CS GROUP

WORKING BY YOUR SIDE
TO TACKLE YOUR CRITICAL CHALLENGES

FOSS4G
FIRENZE 2022

Orfeo Toolbox

Open-source processing for remote sensing images

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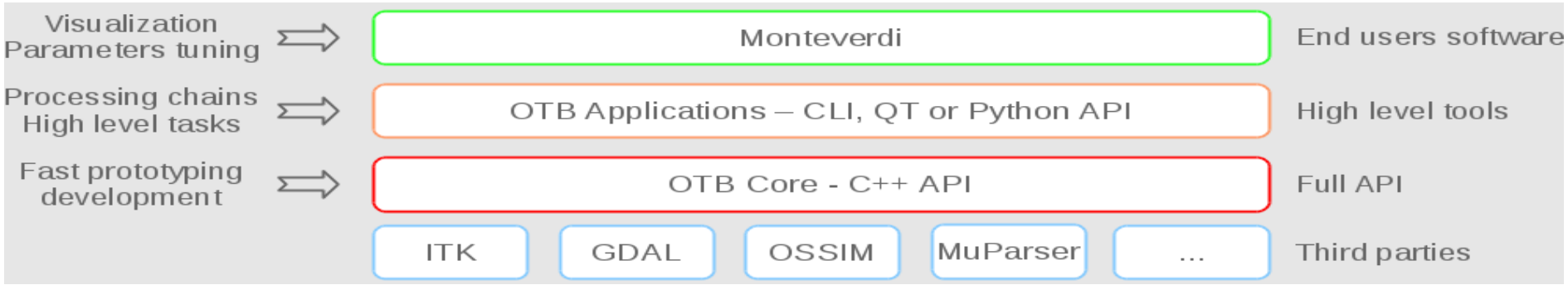
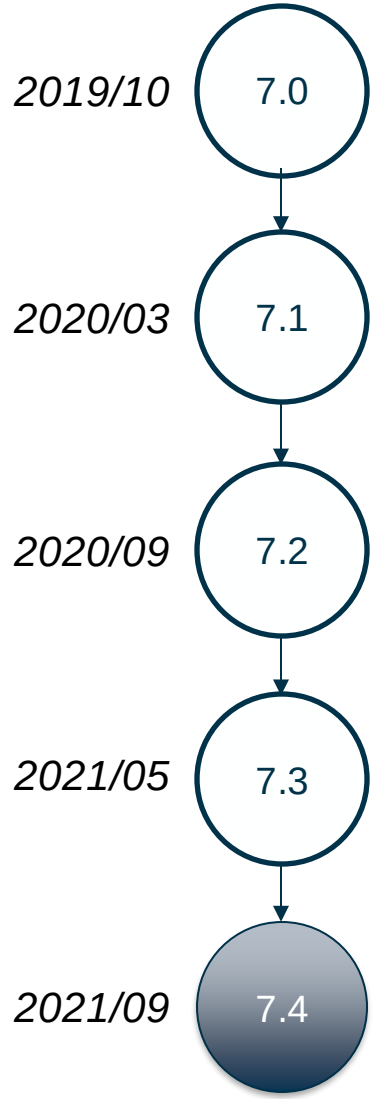
SHORT REMINDER

- Image processing library covers all needs in Remote Sensing: https://www.orfeo-toolbox.org/
- Funded and developed mainly by CNES: ORFEO program, SWOT Aval, Theia, …
- A 15-year-old story
- OSGEO Open-Source : Apache V2.0
- Maximum reach : for all kind of users, SIG, scientists… laptop to clusters computers
- Big data capable
- Streaming / pipeline



OTB SINCE FOSS4G 2019 – OTB 7.X

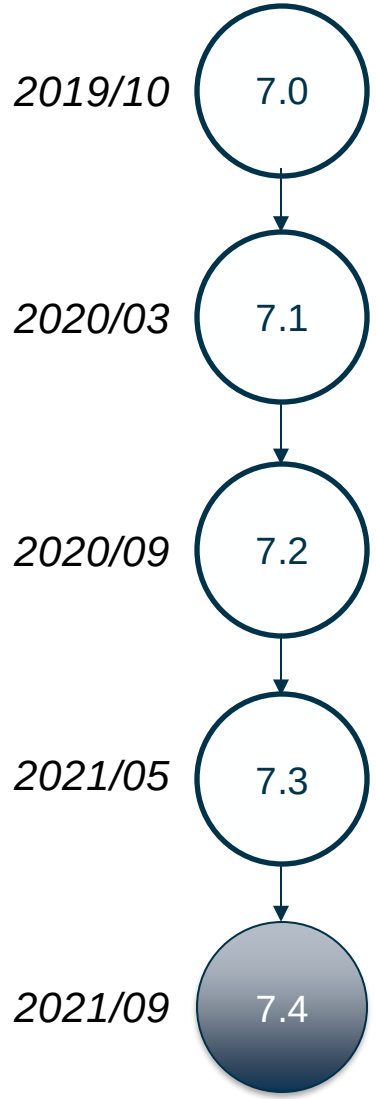
- New set of applications:
  - Regression framework
    - Train(Image/Vector)Regression
    - (Image/Vector)Regression
  - Hyperspectral image processing
  - Image processing
    - FastNLMeans
    - PantexTextureExtraction
  - Utilities
    - Zonal statistics
    - ResetMargin
    - Synthetize



