KADI

Orientation 2: Digital data, tools and technologies in urban resilience

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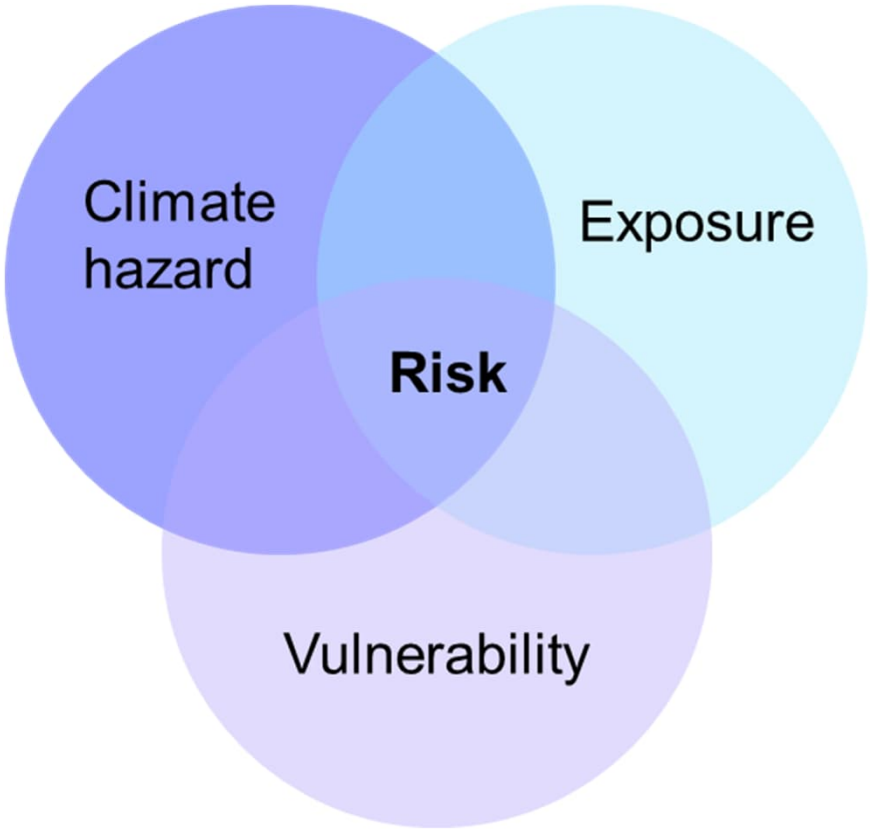
kadi-project.eu


Digital data revolution
Open data
IoT
Big Earth Data
Privacy
FOSS
Nanosatellites
Deep learning
GDPR
High-performance computing (HPC)
ML/AI
Data fusion
Data mining
21st century socio-technological landscape
Citizen science
VGIS/PGIS
Digital twins
APIs
Cloud computing
Global Positioning System (GPS)
Crowdsourcing
FAIR
Ethics
UAVs
Mobile technologies
Community mapping
Location-based services (LBS)
Geovisualisation
https://www.nrcan.gc.ca/earth-sciences/geomatics/canadas-spatial-data-infrastructure/10783?wbdisable=true
Image by Gerd Altmann from Pixabay

Climate risk components



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Data needs for climate services

Earth Observation:
- Satellite imagery
- High-resolution orthoimages
- Lidar data
- Radar data

Infrastructure:
- Buildings
- Roads
- Bridges
- Services
- Drainages

Experiences:
- Flood surveys
- Impact assessments
- Adaptation strategies

River and rainfall:
- Precipitation data
- River models
- Sedimentation dynamics
- Digital Terrain Models

Environment:
- Soil
- Vegetation
- Land cover / land use

Demographics:
- Who and where
- Vulnerable populations
- Communities' assets and their risks

Flood models
Risk assessments

Infrastructure and service improvements

Urban planning and adaptation strategies

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https://giri.unepgrid.ch/map?list=explore&view=MX-BSMG1-X9FSX-BWEAV

CDRI
Coalition for Disaster Resilient Infrastructure

Home MAP viewer RISK Metrics Documentation Contact Us

Featured (16) Explore (113) Pinned (0)

Drought hazard SSI 5-year return period - SSP5 Upper bound

Drought hazard SSI 5-year return period - SSP1 Lower bound

Drought hazard SSI 5-year return period - Existing climate

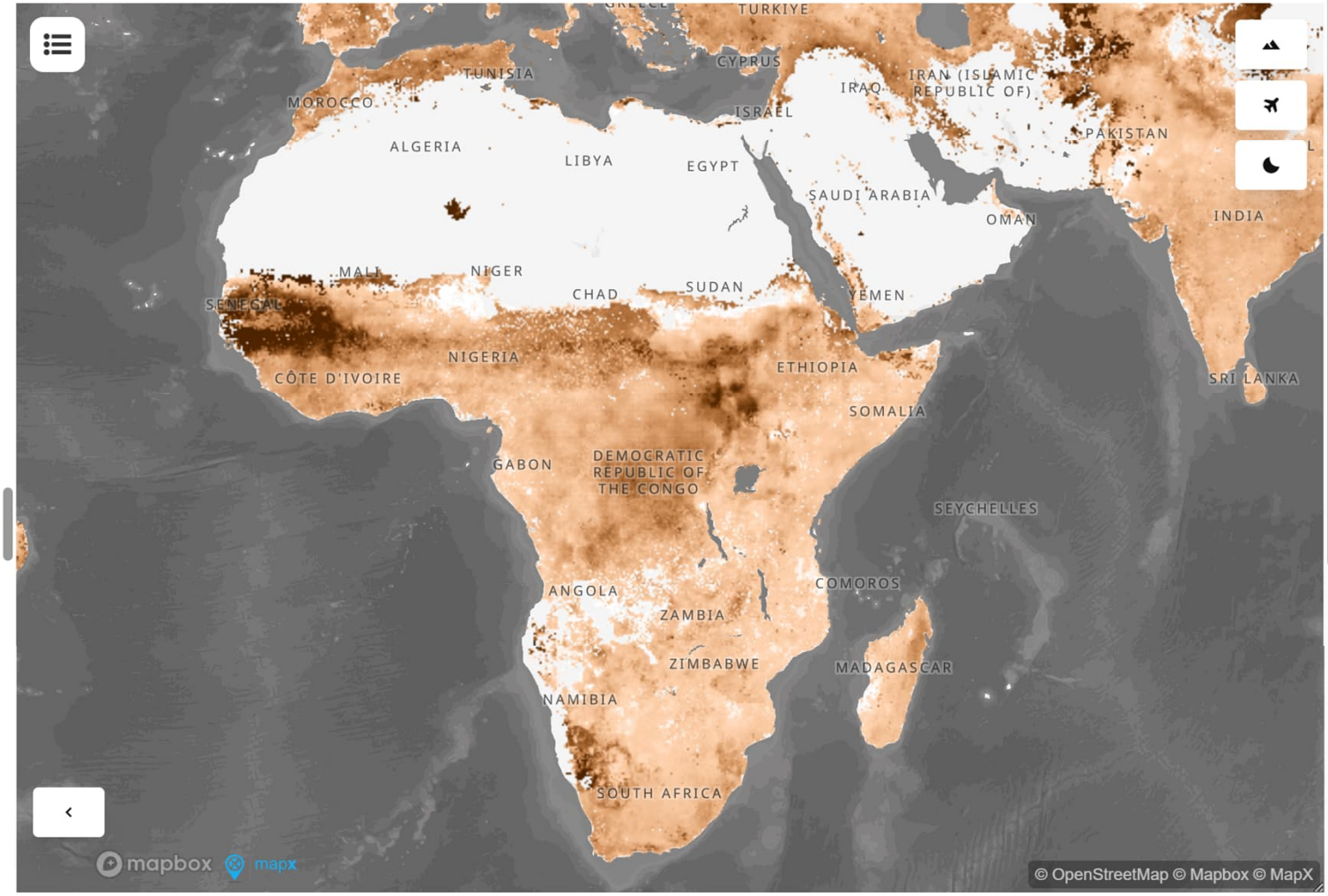
Drought hazard SMA 25-year return period - SSP5 Upper bound

