

Criteria	Product evaluated	Reference Product	Coverage	
Completeness	PROBA-V GEOV1	SPOT/VGT GEOV1	Global 445 BELMANIP2.1	
	Gap size distribution (average maps, temporal variations per biome/continent). Length of gaps.			
	PROBA-V GEOV1	SPOT/VGT GEOV1 MODIS C5	Global 445 BELMANIP2.1	
Spatial Consistency	Visual inspection global maps Difference maps and histograms of residuals (global maps) PDFs of retrievals & histograms of residuals per biome and region (B2.1) Rcv variation over selected (50 km x50 km) areas			
Temporal	PROBA-V GEOV1	SPOT/VGT GEOV1 MODIS C5	445 BELMANIP2.1 DIRECT sites	
Consistency	Qualitative inspection of temporal variations (BELMANIP 2.1. + DIRECT sites) Histograms of the cross-correlation per biomes (*)			
Intra-annual Precision	PROBA-V GEOV1	SPOT/VGT GEOV1 MODIS C5	445 BELMANIP2.1	
(smoothness)	Histograms of the smoothness			
	PROBA-V GEOV1	SPOT/VGT GEOV1 MODIS C5	Global 445 BELMANIP2.1	
Statistical Analysis (Discrepancies)	Scatter-plots (R <sup>2</sup> , RMSE, Bias, Scattering) per biomes & regions (BELMANIP2.1) Box-plots of uncertainty metrics (Bias and RMSE) per bin (BELMANIP2.1) Box-plots of uncertainty metrics per biomes & regions (Global) Regional analysis over the Africa continental region (R <sup>2</sup> , RMSE, Bias)			
Accuracy	PROBA-V GEOV1	Ground-based maps	IN-SITU Reference products	
Assessment	Scatter-plots, Pearson's correlation,			
	Root Mean Square Er		SE, blas, linear fit (offset, slope)	



BELMANIP2.1

0.00 0.02 0.04 0.06 0.08 0.1( ð FAPAR

**DIRECT VALIDATION** 

-PROBA-V GEOV1  $\tau = 0.003$ 

- SPOT/VGT GEOV1  $\tau = 0.0062$ 

- MOD15A2 C5  $\tau = -0.0722$ 

 $y = e^{-8 \text{ FAPAR}/\tau}$ 

 $\delta = \left| P(d_{n+1}) - P(d_n) - \frac{P(d_n) - P(d_{n+2})}{d_n - d_{n+2}} (d_n - d_{n+1}) \right|$ 

y=-0.08+1.05x

**MODIS C5** 

0 1 2 3 4 5 6 7

**BELMANIP2.1** 

0.2 0.4 0.6 0.8 ð LAI

y = -0.00 + 1.05x

HISTOGRAMS

**OF SMOOTHNESS** 

**ACCURACY ASSESSMENT** 

Fores
Crop
Grass

**PROBA-V GEOV1** 

0 1 2 3 4 5 6 7

0.0

PROBA-V GEOV1  $\tau = 0.03$ 

- SPOT/VGT GEOV1  $\tau = 0.0291$ 

MOD15A2 C5  $\tau = 0.0476$ 

 $y = e^{-\delta LAI/\tau}$ 

BELMANIP2.1

0.00 0.02 0.04 0.06 0.08 0.10 a FCOVER

-PROBA-V GEOV1  $\tau = 0.0050$ 

- SPOT/VGT GEOV1  $\tau = 0.0056$ 

v=e<sup>-a</sup>F

**STATISTICAL ANALYSIS** 

## **PROBA-V GEOV1 vs SPOT/VGT GEOV1**



## **PROBA-V GEOV1 vs MODIS C5**



✓ ImagineS has set-up a network of cropland and grassland sites to collect ground measurements for the validation of 1km and 333m biophysical products. In support to the operations of the **Copernicus Global Land** service.  $\checkmark$  Protocols for acquisitions and up-scaling of in-situ measurements according to the **CEOS LPV**. ✓ Since 2013: > than 54 fields campaigns esolutio Resolutio Satellite Satellite over the World > than 85 biophysical maps (LAI, FAPAR, FCover) **High Spatial** Resolution > than1200 Elementary Image of the Sampling Units > than 12.000 hemispheric photos. Available dataset at: Sampling http://www.fp7-imagines.eu/

Quality Criteria	Perfor mance	Comments		
Product Completeness	-	Main limitations over Northern latitudes in wintertime and Equatorial areas.		
Spatial Consistency	+	Optimal spatial consistency between PROBA-V and SPOT/VGT GEOV1 products. Larger discrepancies between PROBA-V and MODIS over EBF and DBF for LAI and globally for FAPAR (similar than SPOT/VGT and MODIS).		
Temporal Consistency	+	Good consistency of PROBA-V GEOV1 temporal variations, as compared to SPOT/VGT GEOV1 and MODIS C5. Cross-correlations between PROBA-V and SPOT/VGT GEOV1 (higher than 0.9 in more than 70% of the sites for most of biomes except in EBF).		
Intra-Annual Precision	+	Very smooth temporal profiles		
Statistical Analysis of Discrepancies	+	Optimal consistency between PROBA-V and SPOT/VGT GEOV1 (RMSE=0.3, 0.03, 0.04 for LAI, FAPAR and FCover over BELMANIP2.1) Larger discrepancies between both GEOV1 products and MODIS C5. FCover PROBA-V shows higher values than SPOT/VGT mainly for forest sites.		
Accuracy	±	Good accuracy with limited ground dataset for LA and FAPAR. Positive bias for FCover.		





BELMANIP2.1

0.8 1.0

Jorge Sánchez Zapero. <u>Contact:</u> Research Engineer EOLAB. (34)963543841 a jorge.sanchez@eolab.es Address: Parc Científic Universitat de València. Catedrático José Beltrán, 2. 46980 Paterna (Valencia), Spain.



