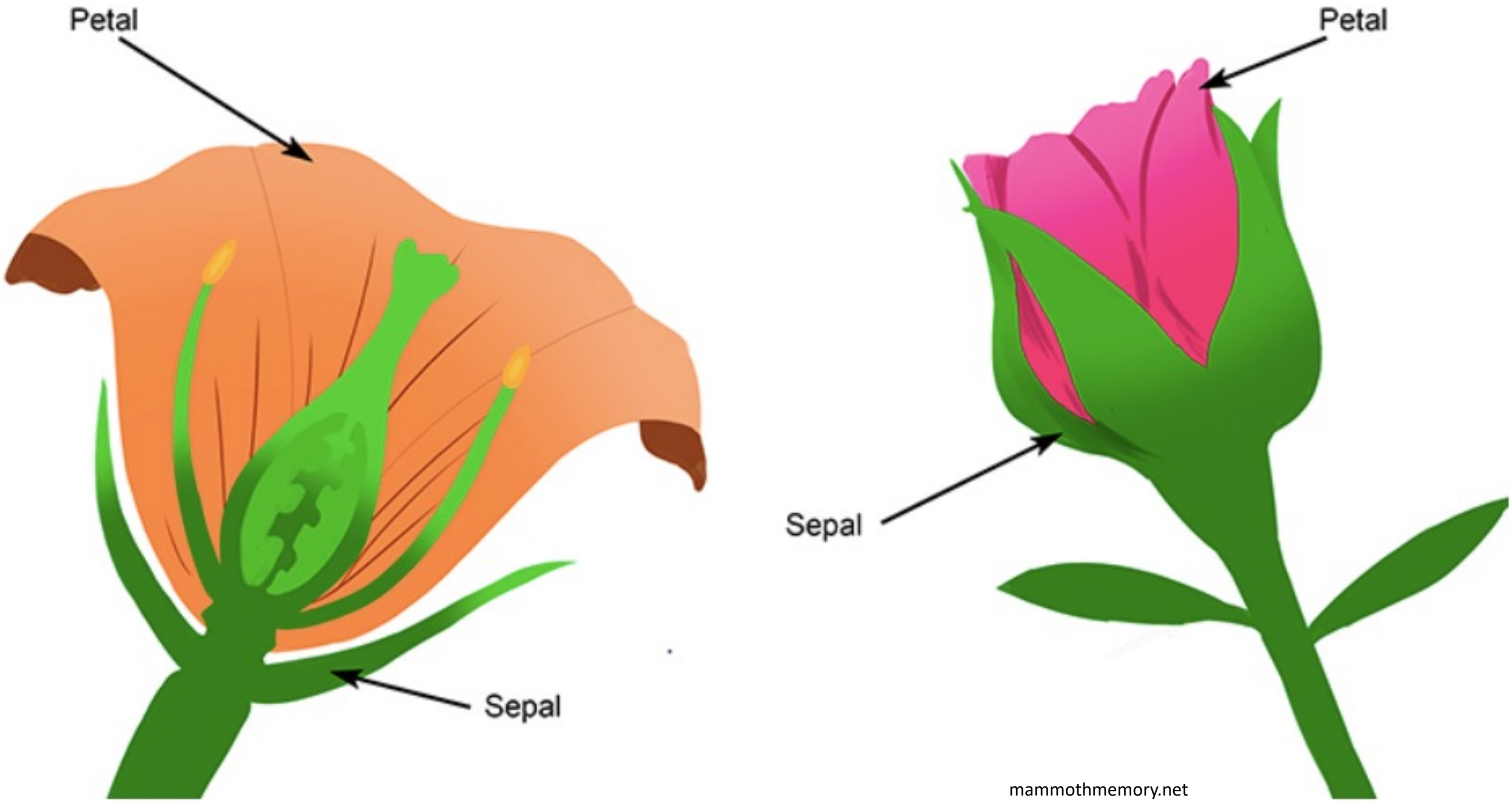
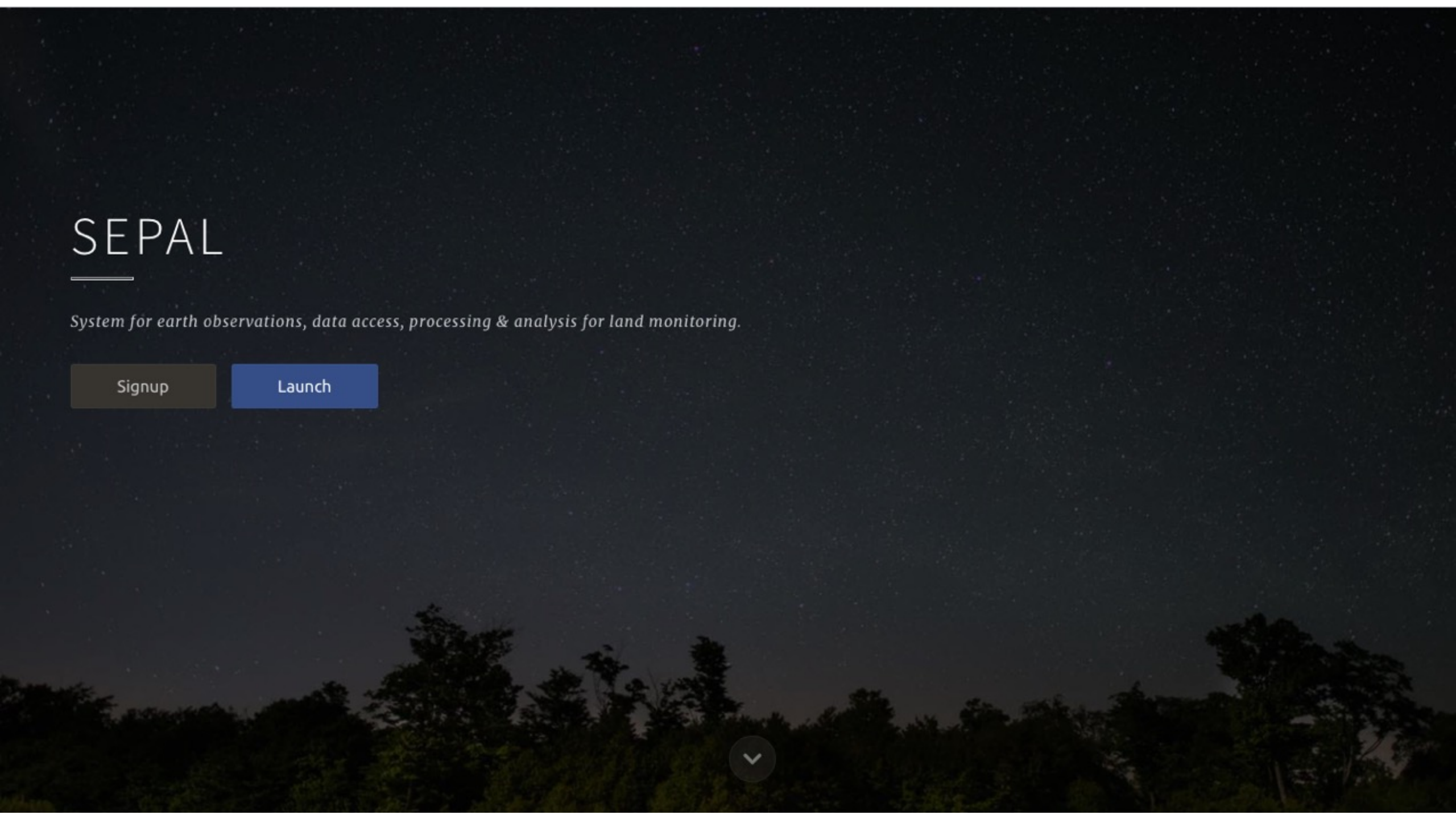
Food and Agriculture Organization of the United Nations