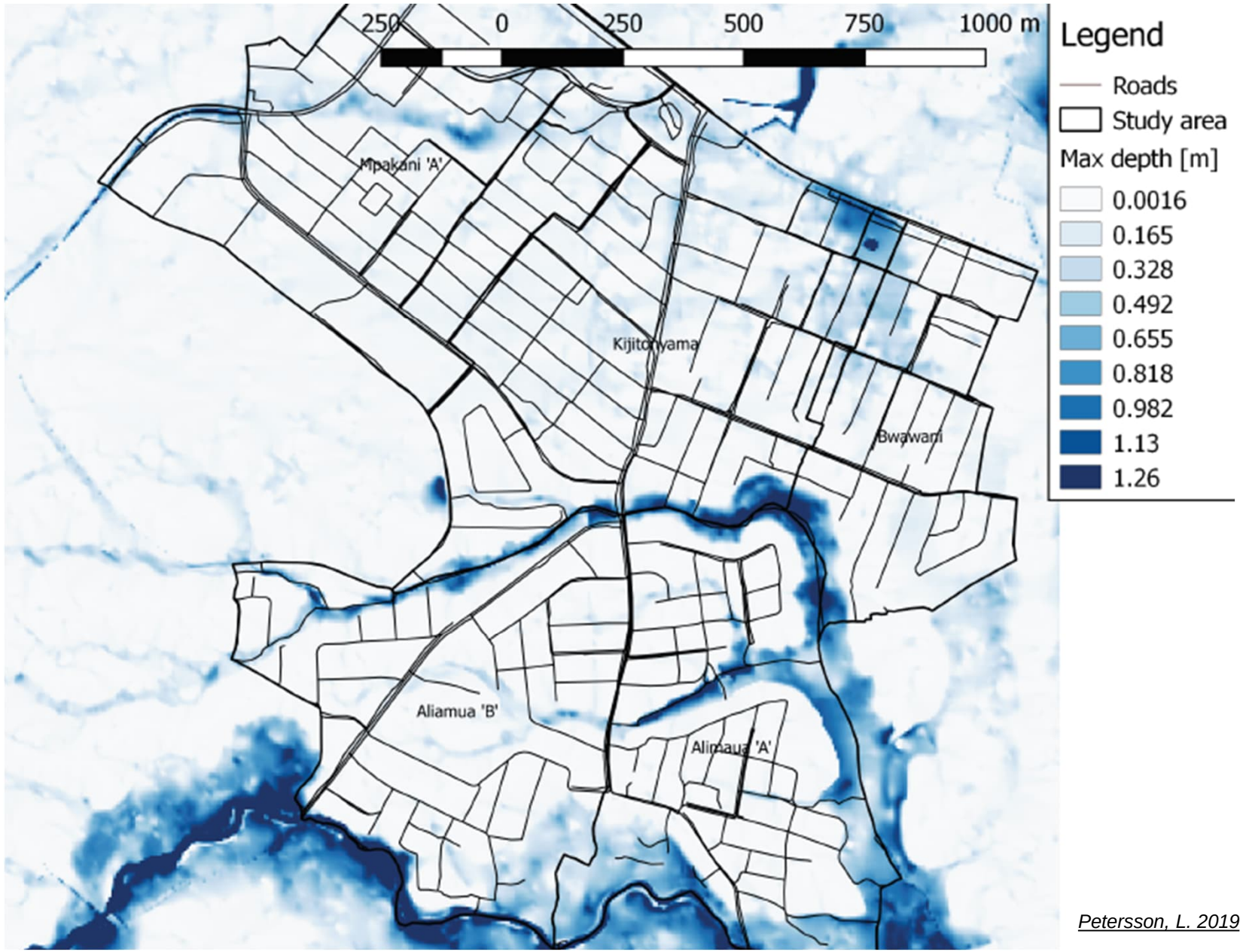
Drought Hazard map based on the SMA-1 indicator (Standardised Moisture Anomaly cumulated on a 1-month window). The map refers to the return period RT = 25 Years and it is computated on the basis Read more

Keywords
hazard, drought, sma, ssp5 rcp8.5

Share Download dataset

Drought hazard SMA 10-year return period - SSP5 Upper bound





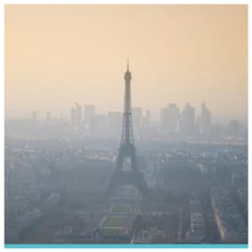
Petersson, L. 2019

Copernicus
Europe's eyes on Earth

Atmosphere Monitoring Service

https://atmosphere.copernicus.eu/

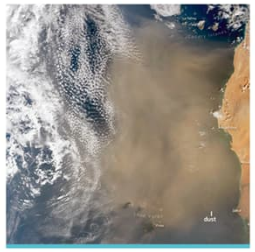
Today's air quality forecasts



Europe

Worldwide

CAMS on Air



Seasonal Atmospheric Recap

In Focus

CAMS provides observation-based information on CO_2 and CH_4 natural fluxes and anthropogenic emissions and their trends in support of the Paris Agreement.

