GEE for large-area disturbance mapping

Saverio Francini

11-05-2022

Domain agnostic online semantic segmentation for multi-dimensional time series

Shaghayegh Gharghabi[1] · Chin-Chia Michael Yeh[1] · Yifei Ding[1] · Wei Ding[2] · Paul Hibbing[3] · Samuel LaMunion[3] · Andrew Kaplan[3] · Scott E. Crouter[3] · Eamonn Keogh[1]

Mapping the forest disturbance regimes of Europe

Cornelius Senf & Rupert Seidl

nature sustainability

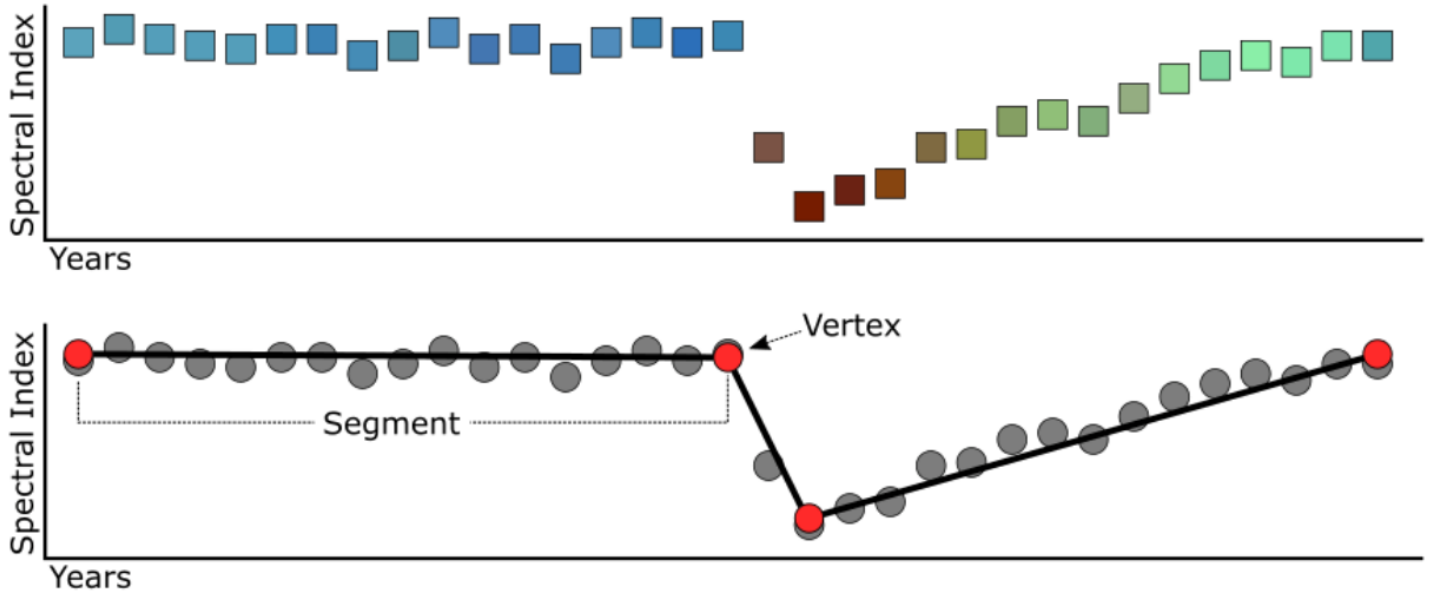
ELSEVIER

Remote Sensing of Environment

Volume 114, Issue 12, 15 December 2010, Pages 2897-2910

Detecting trends in forest disturbance and recovery using yearly Landsat time series: 1. LandTrendr — Temporal segmentation algorithms

Robert E. Kennedy [a], Zhiqiang Yang [a], Warren B. Cohen [b]



Contents lists available at ScienceDirect

Remote Sensing of Environment

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

Regional detection, characterization, and attribution of annual forest change from 1984 to 2012 using Landsat-derived time-series metrics

Txomin Hermosilla [a,*], Michael A. Wulder [b], Joanne C. White [b], Nicholas C. Coops [a], Geordie W. Hobart [b]

[a] Integrated Remote Sensing Studio, Department of Forest Resources Management, University of British Columbia, 2424 Main Mall, Vancouver, British Columbia V6T 1Z4, Canada
[b] Canadian Forest Service (Pacific Forestry Centre), Natural Resources Canada, 506 West Burnside Road, Victoria, British Columbia V8Z 1M5, Canada

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An integrated Landsat time series protocol for change detection and generation of annual gap-free surface reflectance composites

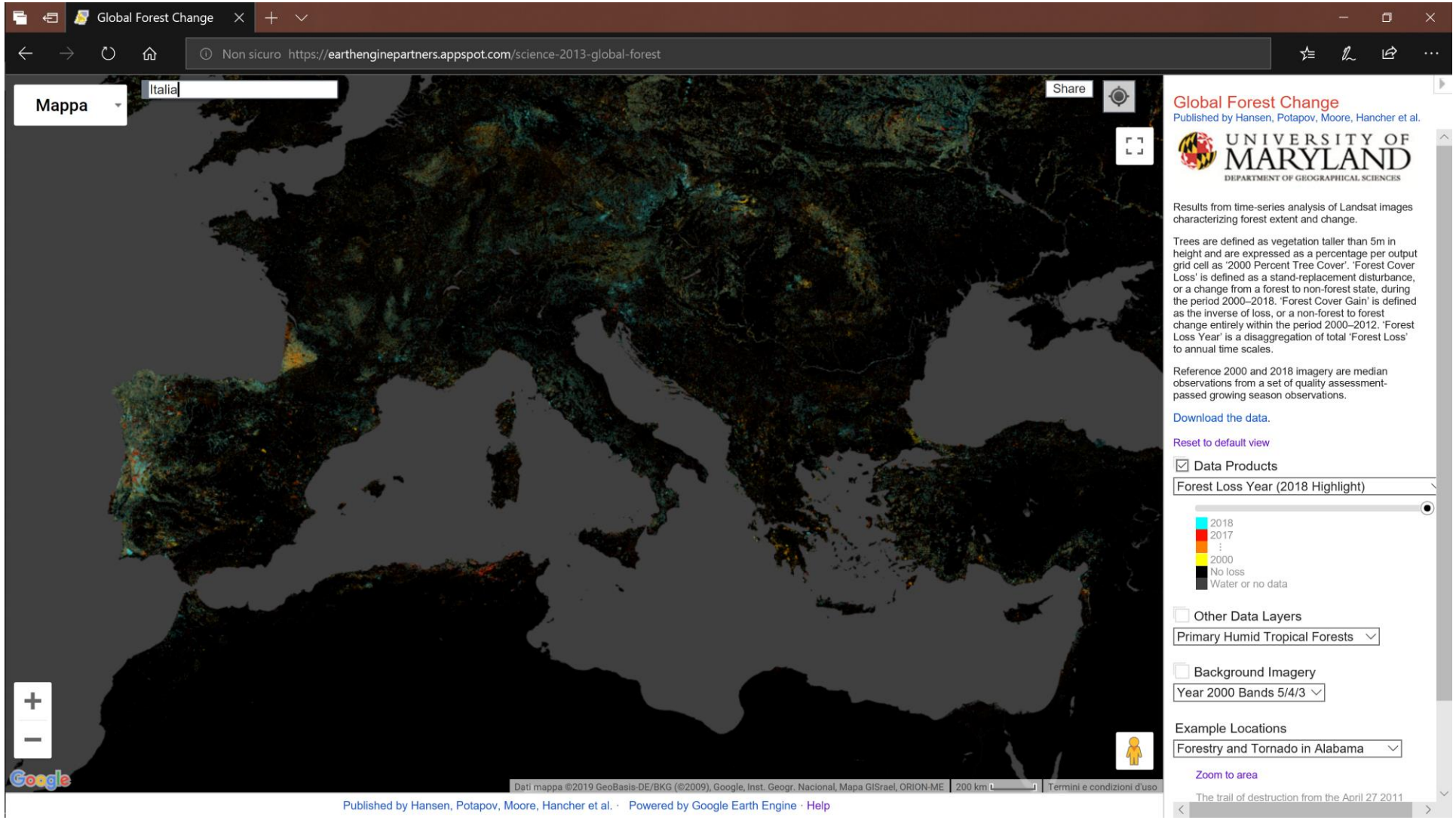
Txomin Hermosilla [a,*], Michael A. Wulder [b], Joanne C. White [b], Nicholas C. Coops [a], Geordie W. Hobart [b]

[a] Integrated Remote Sensing Studio, Department of Forest Resources Management, University of British Columbia, 2424 Main Mall, Vancouver, BC V6T 1Z4, Canada
[b] Canadian Forest Service (Pacific Forestry Centre), Natural Resources Canada, 506 West Burnside Road, Victoria, British Columbia V8Z 1M5, Canada