SEPAL

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



mammothmemory.net


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.

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openforis.org/tools/sepal

Food and Agriculture Organization of the United Nations

SEPAL objectives

Improve data access, processing, and delivery of satellite data and information products to enable autonomous land monitoring capacity.

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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

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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

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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...

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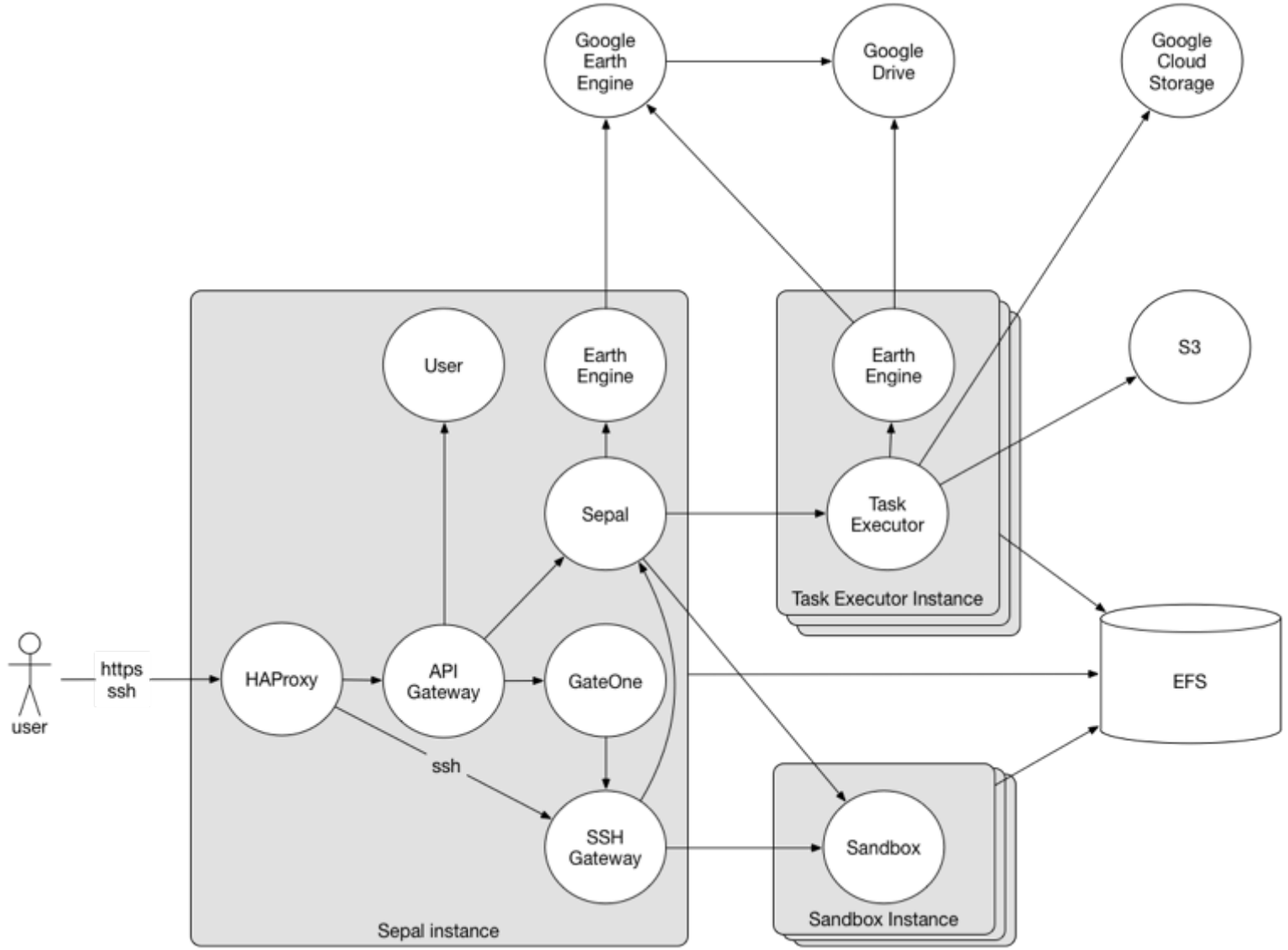
SEPAL Platform – the technical



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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

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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/

Guidos Work Bench - https://forest.jrc.ec.europa.eu/en/activities/lpa/gwb/

PYSMM - https://pysmm.readthedocs.io/en/latest/

Planet – planet.com

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

SAR Handbook – servirglobal.net

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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

