



UNIVERSITÀ
DEGLI STUDI
FIRENZE

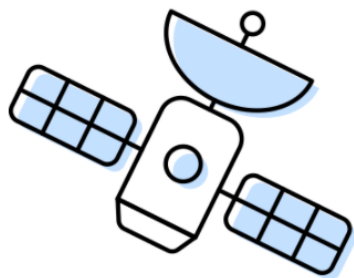
FONDAZIONE PER IL
FUTURO
DELLE **CITTA**

Analisi spaziale e integrazione da piattaforme multisorgente per il monitoraggio della vegetazione in ambiente urbano

Corso di Dottorato: Urban Future Studies
Docente: Dott. **Saverio Francini**

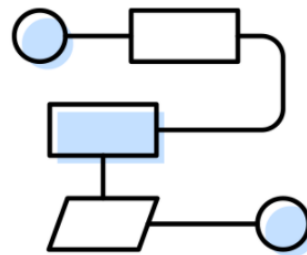
What is Google Earth Engine?

- a cloud platform offering planetary-scale analysis capabilities
- a multi-petabyte catalog of satellite imagery and geospatial datasets



Satellite Imagery

+



Your Algorithms

+



Real World Applications

Why Google Earth Engine?

- **Huge amount of data**
- **Preprocessing of images already done**
- **Fast**
- **Easy to use**
- **Free**

What is Google Earth Engine used for?



Scopus

Search within

Article title, Abstract, Keywords



Search documents*

Google earth engine



3680 documents found in
scopus



Contents lists available at ScienceDirect

Remote Sensing of Environment

journal homepage: www.elsevier.com/locate/rse



Google Earth Engine: Planetary-scale geospatial analysis for everyone



Noel Gorelick ^{a,*}, Matt Hancher ^b, Mike Dixon ^b, Simon Ilyushchenko ^b, David Thau ^b, Rebecca Moore ^b