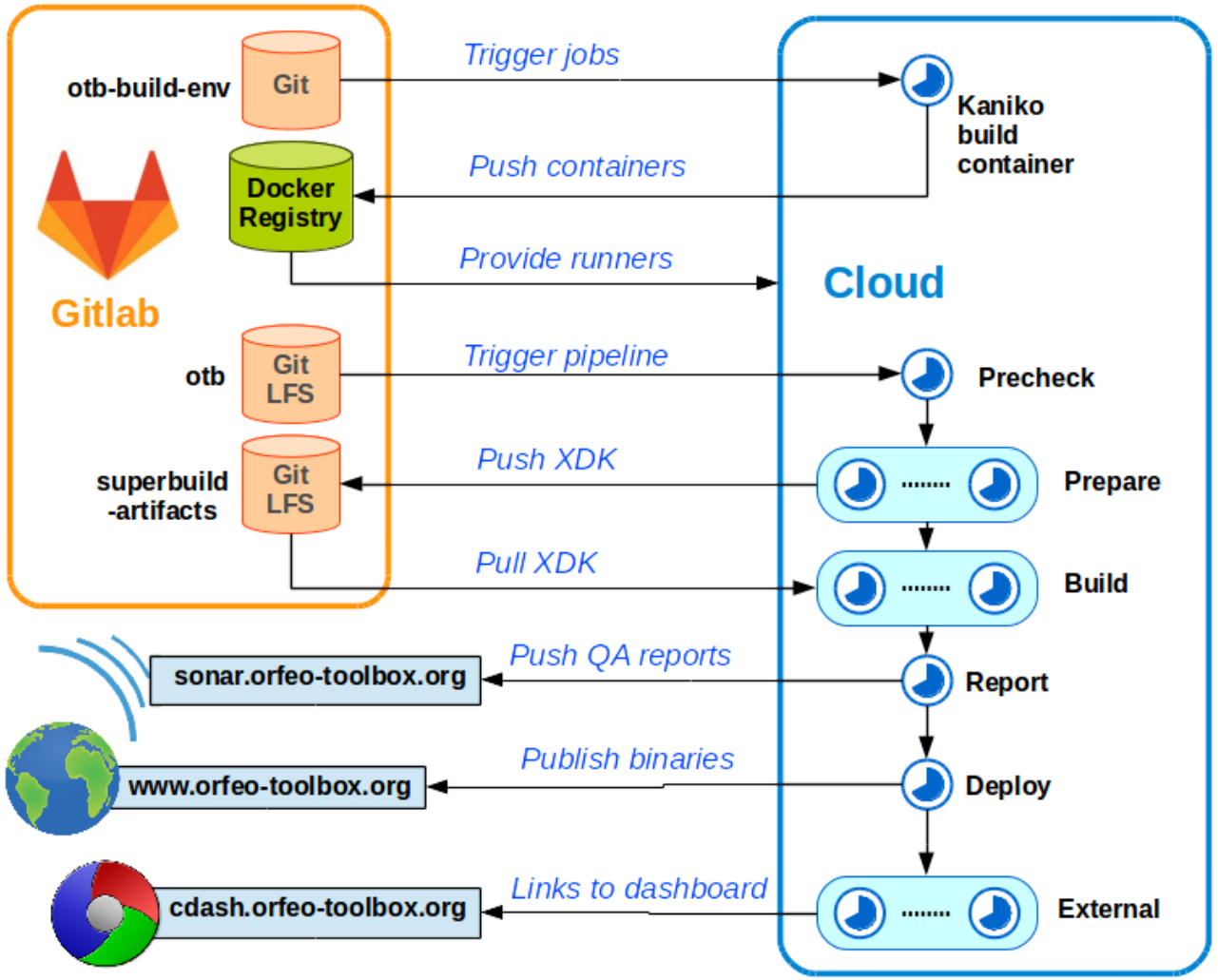
OTB SINCE FOSS4G 2019 – OTB 7.X

- Improve support for SAR image:
  - New SAR sensor models : CosmoSkyMed, TerraSAR-X
  - Improvement of the Sentinel 1 model for S1Tiling and DiapOTB
- NoData extended filename for output images:

