



UNIMORE

UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Big data, telefonia cellulare ed evoluzione pandemica

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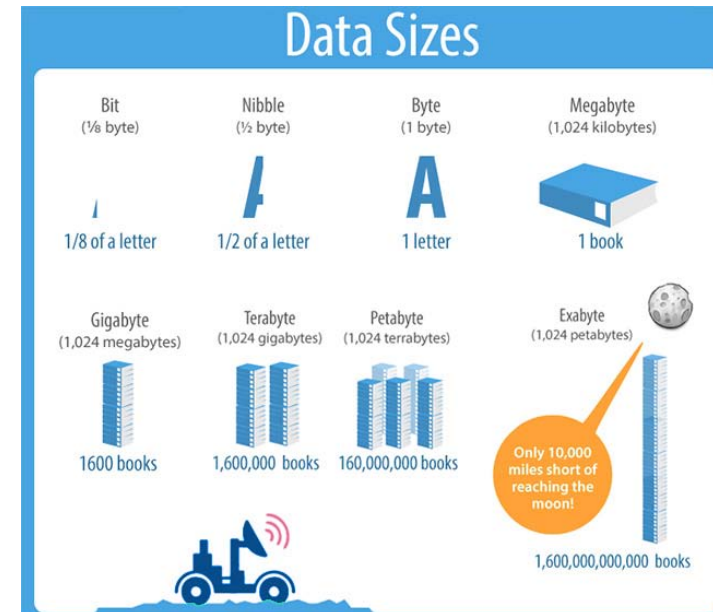
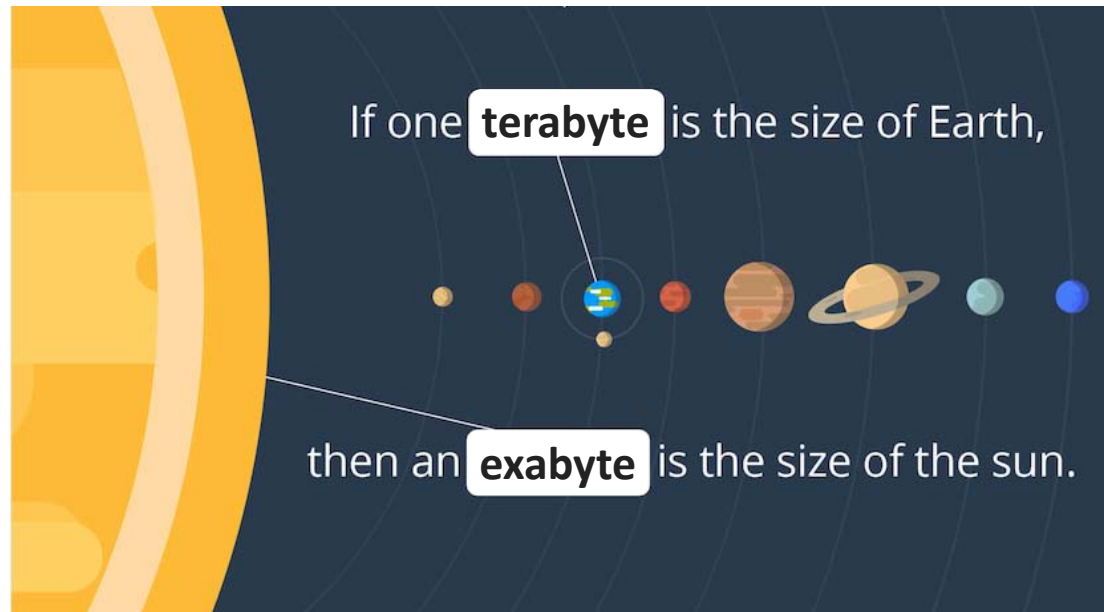
2 dicembre 2021

Aula Magna 'Pietro Manodori', via Allegri 9, Reggio Emilia

L'epidemiologia del COVID-19, i dati satellitari e l'Intelligenza Artificiale per la lotta alle pandemie

Big data

- Il termine *Big Data* sta ad indicare delle **grandi masse di dati informativi** talmente estesa da richiedere delle tecnologie in grado di estrarne il valore, analizzarli e gestirli (*data management* and *data analysis*)
- La quantità di dati digitali raccolti e archiviati è elevata e in rapida **espansione**.
- Le stime globali suggeriscono che, entro il 2025, verranno creati 463 **exabyte** di dati giornalmente, originati da varie fonti.



Risultati Pubmed per 'big data'



naturemedicine

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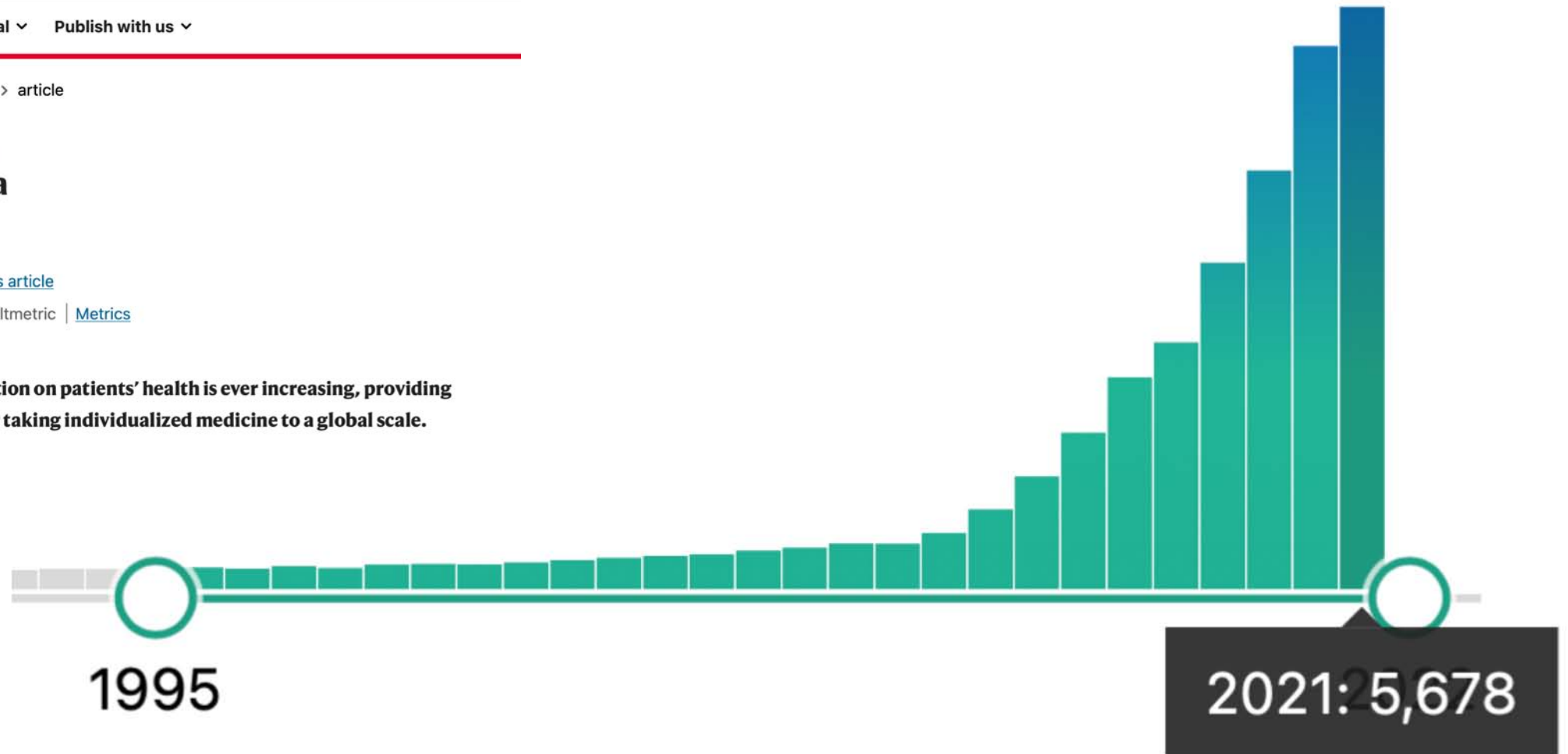
Editorial | [Published: 13 January 2020](#)