5774 citations in scopus

^a Google Switzerland, Brandschenkestrasse 110, Zurich 8002, Switzerland

^b Google Inc., 1600 Amphitheater Parkway, Mountain View, CA, 94043, USA

Google Earth Engine: publications

<https://doi.org/10.1016/j.jag.2021.102663>

<https://doi.org/10.3390/rs12203331>

<https://doi.org/10.3390/s22052015>

<https://doi.org/10.1016/j.dib.2022.108297>

<https://doi.org/10.1093/forestry/cpaa043>

<https://doi.org/10.3390/rs15061638>

<https://doi.org/10.1016/j.envsoft.2022.105477>

<https://doi.org/10.3390/rs15040923>

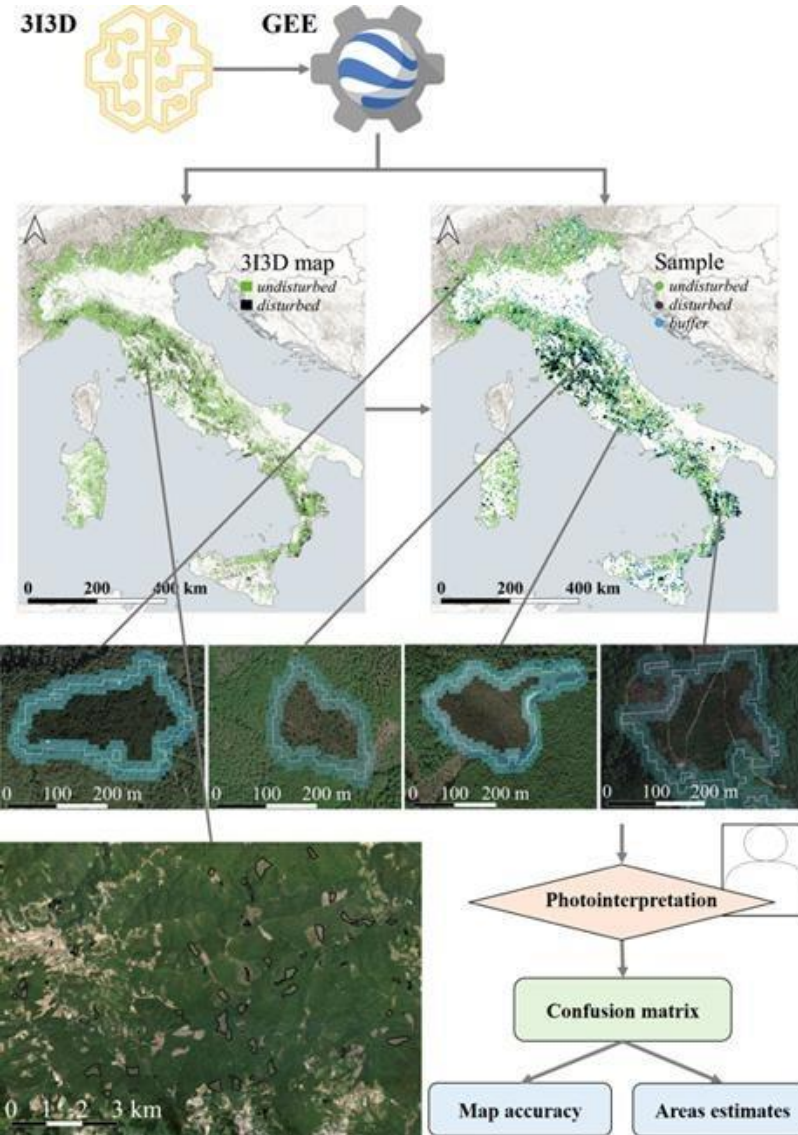
<https://doi.org/10.3832/ifor4043-015>

<https://doi.org/10.3390/rs12223720>

<https://doi.org/10.3389/ffgc.2023.1020477>

<https://doi.org/10.3390/f14061116>

Google Earth Engine



International Journal of Applied Earth Observations and Geoinformation 106 (2022) 102663



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

International Journal of Applied Earth Observations and Geoinformation

journal homepage: www.elsevier.com/locate/jag



An open science and open data approach for the statistically robust estimation of forest disturbance areas

Saverio Francini^{a,b,c,*}, Ronald E. McRoberts^d, Giovanni D'Amico^a, Nicholas C. Coops^e, Txomin Hermosilla^f, Joanne C. White^f, Michael A. Wulder^f, Marco Marchetti^b, Giuseppe Scarascia Mugnozza^c, Gherardo Chirici^a

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^d Department of Forest Resources, University of Minnesota, Saint Paul, MN 55108, USA

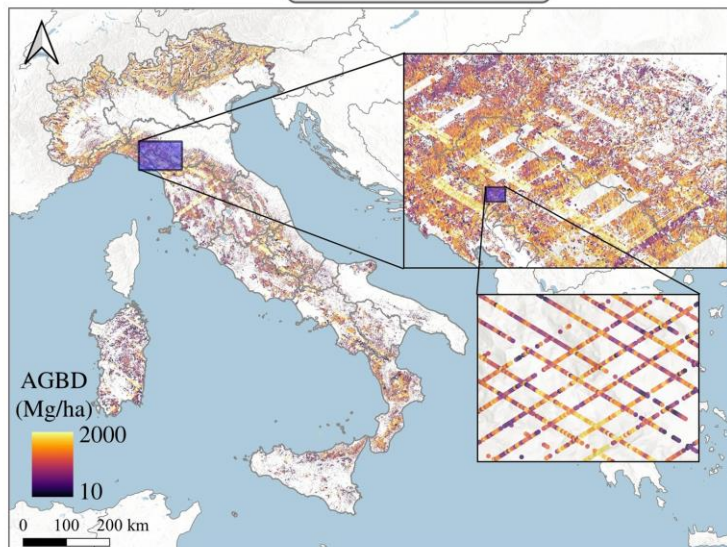
^e Integrated Remote Sensing Studio, Department of Forest Resources Management, University of British Columbia, Vancouver, BC, Canada

^f Canadian Forest Service (Pacific Forestry Centre), Natural Resources Canada, Victoria, BC, Canada