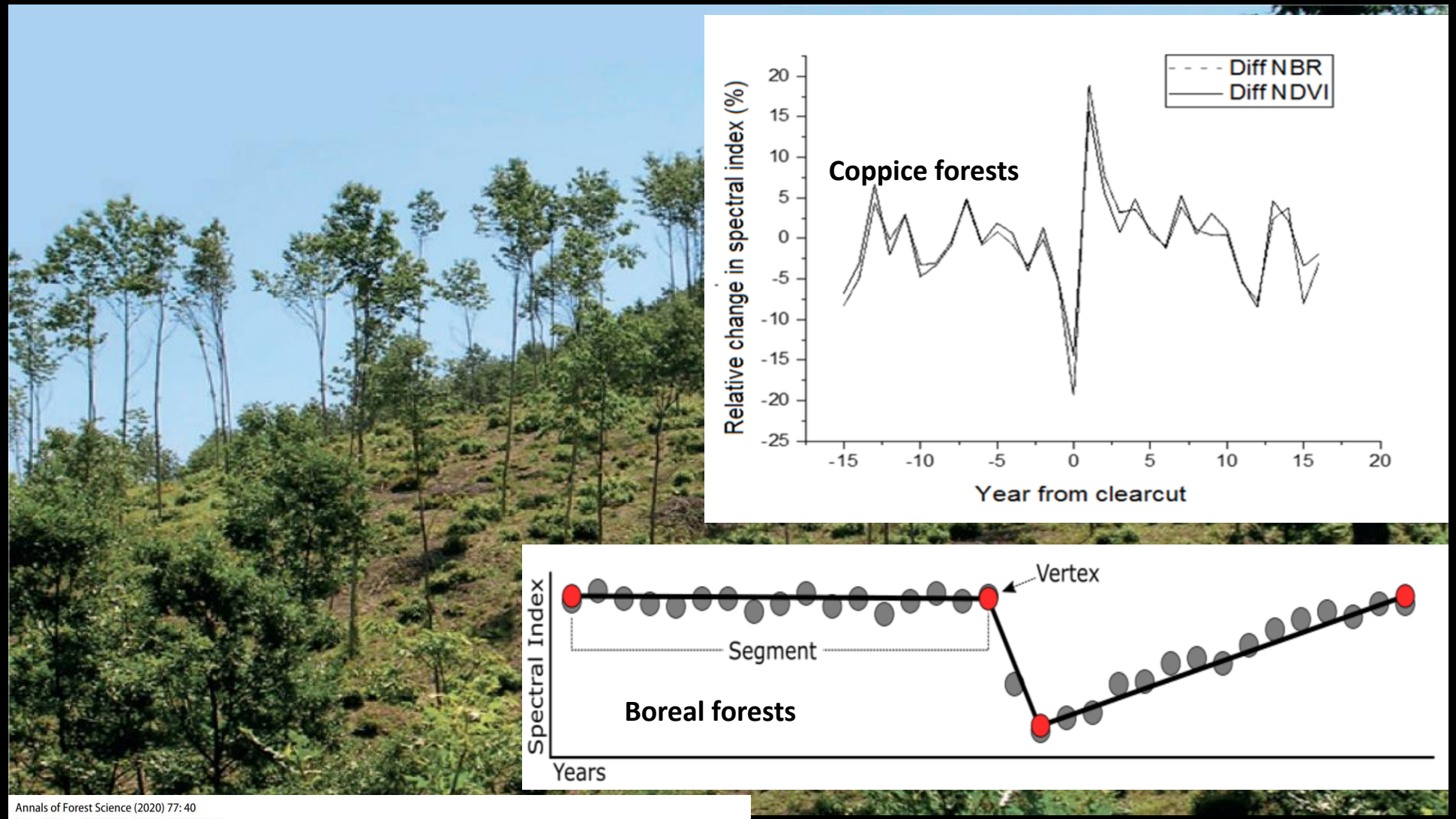
High-Resolution Global Maps of 21st-Century Forest Cover Change

M. C. Hansen[1,*], P. V. Potapov[1], R. Moore[2], M. Hancher[2], S. A. Turubanova[1], A. Tyukavina[1], D. Thau[2], S. V. Stehman[3], S. J. G...
+ See all authors and affiliations

Science 15 Nov 2013:
Vol. 342, Issue 6160, pp. 850-853
DOI: 10.1126/science.1244693



Differences between Boreal forests and Mediterranean coppice forests recovery rates



Annals of Forest Science (2020) 77: 40
https://doi.org/10.1007/s13595-020-00936-2

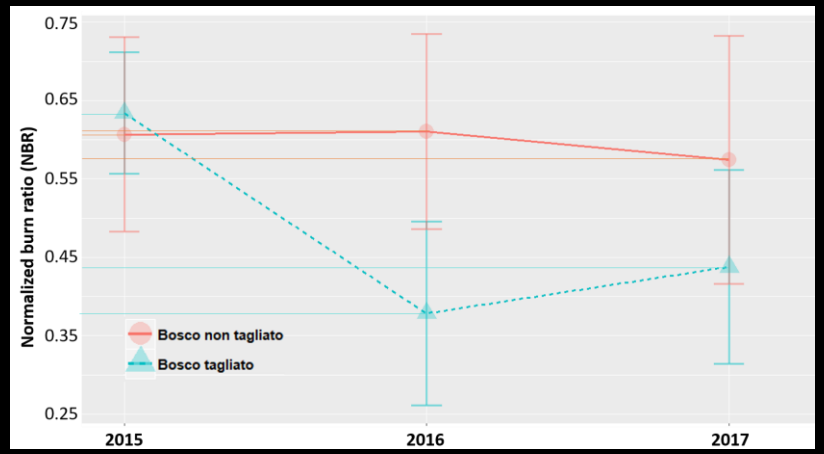
RESEARCH PAPER

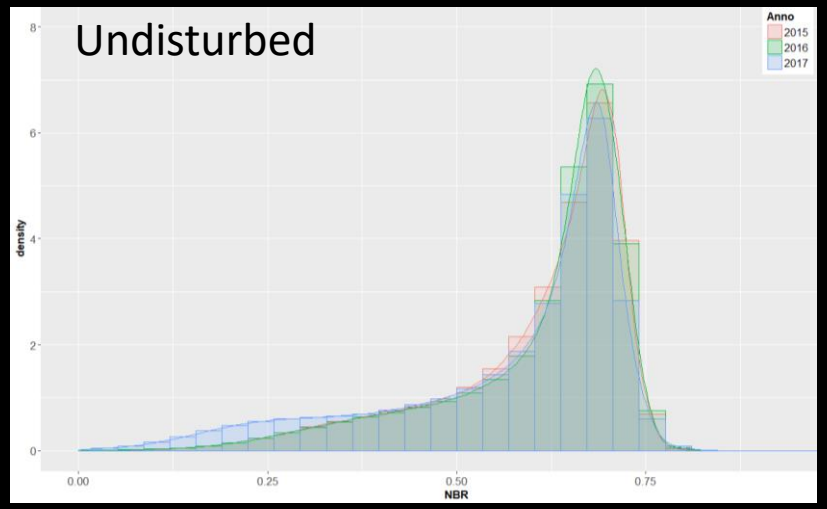
Check for updates

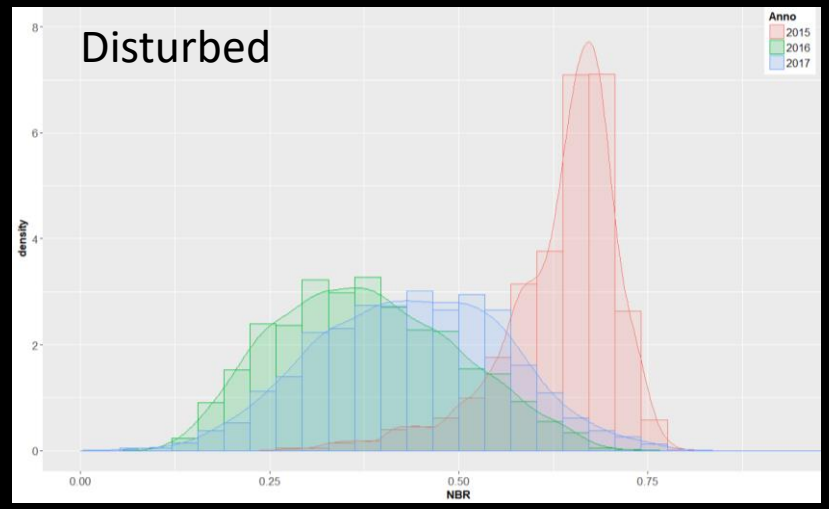
Monitoring clearcutting and subsequent rapid recovery in Mediterranean coppice forests with Landsat time series

Gherardo Chirici[1] · Francesca Giannetti[1] · Erica Mazza[1] · Saverio Francini[1] · Davide Travaglini[1] · Raffaello Pegna[1] · Joanne C. White[2]