  &nodata=(double) value
- For developers
  - Functor Image Filter
  - Support for GDAL 3
  - Switch from Python 2 to Python 3
  - Logs for the Python wrapper
  - The Java wrapper has been removed
  - New CI platform



NEW OTB CONTINUOUS INTEGRATION PLATFORM



FUNCTOR IMAGE FILTER

A generic filter for pixel-based operations

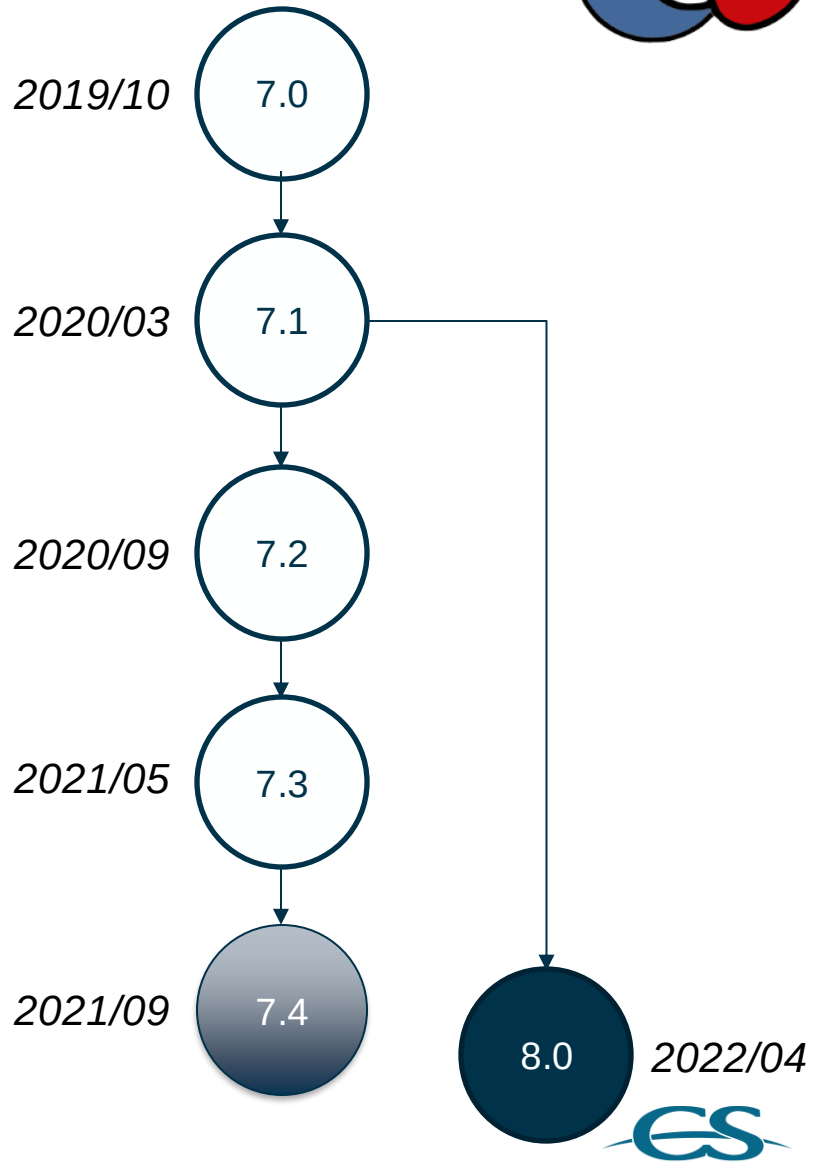
- Takes any number of images or vector images as input
- Outputs an image or a vector image
- Operation based on pixel, neighborhood or both
- Operation defined using lambda, functor or function pointer

```
// Define the filter
auto ndvi = [](double nir, double red) -> double {(nir - red) / (nir + red)};
auto ndviFilter = NewFunctorFilter(ndvi);

// Set inputs (otb::Image)
ndviFilter->SetInput<1>(nirImage);
ndviFilter->SetInput<2>(redImage);

// Use the filter
ndviFilter->Update();
```