Big hopes for big data

Nature Medicine 26, 1 (2020) | [Cite this article](#)

9648 Accesses | 18 Citations | 30 Altmetric | [Metrics](#)

Large-scale multi-modal information on patients' health is ever increasing, providing an opportunity to use big data for taking individualized medicine to a global scale.



1 dicembre 2021

Big data e pandemia COVID-19

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NEWS AND VIEWS | 10 November 2020

Big data and simple models used to track the spread of COVID-19 in cities

Understanding the dynamics of SARS-CoV-2 infections could help to limit viral spread. Analysing mobile-phone data to track human contacts at different city venues offers a way to model infection risks and explain infection disparities.

[Kevin C. Ma](#) ✉ & [Marc Lipsitch](#) ✉



International Society of Travel Medicine
Established 1991
Promoting healthy travel worldwide

Journal of Travel Medicine, 2020, 1–4

doi: 10.1093/jtm/taaa080

Advance Access Publication Date: 21 May 2020

Perspective

Perspective

Combat COVID-19 with artificial intelligence and big data

Leesa Lin, PhD^{1,*}, and Zhiyuan Hou, PhD²

¹Department of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine, London, UK and ²School of Public Health, Fudan University, Shanghai, China

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Submitted 15 May 2020; Revised 19 May 2020; Editorial Decision 18 May 2020; Accepted 18 May 2020

Key words: SARS-CoV-2, quarantine, contact tracing, lockdown, containment, isolation, codes

Attuali positivi

194.270

Incremento
4.627

Dati Andamento

Dimessi / Guariti

4.700.449

Incremento
8.041

Dati Andamento

Deceduti

133.828

Incremento
89

Dati Andamento

Totale casi

5.028.547

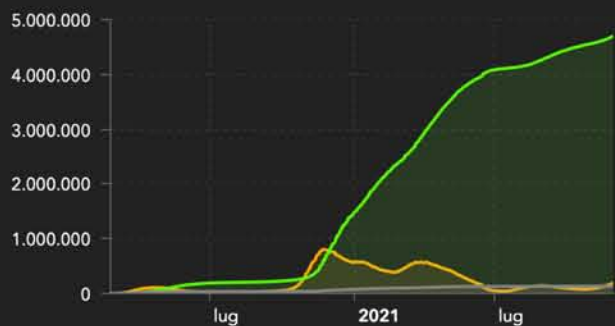
Incremento
12.764

Dati Andamento

Altri dati e informazioni

- Aggiornamento dati sanitari [storico]
- Infografica epidemiologica ISS
- Sorveglianza settimanale Regioni
- Aggiornamento nazionale ISS

Andamento nazionale



Nuovi positivi



Positivi Variazione



Regioni - attuali positivi Province - casi totali



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 Scheda metadati RNDT: [dati](#) - [aree](#)
 Temi del dataset: [Salute umana e sicurezza](#) (Inspire) - ISO 19115: Salute
 Dati forniti dal Ministero della Salute
 Elaborazione e gestione dati a cura del Dipartimento della Protezione Civile

Download schede e dati:
[- Schede riepilogo PDF](#)
[- Dati CSV / JSON](#)
[- Shape aree](#)
[- Metadati](#)

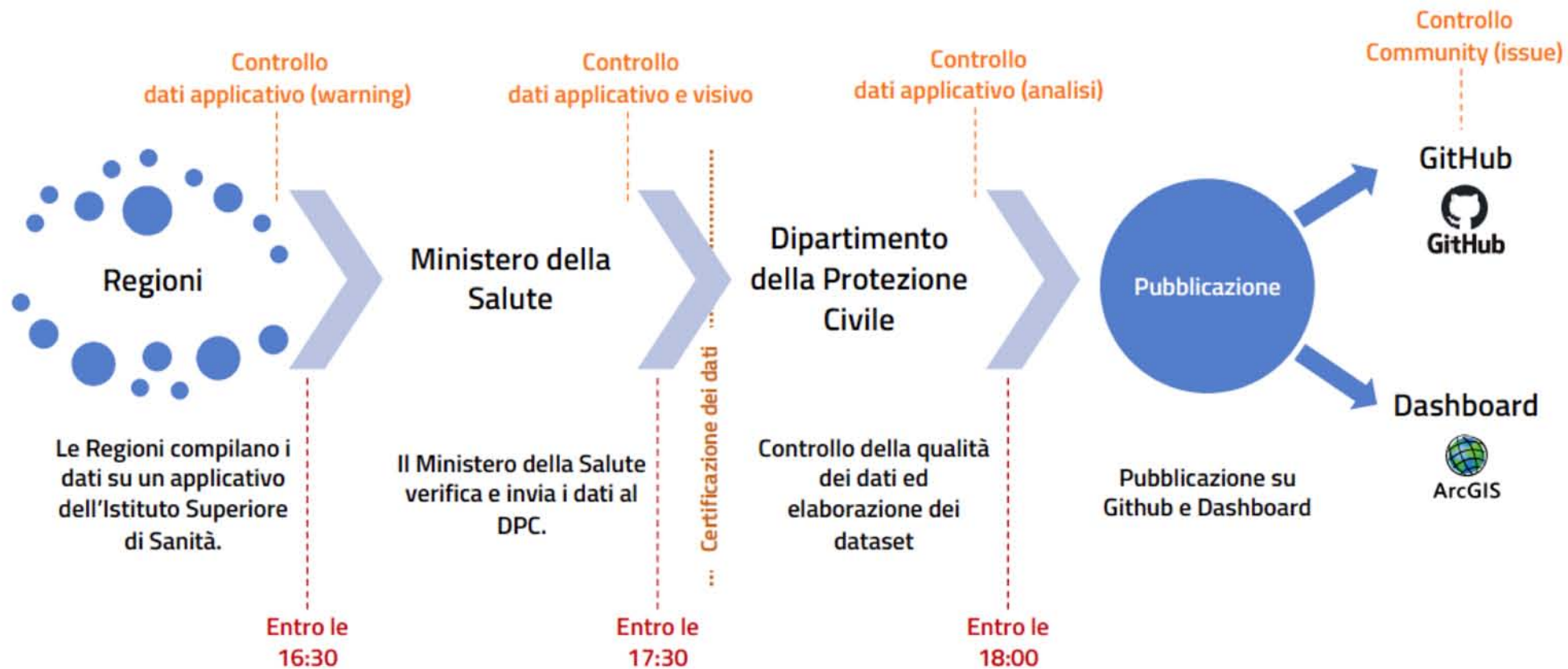
Regioni - totale casi, attuali e incremento