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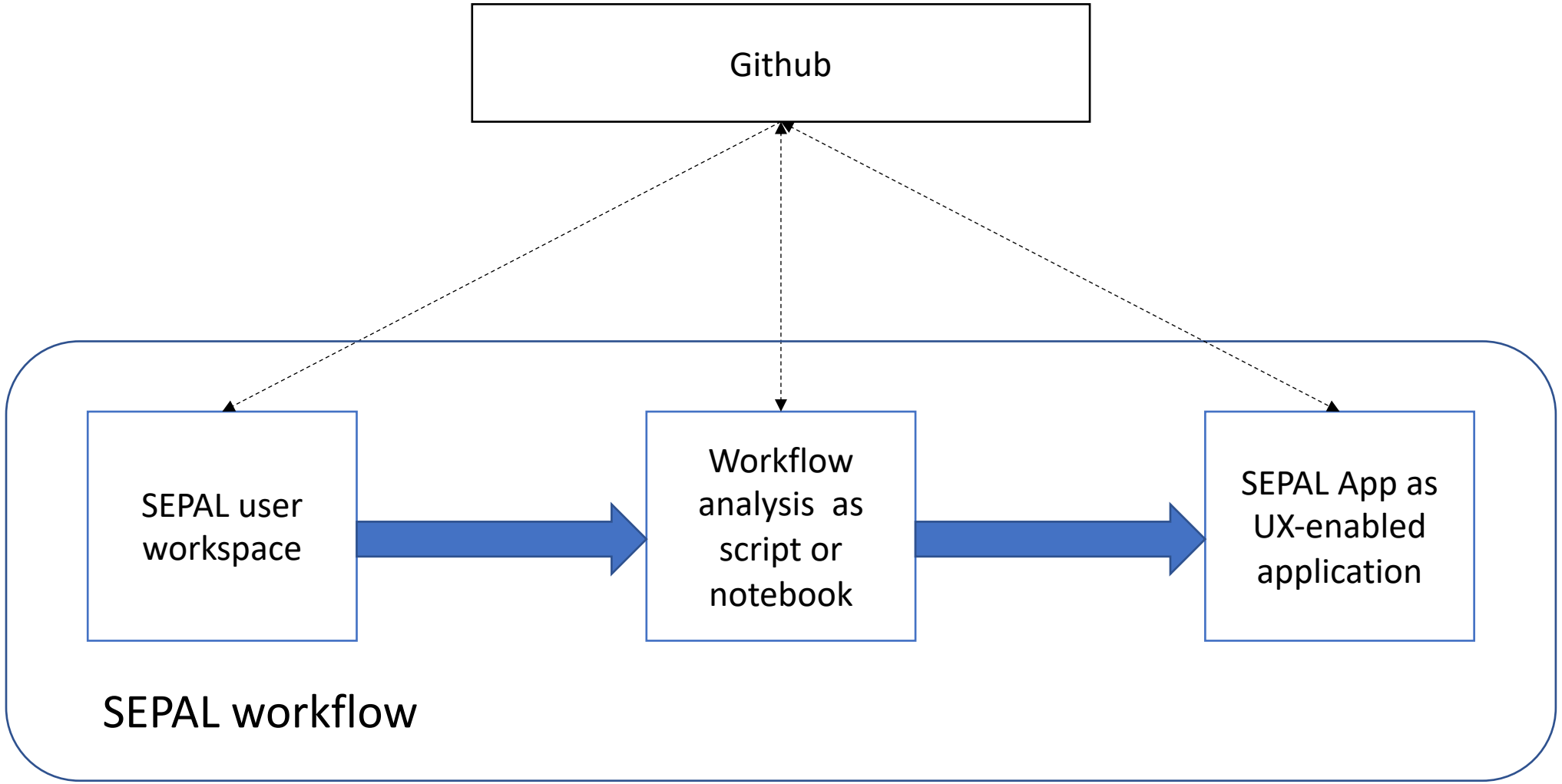
SEPAL Platform – contributor workflow



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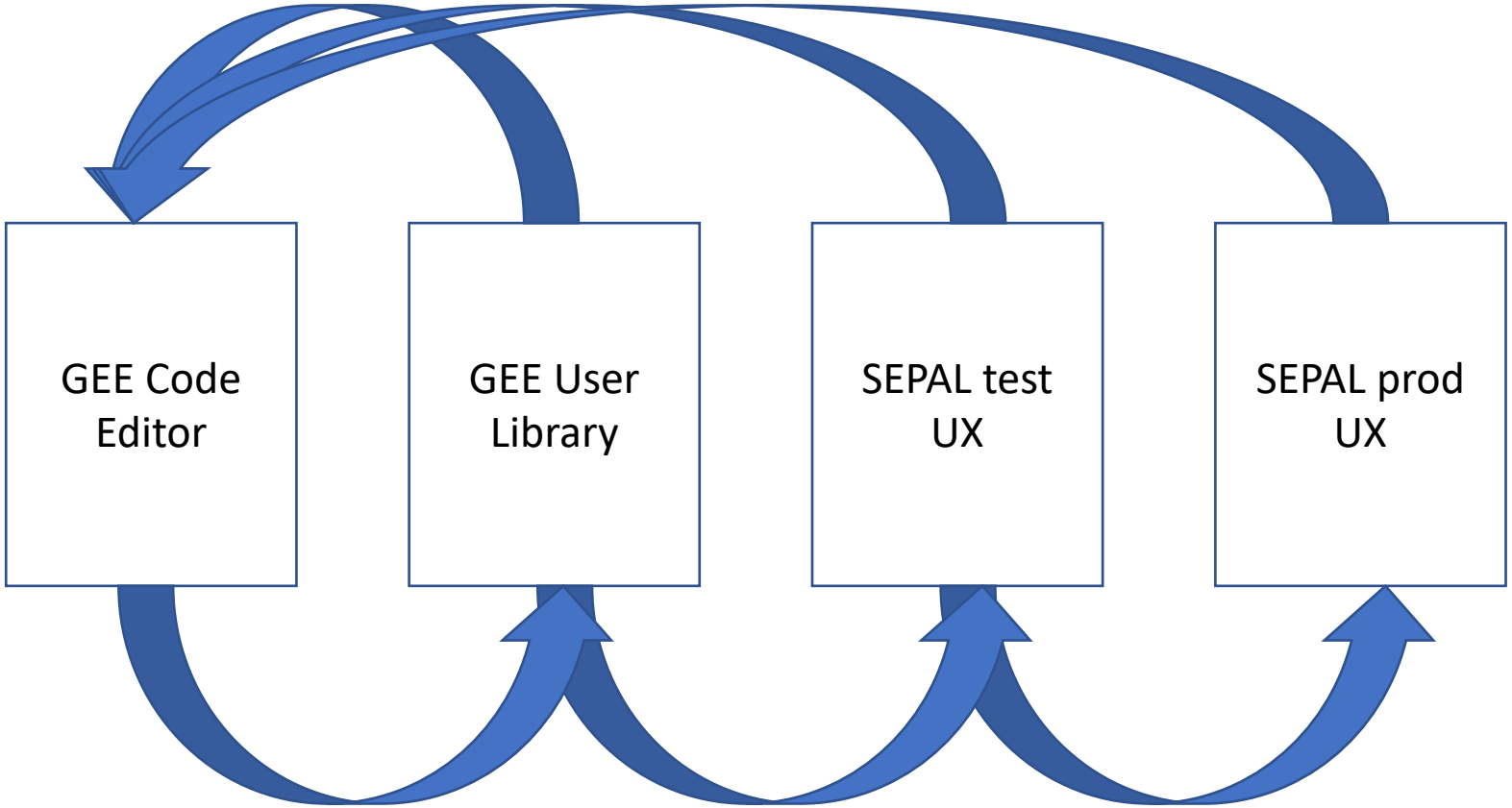
SEPAL Platform – contributor workflow GEE



