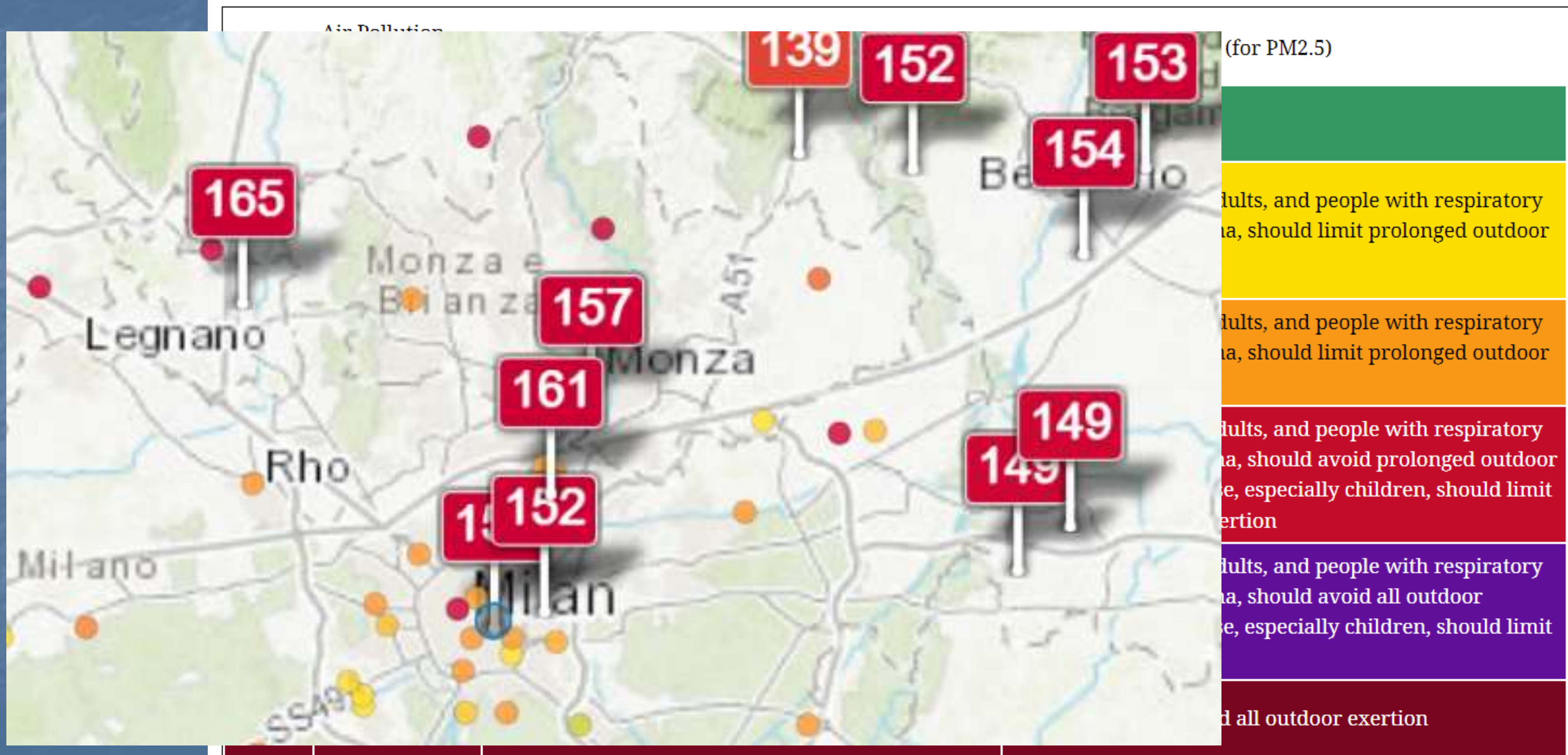


Tendenze degli spostamenti relative a luoghi quali parchi nazionali, spiagge pubbliche, porticcioli, aree cani, piazze e giardini pubblici.