Lombardia:	932.544	(31.334)	(2.223)
Veneto:	517.158	(30.849)	(2.362)
Campania:	490.659	(16.891)	(886)
Emilia-Romagna:	455.930	(20.812)	(1.086)
Lazio:	423.571	(19.749)	(1.253)
Piemonte:	399.288	(10.460)	(972)
Sicilia:	324.222	(12.545)	(545)
Toscana:	301.496	(9.033)	(521)
Puglia:	279.384	(4.116)	(283)
Friuli Venezia Giulia:	131.037	(7.063)	(457)

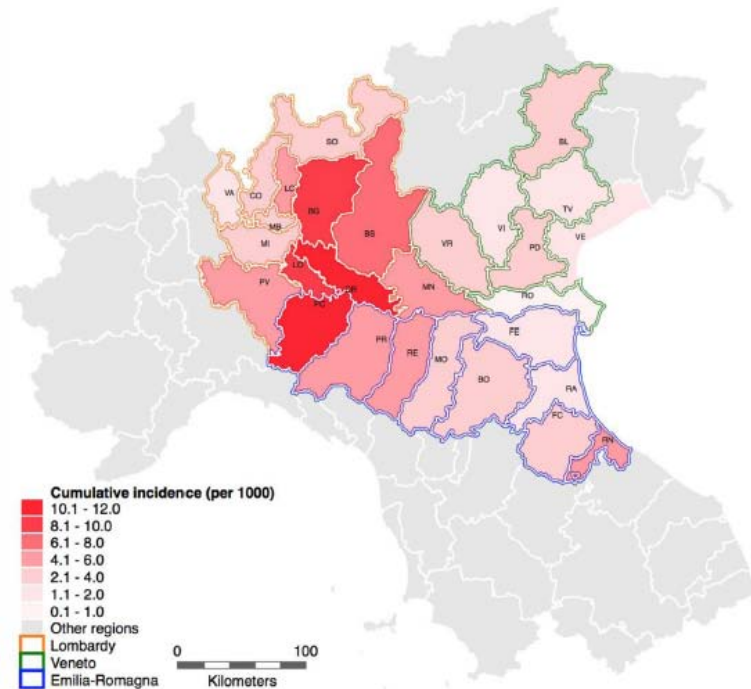
Regioni Province

Note

30/11/2021, 18:00
 La Regione Campania comunica che a seguito delle verifiche quotidiane si evince che un decesso registrato oggi, risale al giorno 24/11/2021. La Regione Emilia-Romagna comunica che sono stati eliminati 6 casi, positivi a test antigenico ma non confermati



Big data e telefonia cellulare



Contents lists available at [ScienceDirect](#)

EClinicalMedicine

journal homepage: <https://www.journals.elsevier.com/eclinicalmedicine>



Research Paper

Lockdown timing and efficacy in controlling COVID-19 using mobile phone tracking

Marco Vinceti^{a,b,*}, Tommaso Filippini^a, Kenneth J. Rothman^{b,c}, Fabrizio Ferrari^d, Alessia Goffi^d, Giuseppe Maffei^d, Nicola Orsini^e

^a Environmental, Genetic and Nutritional Epidemiology Research Center (CREAGEN), Section of Public Health, Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Via Campi 287, 41125 Modena, Italy

^b Department of Epidemiology, Boston University School of Public Health, 715 Albany St, Boston, MA 02118, United States

^c RTI Health Solutions, 3040 E Cornwallis Rd, Research Triangle Park, NC 27709, United States

^d Terraria, Via Melchiorre Gioia, 132, 20125 Milan, Italy

^e Department of Global Public Health, Karolinska Institutet, Solnavägen 1 E, 11365 Stockholm, Sweden

Fig. 1. Northern Italy study area with the cumulative incidence (per 1000) of SARS-CoV-2 infected cases diagnosed through April 6, 2020 in the provinces of the Lombardy, Veneto and Emilia-Romagna regions.

Mobilità



COVID-19: durante l'impennata di contagi, l'Italia si è fermata

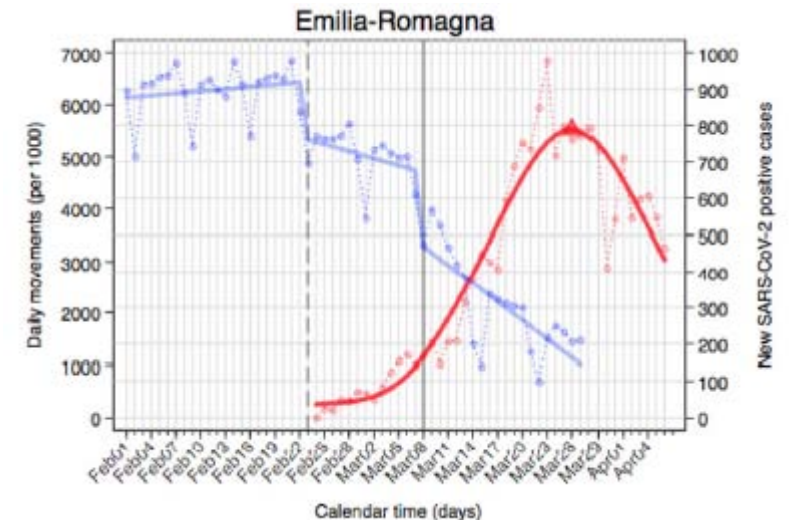
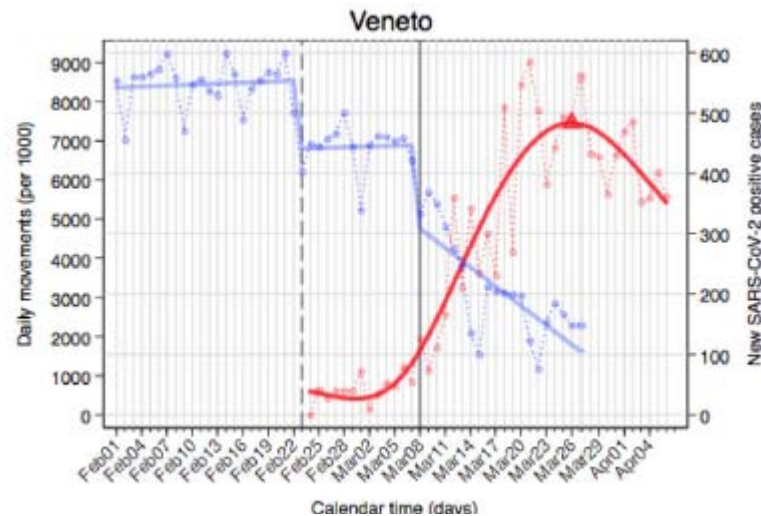
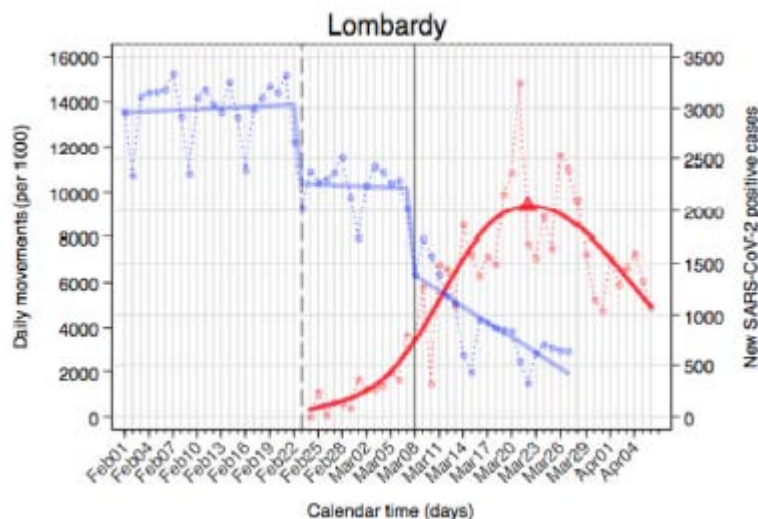
MOBILITÀ