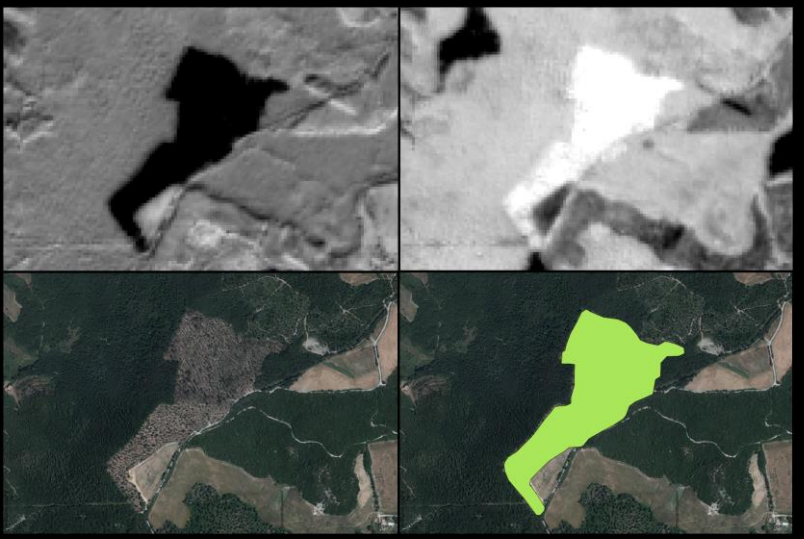
Two Thresholds Method (TTM)

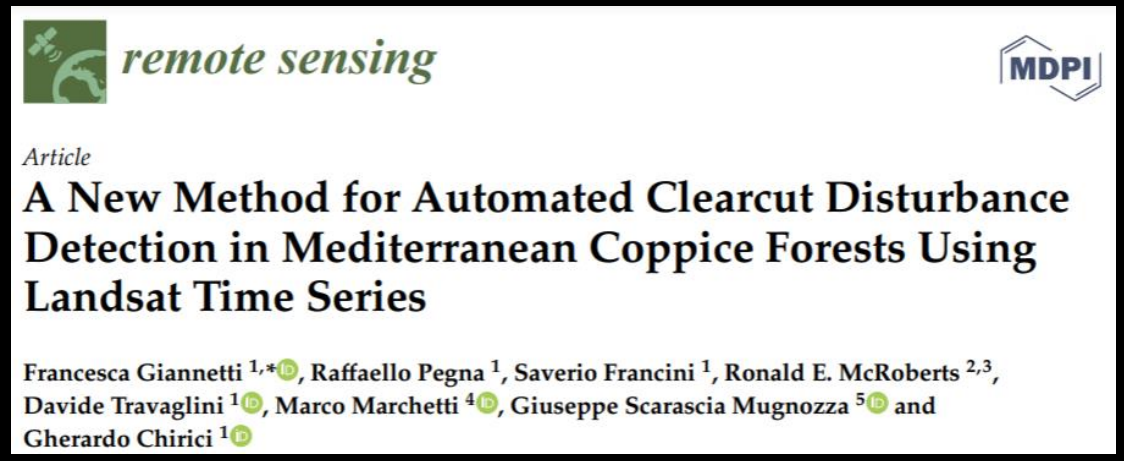






ΔNBR$_{pre}$ ΔNBR$_{post}$





remote sensing

MDPI

Article

A New Method for Automated Clearcut Disturbance Detection in Mediterranean Coppice Forests Using Landsat Time Series

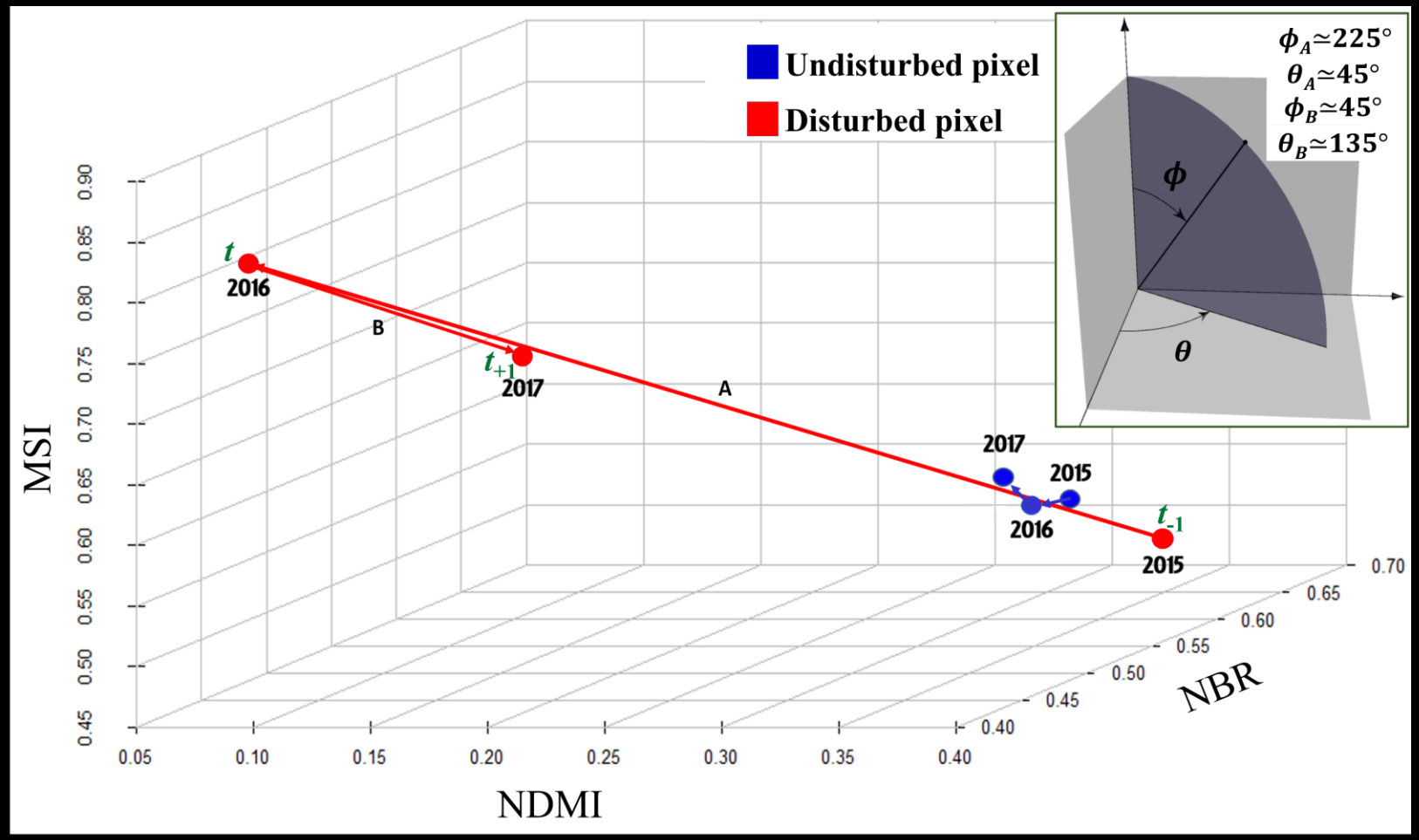
Francesca Giannetti [1,*], Raffaello Pegna [1], Saverio Francini [1], Ronald E. McRoberts [2,3], Davide Travaglini [1], Marco Marchetti [4], Giuseppe Scarascia Mugnozza [5] and Gherardo Chirici [1]