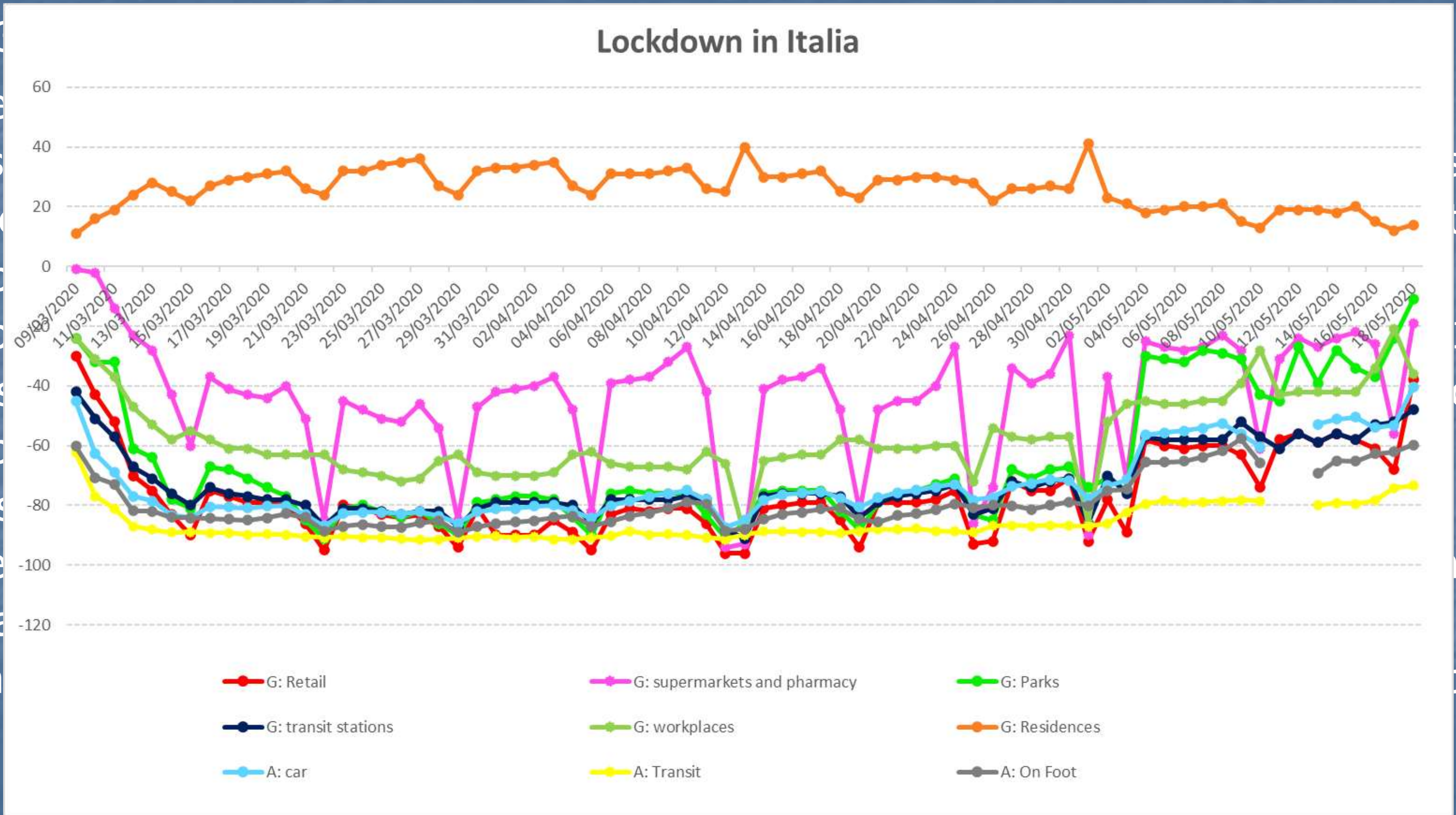


AQICN

Air Quality Historical Data Platform



Lockdown in Italia



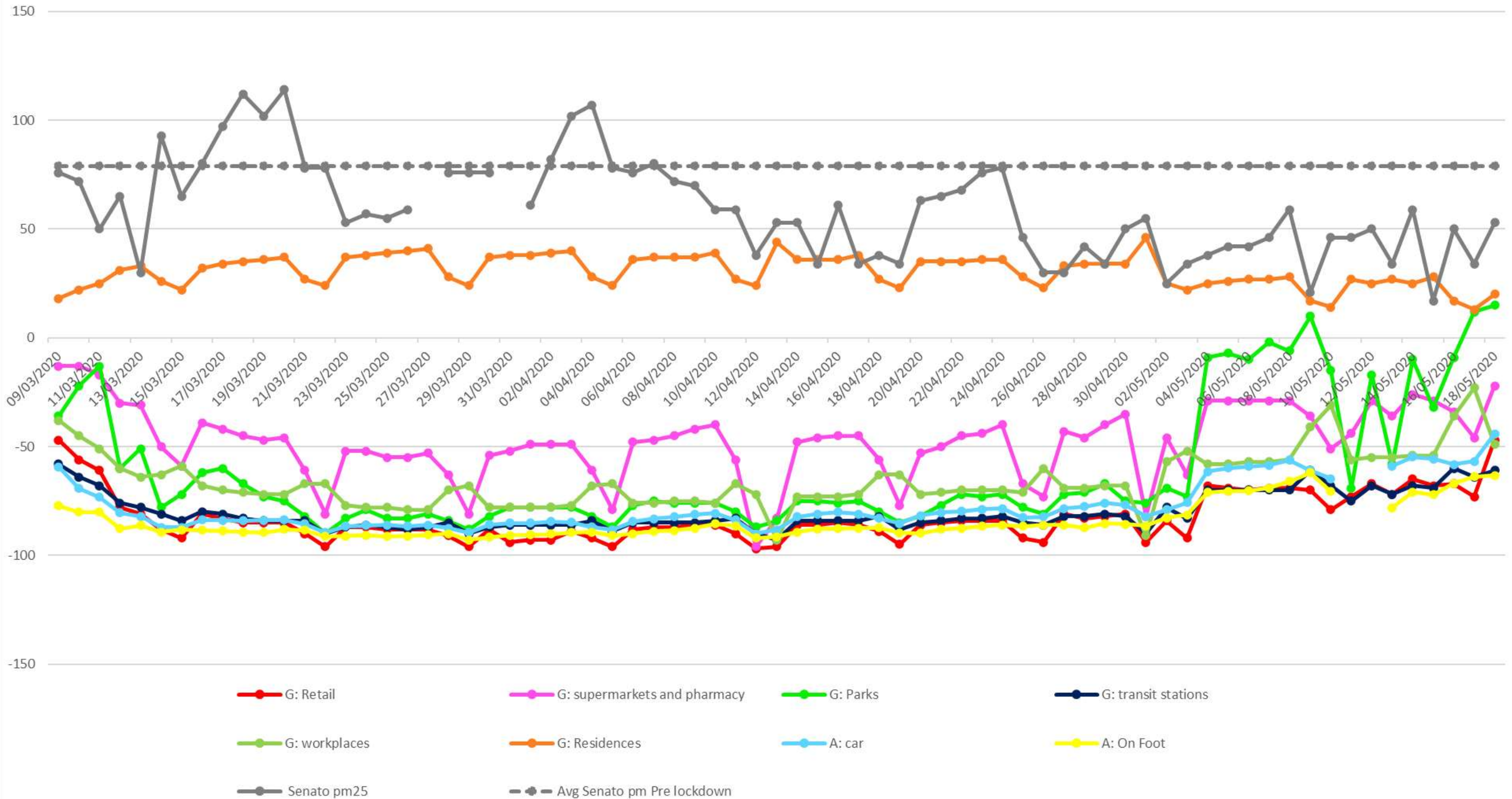
- On 23
- The
- Sus
- othe
- of p
- App
- Clos
- of b
- Clos
- Use
- esta
- Lim
- air,