COVID-19

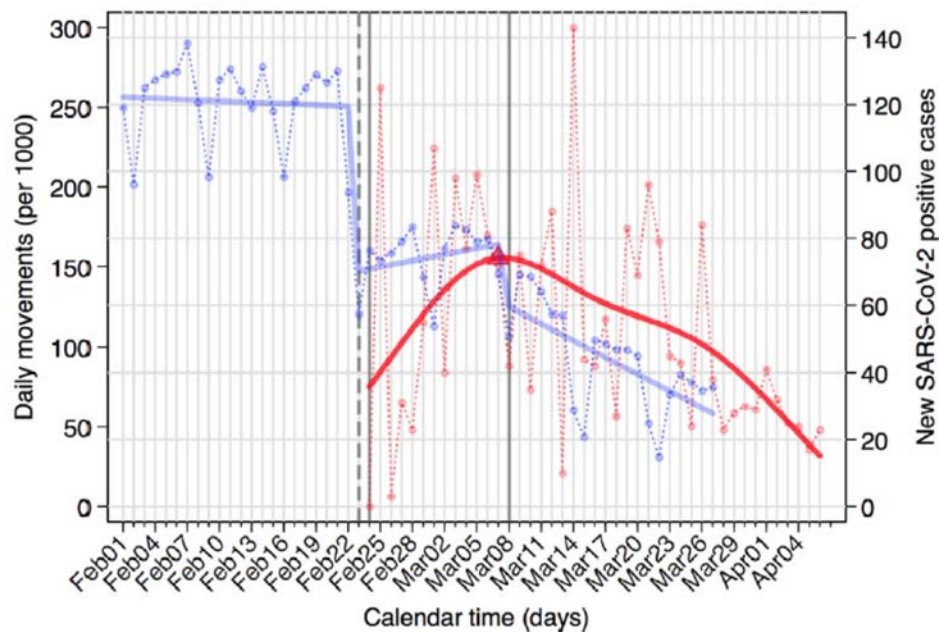


Big data e telefonia cellulare

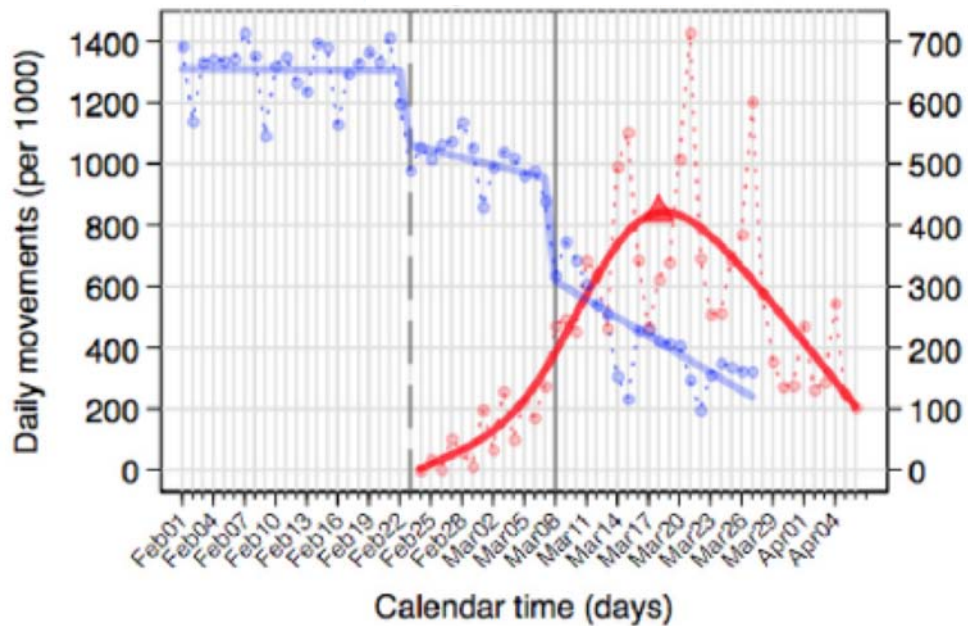
- La **prima fase** del lockdown, meno rigida, ha portato a una **diminuzione** della mobilità, **insufficiente** per invertire la pandemia.
- Con un blocco più stretto, la mobilità è diminuita abbastanza da **ridurre la diffusione** al di sotto del livello necessario per sostenere la pandemia.