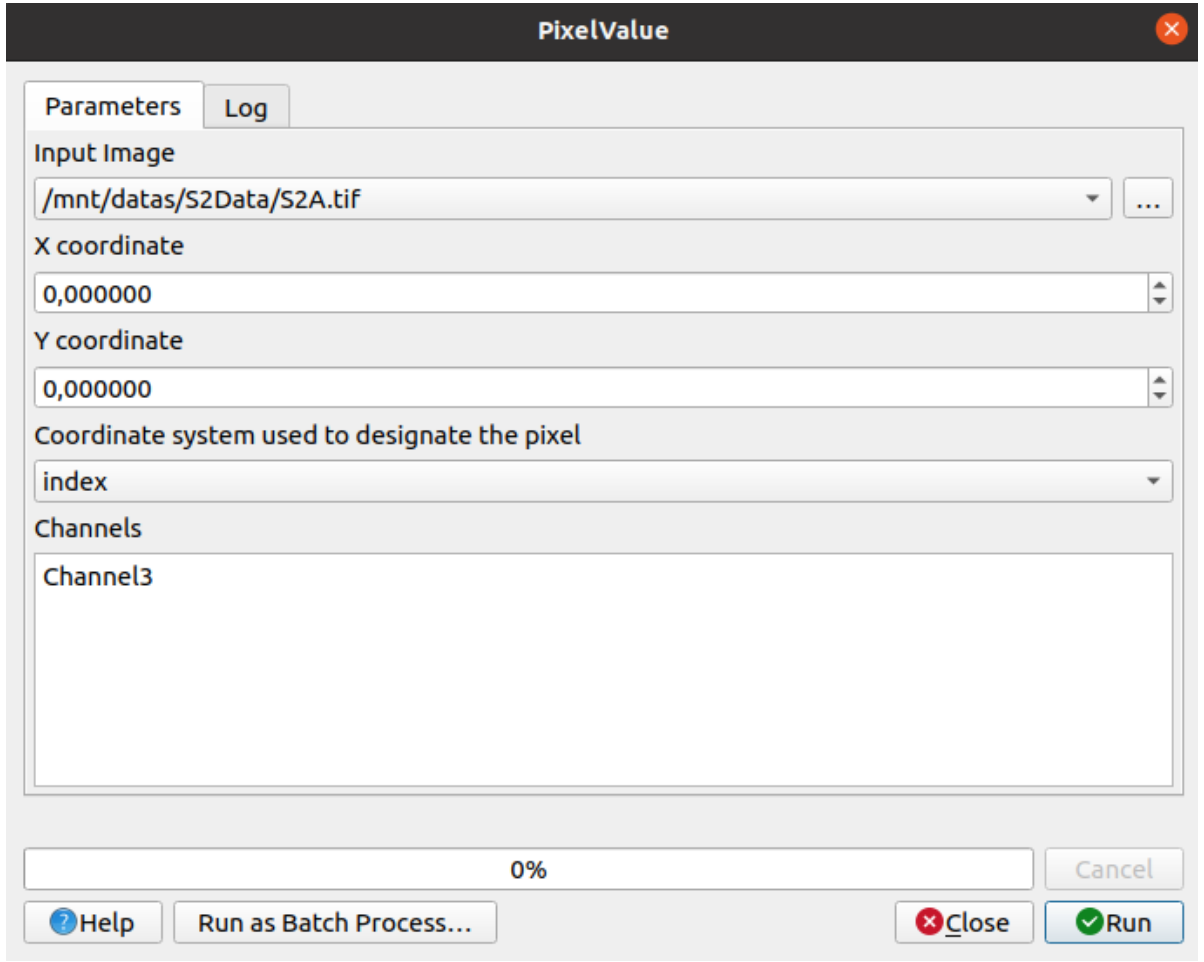
Check out the "Functor application template" project on the Gitlab