Global carbon dioxide and methane monitoring

Land Monitoring Service

https://land.copernicus.eu/en

Full-coverage Land Cover & Use

Global and pan-European land cover and land use inventories complemented by layers on vegetated and non-vegetated land cover characteristics

Land Cover & Use in Priority Areas

Tailored land cover, land use and crop type information for specific areas in Europe and worldwide vulnerable to environmental changes

Ground Motion Data

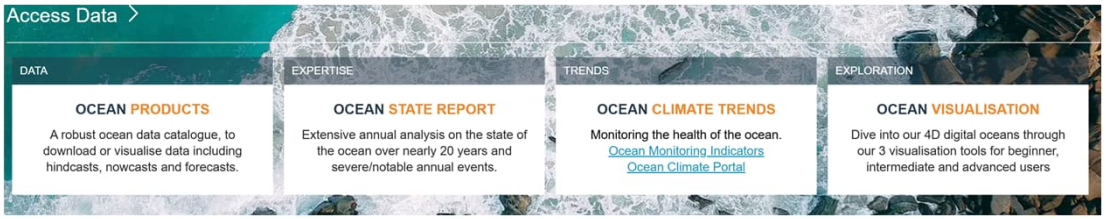
Information on the natural and anthropogenic ground motion throughout Europe

Land Satellite Mosaics

Satellite images from Copernicus and commercial satellites monitoring land surface conditions

Copernicus Marine Service

https://marine.copernicus.eu/

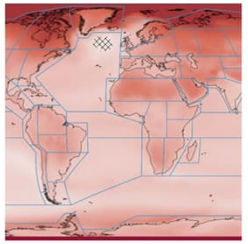


Climate Change Service

https://climate.copernicus.eu/

Climate Intelligence

Climate Data Store



C3S Atlas

Data in action

https://developers.google.com/earth-engine/datasets/categories

Earth Engine Data Catalog

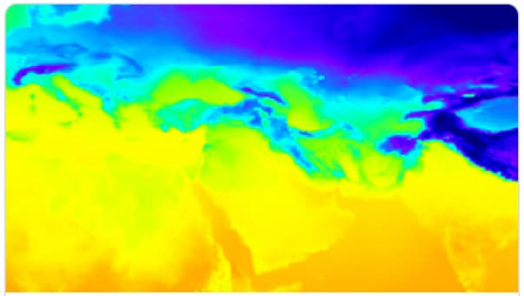
Search /

Language

Dataset categories

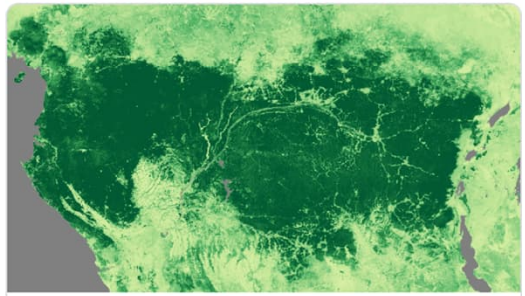
Basics

- Elevation & Topography
- Imagery - Orthophotos (Aerial)
- Imagery - Satellite
- Land Use & Land Cover



Geography

- Atmosphere
- Atmospheric Water Vapor
- Climate
- Cryosphere
- Fire
- Oceans
- Precipitation
- Soil
- Surface and Ground Water



Biosphere

- Ecosystems
- Forest & Biomass
- Plant Productivity
- Vegetation Indices

Human Dimensions

- Agriculture
- Infrastructure & Boundaries
- Population

https://map.openaerialmap.org/

OpenAerialMap

OpenAerialMap (OAM) is a set of tools for searching, sharing, and using openly licensed satellite and unmanned aerial vehicle (UAV) imagery.