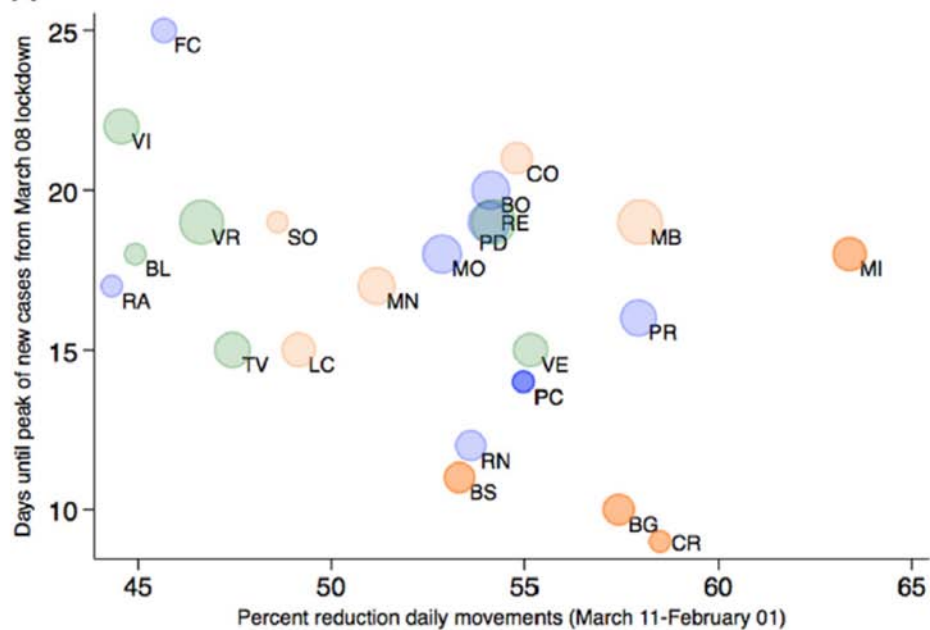
Lodi



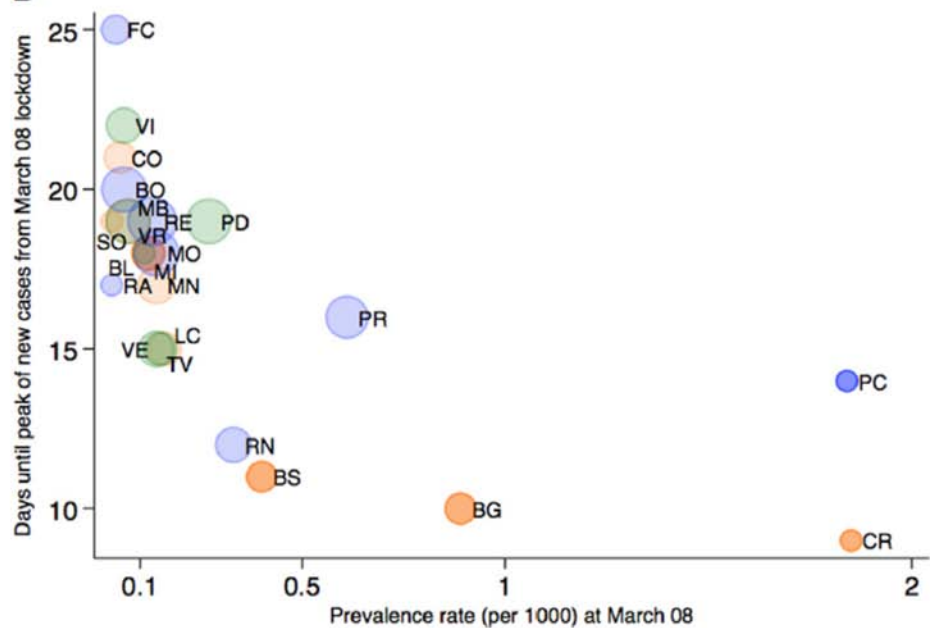
Bergamo

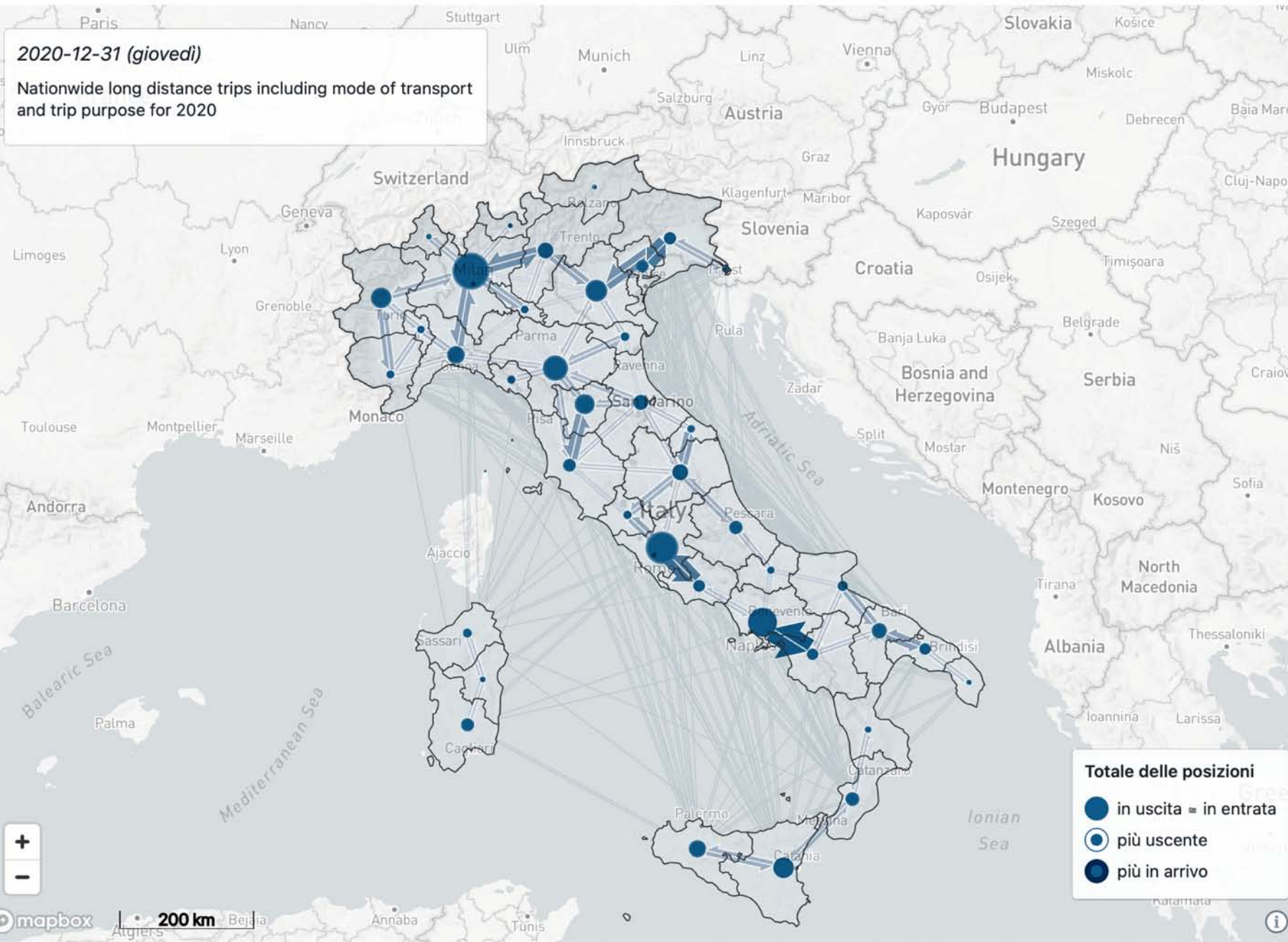


A



B



Filtri [Stile mappa](#) [Visualizzazione della mappa](#) [POI Layer](#) [Routes](#) [Selezionare più zone](#)[Elenco delle visualizzazioni salvate](#)