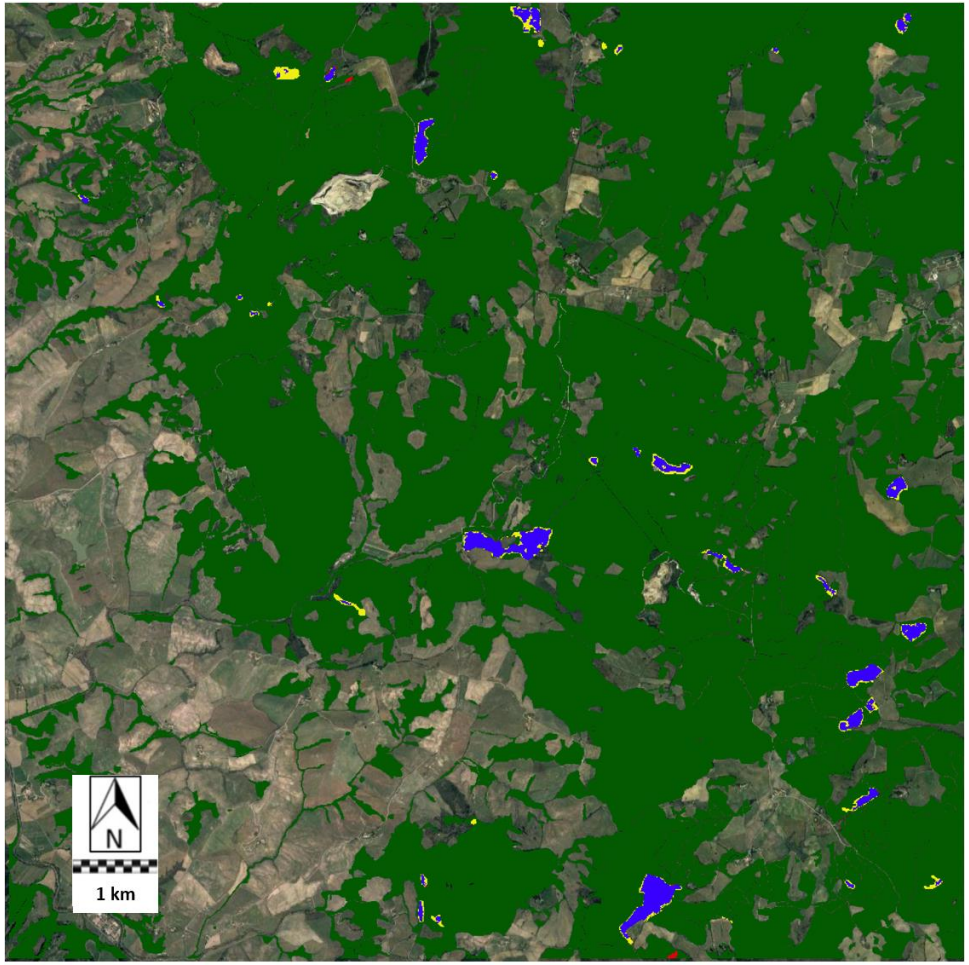
Three Indices Three Dimensions algorithm (3I3D)

Sentinel2 image 2015

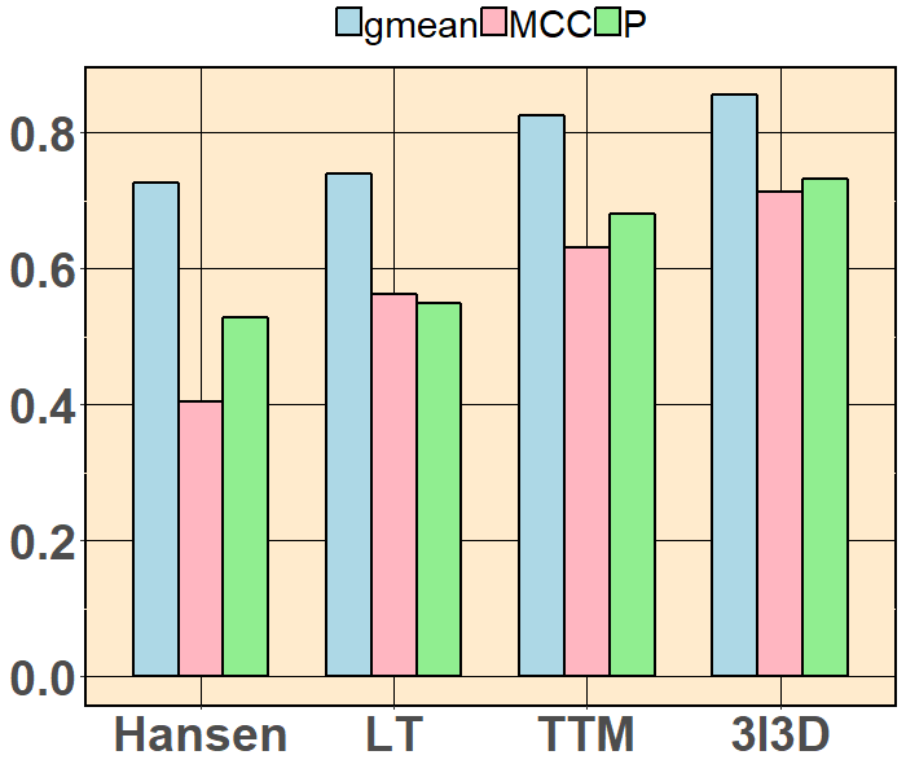
Sentinel2 image 2016

Sentinel2 image 2017





Methods	True Negatives(ha)	False Negatives(ha)	False Positives(ha)	True Positives(ha)
Hansen	125873.4	325.77	131.93	147.62
LT	125779.3	198.28	226.05	275.11
TTM	125875.4	195.25	129.99	278.14
3I3D	125884.5	143.37	120.83	330.02



INTERNATIONAL JOURNAL OF REMOTE SENSING
2021, VOL. 42, NO. 12, 4693-4711
https://doi.org/10.1080/01431161.2021.1899334

Taylor & Francis
Taylor & Francis Group

The Three Indices Three Dimensions (3I3D) algorithm: a new method for forest disturbance mapping and area estimation based on optical remotely sensed imagery

Saverio Francini [a,b,c], Ronald E. McRoberts [d], Francesca Giannetti [a], Marco Marchetti [b], Giuseppe Scarascia Mugnozza [c], and Gherardo Chirici [a]

Upscaling??

The coming Google Earth Engine

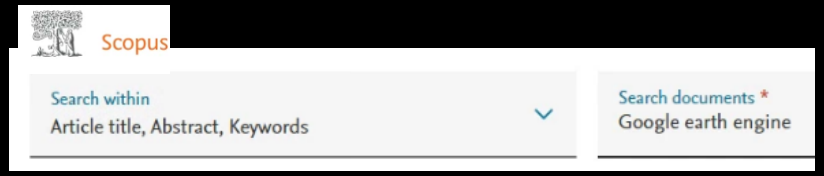
- a cloud platform offering planetary-scale analysis capabilities
- a multi-petabyte catalog of satellite imagery and geospatial datasets

Why Google Earth Engine?

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

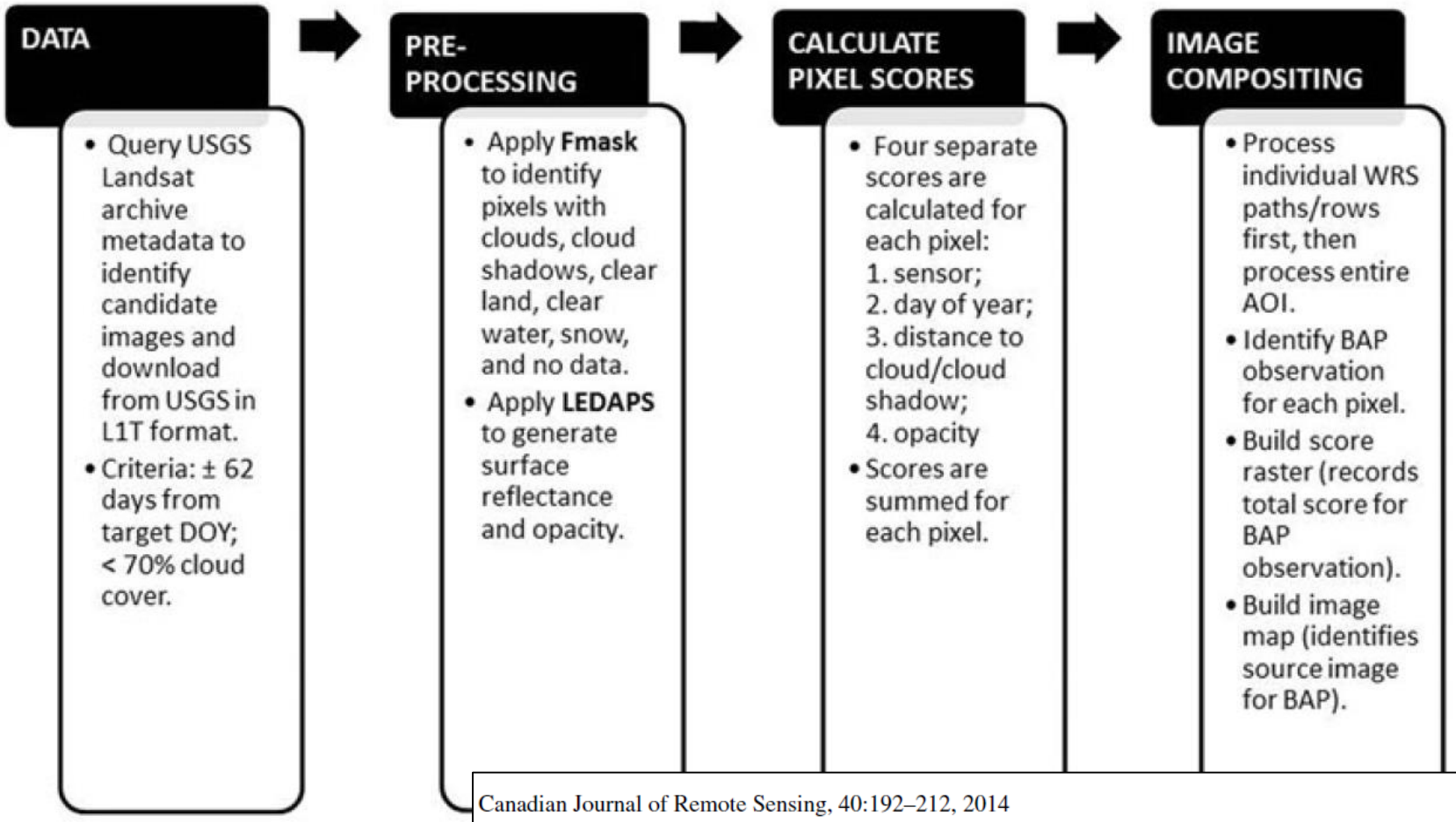
What is Google Earth Engine used for?