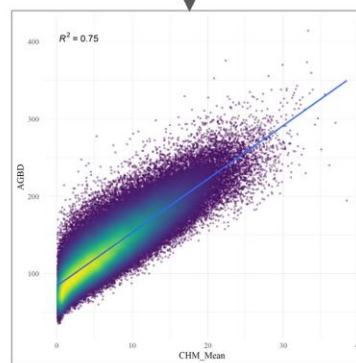
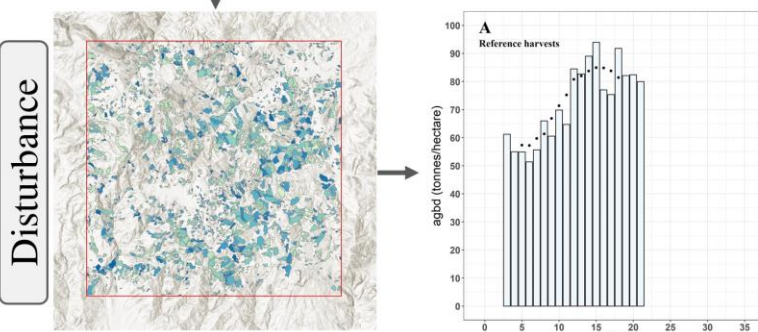
 <https://doi.org/10.1016/j.jag.2021.102663>

Google Earth Engine

GEDI level 4



ALS data



Article

Integrating GEDI and Landsat: Spaceborne Lidar and Four Decades of Optical Imagery for the Analysis of Forest Disturbances and Biomass Changes in Italy

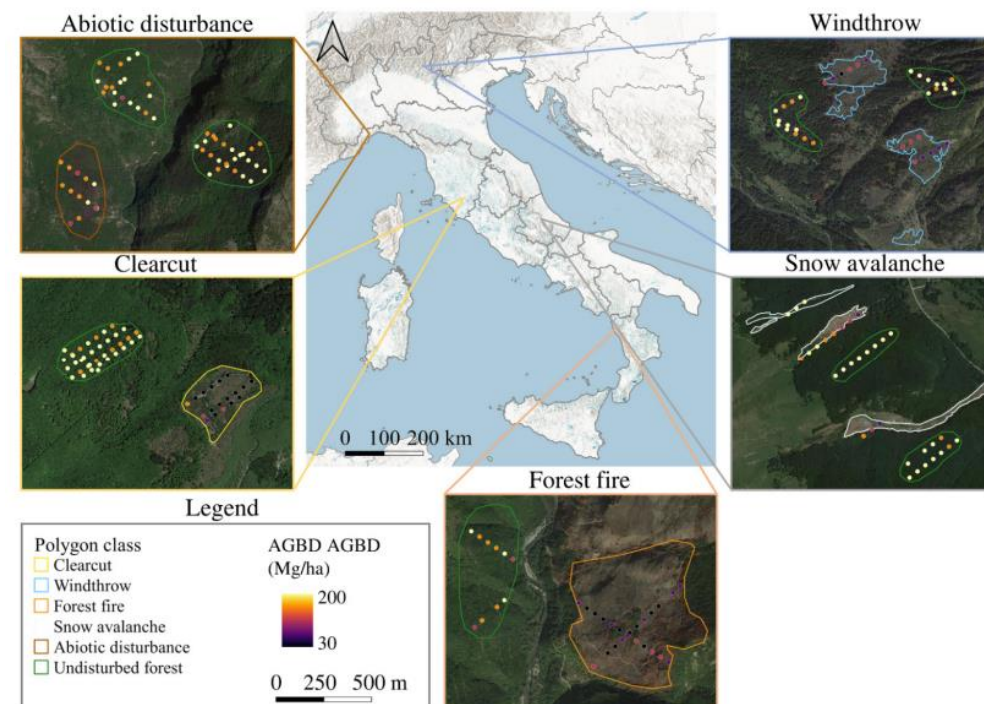
Saverio Francini ¹, Giovanni D'Amico ^{1,*}, Elia Vangi ^{1,2}, Costanza Borghi ¹ and Gherardo Chirici ¹