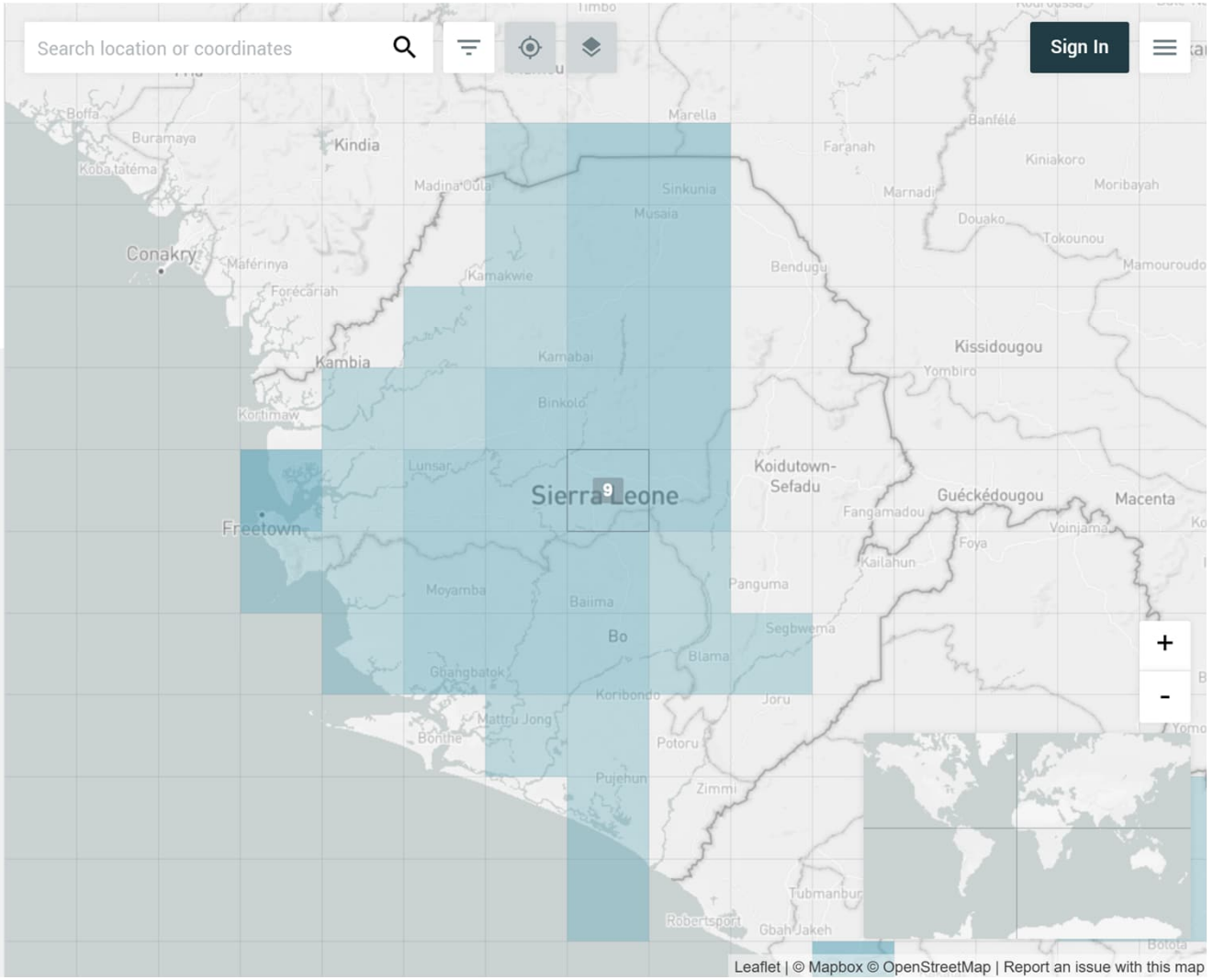
Latest uploads

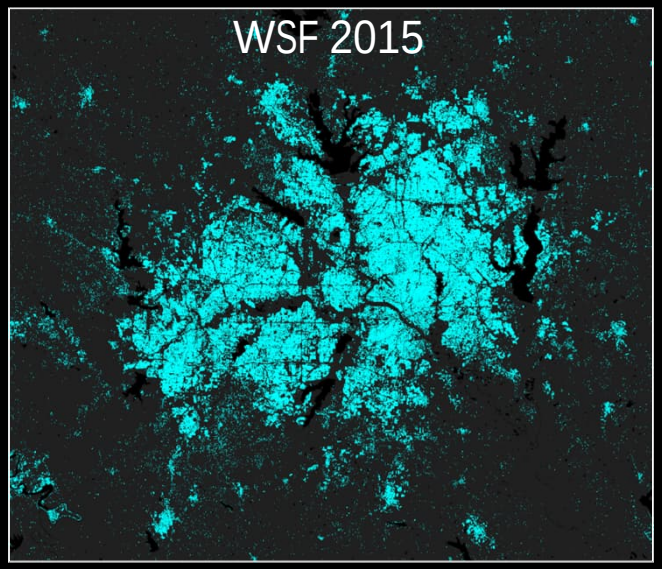
River Road - 8/10/2025
2025-08-10 / 5 cm
Shawn Murphy

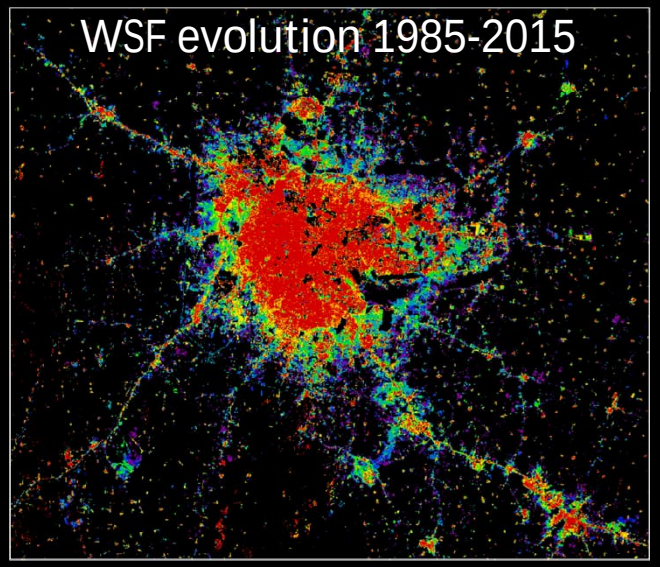
River Road - 8/10/2025
2025-08-10 / 2 cm
Shawn Murphy