‘‘analyze forest and water coverage, land use change, or assess the health of agricultural fields, among many other possible analyses.”



1495 documents found

Published in 2017
Cited by 2485 documents



Canadian Journal of Remote Sensing, 40:192–212, 2014
Published with license by Taylor & Francis
ISSN: 0703-8992 print / 1712-7971 online
DOI: 10.1080/07038992.2014.945827

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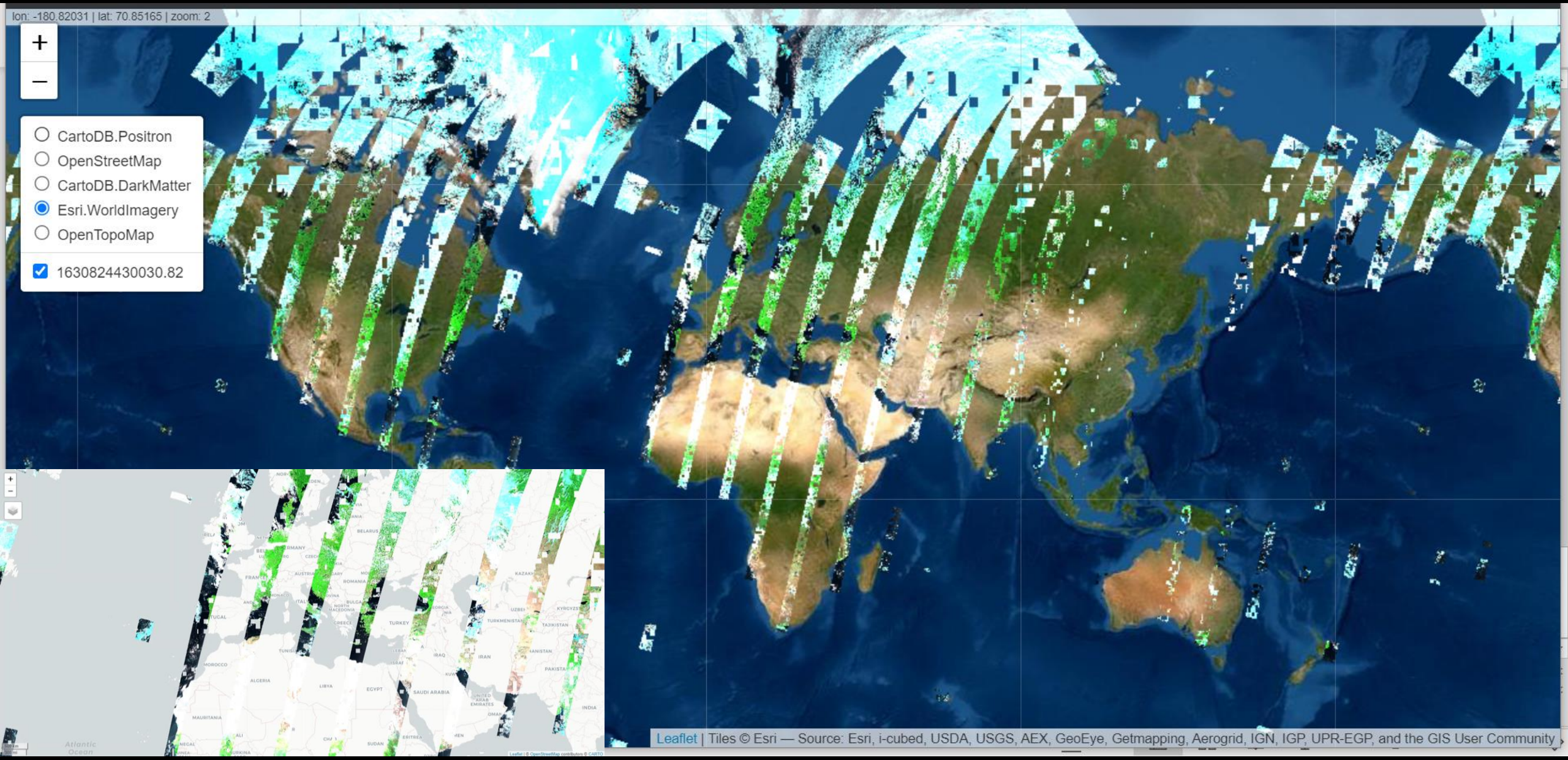
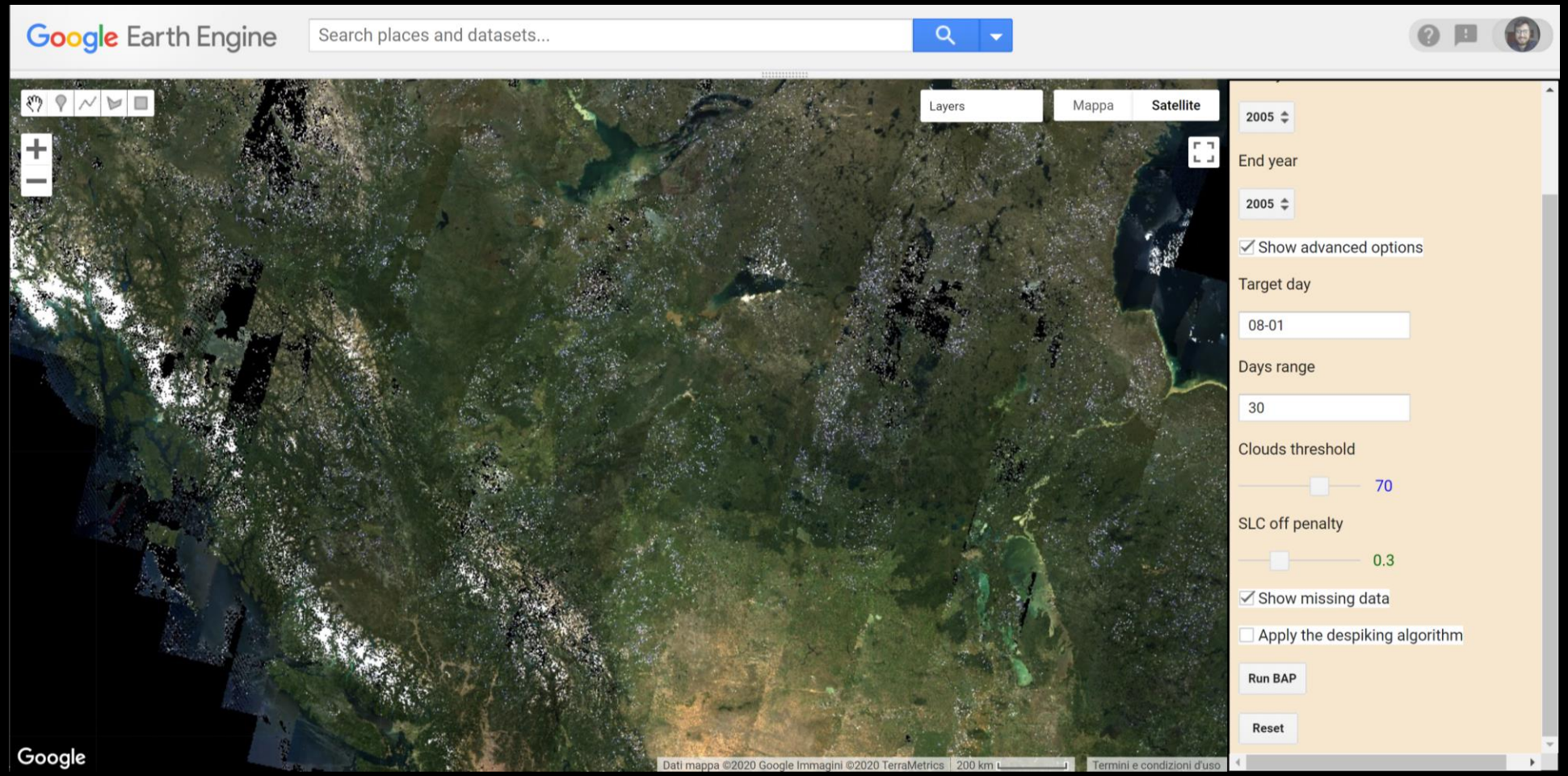
Pixel-Based Image Compositing for Large-Area Dense Time Series Applications and Science

J. C. White[1,*], M. A. Wulder[1], G. W. Hobart[1], J. E. Luther[2], T. Hermosilla[3], P. Griffiths[4], N. C. Coops[3], R. J. Hall[5], P. Hostert[4], A. Dyk[1], and L. Guindon[6]