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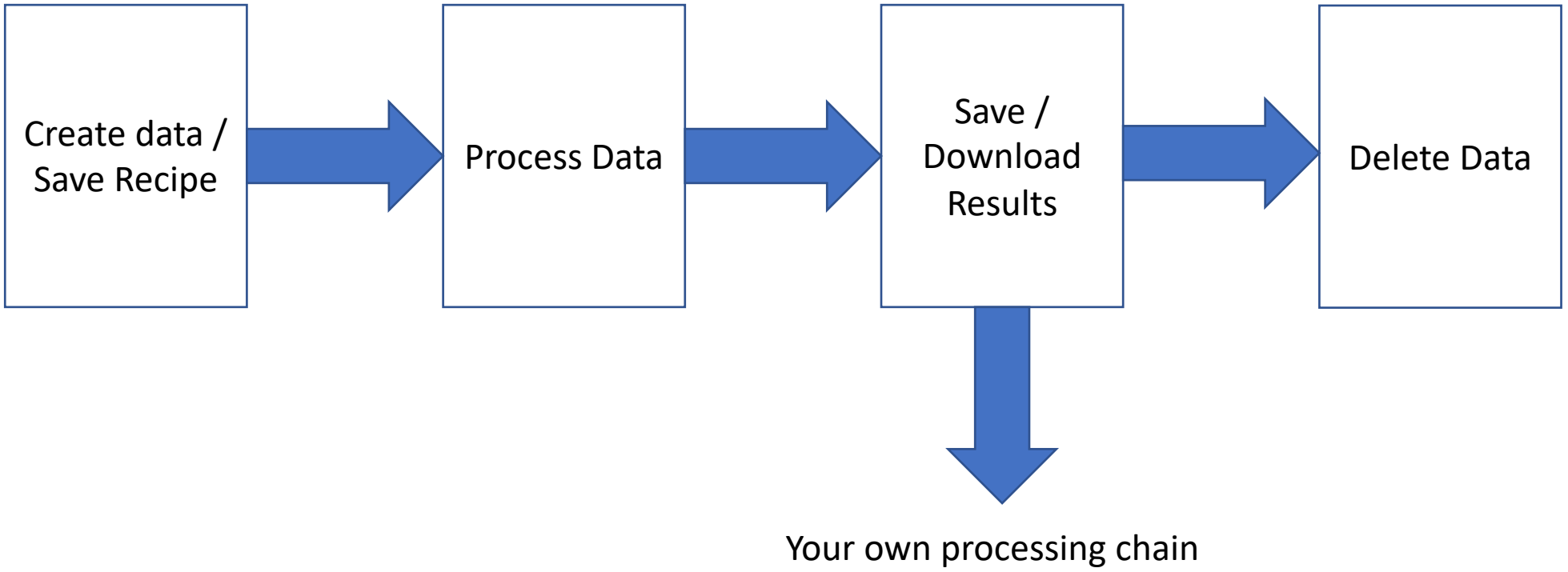
SEPAL Platform – user workflow SEPAL interface



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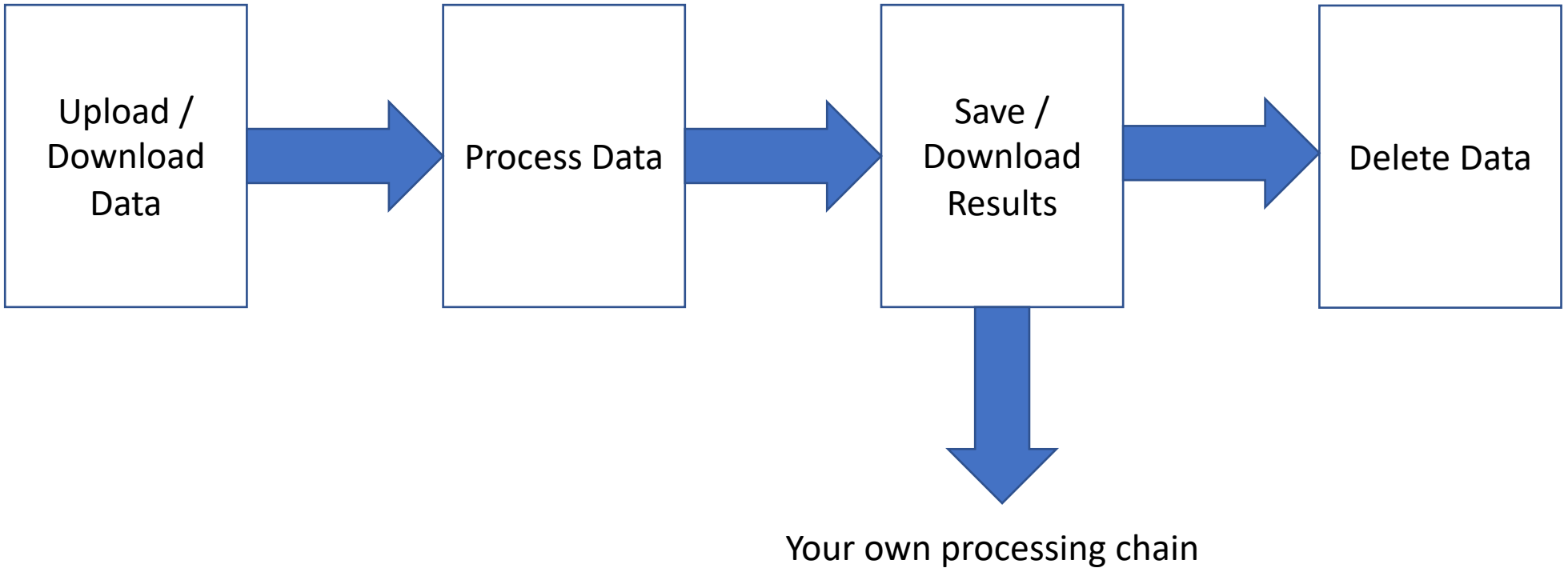
SEPAL Platform – user workflow AWS instance