OTB SINCE FOSS4G 2019 – OTB 8.0

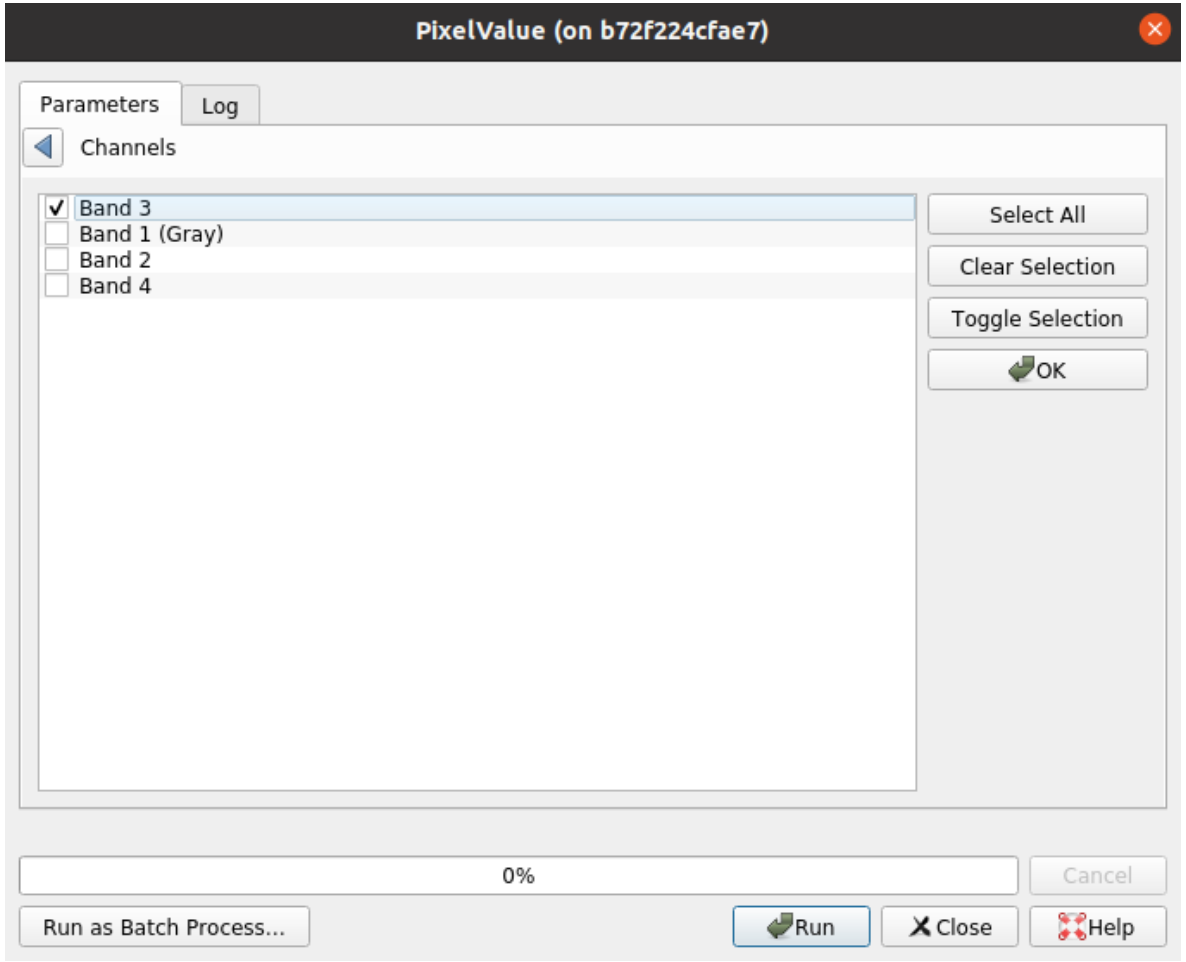
- Remove OSSIM
  - Why?
    - Hard to package (Debian, Conda, Superbuild) -> Python
    - Hard to follow Ossim development cycle
    - Many Ossim functionalities are also implemented in GDAL
  - Large impact:
    - Metadata parsing and management refactoring (no GEOM)
    - DEM handler refactoring -> more flexibility
    - RPC handling
    - Reuse RPC parsing from GDAL and new RPC class
    - SAR model reimplementation
    - Modern time points and duration
- Improve OTB integration into QGIS
- An official Docker container