s and
tment
19;
chase
mercial
ble by

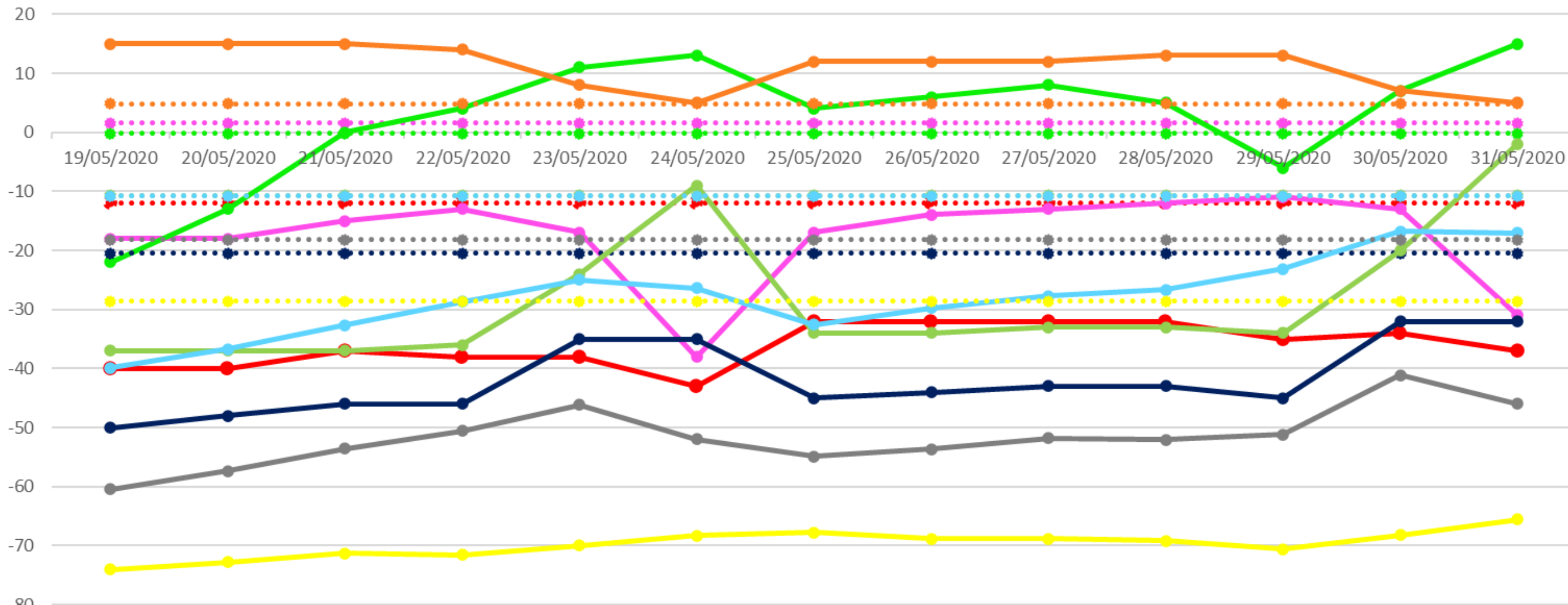


Lockdown in Milan

Lockdown a Milano

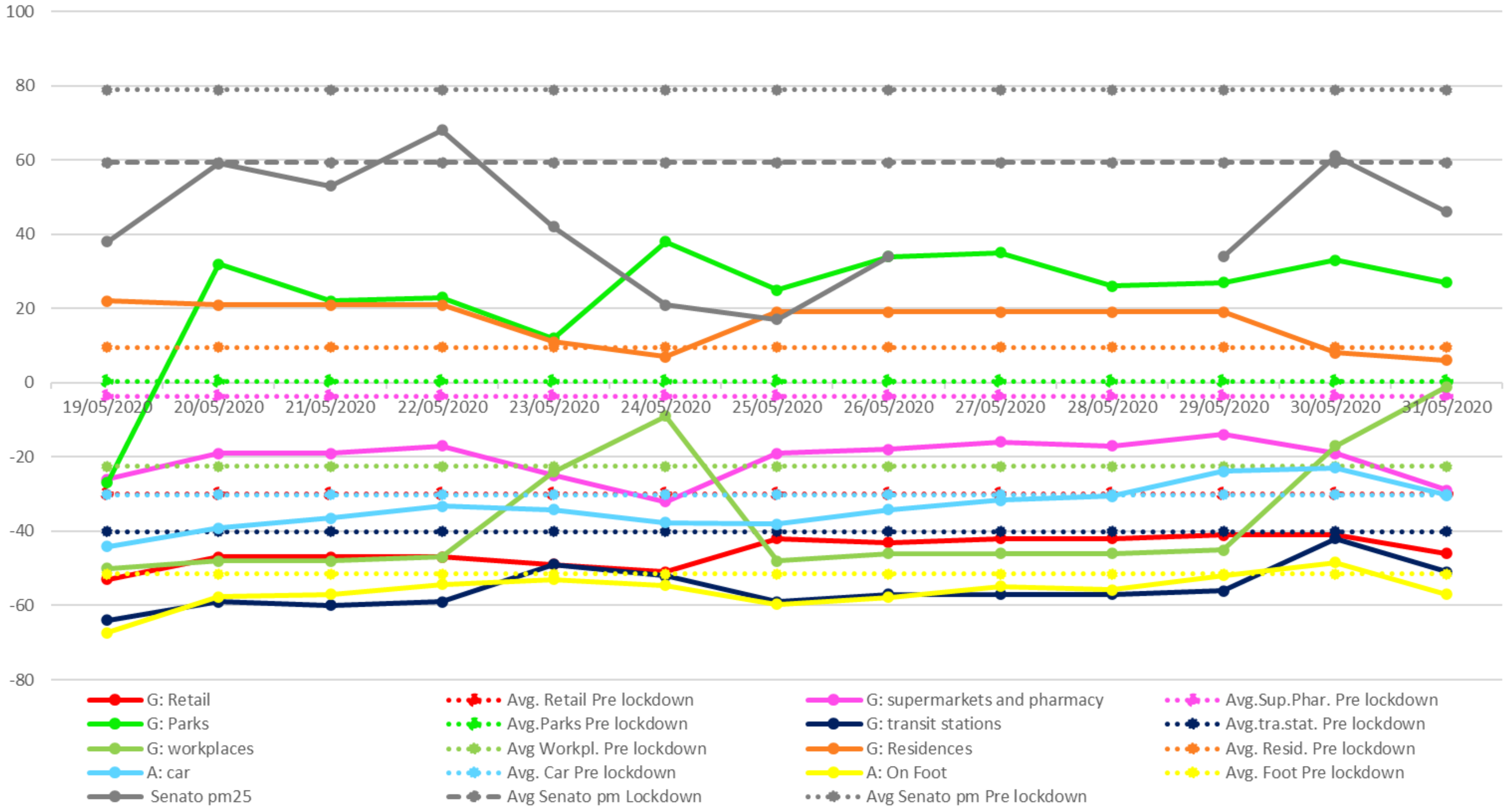


Post lockdown in Italy



- G: Retail
- G: Parks
- G: workplaces
- A: car
- A: On Foot
- Avg. Retail Pre lockdown
- Avg. Parks Pre lockdown
- Avg Workpl. Pre lockdown
- Avg. Car Pre lockdown
- Avg. Foot Pre lockdown
- G: supermarkets and pharmacy
- G: transit stations
- G: Residences
- A: Public transport
- Avg.Sup.Pharm. Pre lockdown
- Avg.tran.stat. Pre lockdown
- Avg. Resid. Pre lockdown
- Avg. Public transport Pre lockdown