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SEPAL Platform – reference

SEPAL website: sepal.io
SEPAL documentation: https://sepal-doc.readthedocs.io/en/latest/index.html
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

Daniel Wiell, Luca Paolini, Yelena Finegold, Remi D'Annunzio, Pierrick Rambaud, Daniel GuerreroMachado, Andreas Vollrath, Erith MunozRios, Jose Serafini, Naila Yasmin, Rashad Jalal, Amelie Arquero, Aurelie Shapiro, Laura D'Aietti, Matieu Henry, Lorena HojasGascon, Stefano Giaccio, Roberto Fontanarosa, Marieke Sandker, Till Neef, Inge Jonckheere, Danilo Mollicone, Alfonso Paus-Diaz, Marcelo Rezende, Giulio Marchi, Stefano Ricci, Adia Bey, Chiara Patriarca, Anssi Pekkarinen, Rachel Golder, Esther Phillips, Mariangela Bagnardi, Alessandro Petrucci

Many more...

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Examples

Customized monitoring systems

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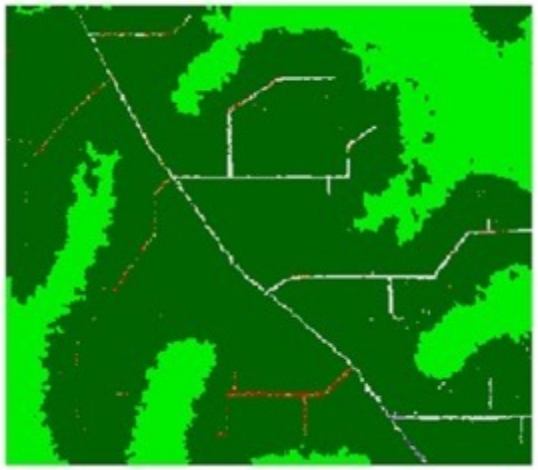
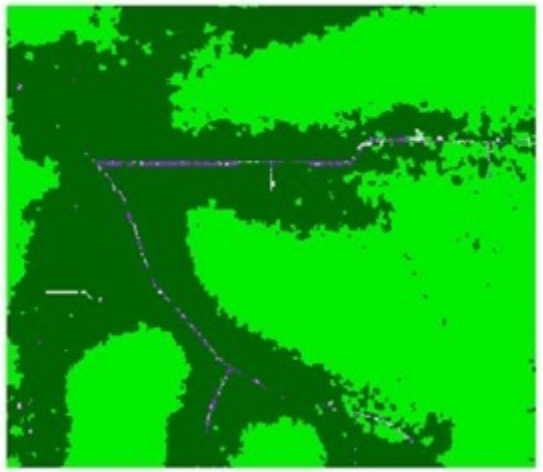
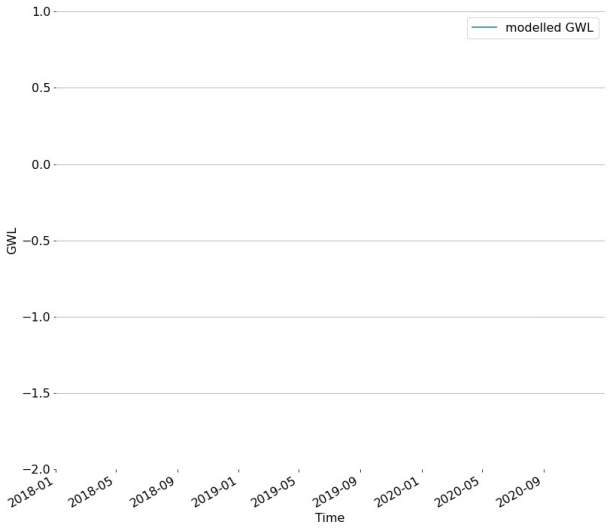
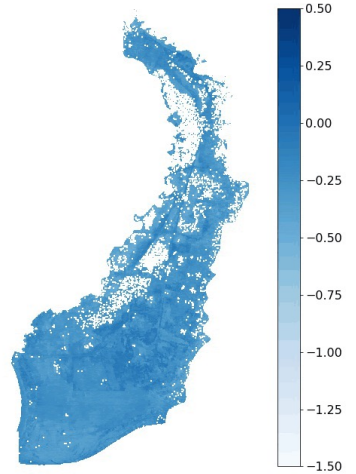
Brazzaville, national forest monitoring





Jakarta, peatland restoration





Restoration monitoring & reporting

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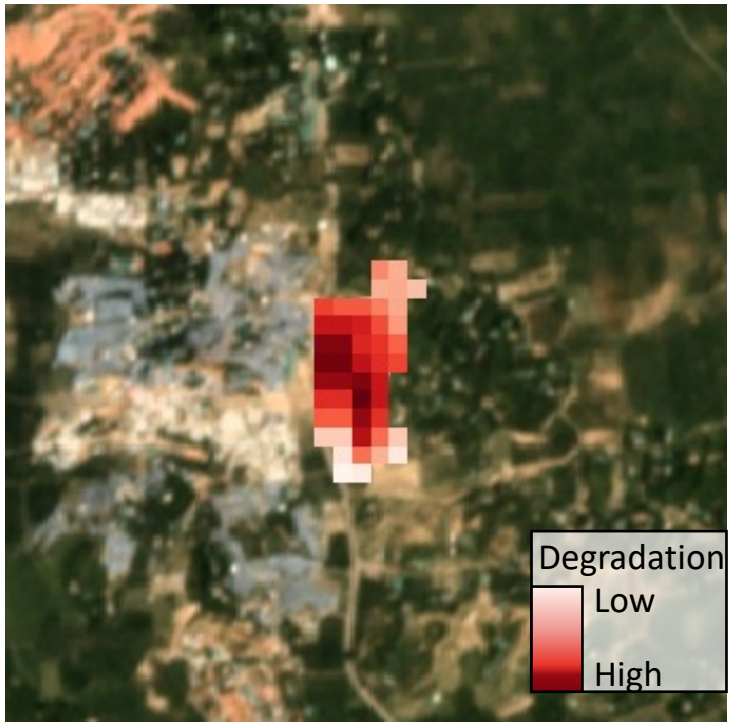
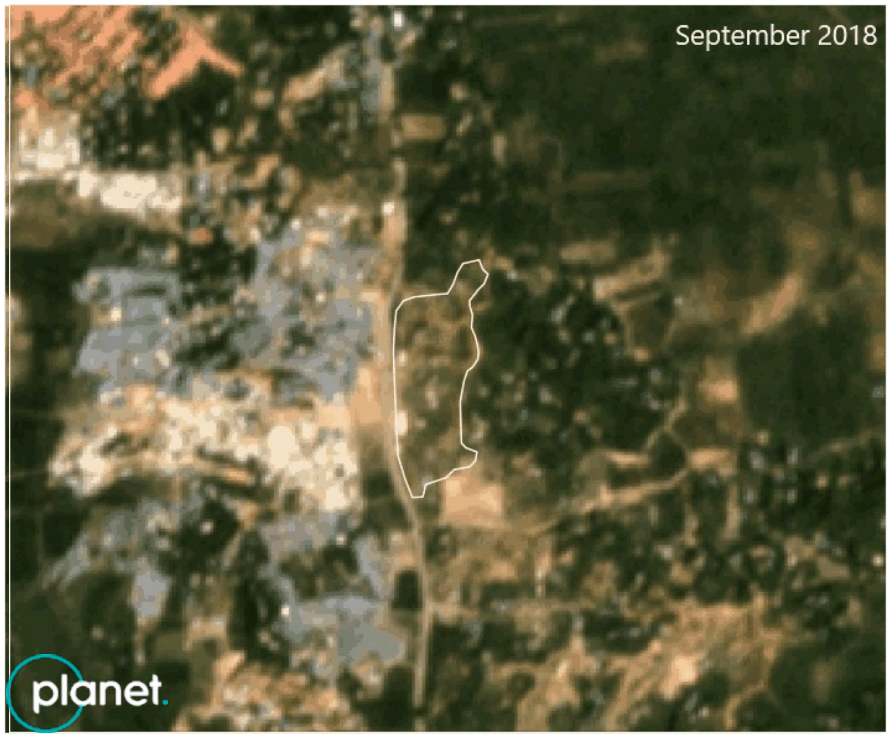
Cox's Bazar refugee camp, Bangladesh

