



WORKING BY YOUR SIDE
TO TACKLE YOUR CRITICAL CHALLENGES



FOSS4G

FIRENZE 2022

Orfeo Toolbox
Integration in operational
processing chains



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OTB REMOTE MODULE

- Easy way to develop new features in OTB framework
 - Choose your license
 - Don't have to distribute it with OTB
 - Can be shared with community
 - Can benefit from OTB Continuous Integration
- A template module is available with the required folders and files
 - "app": a folder for the OTB applications
 - "src": a folder for the cxx source files
 - "include": a folder for the headers and templated classes
 - "test": a folder containing the tests of the sources, applications and python wrappers
 - Visit https://gitlab.orfeo-toolbox.org/remote_modules/remote-module-template
- Orchestration of the applications using Python (processing chain)
 - Take advantage of the Python API provided by OTB
 - In memory pipeline
 - Multi-threading
 - Streaming

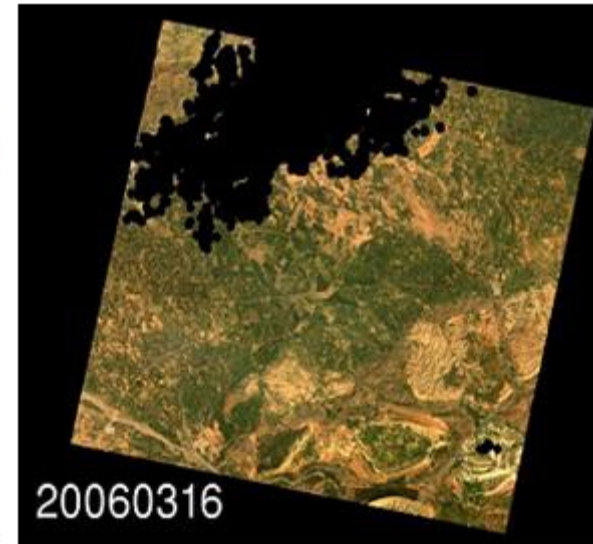
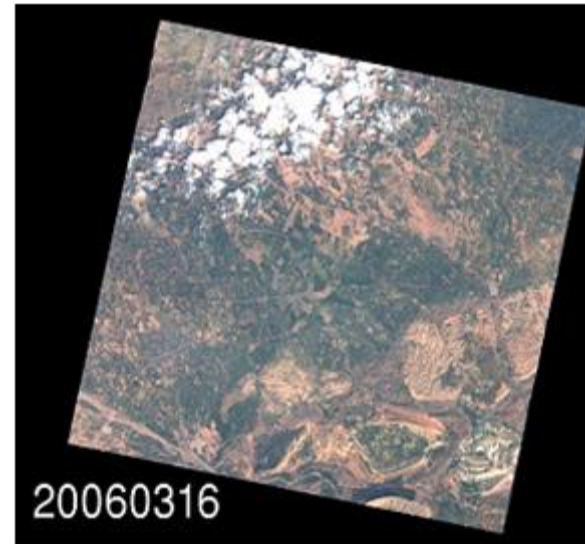
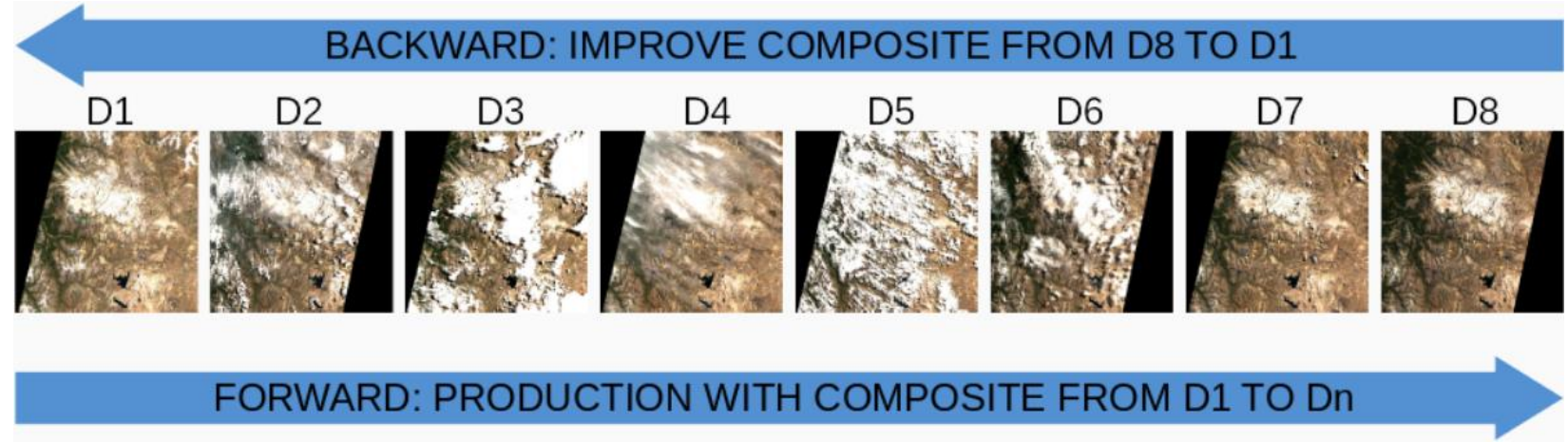
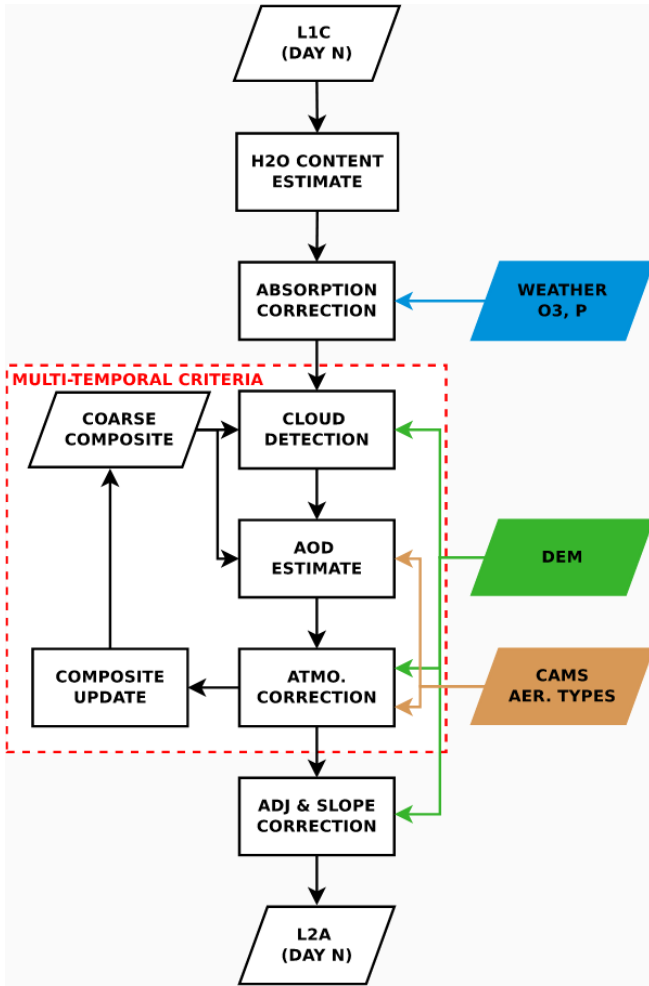


