SEPAL

System for Earth Observation Data Access, Processing and Analysis for Land Monitoring
SEPAL

System for earth observations, data access, processing & analysis for land monitoring.

Signup   Launch
Now is a good time for earth observation

Our challenge is to make the best use of the data available.
SEPAL objectives

Improve data access, processing, and delivery of satellite data and information products to enable autonomous land monitoring capacity.
SEPAL Platform (sepal.io) – High Level Goals

Cloud-based catalyst for autonomous land monitoring / data processing

Democratize access to data / algorithms / methods / results generation

Make code actionable

Innovation to Adoption

A Global Public Good
SEPAL Platform – the basics

Open source

Easy query, access and processing of earth observation data

Expandable with user scripts (python, GEE, R, C++, bash, etc)

Enable easy access / processing of Analysis Ready Data
Supercomputing power, Maintenance and Dependencies
SEPAL Platform – the basics

~7000 global active users

Access from anywhere...with internet or mobile phone

English / French / Spanish

Create / process data in multiple formats (GEE, data cube, etc)

Make interface seamless for front-end users

Focus on task / not data wrangling

We're pretty agnostic when it comes to branding, etc...
SEPAL Platform – the technical
SEPAL Platform – the technical

Compute platform for big geospatial data analysis

AWS EFS storage (persistent) attached to AWS instances provisioned for processing by anyone, anywhere

  Instantaneous access to 1 – 128 CPU and 1 to 2000 Mb RAM + GPU

Ubuntu Linux OS

Relies heavily on EE API but...

also R, Python, bash, Perl, C++, etc.

Easy to use UX enabling all levels of engagement
SEPAL Platform – integration examples

BFAST – https://github.com/diku-dk/bfast

CCDC - http://sites.bu.edu/measures/project-methods/change-detection-and-classification-algorithm/

SMFM Toolkit - https://www.smfm-project.com/


Planet – planet.com

JRC Tropical Moist Forest - https://forobs.jrc.ec.europa.eu/TMF/

SAR Handbook – servirglobal.net
SEPAL Platform – our collaborators
SEPAL Platform – the 'take home'

Designed to be an open-source, collaborative platform

Engage on any level (from novice to expert)

Work is your own

Things just run...and can do so on very large machines

Develop in or out of SEPAL, share with all SEPAL users worldwide

All code can run inside or outside of SEPAL – we just make it easier

Concept is repeatable / scalable / copy-able

It's there to be used and to do good...so please go ahead
SEPAL Platform – contributor workflow

- Github
- SEPAL user workspace
- Workflow analysis as script or notebook
- SEPAL App as UX-enabled application

SEPAL workflow
SEPAL Platform – contributor workflow GEE
SEPAL Platform – user workflow SEPAL interface

Create data / Save Recipe → Process Data → Save / Download Results → Delete Data

Your own processing chain
SEPAL Platform – user workflow AWS instance

Upload / Download Data → Process Data → Save / Download Results → Delete Data

Your own processing chain
SEPAL Platform – reference

SEPAL website: sepal.io
SEPAL code: github.com/openforis/sepal

OpenForis website: openforis.org

FAO NFM website: http://www.fao.org/national-forest-monitoring
SEPAL Platform – thanks to...

Governments of Norway, Germany, Finland, European Commission
USGS, NASA, ESA
Google


Many more...
Examples
Customized monitoring systems

Brazzaville, national forest monitoring

Jakarta, peatland restoration
Cox’s Bazar refugee camp, Bangladesh

Restoration monitoring & reporting

Forest degradation between 2016-2018

Reforestation in August 2018

Reporting at scale

- Forest cover
- Forest degradation
- Reforestation
- Land use & land use change
- Restoration suitability

Data prepared by: Rashed Jalal, Saimunnahar Ritu & Amit Ghosh
Impacts of SEPAL

A new collaboration: WWF & FAO

In August 2019, WWF and the UN Food and Agriculture Organisation (FAO) tackled this issue together to map the changes in natural habitats in RAGA. WWF gained access to server resources and space on SEPAL: FAO’s powerful platform for cloud computing and data management.

SEPAL, the system for Earth observations, data access, processing & analysis for land monitoring, builds capacity for advanced forest and agriculture monitoring.

Open Foris: FAO in collaboration with Google developing innovative technical solutions for catalysing climate action

Innovative open-source solutions that help countries generate critical forest and land cover information in their efforts to mitigate and adapt to climate change.

Using SEPAL, land cover changes have been detected in Uganda. Here, deforestation in red and forest degradation in yellow are shown eating away at forests over the period 2010-2018. This type of analysis, which shows change almost from one day to another and with a resolution of meters, can enable a near-real-time understanding of change dynamics and drivers, and rapid and targeted response of the people managing forests. Image copyright FAO.

United Nations Decade on Ecosystem Restoration 2021-2030
Fast-tracking innovation to application

Image pre-processing – BRDF correction

Time series analysis – BFAST, CCDC, SMFM

- Consistently apply best practices and advanced methods
- Allow large scale implementation
- Allow trial and error – fail faster
Custom analysis ready data

- Easy image fusion – possibility to combine Landsat, Sentinel 1 and 2
- Export data for **SMFM deforestation/degradation module**
- In application training data collection (advanced module coming soon!)
SMFM integration - BIOTA

SEPAL BIOTA

The BIomass Tool for Alphas (BIOTA) was developed by ITS International and the University of Edinburgh to calculate above-ground biomass from L-band satellite data in dry forests and savannahs, as well as biomass change and forest degradation.

Longitude 75
Latitude 0
Year 1
Year 2
Large Tile
1x1 grid
5x5 grid

Download Images

BIOTA Using ALOS annual composites