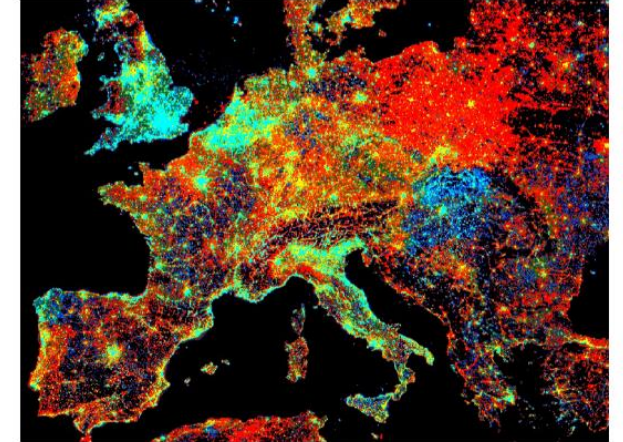
Figure 7. Comparison of AGBD between GEDI pulses acquired in 2019 over different kinds of forest disturbances that occurred in 2019.

Google Earth Engine: E-Book

Welcome to Cloud-Based Remote Sensing with Google Earth Engine: Fundamentals and Applications

This book is the product of more than a year of effort from more than 100 individuals, working in concert to provide this free resource for learning how to use this exciting technology for the public good.

The book includes work from undergraduates, master's students, PhD students, postdocs, assistant professors, associate professors, and independent consultants.



The book is broadly organized into two sections:

1. Fundamentals

The first half, **Fundamentals**, is a set of 31 labs designed to take you from being a complete Earth Engine novice to being a quite advanced user.

2. Applications

The second half, **Applications**, presents you with a tour of the world of Earth Engine across 24 chapters, showing how it is used in a very wide variety of settings that rely on remote-sensing data.

<https://www.eefabook.org/>

Google Earth Engine MDPI Topics collection

Google Earth Engine Applications for Monitoring Natural Ecosystems and Land Use

Abstract submission deadline
25 October 2023

Manuscript submission deadline
25 December 2023

Viewed by
4285

Topic Information

Dear Colleagues,

Global ecosystems play a major role in mitigating global warming, but climate change is increasing the number and the magnitude of stressors, making ecosystem monitoring more important than ever. In this context, remote sensing data and the Google Earth Engine cloud computing platform represent crucial tools for comprehensively and exhaustively monitoring ecosystems globally. Google Earth Engine provides access to the vast majority of freely available, public, multi-temporal remote sensing data and offers free cloud-based computational power to apply complex algorithms over large areas.

The Topic "Google Earth Engine Applications for Monitoring Natural Ecosystems and Land Use" welcomes high-quality studies that focus on applications exploiting GEE for monitoring natural ecosystems and land use. Relevant themes include, but are not limited to: (a) ecosystem disturbance near real-time prediction and monitoring, (b) carbon storage prediction, (c) forest species classification, (d) forest harvestings, wind damages, and fires prediction, (e) climate change impact on global ecosystems, (f) drought monitoring, (g) innovative time series analysis and machine learning approaches for ecosystem monitoring, (h) development and validation of ecosystem disturbance monitoring methods, (i) forest degradation monitoring, (j) natural disaster monitoring, (k) precision and accuracy estimation and modeling of forest structure and function parameters, (l) agroforestry ecosystem visualization and management, (m) land cover and land-use change monitoring, and (n) hydrological and eco-hydrological processes monitoring.

Topic Editors



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<https://www.mdpi.com/topics/1925BXC26Y>