MAJA: ATMOSPHERIC CORRECTION AND CLOUD SCREENING

- From L1C to L2A products (Sentinel2, Landsat8, Venµs)
 - Cloud and shadow detection
 - Estimate of water vapor and aerosol content
 - Atmospheric correction including adjacency and terrain effect correction
 - Correction of thin cirrus clouds
- Used in production via Theia (10 millions square kilometers processed)
- On-going research to improve and validate results
- Free Open-Source Software since version 4
 - <https://gitlab.orfeo-toolbox.org/maja/maja>



MAJA: ATMOSPHERIC CORRECTION AND CLOUD SCREENING



Level 1C:

Level 2A:

WASP: L3A TEMPORAL SYNTHESIS

- Weighted Average Synthesis Processor (WASP)
- From L2A to L3A products: syntheses of cloud-free reflectance for Sentinel-2 or Venus
 - Synthetic image from multiple L2 products
 - Pixels close to a detected cloud or shadow have a lower weight
 - Pixels with a lower aerosol optical thickness have a higher
 - A greater weight is given to dates close to the synthesis date
- Used in production via Theia
- Free Open-Source Software
 - https://gitlab.orfeo-toolbox.org/remote_modules/wasp



WASP: L3A TEMPORAL SYNTHESIS

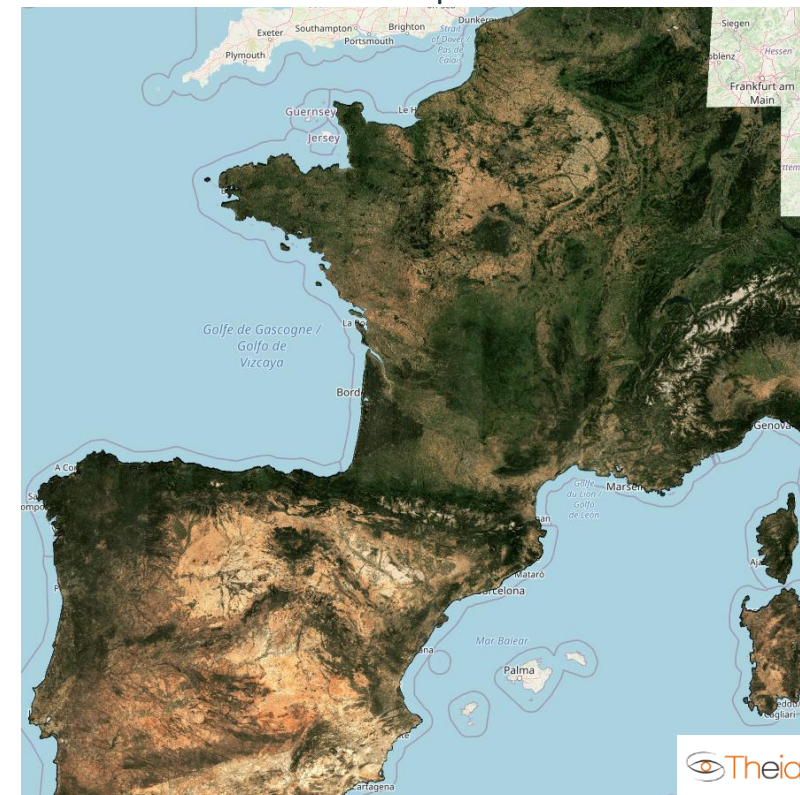
Mosaic of WASP L3A



Norway Cloud-free mosaic 2021



Mosaic of WASP L3A September 2021

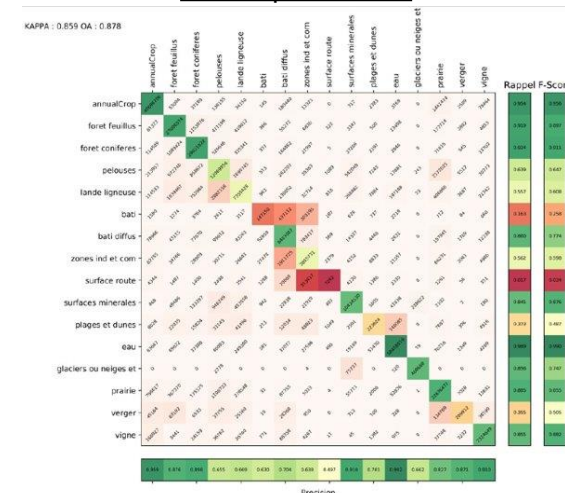


IOTA2: EO-ML FRAMEWORK FOR LAND COVER MAPPING AT LARGE SCALE

- Iota2 is able to manage
 - OPTICAL (S2 L2A, L3A) and SAR times series (S1 IW GRD)
 - Large spatial area
 - Model spatial stratification
 - Multithreading (OTB) + Distributed processing : local & HPC (dask)
- Operational - OSO product :
 - Annual
 - 23 classes
 - CNES HPC environment
- Free Open-Source Software
 - <https://framagit.org/iota2-project/iota2>
- Based on python stack and OTB