Post lockdown in Milan



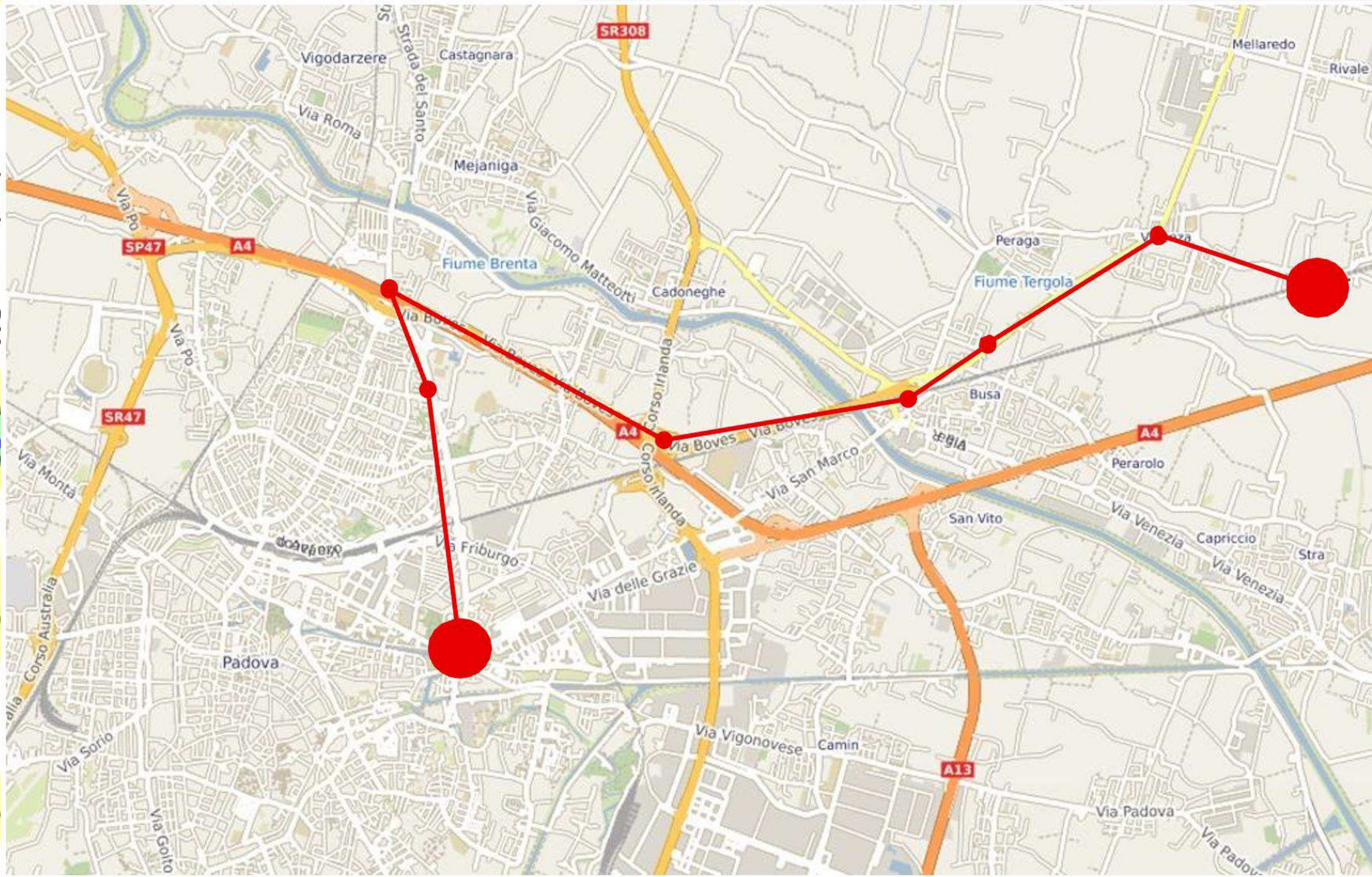
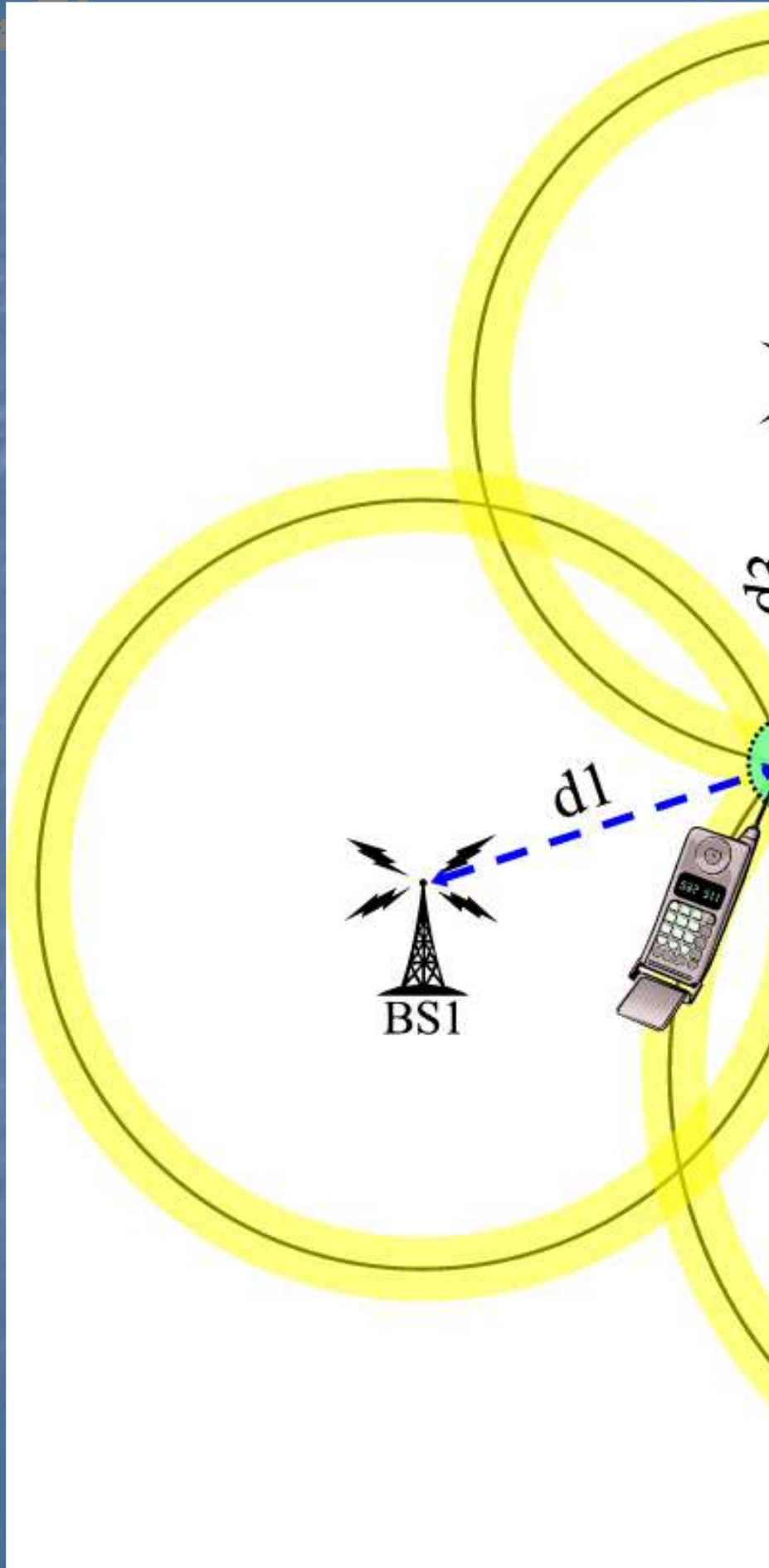
Limitation during «Colored» period

11/06/20-24/06/20



- capacity of public transport reduced from 80% to 50%
- movements prohibited except for necessity
- closed bars and restaurants. Yes to take away until 10pm
- food shops, pharmacies, newsagents, tobacconists, hairdressers, barbers and laundries open
- DAD from the seventh grade onwards

TELCO Mobile data





Cell phone data

Region Friuli Venezia Giulia
since 2016

people inside a cell of 150X150 meters

every 15 minutes

foreigners with state of origin

Italians by province of origin and typology (residents, regular visitors, occasional visitors)

350,000 cells

35 million records per day
12 billion records per year

Cell phone data



Presences



Interactive

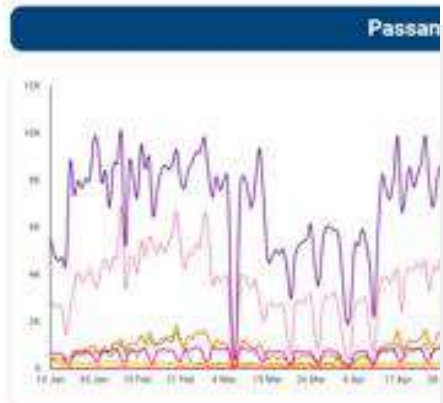
Friuli Venezia Giulia

Reimposta Condividi

Mappatura degli utenti sul territorio

Matrici origine / destinazione

Monitoraggio zone turistiche e c.c.