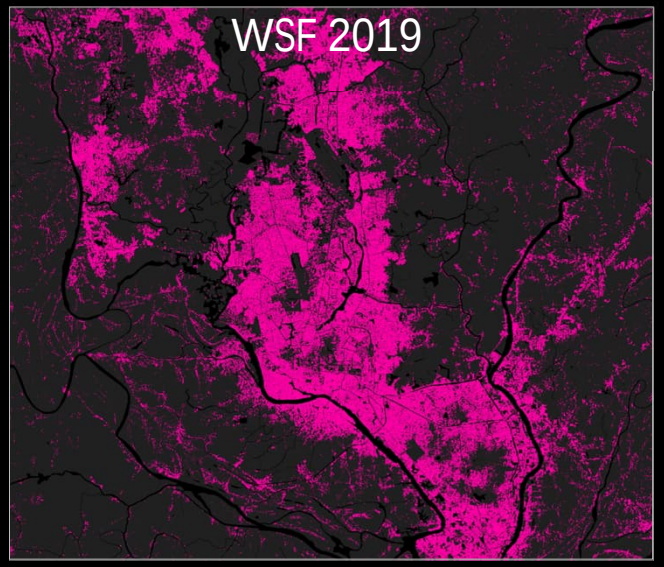
SLA2
2025-08-09 / 6 cm
Mitch Slayton

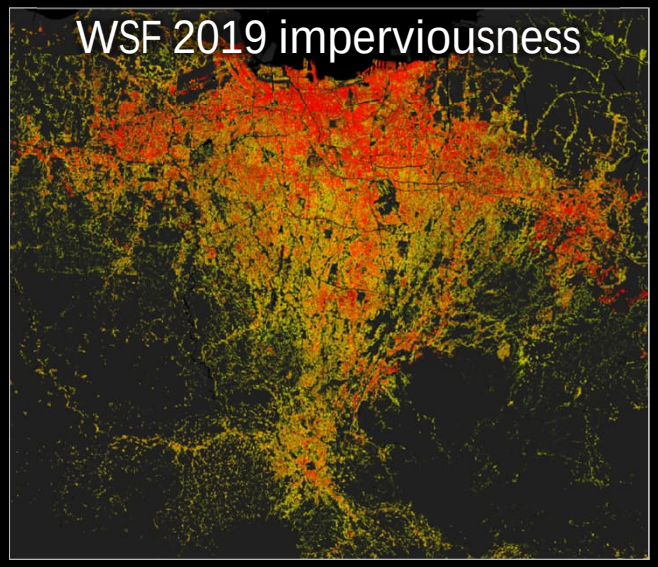
SLA1
2025-08-09 / 5 cm
Mitch Slayton

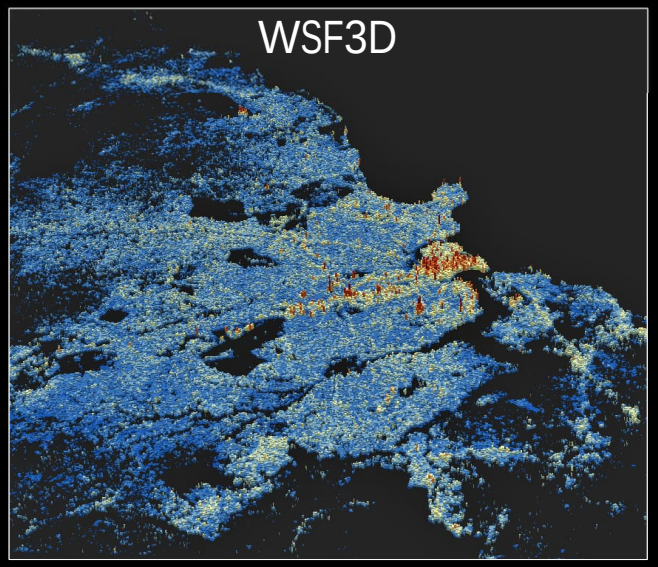


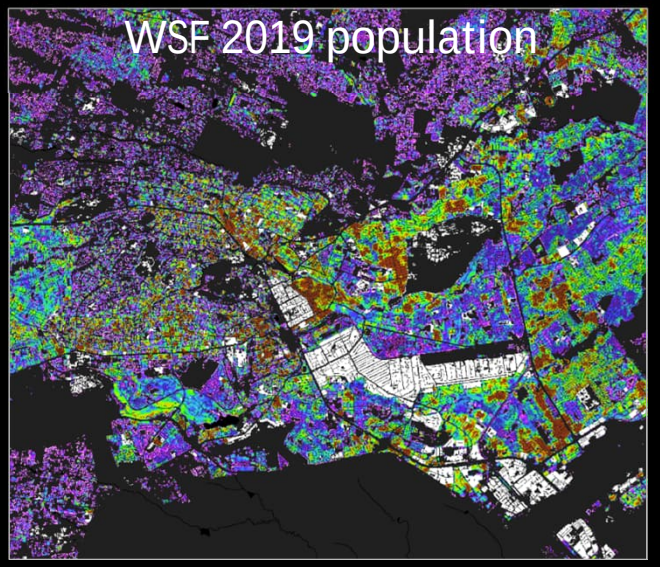

WSF 2015


WSF evolution 1985-2015

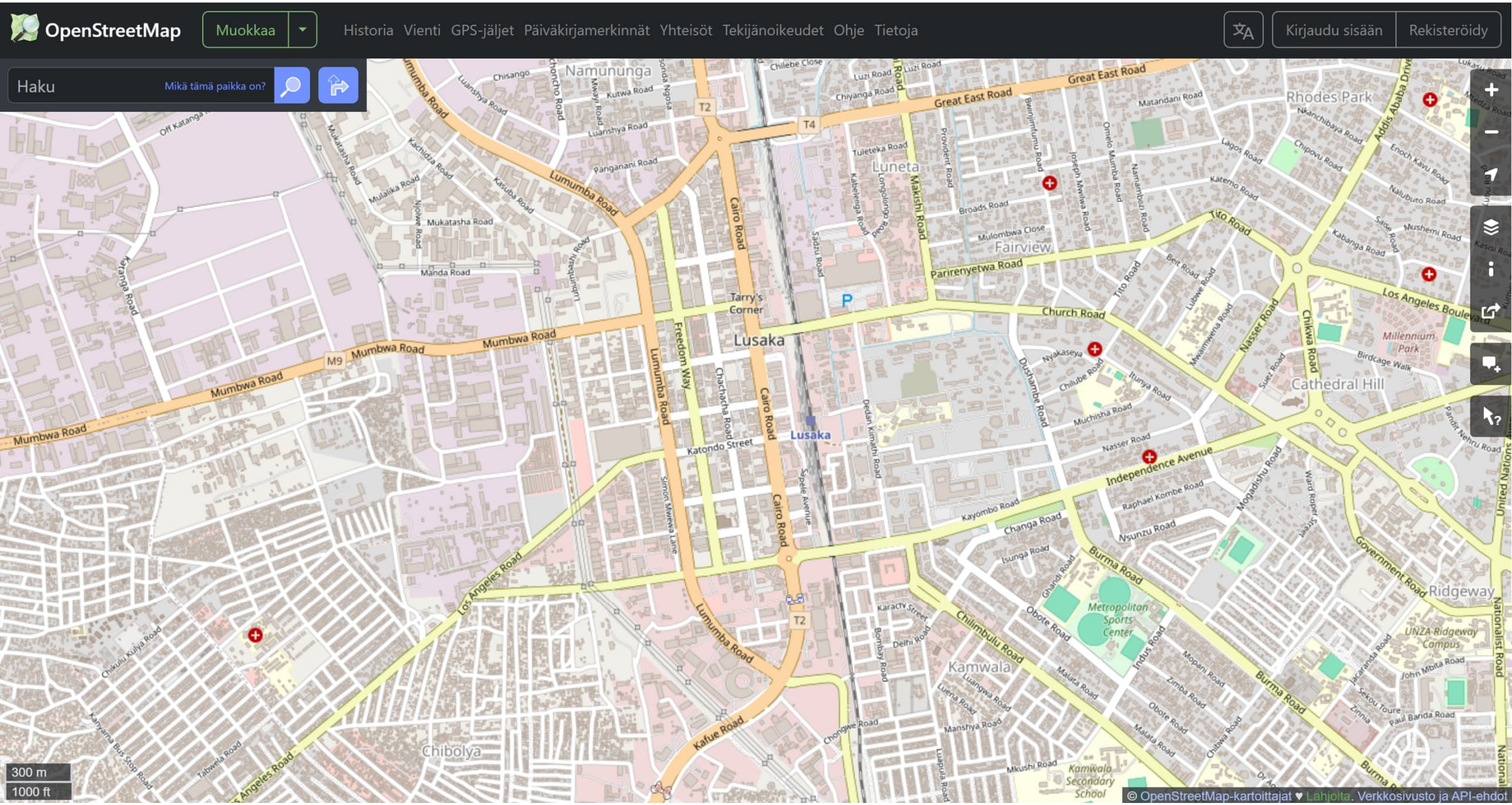

WSF 2019


WSF 2019 imperviousness


WSF3D


WSF 2019 population

https://www.openstreetmap.org/#map=15/-15.41997/28.28168



https://www.climatejust.org.uk/map.html

airqo

https://airqo.africa/home

Products Solutions About Get involved Explore dat

Our Products > Binos Monitor

Built in Africa for African cities.

Designed, manufactured, and calibrated to measure ambient air quality and optimized to suit the African context.

sensors.africa/air/how-sensors-work

AIR WATER SOUND RADIATION

https://sensors.africa/air

THE SCIENCE AND HARDWARE

SDS011

Particulate matter Sensor

This sensor is used to measure PM10 and PM2.5 particles for concentration ranges between 0-