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

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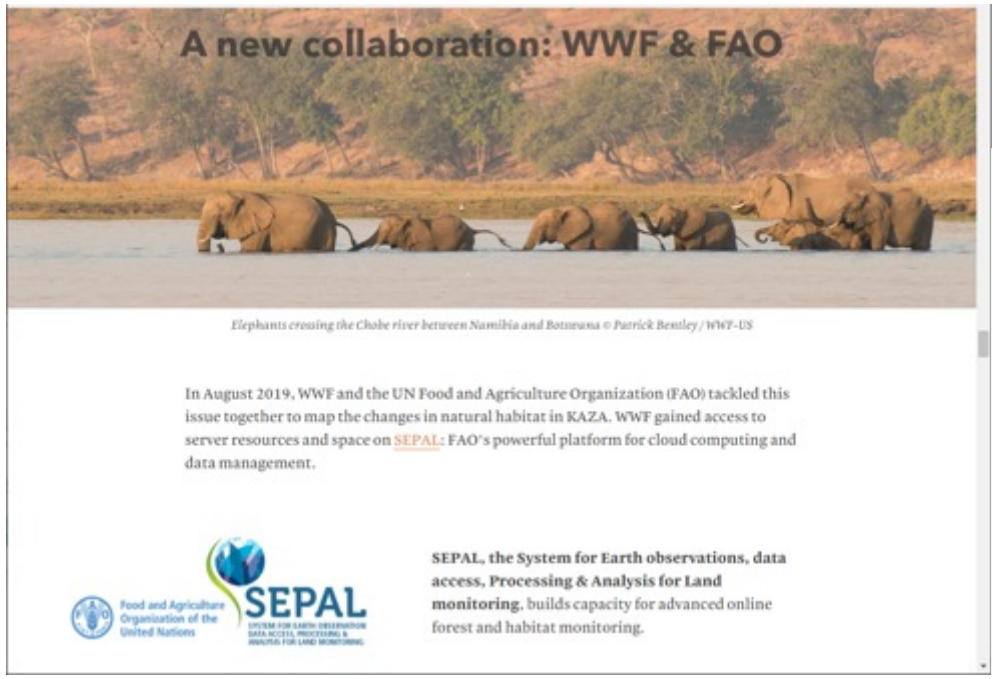
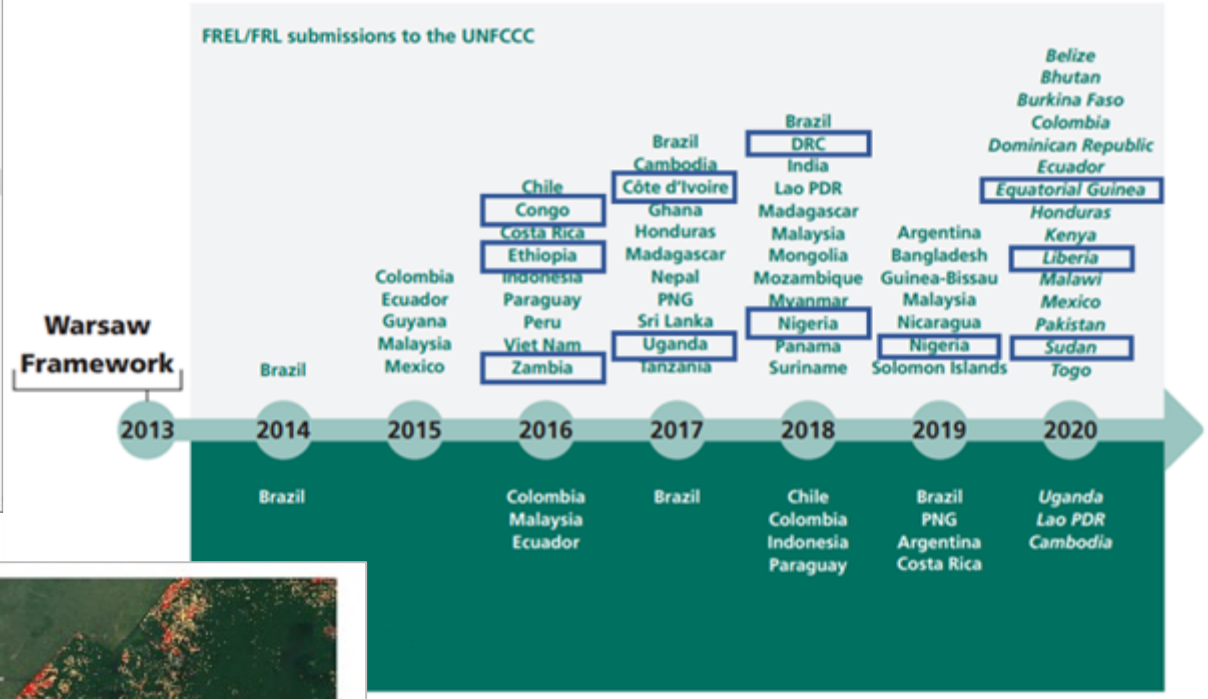
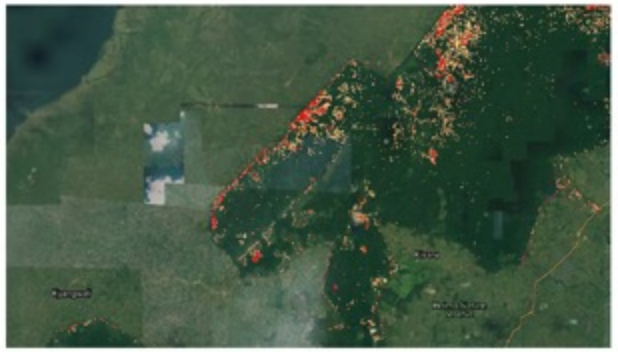