Distribuzione passanti ne

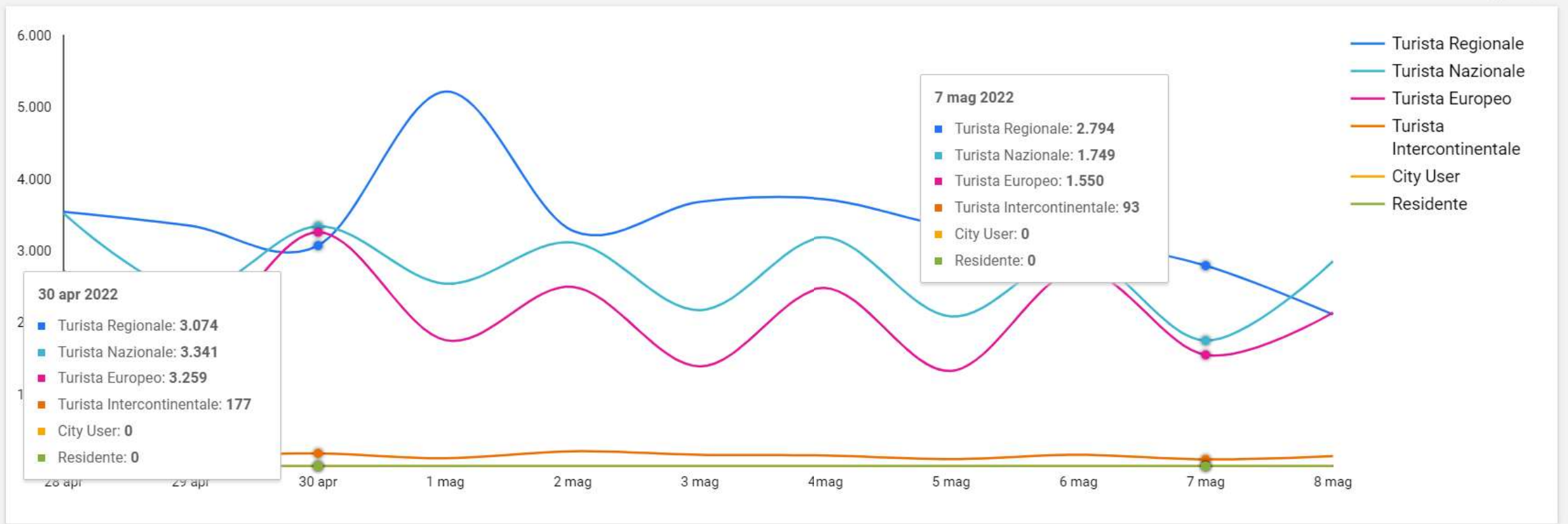
Stato	Passanti 00-18	Passanti 18-74
Summe	0.88%	0.21%
Passante	1.33%	0.21%
Totale	1.06%	0.47%
Turista	1.05%	0.43%
Intercontinentale	0.98%	0.48%
City User	1.04%	0.48%
Residente	0.07%	0.20%

 **REGIONE AUTONOMA
FRIULI VENEZIA GIULIA**

Provincia: Udine (1) Comune: Udine (1) 28 apr 2022 - 8 mag 2022

Visite

Escludi City Users Escludi Residenti



Temporal distribution



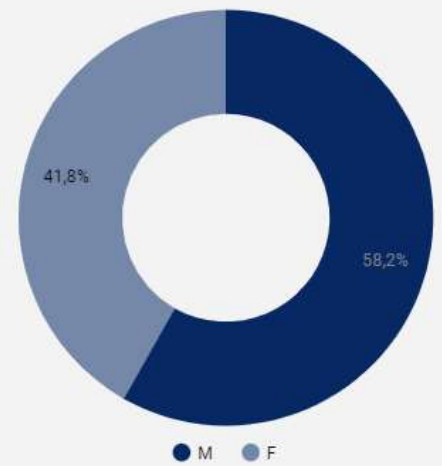
Giorno	Provincia	Comune	Visite	Visitatori	Residenti	City Users	Turisti	Maschi	Femmine
8 mag 2022	Udine	Udine	7.244	7.244	0	0	7.244	56,6%	43,4%
7 mag 2022	Udine	Udine	6.185	6.185	0	0	6.185	54,2%	45,8%
6 mag 2022	Udine	Udine	8.988	8.988	0	0	8.988	56,6%	43,4%
5 mag 2022	Udine	Udine	6.838	6.838	0	0	6.838	55,4%	44,6%
4 mag 2022	Udine	Udine	9.542	9.542	0	0	9.542	57%	43%
3 mag 2022	Udine								
2 mag 2022	Udine								
1 mag 2022	Udine								
30 apr 2022	Udine								
29 apr 2022	Udine								
28 apr 2022	Udine								

[Reimposta](#)
[Condividi](#)

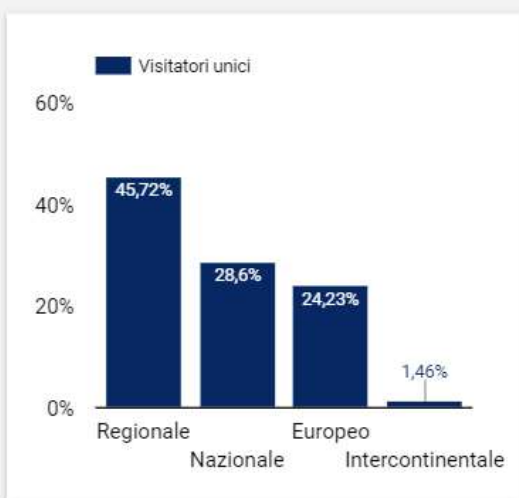
	Italiani	Stranieri	Turista Nazionale	Turista Regionale	Turista Europeo	Turista Intercontinentale	Età 18-24	Età 25-34	Età 35-44	Età 45-54	Età 55-64	Età 65+
2 mag 2022	80,4%	19,6%	39,4%	29,2%	29,5%	1,9%	7,2%	17,4%	17,4%	25,6%	19%	13,3%
1 mag 2022	82,7%	17,3%	28,3%	45,2%	25,1%	1,5%	6,5%	18,4%	16,1%	26,6%	20,6%	11,7%
30 apr 2022	83,1%	16,9%	32,8%	35,1%	30,4%	1,8%	8,3%	17%	16,2%	28,3%	20%	10,2%
29 apr 2022	82,8%	17,2%	30,5%	48,7%	19,4%	1,4%	11,6%	15,5%	15,3%	27,8%	20,4%	9,5%
28 apr 2022	82%	18%										
	82,9%	17,1%										
	81,5%	18,5%										
	85,2%	14,8%										
	81,7%	18,3%										
	84,6%	15,4%										
	83,9%	16,1%										

Totale com...