PurpleAir Map Sensors Data About

https://www2.purpleair.com/

AIR QUALITY SENSORS

PurpleAir Classic - Air Quality Monitor

85 reviews

$229.00

PurpleAir Classic Plus - Air Quality Monitor

6 reviews

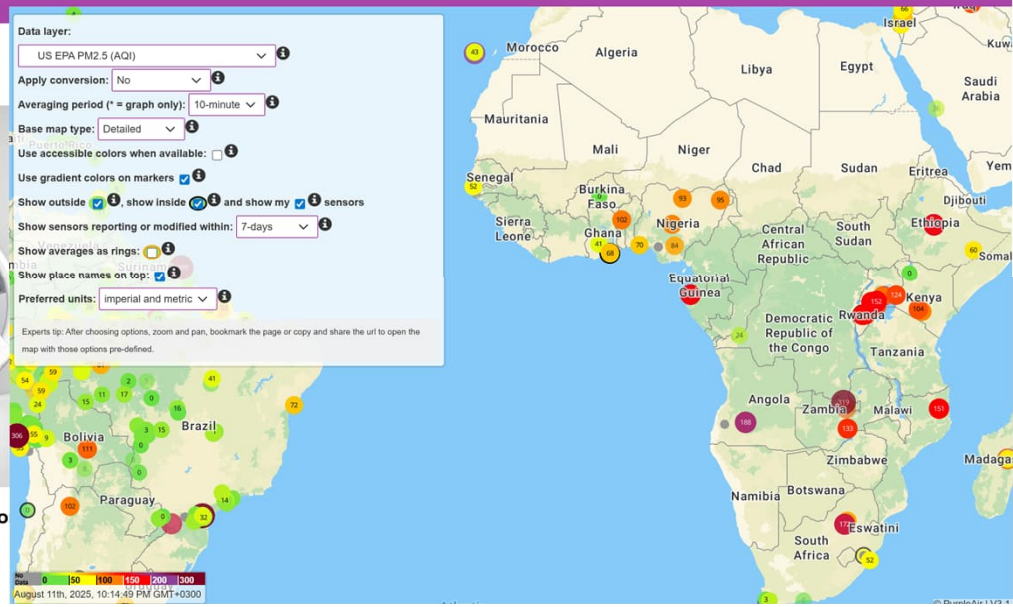
$239.00

PurpleAir Flex - Air Quality Mo

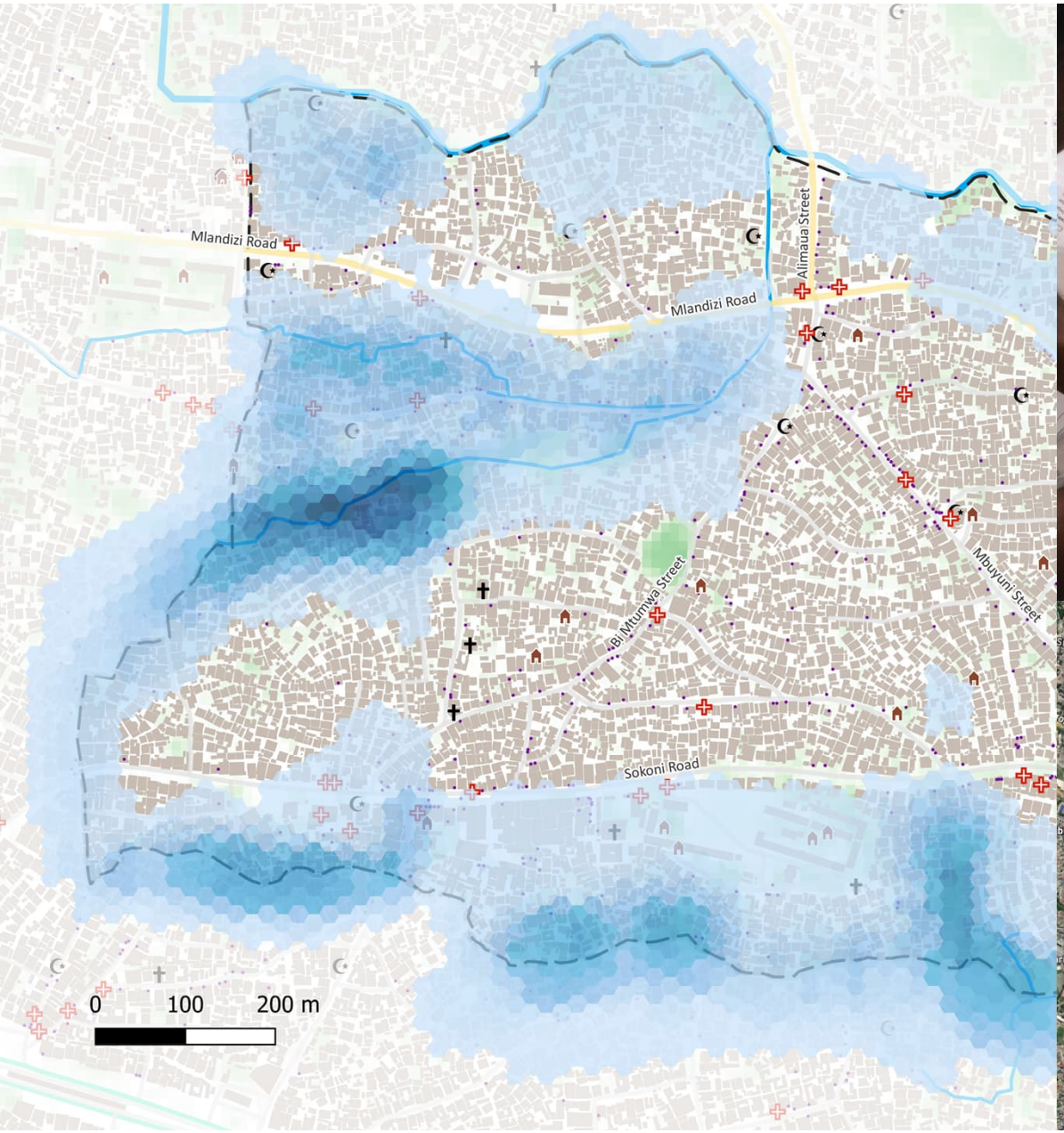
77 reviews

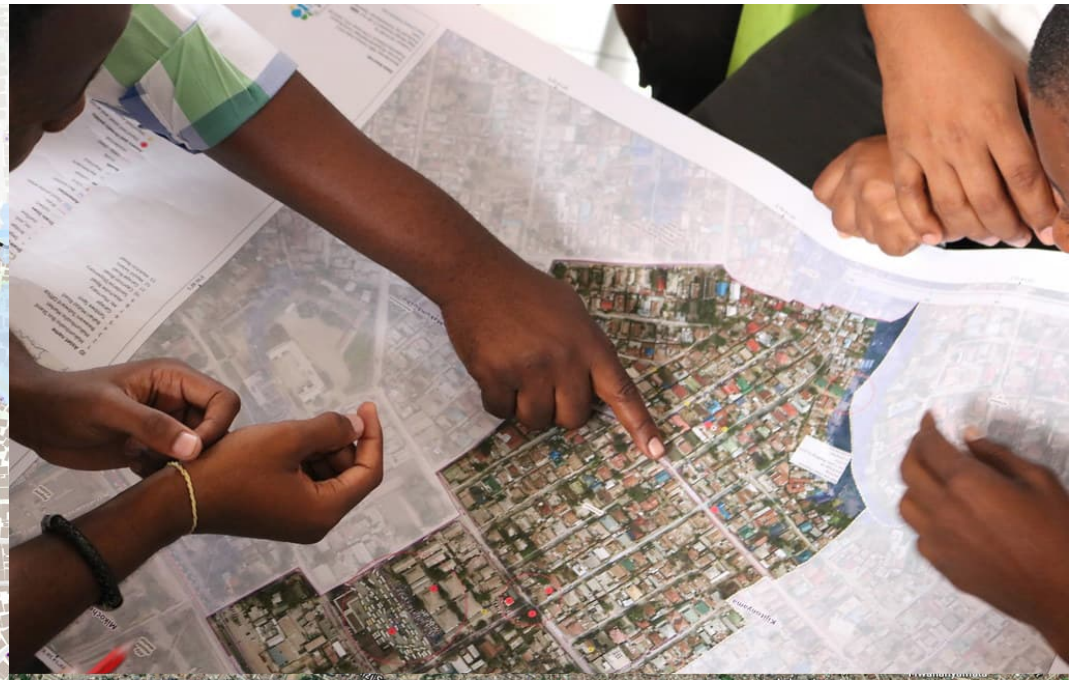
$289.00

PurpleAir Map Sensors Data About



https://vito.be/en/news/citizen-science-project-maps-heat-stress-johannesburg





Climate stressor locations

You may put as many locations on the map in your neighborhood as you like. The points or polygons represent locations where you have experienced floods, heat or air pollution.

