



Land Monitoring

Quality Assessment of Sentinel-3 biophysical products

Roselyne Lacaze

HYGEOS, on behalf the CGLOPS-1 consortium

with input from D. Jolivet (HYGEOS) & J. Sanchez-Zapero (EOLAB)



VEGETATION



- Leaf Area Index (LAI)
- Fraction of Absorbed Photosynthetically Active Radiation (FAPAR)
- Fraction of vegetation cover (FCOVER)
- Normalized Difference Vegetation Index (NDVI)
- Dry Matter Productivity
- Burnt Area
- Moderate Yearly Land Cover
- Surface Soil Moisture
- Soil Water Index
- Vegetation Condition Index
- Vegetation Productivity Index

ENERGY



- Land Surface Temperature
- Top-of-Canopy reflectance
- Surface Albedo

Free and Open Access

WATER



- Lake and river water level
- Lake Water Quality
- Lake surface water temperature
- Water Bodies

CRYOSPHERE



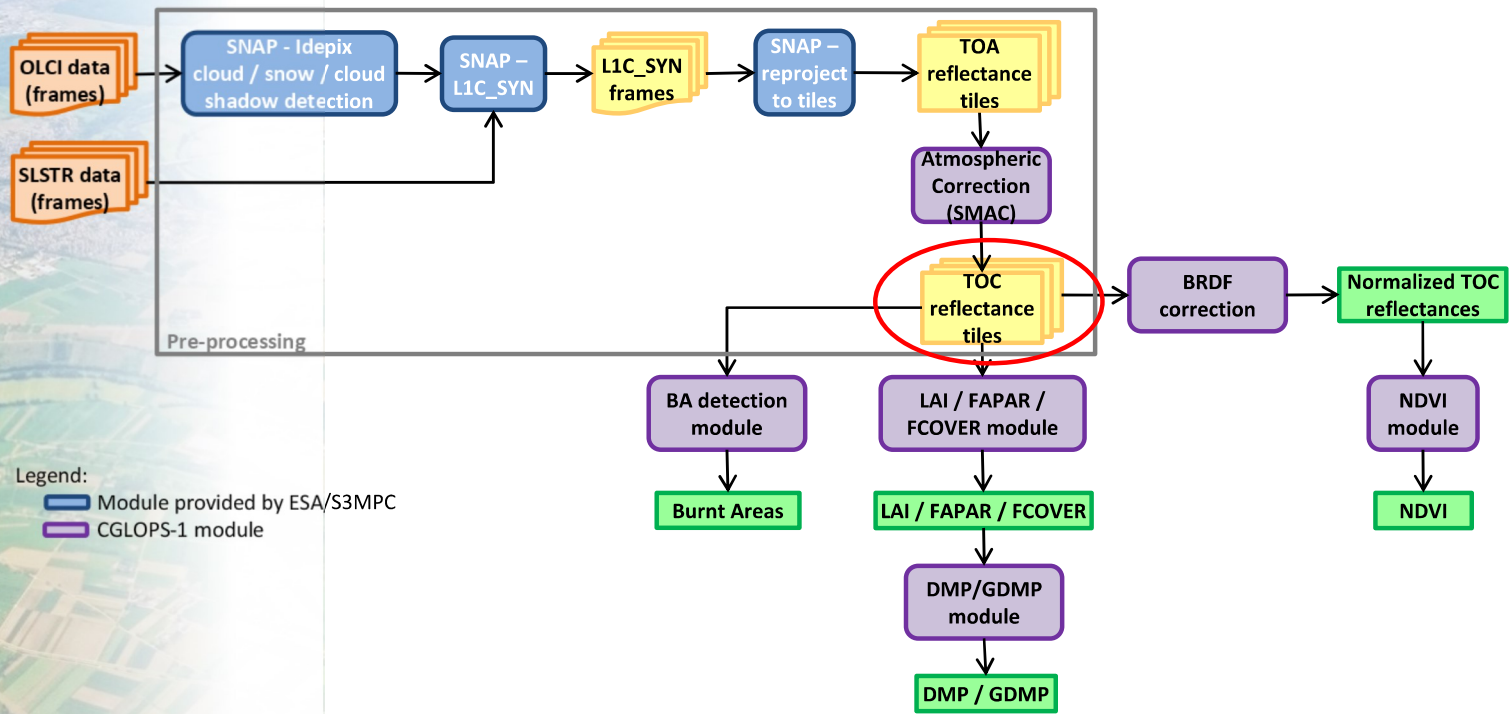
- Snow water equivalent
- Snow cover extent
- Lake Ice Extent

Sentinel-3 Biophysical Products

Variable	Temporal coverage	Temporal resolution	Spatial coverage	Spatial resolution	Sensor
LAI - FAPAR - FCOVER	July 2020 - present	10 days	Global	300 m	S3/OLCI
NDVI	July 2020 - present	10 days	Global	300 m	S3/OLCI
Dry Matter Productivity	July 2020 - present	10 days	Global	300 m	S3/OLCI
Burnt Areas V1*	From April 2021	1 day	Global	300 m	S3/OLCI & SLSTR
Burnt Areas V3* (offline)	July 2020 - present	1 day	Global	300 m	S3/SLSTR

* Not yet in operations; still produced with PROBA-V over Europe and Africa only.