OTB 8 AND QGIS – NEW INTERFACE



OTB 7.4



OTB 8.0

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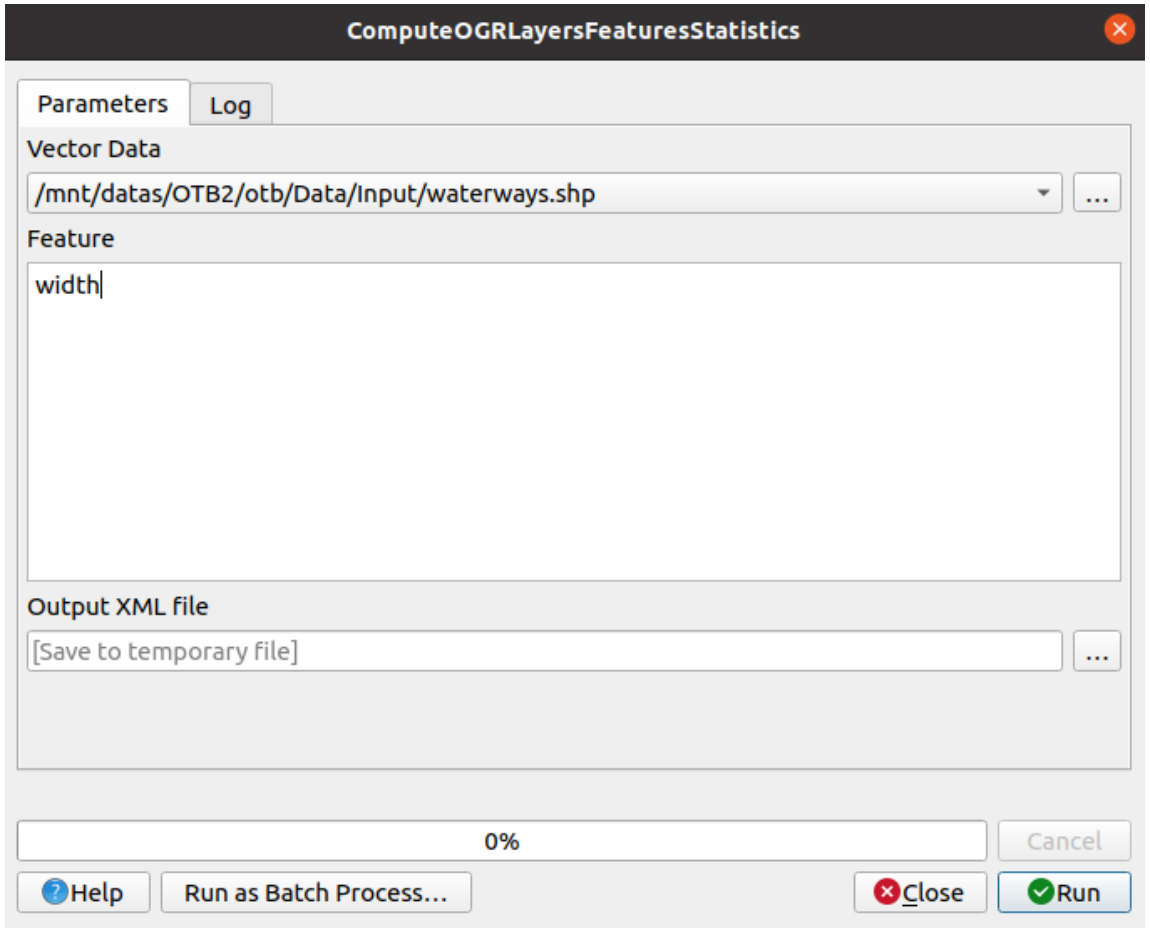

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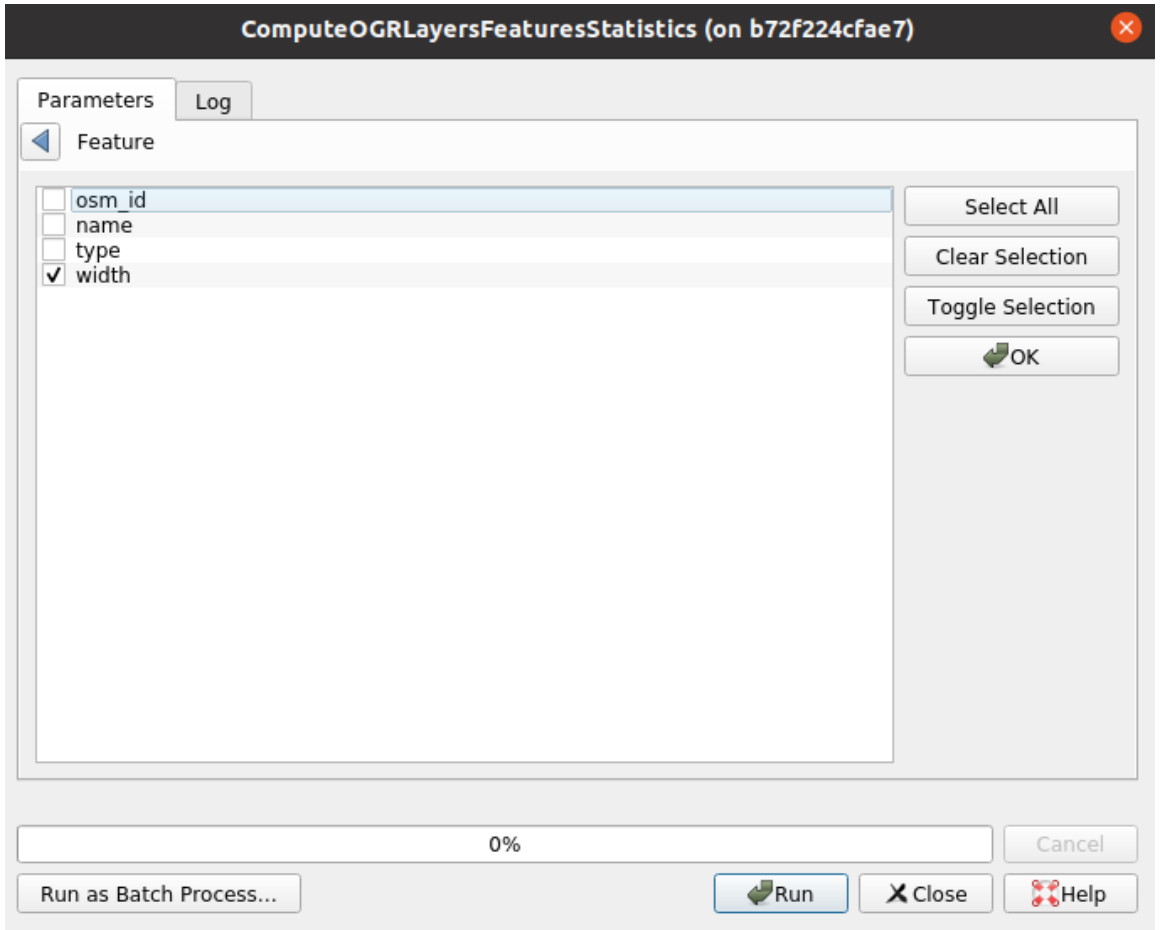