16. Where in your neighborhood have you most often experienced floods?

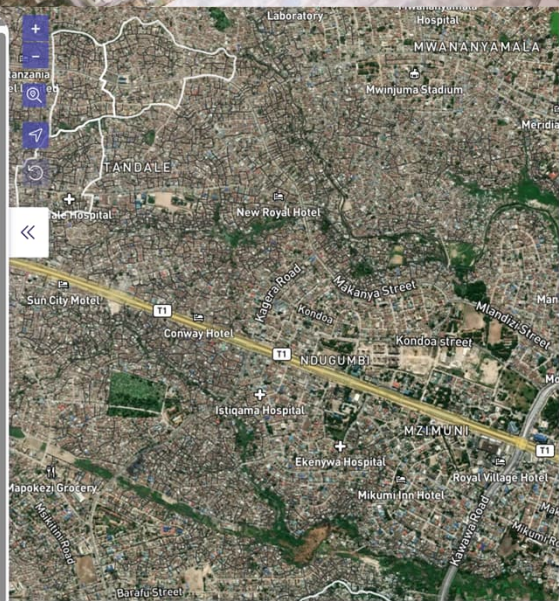
Flood experience (point)

Flood experience (area)

17. Where in your neighborhood have you most often experienced heat stress?

Heat stress experience (point)

Heat stress experience (area)



AT HOT, WE USE A COMBINATION OF OPEN MAPPING TOOLS DEVELOPED BY THE OPEN SOURCE COMMUNITY TO CREATE, ACCESS, MANAGE, ANALYZE, AND SHARE OPEN MAP DATA THAT SERVES OUR PARTNERS AND LOCAL COMMUNITIES.

Below you can explore tools for your data workflows and mapping projects from start to finish. All tools below are either open source or relating to the promotion of open data. OpenStreetMap (OSM) and other open geospatial tools are included to promote open and free mapping in all contexts, including limited resourced environments. HOT's tools, which fill a niche in end to end mapping workflows, are marked.

https://www.hotosm.org/open-data-solutions

- **Imagery** & Earth Observation
- **Data Collection:** Remote
- **Data Collection:** Field
- **Data Analysis** and Open Data Insights
- **Data Visualization**
- **Open Data Access** & Sharing

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Projects Resources About OSGeo Initiatives Community

Home » Resources

https://www.osgeo.org/resources/

Resources

Resources provide guidance on how to use open source projects and tools, alongside stories on how our community are using these tools in their work.

Use the filter below to highlight case studies, course and workshop materials, presentations and white papers.

An Introduction to Cartography with Open Source Software (In...

Introductory mapping course with open source tools (In Spanish). Curso introduct...

2023/10 Course Materials

Paulo César Coronado Sánchez

"Machine Learning with Earth Observation data: Case studies ...

An educational material on the use of machine learning methods applied to Earth ...

2021/12 Course Materials Cristina Vrînceanu

Introduction to FOSS G using QGIS .8, PostgreS PostGIS,...

This contains exercises that can be use classroom or for self-study as wel...

2018/06 Course Materials Get Inte

Training

- FOSS4G Academic Track proceedings
- EduGIS Academy for School teachers in STEM
- EduGIS Academy guidebook for School teachers in STEM
- gvSIG Batovi
- FOSS4G Academy
- Boundless training workshops
- Power of Geographic Information
- OSGeo-Live (for workshop/training program organisers)
- MapStory
- FOSS4G GeoAcademy Curriculum
- FOSS4G GeoAcademy GitHub resources
- Hands-on Open Source GIS & WebMapping for UN staff
- Interactive Web Maps course from OSGL, ETH Zurich
- Open Web Mapping course from Pennsylvania State University
- Tools for Open Geospatial Science

Home » Initiatives » FOSS4G Travel Grant Programme

FOSS4G Travel Grant Programme

With your assistance OSGeo provides a travel grant program to facilitate accessibility and diversity at our global and regional FOSS4G events.

Free and Open-Source (FOSS) tools

Content Management Systems
- GeoNode

Desktop Applications
- Marble
- gvSIG Desktop
- QGIS Desktop

Spatial Databases
- PostGIS

Metadata Catalogs
- GeoNetwork
- pycsw

Web Mapping
- pygeoapi
- MapServer
- deegree
- ZOO-Project
- OpenLayers
- GeoMoose
- Mapbender
- PyWPS
- GeoServer

Other
- OSGeoLive


Digital data revolution
Open data
IoT
Big Earth Data
Privacy
FOSS
Nanosatellites
Deep learning
GDPR
High-performance computing (HPC)
Data fusion
ML/AI
Data mining
21st century socio-technological landscape
Citizen science
VGIS/PGIS
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FAIR
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UAVs
Mobile technologies
Community mapping
Location-based services (LBS)
Geovisualisation
https://www.nrcan.gc.ca/earth-sciences/geomatics/canada-spatial-data-infrastructure/10783?wbdisable=true
Image by Gerd Altmann from Pixabay

"Our interconnected world needs open science to help solve complex social, environmental, and economic challenges and achieve the Sustainable Development Goals"

unesco

The UNESCO Recommendation on Open Science 2021

How can we practice open science of the 21 st century so that opportunities around the revolution of open data and digital technologies, community engagement and youths skills-building can be turned into contextually smart, actionable and sustainable climate services and adaptation solutions?

KADI

info@project-kadi.eu

Funded by
the European Union

KADI

Let’s discuss:

What data sources and tools have you used in your work? You may think about the most important, recent or interesting ones