Sentinel-2 images acquired in the last two days



BAP


Google Earth Engine
Search places and datasets...
Layers
Mappa
Satellite
2005
End year
2005
Show advanced options
Target day
08-01
Days range
30
Clouds threshold
70
SLC off penalty
0.3
Show missing data
Apply the despiking algorithm
Run BAP
Reset
Google
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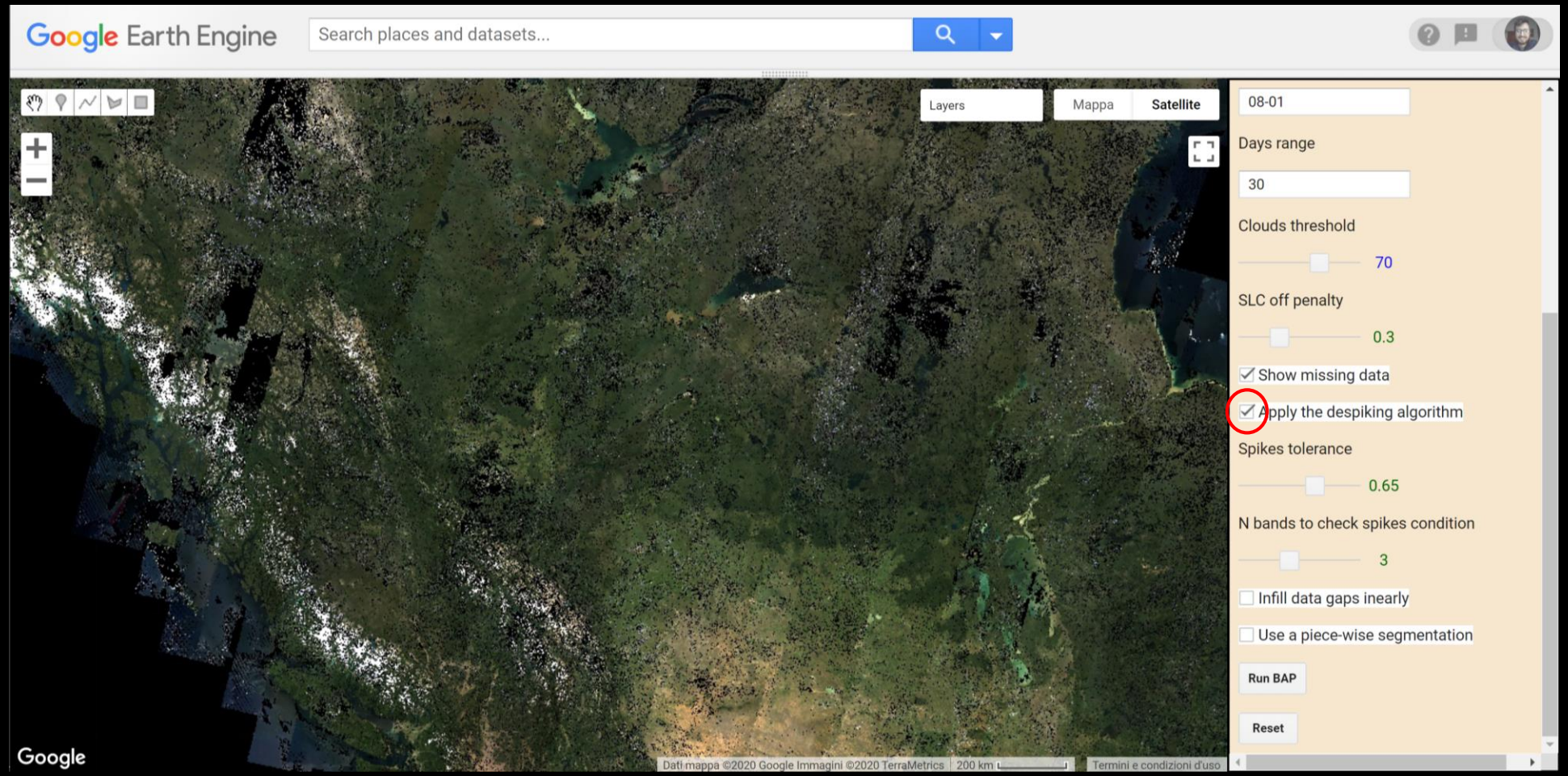
200 km
Termini e condizioni d'uso

DESPIKED


Google Earth Engine
Search places and datasets...
Layers
Mappa
Satellite
08-01
Days range
30
Clouds threshold
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SLC off penalty
0.3
Show missing data
Apply the despiking algorithm
Spikes tolerance
0.65
N bands to check spikes condition
3
Infill data gaps inearly
Use a piece-wise segmentation
Run BAP
Reset
Google
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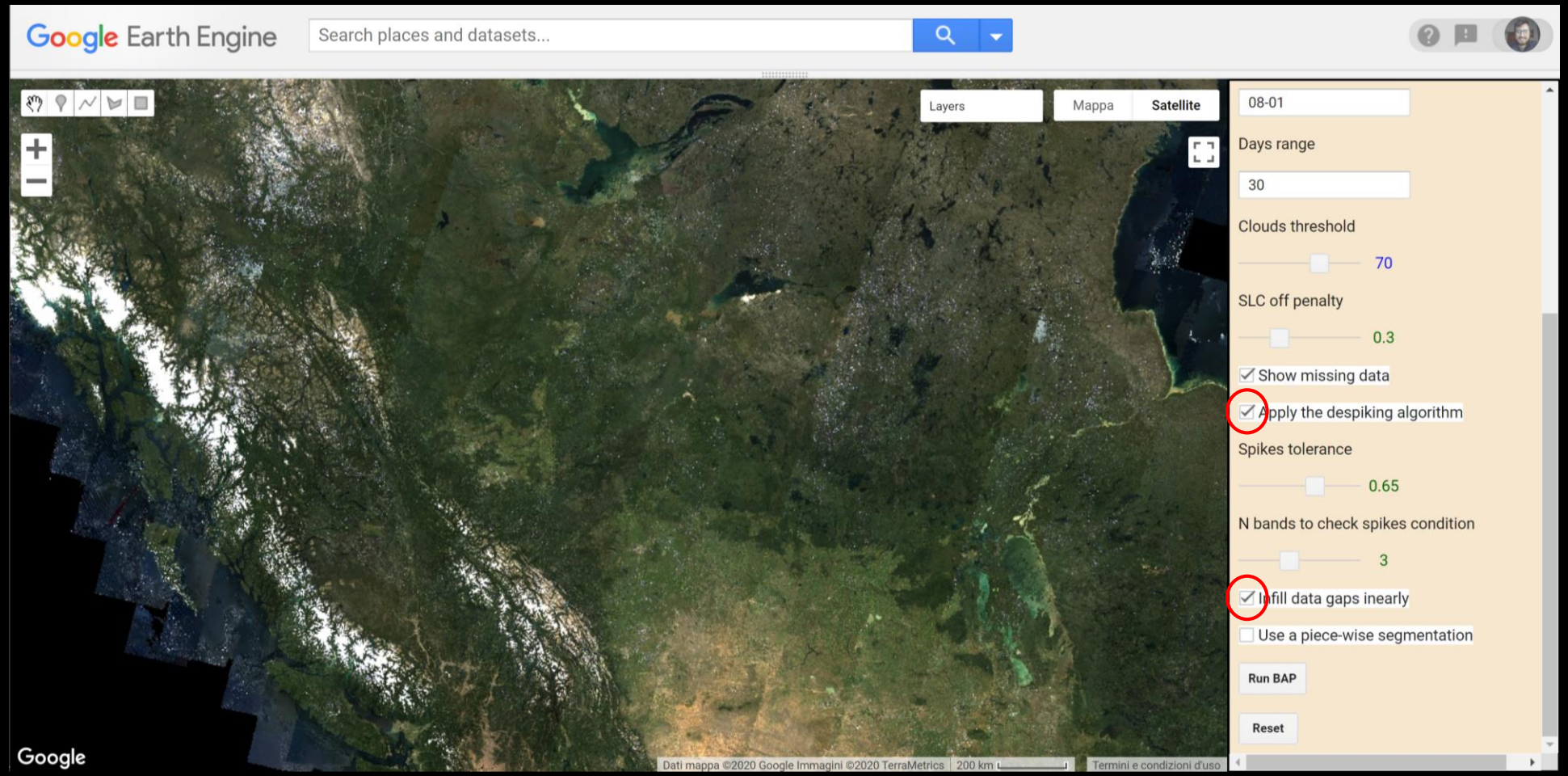
200 km
Termini e condizioni d'uso