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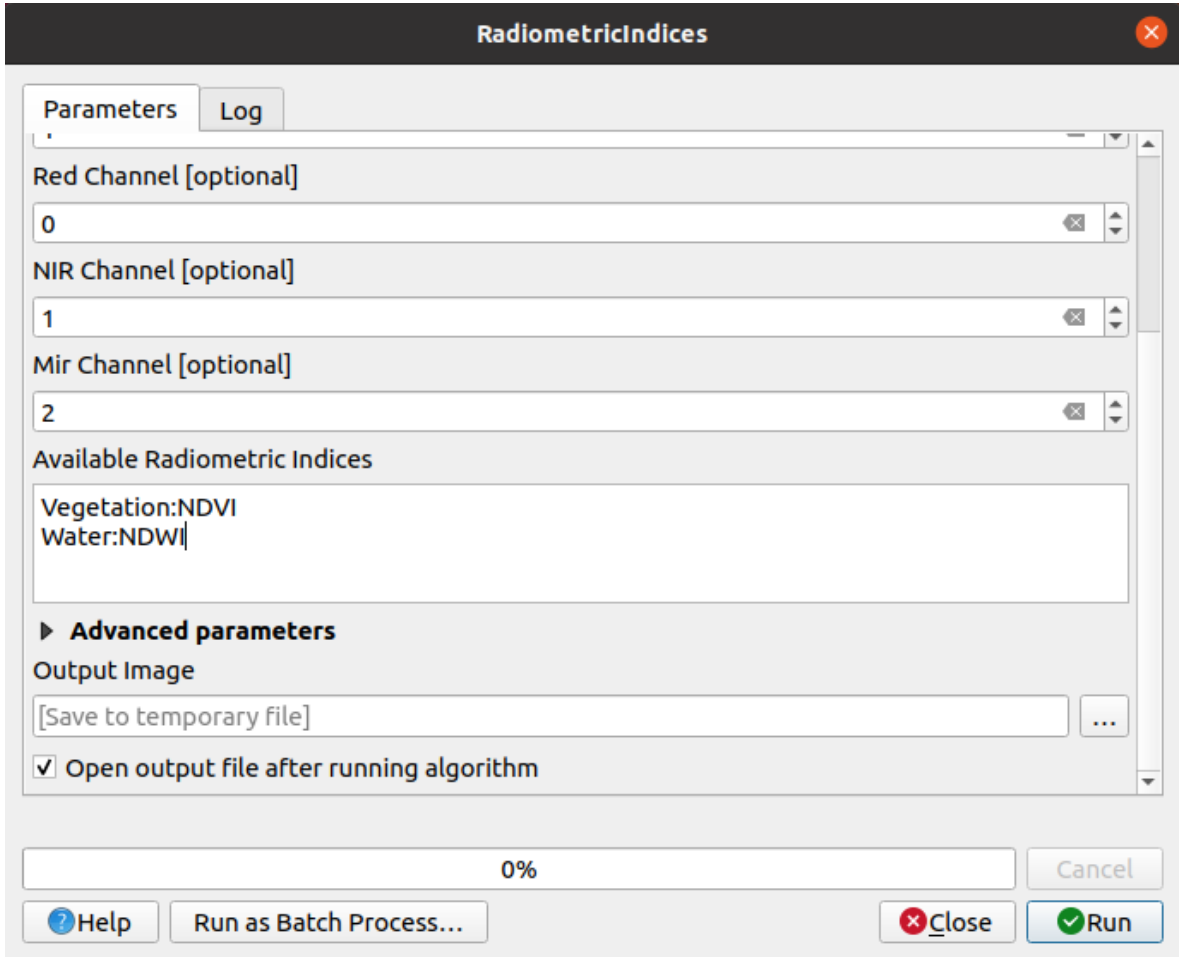