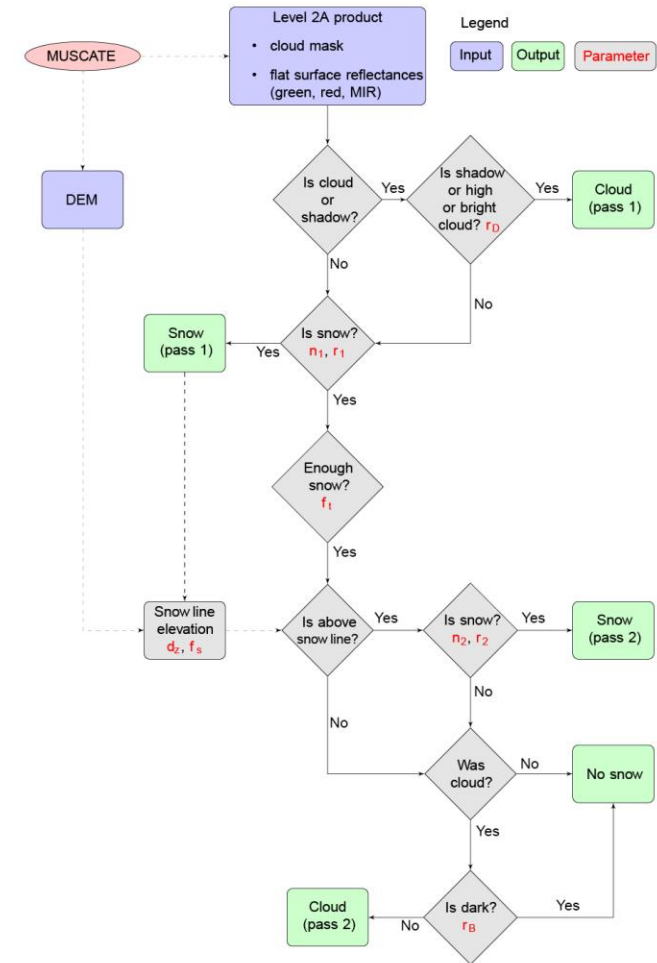
OSO product



Output report

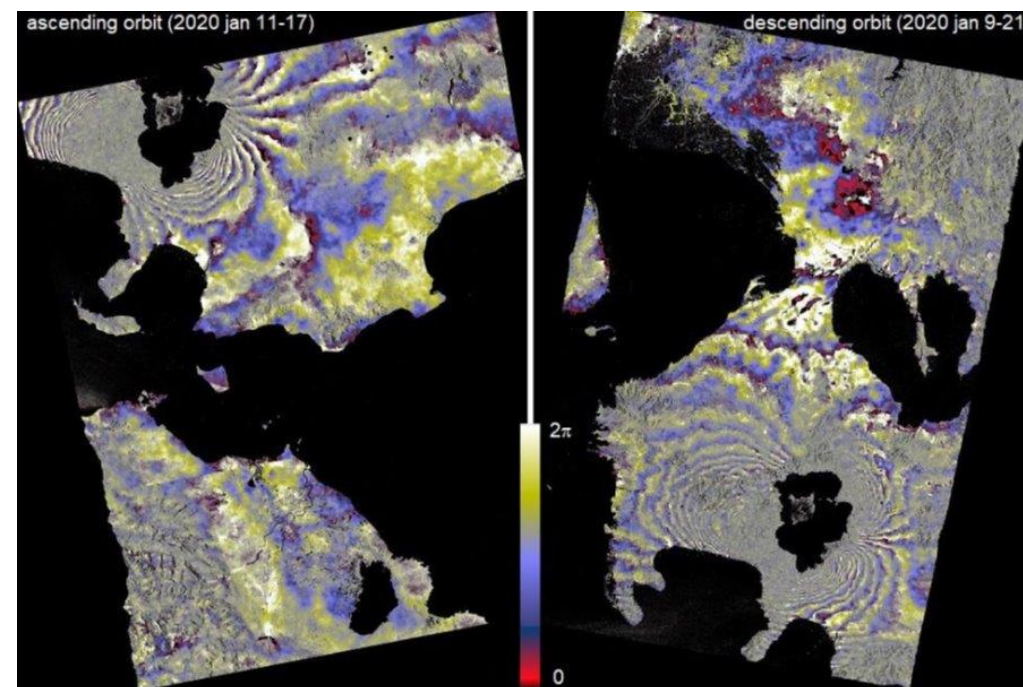
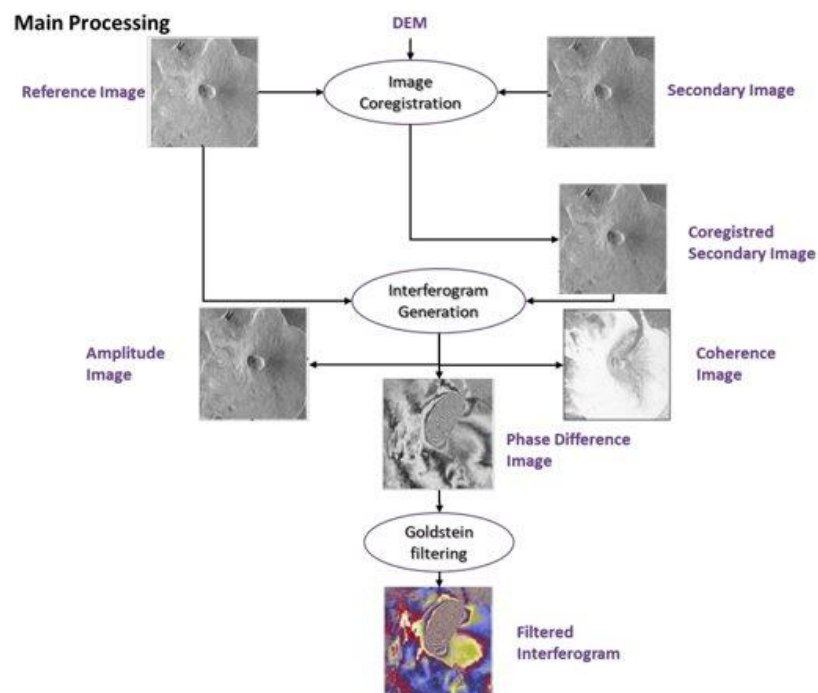
LET IT SNOW (LIS)