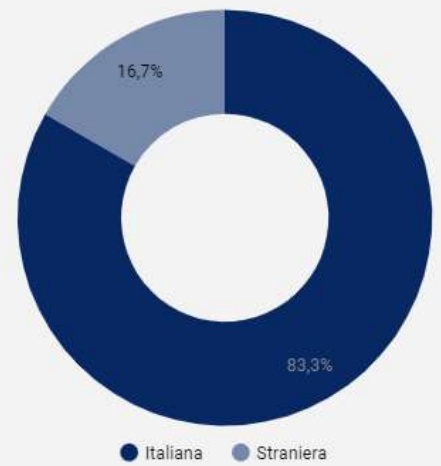
Sesso



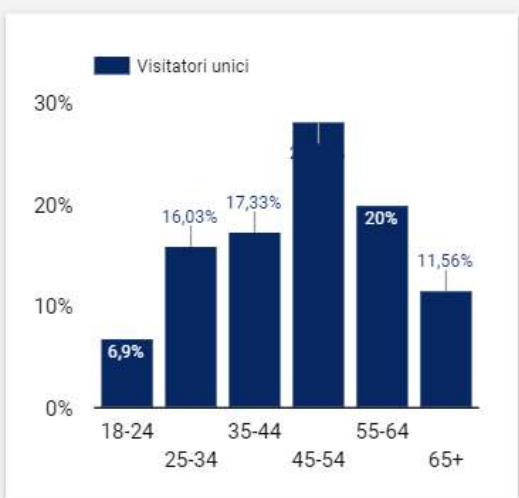
Tipologia visitatore



Nazionalità



Età





Origin Destination

Daily trips Udine - Trieste

Friuli Venezia Giulia

Reimposta

Condividi



Mappatura degli utenti sul territorio

Matrici origine / destinazione

Monitoraggio zone turistiche e c.c.



REGIONE AUTONOMA
FRIULI VENEZIA GIULIA

2 mag 2022 - 6 mag 2022

Provincia di partenza

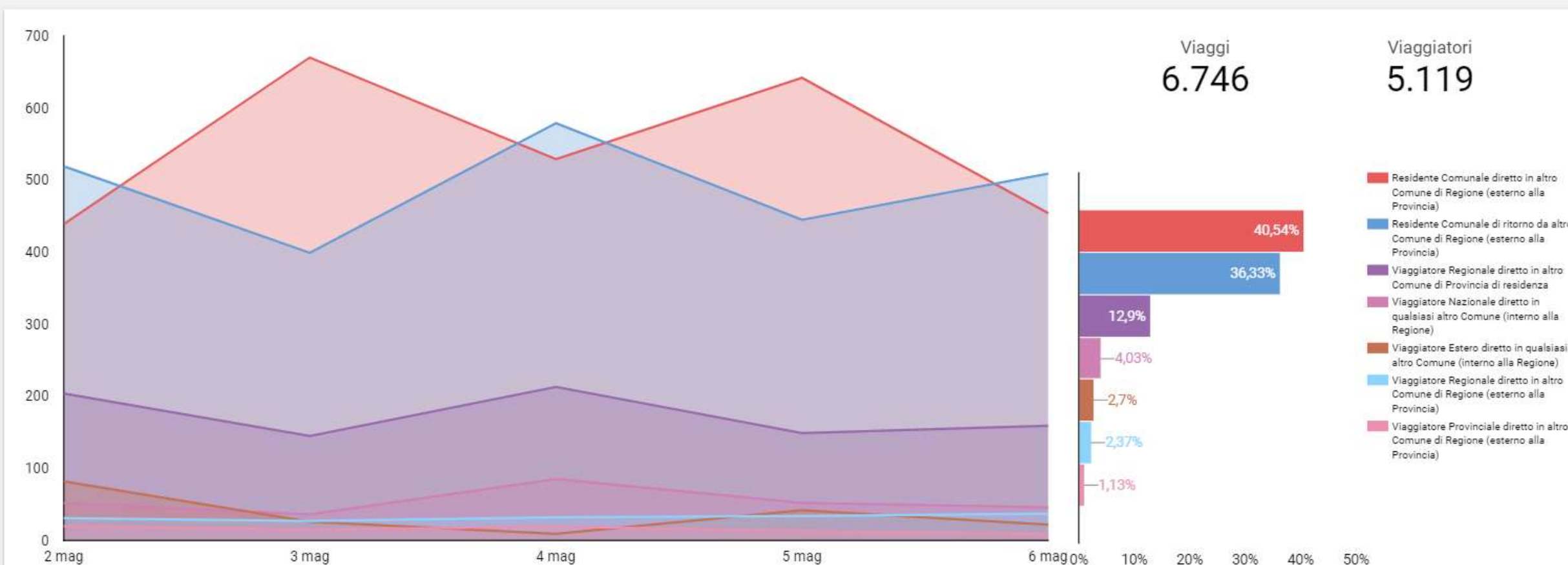
Provincia di arrivo

Comune di partenza: (1)

Comune di arrivo: Ud... (1)

Tipologia viaggiato...