Open Foris: FAO in collaboration with Google developing innovative technical solutions for catalysing climate action

Open Foris · Sep 8 · 7 min read

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 change has been detected in Uganda. Here, deforestation in red and forest degradation in yellow are shown eating away at a forest over the period 2018–2019. This type of analysis, which can show change almost from one day to another and with a resolution in metres, 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

SEPAL
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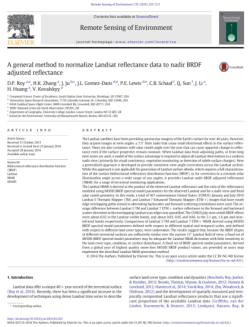
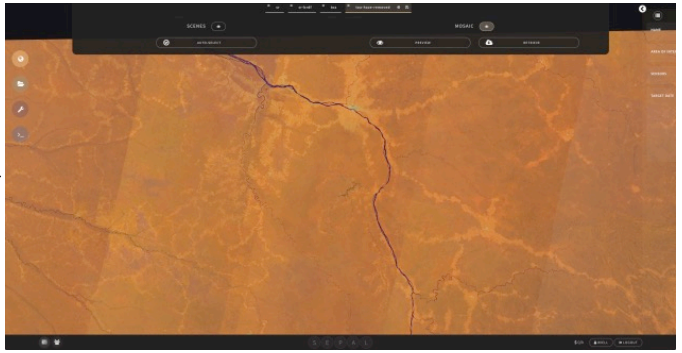
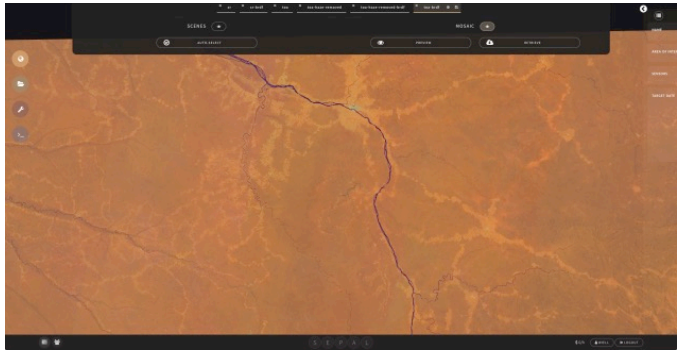
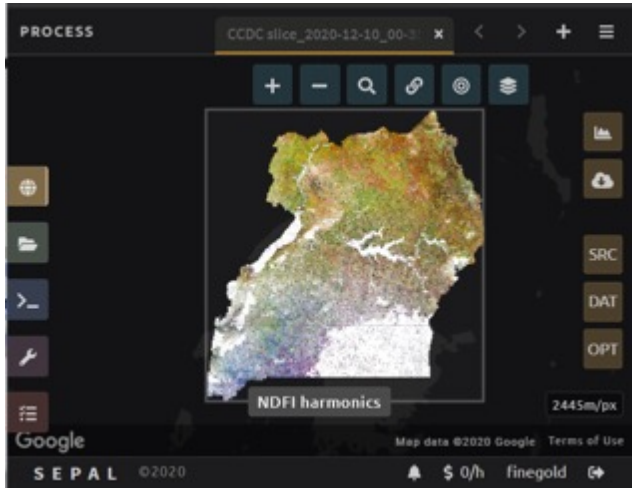
Image pre-processing – BRDF correction