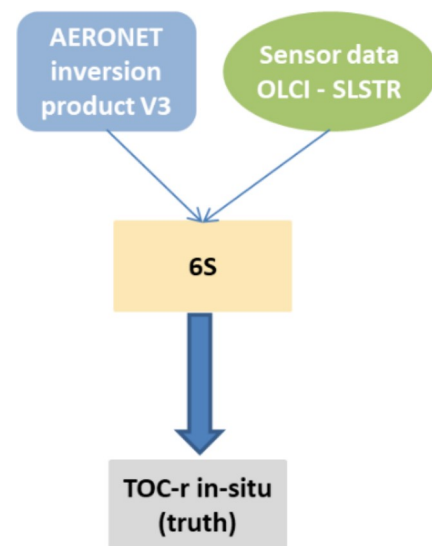
Sentinel-3 Biophysical Products - Workflow





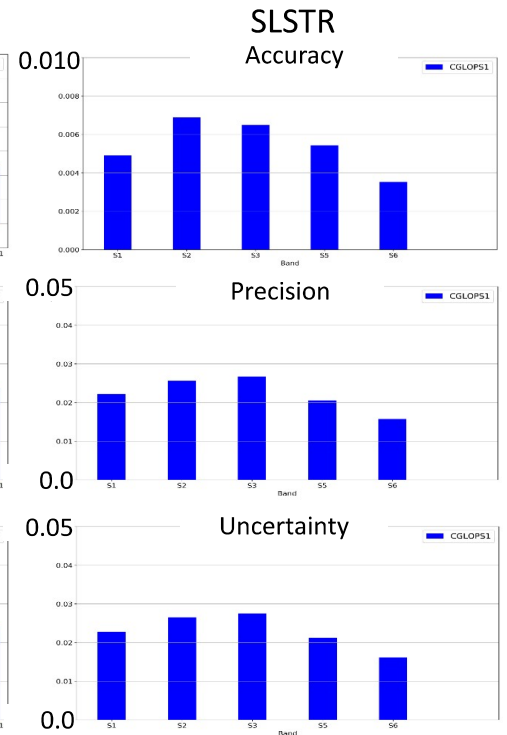
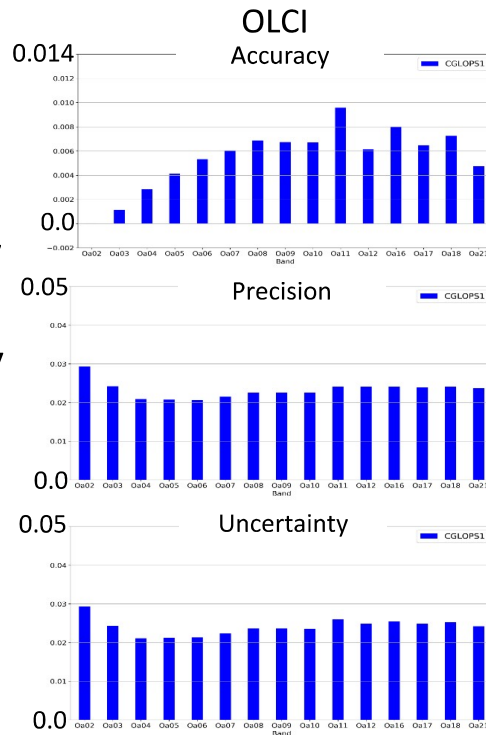
Evaluation of Atmospheric Corrections - Procedure

- TOC reflectances simulated by 6S using OLCI and SLSTR TOA reflectances and AERONET inversion products V3 are considered as “truth”
- Intercomparison with CGLOPS-1 TOC reflectances, according to ACIX recommendations
- **Accuracy, Precision, Uncertainty** quantified by the mean bias, the standard deviation of bias and the root mean square deviation, respectively.



Evaluation of Atmospheric Corrections - Results

- Results for 47 AERONET stations over one year
- Spectral dependency of Accuracy
- Uncertainty is mainly driven by the dispersion (Precision), not by the bias (Accuracy).



More details in https://land.copernicus.eu/global/sites/cgls.vito.be/files/products/CGLOPS1_QAR_S3-AC_I1.10.pdf

Quality Assessment of TOC reflectances – Procedure

Quality Criteria	Reference	Coverage
Product Completeness	None	Global
	Monthly global maps of valid good quality retrievals	
Spatial Consistency	“Expert knowledge” Sentinel-2 L2A	Global Areas of Interest (AOIs)
	Visual inspection of global maps and selected AOIs. Difference maps over selected AOIs.	
Temporal consistency	“Expert knowledge” RadCalNet ground data	48 LANDVAL sites RadCalNet sites
	Qualitative inspection of temporal profiles	
Accuracy Precision Uncertainty (product intercomparison)	OLCI vs SLSTR Sentinel-2 L2A	AOIs AOIs
	Scatterplots and validation metrics	
Accuracy Precision Uncertainty (direct validation)	RadCalNet ground data ESA FRM4Veg	RadCalNet sites Barrax
	Scatterplots and validation metrics	