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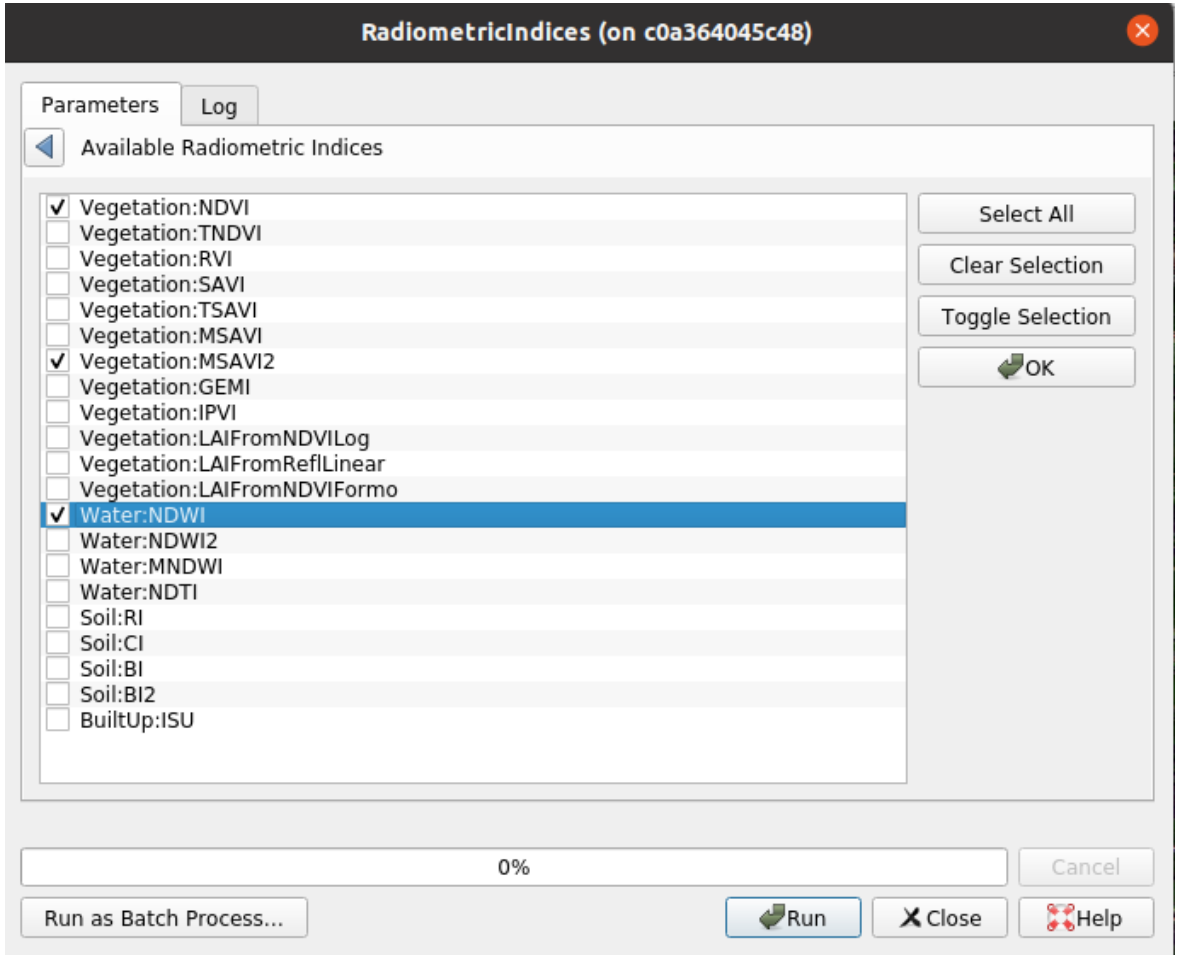

OTB 8.0

OTB USER DAYS IN 2021

- OTB User day in November 2021
  - Discover new usage of OTB
  - Share experience of the community
  - Think to future
  - Video and presentations available

CONCLUSION – THE FUTURE FOR OTB

- OTB is alive and more and more used for operational use but less by researchers
- OTB 8.1 coming next month (release candidate available)
- Roadmap to 9.0:
  - Remove GUI -> QGIS main interface
  - Drop support of MacOSX thanks to official docker image: https://hub.docker.com/r/orfeotoolbox/otb
  - ITK 5
- And Next?
  - More modular OTB
  - Continue the Python integration (PyOTB, pip install otb)
  - How to reached new contributor in C++?
- Your contributions are welcome:

  the OTB Forum: https://forum.orfeo-toolbox.org/