Time series analysis – BFAST, CCDC, **SMFM**

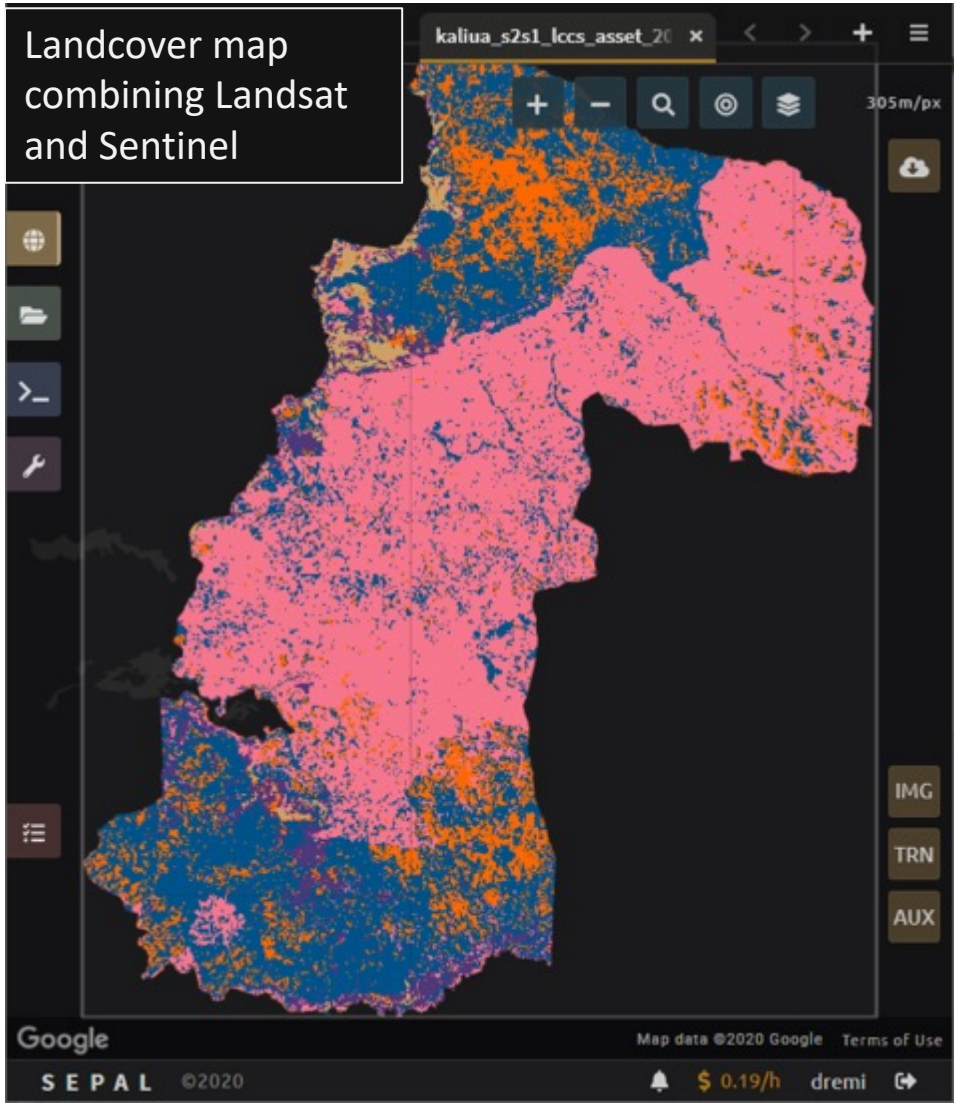


350 GB of data

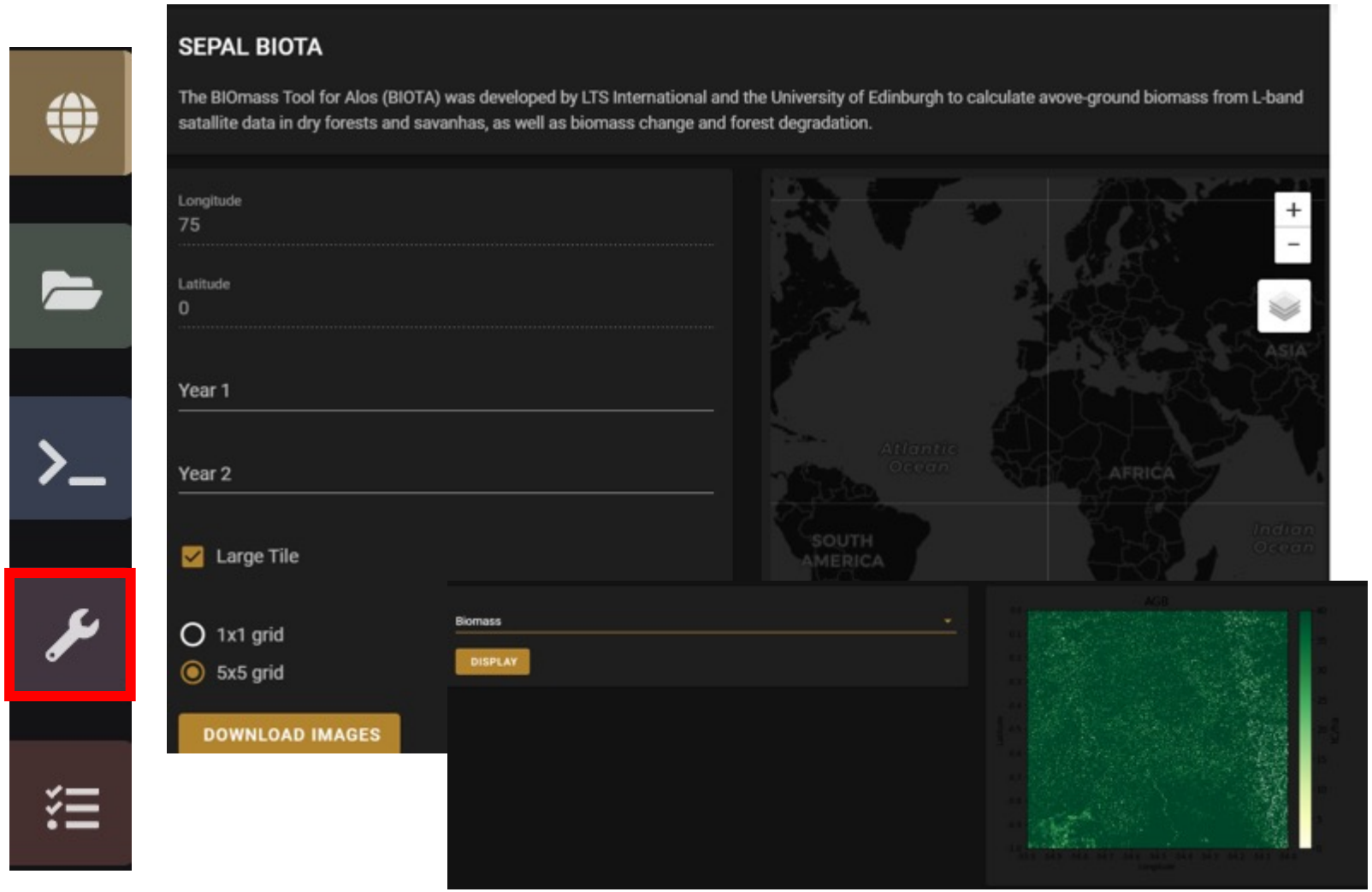
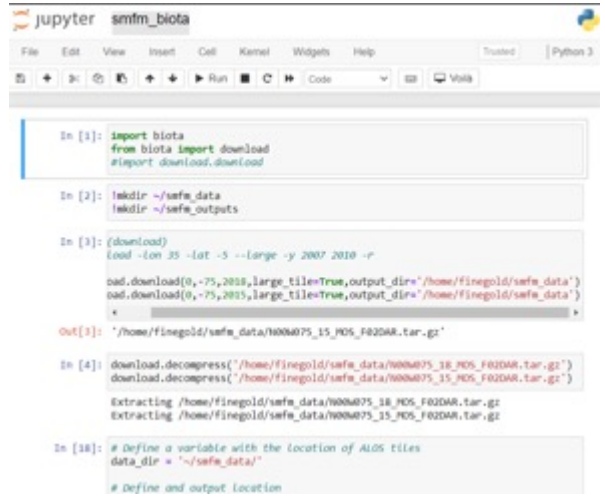
- Consistently apply best practices and advanced methods
- Allow large scale implementation
- Allow trial and error – fail faster

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



BIOTA
Using ALOS annual composites