Google Earth Engine Summer School



3 Editions
41 Participants
12 Countries



**Google
Earth Engine
Summer School**
Fourth edition

Firenze (IT) – 23/27 September 2024

Scan here to see the programme

**PRE-REGISTRATION
FORM**

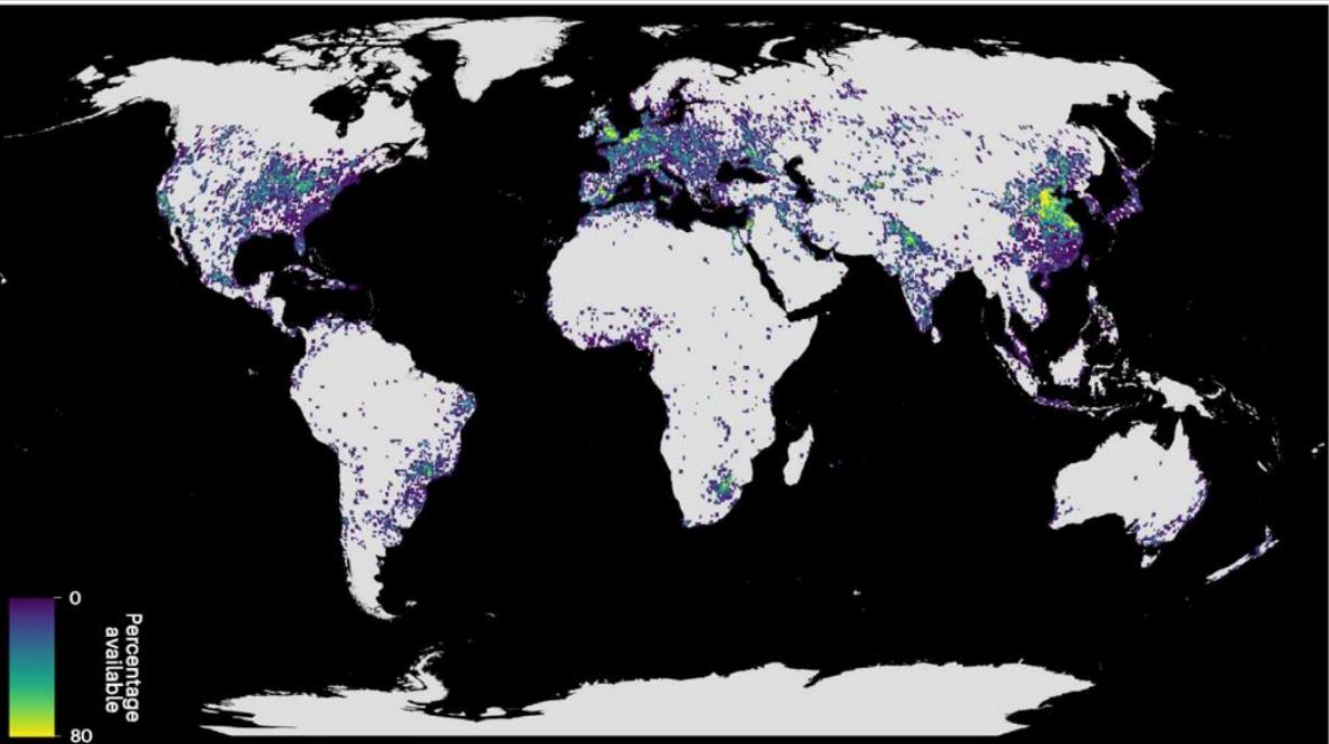


Global spatial assessment of potential for new peri-urban forests to combat climate change

Received: 19 April 2023

Saverio Francini ^{1,2}✉, Gherardo Chirici^{1,2}, Leonardo Chiesi ^{1,3}, Paolo Costa ³, Guido Caldarelli^{1,4,5,6} & Stefano Mancuso¹

Accepted: 15 February 2024



Mentions in news and blogs

[L'importanza delle foreste periurbane per il clima: spazio per 241 miliardi di alberi - Greenreport: economia ecologica e sviluppo sostenibile](#)

Green Report (Italy)

[Scienza, attorno alle città spazio per 241 miliardi di alberi](#)

TeleAmbiente

[Piantare alberi salva il Pianeta? Sì, se sono foreste periurbane](#)

Innovazione

[Aree periurbane del mondo capaci di ospitare fino 241 miliardi di alberi. Lo studio](#)

The Map Report

[Foreste per il clima: attorno alle città spazio per 241 miliardi di alberi](#)

Meteo Web

OSSERVATORIO

L'Osservatorio italiano per le politiche di forestazione urbana della Fondazione per il Futuro delle Città è uno strumento di monitoraggio e intervento sulla qualità dell'ambiente urbano e delle aree verdi urbane d'Italia.

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Tipo Vegetazione

- Alberi
- Arbusti
- Erbaceo

+

-

▲

Isole di calore

°C

< 38

40

43

46



3D



Carbonio accumulato

Tonnellate

0

13.54

27.49

41.03 >



Capacità rimozione PM10

kg/anno

0

2.92

5.93

8.85 >