Viaggi giornalieri



Origin Destination *trips distribution*

Friuli Venezia Giulia

Reimposta

Condividi

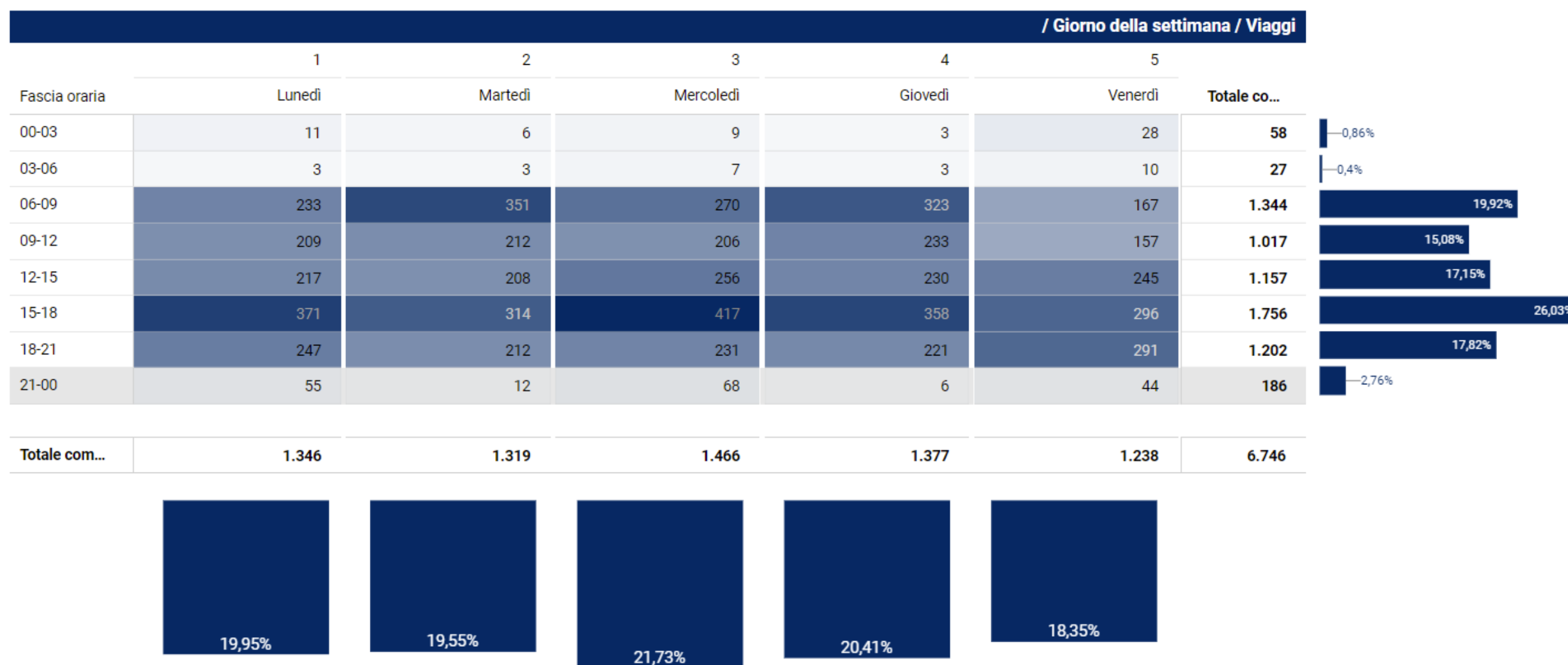
Mappatura degli utenti sul territorio

Matrici origine / destinazione

Monitoraggio zone turistiche e c.c.

2 mag 3 mag 4 mag 5 mag 6 mag 0% 10% 20% 30% 40% 50%

Distribuzione temporale dei viaggi



Origin Destination trip duration

Friuli Venezia Giulia

Reimposta

Condividi

Mappatura degli utenti sul territorio

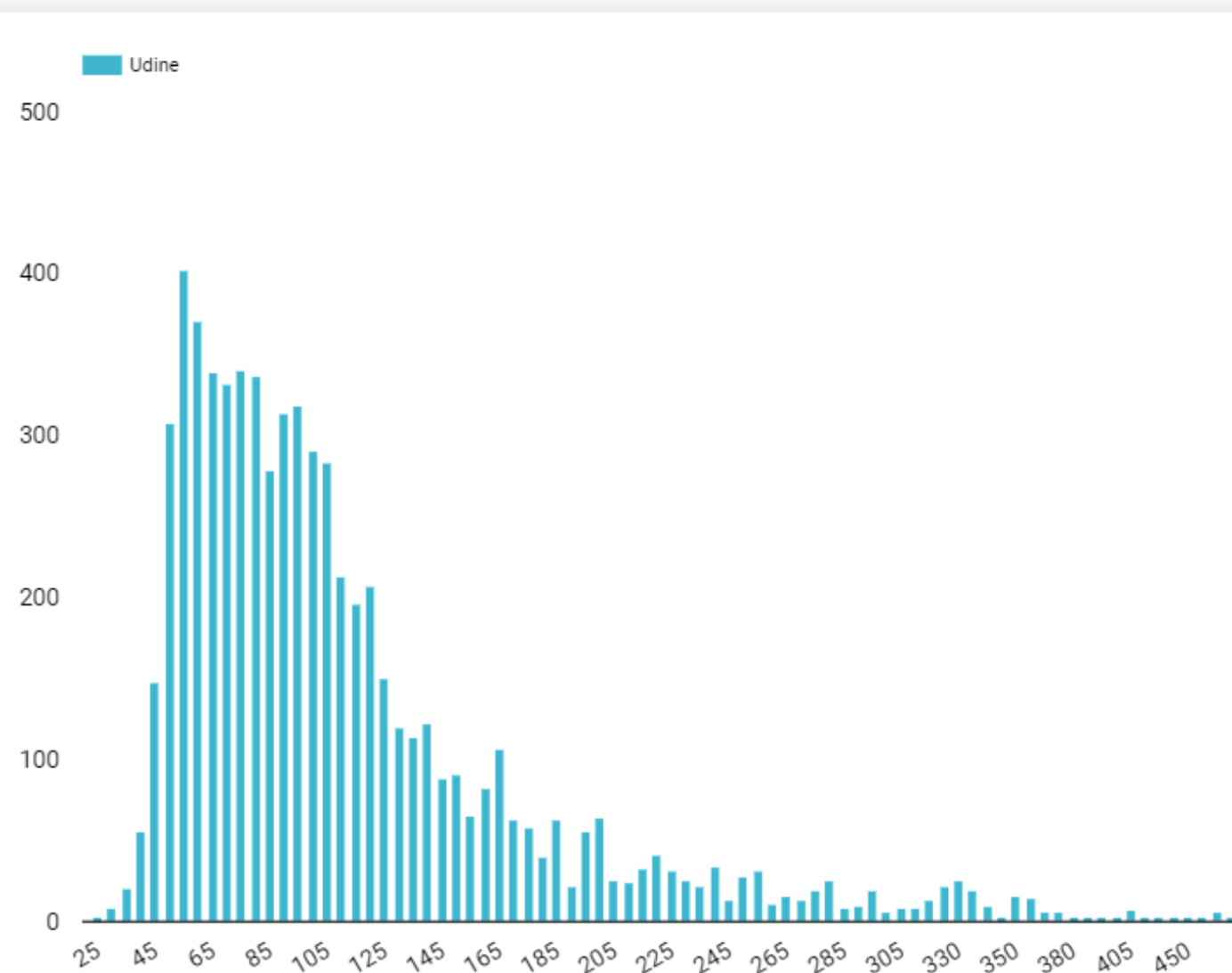
Matrici origine / destinazione

Monitoraggio zone turistiche e c.c.

21,73%

20,41%

Durata viaggi



Comune di partenza

Comune di arrivo

Comune di origine

Comune di arrivo

Durata viaggio

Trieste

Udine

00:57:00

Main destinations

Mappatura degli utenti

Mappatura degli utenti sul territorio

Matrici origine / destinazione

Monitoraggio zone turistiche e c.c.

1 - 23 / 23

Google Scorciatoie da tastiera Dati mappa Termini e condizioni d'uso Segnala un errore nella mappa

Mappatura degli utenti sul territorio

Matrici origine / destinazione

Monitoraggio zone turistiche e c.c.