4.612.005 passeggero km

Ripristinare i filtri

Filtra per località

Ripristina

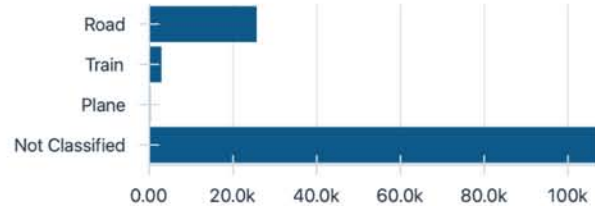
Tutti gli spostamenti

Reggio nell'Emilia

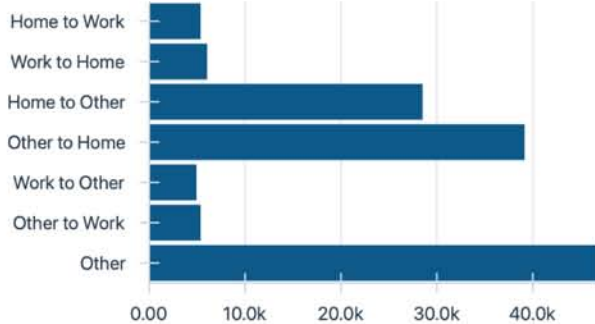
Includi spostamenti tra le località selezionate

Filtra per attributi

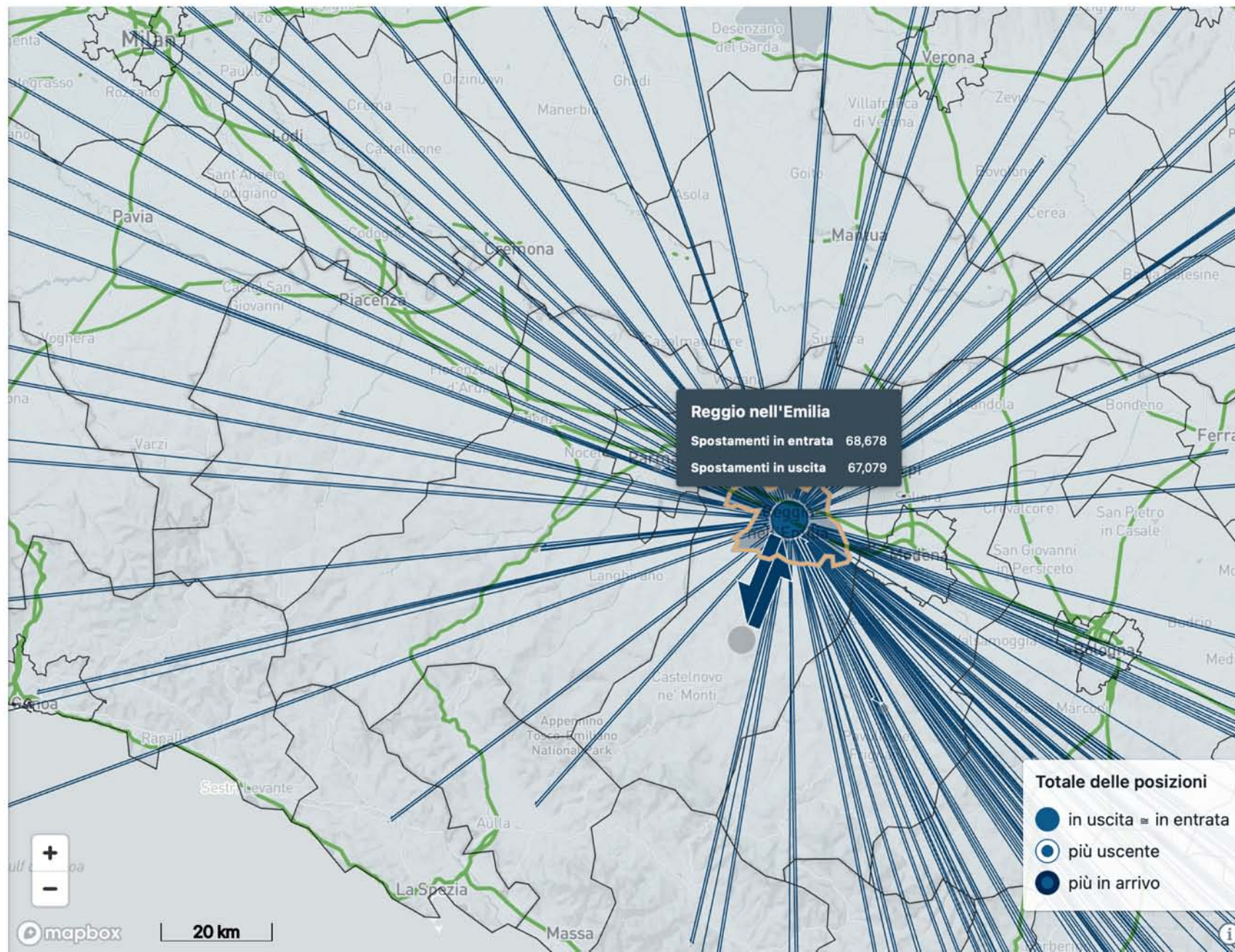
Mode of Transport



Trip purpose



Trip distance (km)



Salute, ambiente e big data

Compendium of WHO and other UN guidance on health and environment

Are you a decision-maker working in one of these areas?