- Snow cover detection from optical multispectral L2A products (Sentinel-2 or Landsat-8)
- Generate L3A product
 - snow appearance date
 - snow disappearance date
 - snow cover duration
- Used in production via Theia
- Free Open-Source Software
 - https://gitlab.orfeo-toolbox.org/remote_modules/let-it-snow



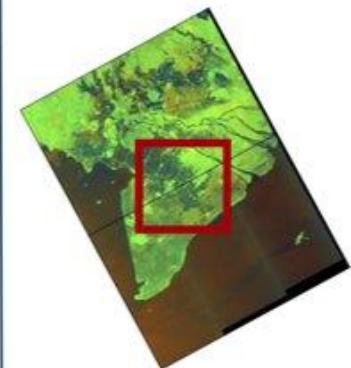
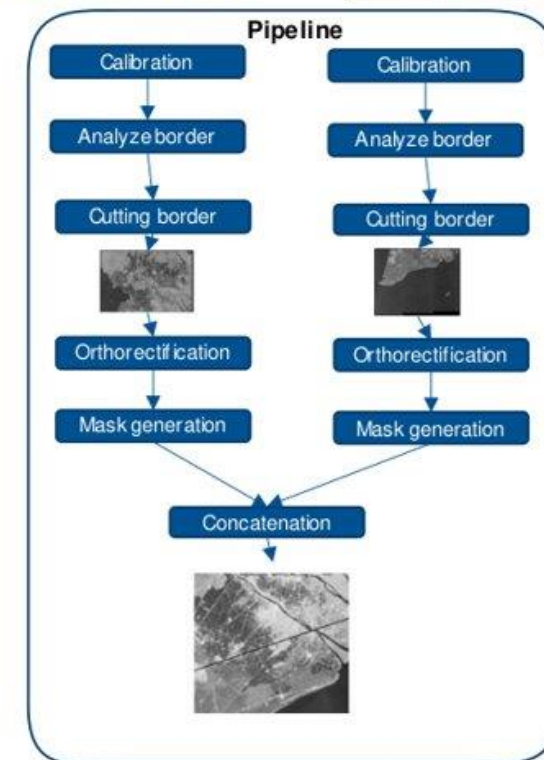
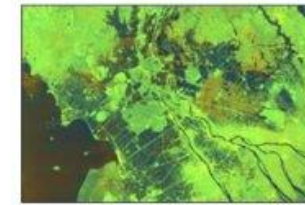
DIAPOTB: DIAPASON ALGORITHM WITH OTB

- SAR Interferometric processing chain (Sentinel1, CosmoSkyMed, TerrasarX)
- Analyze potential events (earthquake, destruction ...) by highlighting differences between SAR images.
- Free Open-Source Software
 - https://gitlab.orfeo-toolbox.org/remote_modules/diapotb



S1 TILING: ON DEMAND ORTHO-RECTIFICATION OF SENTINEL-1 DATA

- Sentinel-1 data ortho-rectified on the Sentinel-2 grid to promote joint use of both missions
- EODAG for data provider management
- OTB for building in memory pipelines
- DASK for running pipelines in parallel
- Available on PiPy / Conda
- Used in TropiSCO and WorldCereal projects at large scale
- Free Open-Source Software
 - <https://gitlab.orfeo-toolbox.org/s1-tiling/s1tiling>



EOCARE – GIS AND EO TRAINING PLATFORM



<https://eocare.eu>



contact@eocare.eu

ICT resources

Our working environments are

- ❖ Customized to meet requirements from training organisers
- ❖ Available from a simple laptop using a standard Internet browser
- ❖ Scalable in terms of RAM, computing power or storage capacity
- ❖ Compatible with several cloud providers including the European DIAS



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