Aggregazione temporale: Giornaliera

Giorno	Comune	Punto di interesse	Tipologia visitatore
30 apr 2022	Tavagnacco	Udine Nord	City User
30 apr 2022	Martignacco	Città Fiera	City User
30 apr 2022	Fiume Veneto	Gran Shopping Granfiume	City User
30 apr 2022	Villesse	Tiare Shopping	Regionale
30 apr 2022	Aiello del Friuli	Palmanova Outlet Village	Europeo
30 apr 2022	Villesse	Tiare Shopping	City User
30 apr 2022	Trieste	Centro Commerciale Torri D'Europa	Residente
30 apr 2022	Muggia	Centro Commerciale Montedoro	City User
30 apr 2022	Bagnaria Arsa	Emmezeta	City User
30 apr 2022	Villesse	Tiare Shopping	Europeo
30 apr 2022	Aiello del Friuli	Palmanova Outlet Village	City User
30 apr 2022	Monfalcone	Centro Commerciale Belforte	Residente
30 apr 2022	Pradamano	Pradamano	City User
30 apr 2022	Muggia	Centro Commerciale Montedoro	Europeo

Distribuzione delle visite

Fascia oraria	/ Giorno della settimana / Visite							Totale co...	%
	1	2	3	4	5	6	7		
	Lunedì	Martedì	Mercoledì	Giovedì	Venerdì	Sabato	Sunday		
00-03	1.229	956	766	797	1.220	4.472	3.489	12.929	-0,83%
03-06	1.930	2.002	1.053	1.021	1.188	1.438	863	9.495	-0,61%
06-09	22.652	26.564	17.071	15.323	18.407	14.770	6.411	121.198	7,77%
09-12	57.921	50.053	43.540	46.750	59.777	96.780	61.641	416.463	26,69%
12-15	46.708	36.894	32.596	35.135	46.445	81.686	61.669	341.132	21,86%
15-18	50.685	46.774	44.217	45.614	67.830	115.266	75.170	445.556	28,55%
18-21	18.824	20.748	22.278	23.566	35.056	45.612	23.225	189.310	12,13%
21-00	2.206	2.195	2.146	3.227	4.607	7.415	2.705	24.501	-1,57%
Totale com...	202.155	186.187	163.667	171.433	234.530	367.439	235.173	1.560.584	

Distribuzione delle visite

Fascia oraria	/ Giorno della settimana / Visite				
	1	2	3	4	5
	Lunedì	Martedì	Mercoledì	Giovedì	Venerdì
00-03	1.229	956	766	797	1.220





Main destinations *Città Fiera mall*



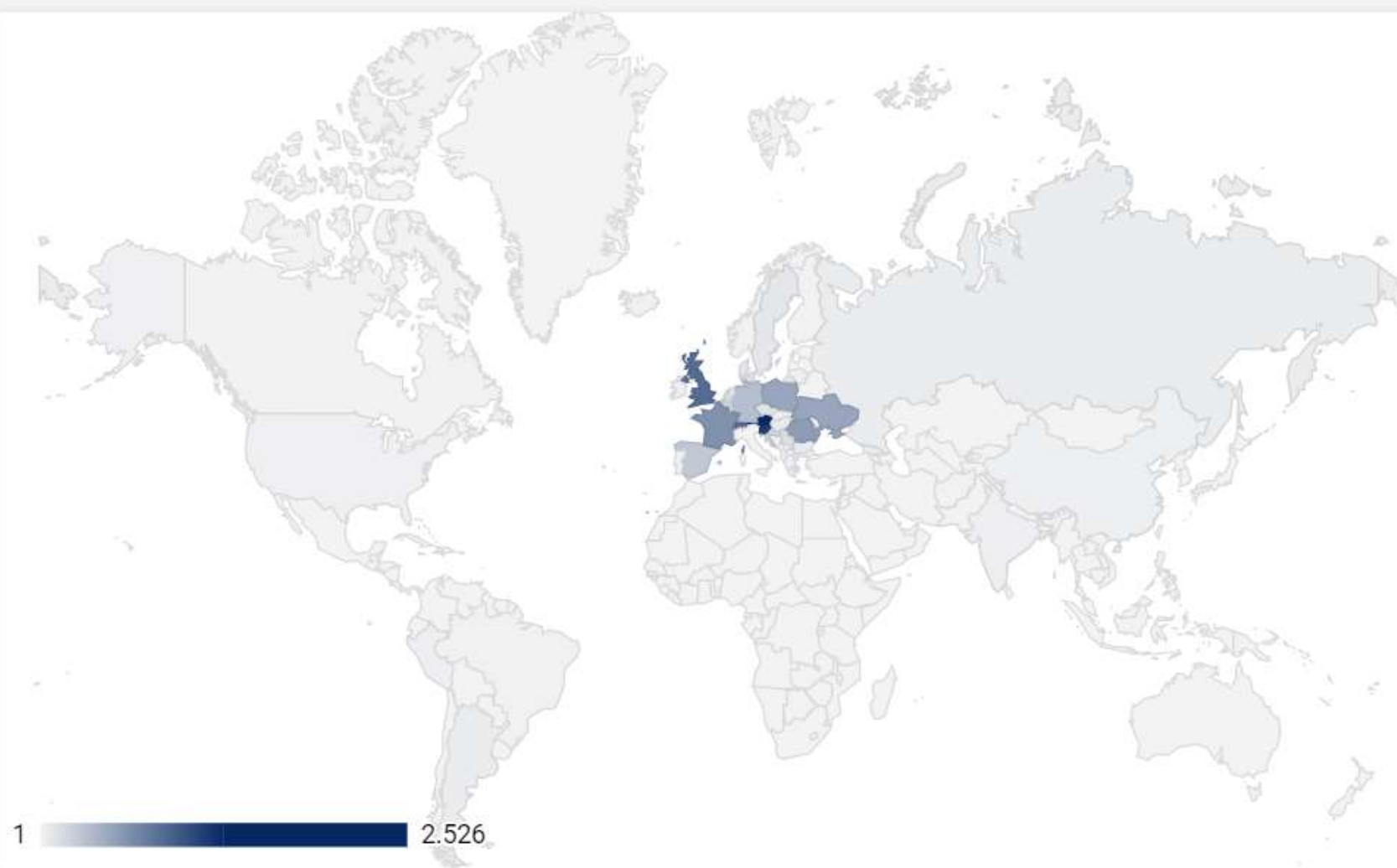
REGIONE AUTONOMA
FRIULI VENEZIA GIULIA

1 apr 2022 - 30 apr 2022

Provenienza v

Provenienza viaggiatori internazionali

Tip



Punto di ...	Paese	Visite	Visitatori
Città Fiera	Austria	2.526	2.526
Città Fiera	Slovenia	1.116	1.116
Città Fiera	Svizzera	861	861
Città Fiera	Regno Unito	832	832
Città Fiera	Francia	604	604
Città Fiera	Romania	534	534
Città Fiera	Ucraina	479	479
Città Fiera	Polonia	475	475
Città Fiera	Germania	322	322
Città Fiera	Spagna	259	259
Città Fiera	Belgio	213	213
Città Fiera	Croazia	182	182
Città Fiera	Serbia	121	121
Città Fiera	Olanda	106	106

1 - 60 / 60 < >



Ongoing activity

Concentrating on Region Friuli Venezia Giulia and it's Municipalities

Integration between Open Data (google, ...) and this very detailed TELCO data

Application of Artificial Intelligence an ML techniques to find hidden correlations

Problems

The MORE **data** available is NOT always MORE **information**

Cell phone data companies willingness to do analysis themselves

Awareness of Private Companies and Public Administration



THANK YOU

Salvatore Amaduzzi
salvatore.amaduzzi@uniud.it