National, regional and municipal sectors



NGO or development agencies

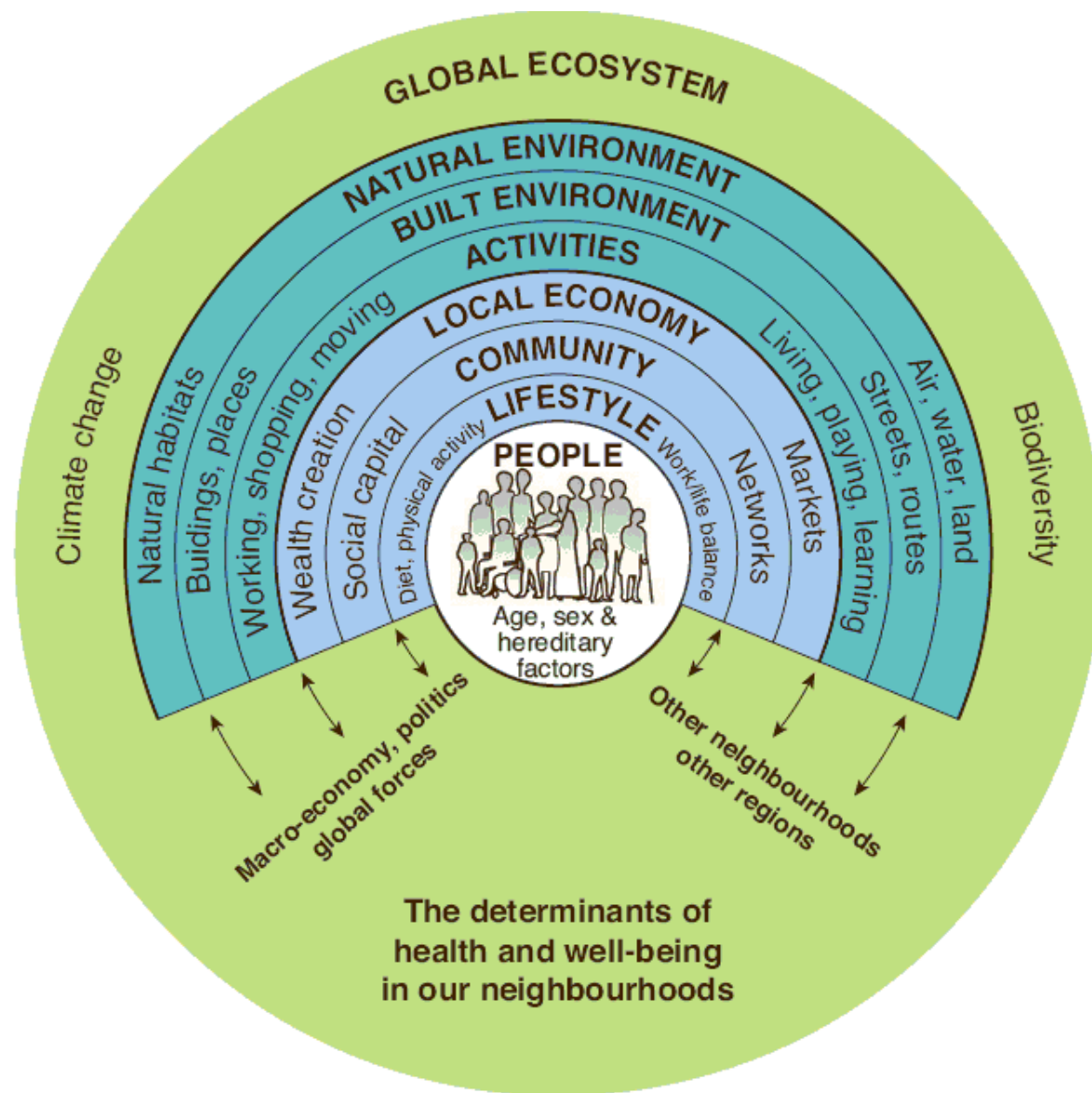


Healthcare

This compendium compiles a comprehensive collection of about 500 interventions for healthier environments that YOU can implement in the following areas:

<p>Air pollution</p>	<p>Water, sanitation and hygiene</p>	<p>Climate change</p>
<p>Radiation</p>	<p>Solid waste</p>	<p>Nature and health</p>
<p>Chemicals</p>	<p>Safe environments and mobility</p>	<p>And others:</p> <ul style="list-style-type: none"> • Safe and healthy food • Priority settings for action • Cross-cutting topics

Access the compendium at <https://www.who.int/tools/compendium-on-health-and-environment>