We’ll collect and share a compiled resource list

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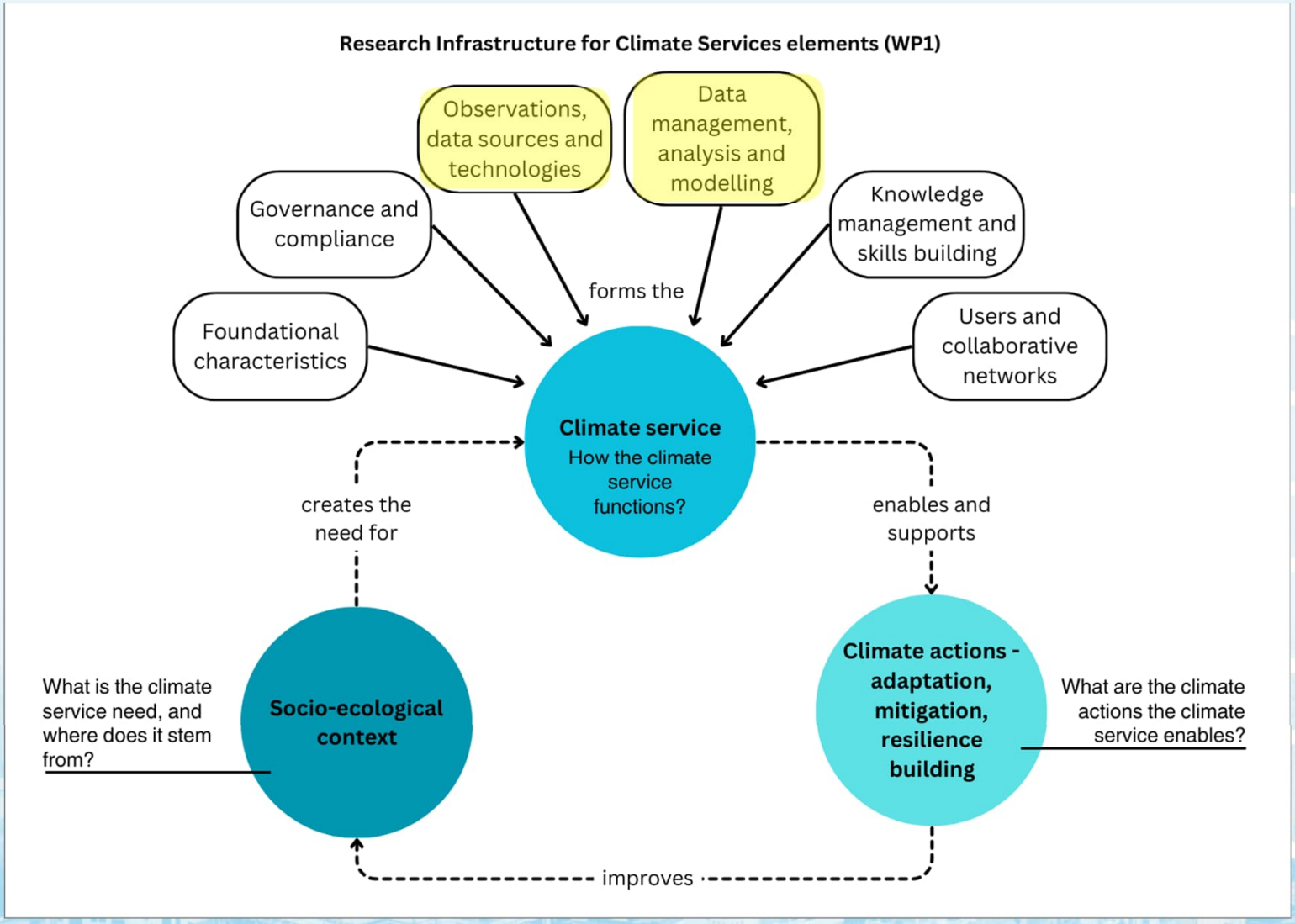
Digital data is an essential part of the co-creation of **climate resilence services** in cities



Conceptual design of climate services (https://kadi-

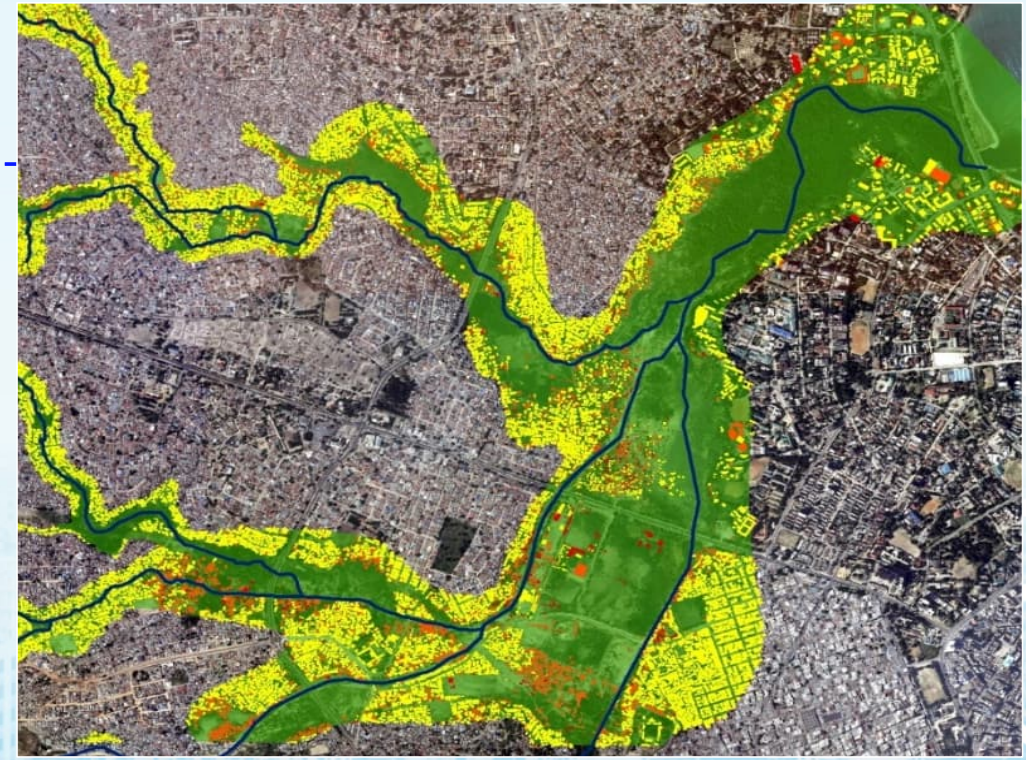
How is geospatial data used in Urban Climate Resilience – some examples

- **Climate risk assessment & hazard mapping** (eg. Flood mapping, earthquake risks, wildfires…)
- **Early warning systems** (eg. Real-time monitoring, alert systems..)
- **Emergency response** (eg. Evacuation planning)
- **Climate change monitoring** (eg. Urban heat mapping, flood prediction..)
- **Sustainable resource planning** (eg. Urban planning, flood management planning, greening…)

What type of digital geospatial data is used in climate resilience?

Hazard & Risk Mapping Data

- **Satellite Imagery** (Sentinel-2, Landsat, MODIS) – Detects wildfires, floods, and deforestation.
- **Elevation & Terrain Models** (LiDAR, SRTM, DEMs) – Helps map flood-prone areas and landslide risks.
- **Seismic Data** (USGS Earthquake Catalog) – Tracks earthquake epicenters and fault lines.
- **Weather & Climate Data** (NASA POWER, ERA5, Copernicus) – Monitors temperature, precipitation, and extreme weather patterns.



What type of digital geospatial data is used in climate resilience?

Exposure & Vulnerability Data

- **Population Density** (WorldPop, Gridded Population of the World - GPW) – Assesses human exposure to hazards.
- **Infrastructure & Critical Facilities** (OpenStreetMap, Humanitarian Data Exchange) – Identifies hospitals, roads, and evacuation centers.
- **Land Use & Land Cover** (CORINE, ESA CCI Land Cover) – Maps urban expansion, deforestation, and coastal changes.