FILLED


Google Earth Engine
Search places and datasets...
Layers
Mappa
Satellite
08-01
Days range
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Clouds threshold
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SLC off penalty
0.3
Show missing data
Apply the despiking algorithm
Spikes tolerance
0.65
N bands to check spikes condition
3
Infill data gaps inearly
Use a piece-wise segmentation
Run BAP
Reset
Google
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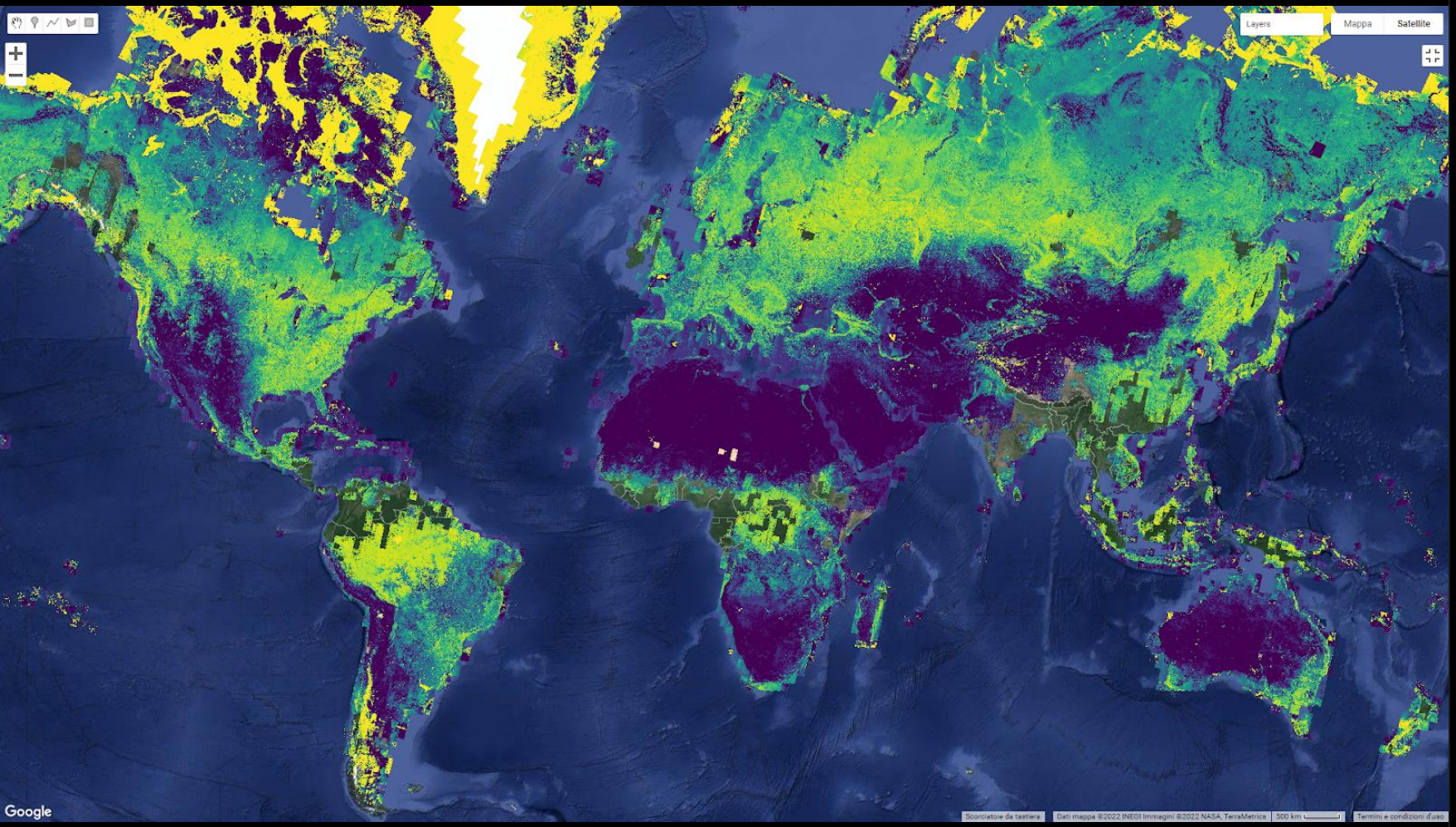
200 km
Termini e condizioni d'uso

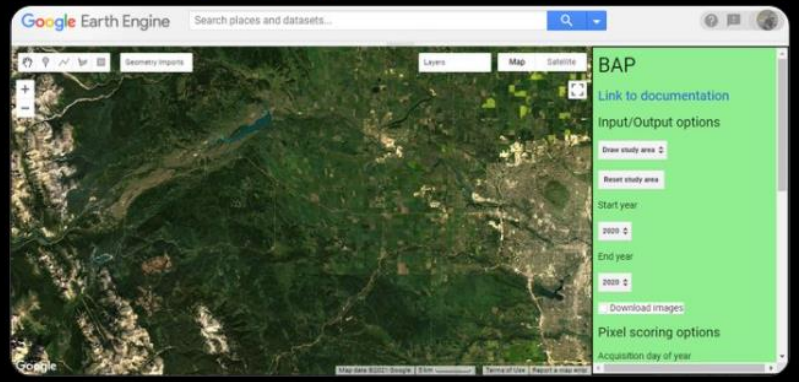


Mike Wulder
@mikewulder

The best-available-pixel (BAP) tool you have been waiting for! Implemented on #GoogleEarthEngine (#GEE). #Landsat

In #GEEBAP can tune composite parameters, create a #timeseries, set area of interest, AND download surface reflectance outcomes!

Try it out:
code.earthengine.google.com/e27240a92ecf64...