Salute, ambiente e big data

Copernicus - Earth observation programme

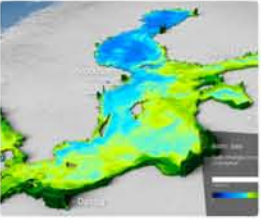




APPLICATIONS

Air pollution

VIDEO 00:03:40 3010 VIEWS 5 LIKES



APPLICATIONS

Chlorophyll concentration

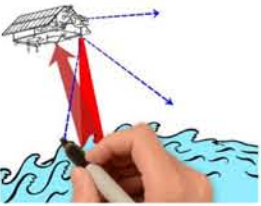
VIDEO 00:02:46 3516 VIEWS 50 LIKES



APPLICATIONS

Copernicus Sentinel-6 over Northern Europe

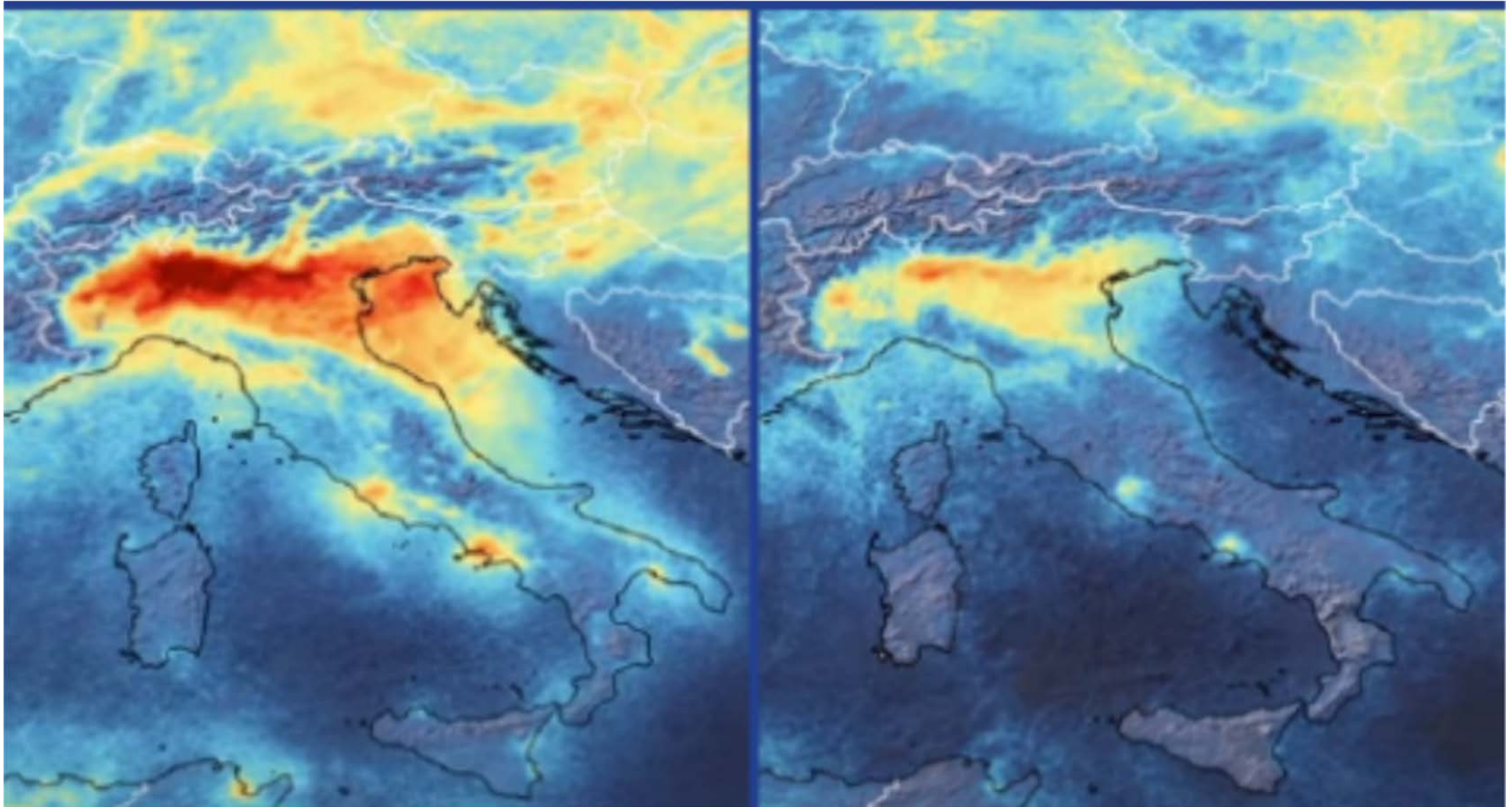
VIDEO 00:00:22 436 VIEWS 2 LIKES



APPLICATIONS

Learn about sea-level rise and Copernicus Sentinel-6

VIDEO 00:03:44 4476 VIEWS 90 LIKES



European Space Agency (ESA) satellite images from January (left) and March (right) demonstrate the reduction in air pollution over Northern Italy. Source: ESA

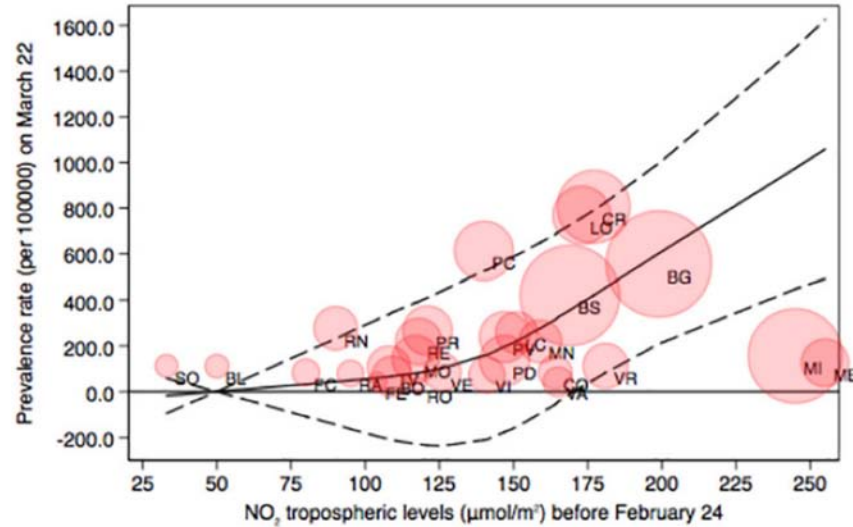
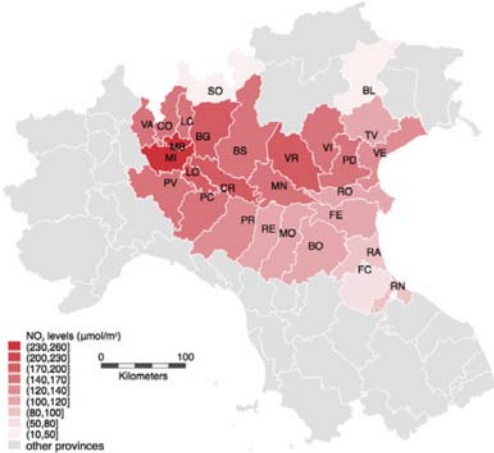
<https://euideas.eui.eu/2020/05/07/the-covid-19-lockdown-a-breath-of-fresh-air-for-italy/>



Satellite-detected tropospheric nitrogen dioxide and spread of SARS-CoV-2 infection in Northern Italy

Tommaso Filippini^a, Kenneth J. Rothman^{b,c}, Alessia Goffi^d, Fabrizio Ferrari^d, Giuseppe Maffei^d, Nicola Orsini^e, Marco Vinceti^{a,c,*}

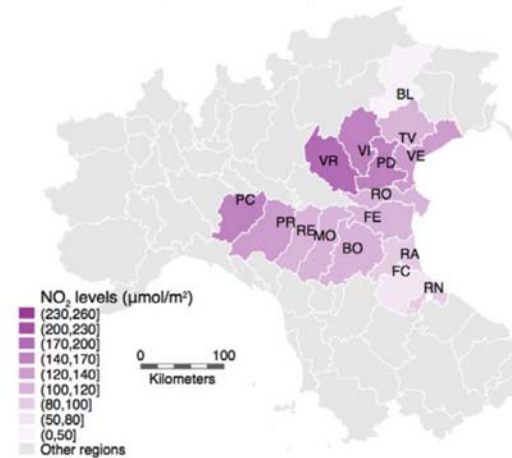
Tropospheric NO₂ levels before lockdown



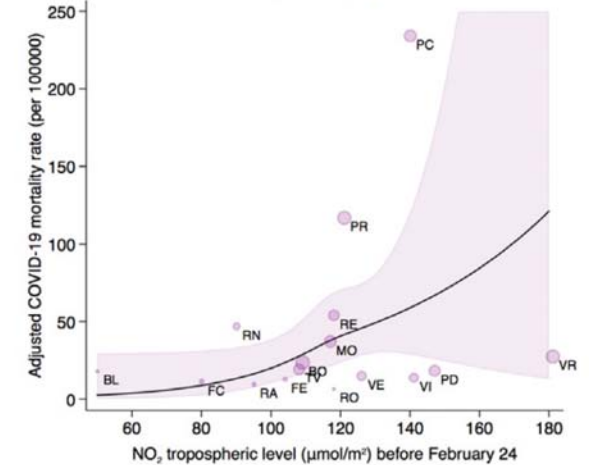
Associations between mortality from COVID-19 in two Italian regions and outdoor air pollution as assessed through tropospheric nitrogen dioxide

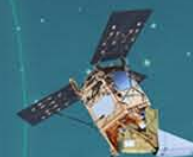
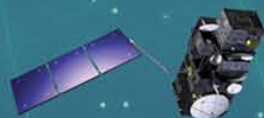
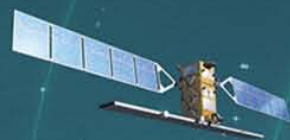
Tommaso Filippini^a, Kenneth J. Rothman^{b,c}, Silvia Cocchio^d, Elena Narne^e, Domenico Mantoan^f, Mario Saia^e, Alessia Goffi^g, Fabrizio Ferrari^g, Giuseppe Maffei^g, Nicola Orsini^h, Vincenzo Baldo^d, Marco Vinceti^{a,c,*}

Nitrogen dioxide level before February 24, 2020



Association with adjusted COVID-19 mortality rate February 24-April 5, 2020





Rapid Action on COVID-19 and EO



Copernicus
Europe's eyes on Earth



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Centro di Ricerca in Epidemiologia Ambientale,
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Federico Zagnoli



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