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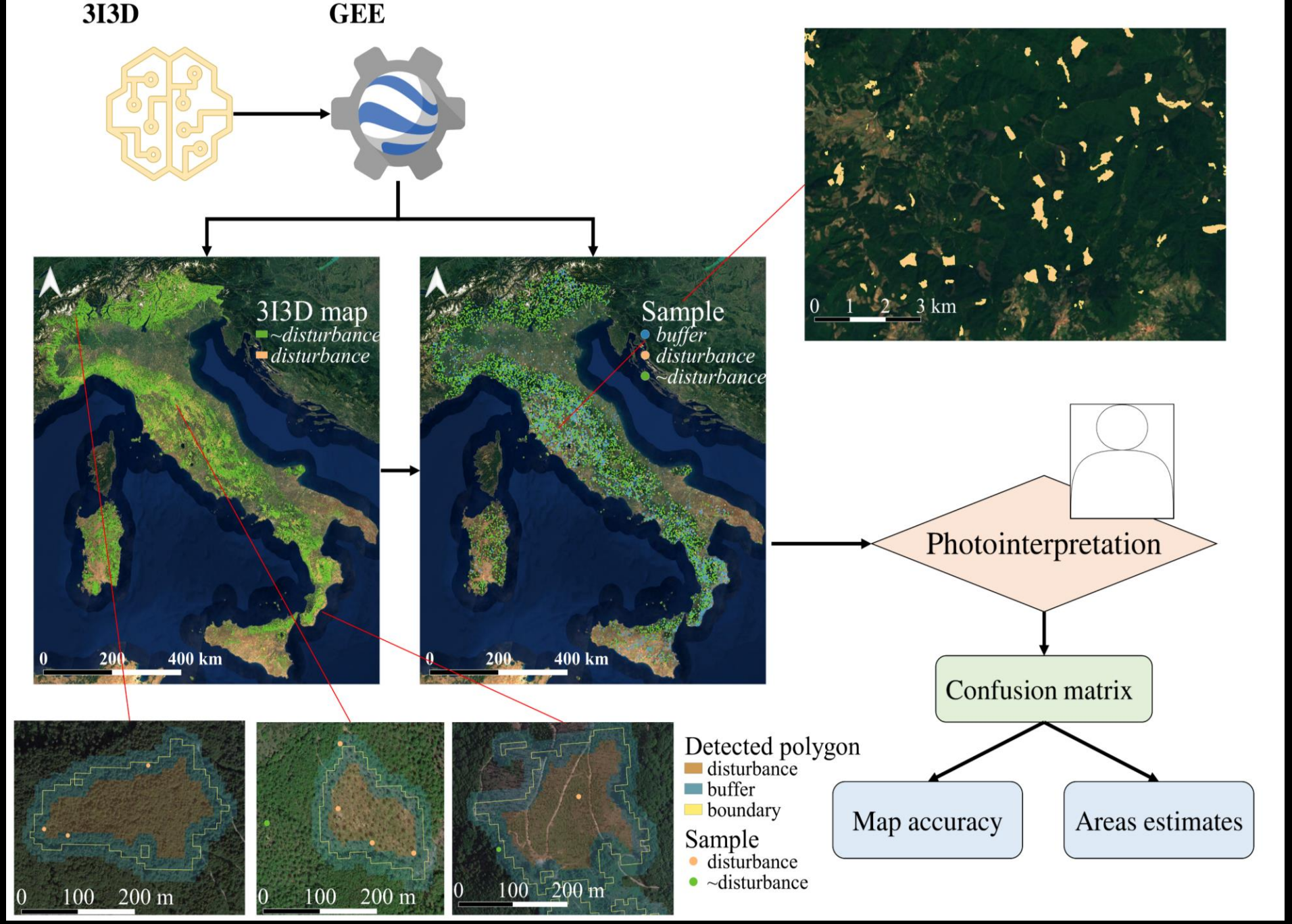
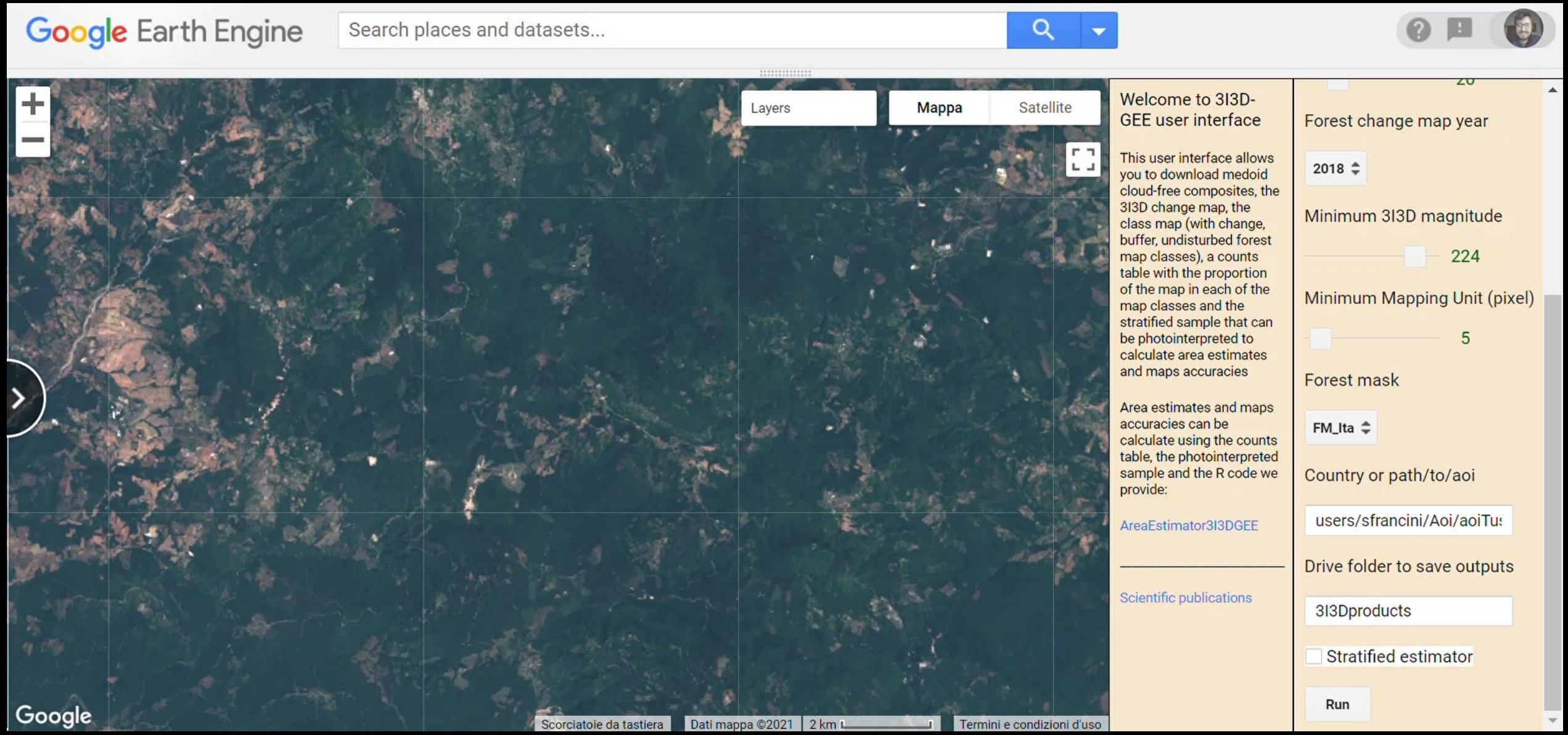


The number of processed Sentinel-2 images was 17592: 5100 acquired in 2017, 6547 in 2018 and 5945 in 2019.



https://code.earthengine.google.com/?accept_repo=users/sfrancini/S23I3D

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

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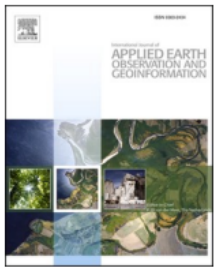
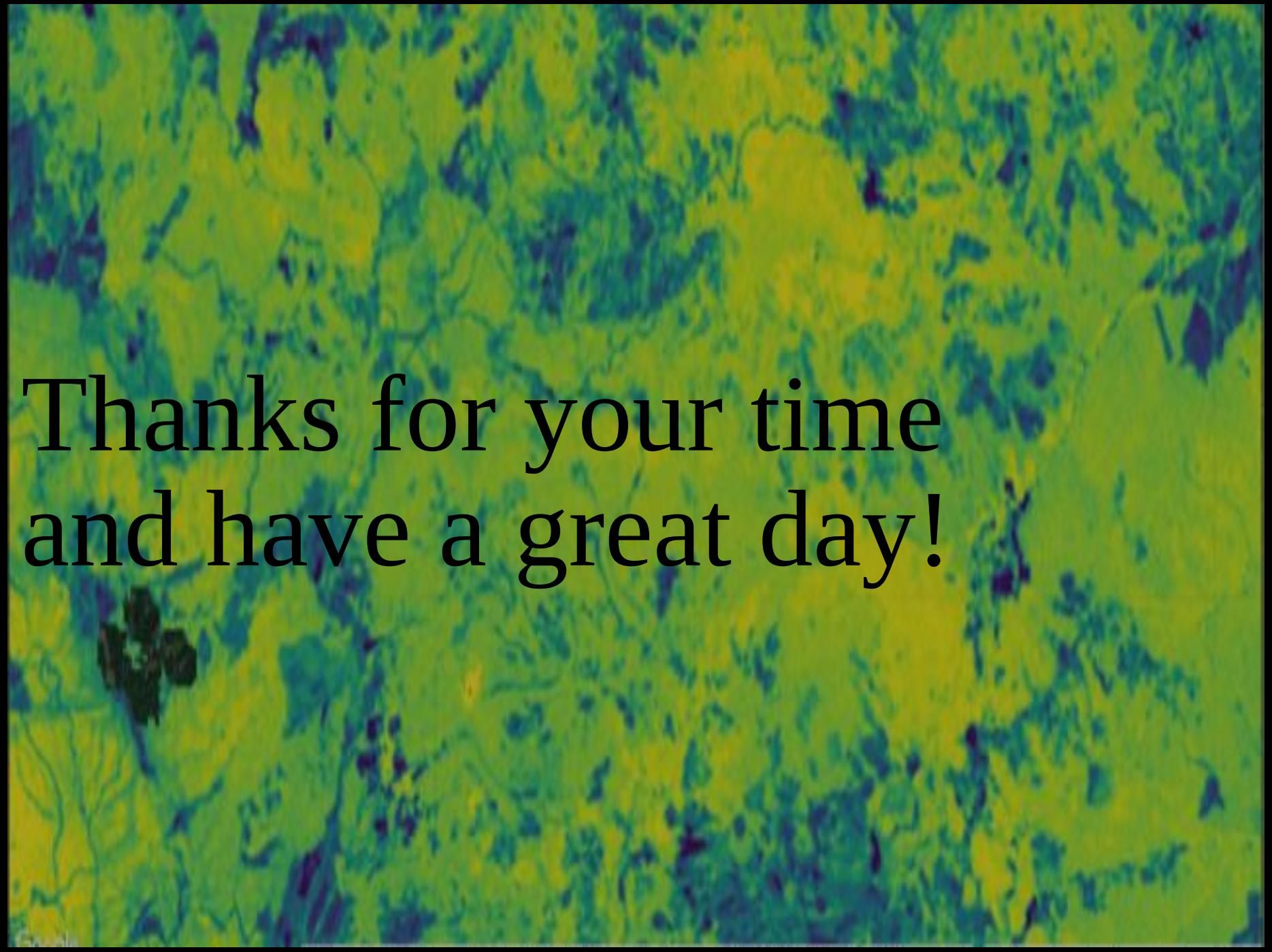


An open science and open data approach for the statistically robust estimation of forest disturbance areas

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]

[a] Department of Agriculture, Food, Environment and Forestry, Università degli Studi di Firenze, Via San Bonaventura, 13, 50145 Firenze, Italy
[b] Dipartimento di Bioscienze e Territorio, Università degli Studi del Molise, Pesche, Isernia, Italy
[c] Dipartimento per l'Innovazione dei sistemi Biologici, Agroalimentari e Forestali, Università degli Studi della Tuscia, Via San Camillo de Lellis, Viterbo, Italy
[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


Thanks for your time
and have a great day!