CEOS/WGCV/LPV
… & Land Cover products

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Outline

- *objectives and structure*
- *accomplishments and ongoing activities*
- *Conclusions*

Mission Statement & Goals

- to foster **quantitative validation** in a traceable way of *higher level global land products* derived from remote sensing data and relay results so they are relevant to users

- to increase the **quality and efficiency** of global satellite product validation *via* developing and promoting international standards and protocols for field sampling, scaling, error budgeting, data exchange

- to provide feed-back to international structures (GEO/GEOSS) for :
  - requirements and achievements on product accuracy and quality assurance
  - definitions of future mission

Products targeted

- Land cover
- Fire (active, burnt area)
- Biophysical characteristics (LAI, fAPAR, fCover, chlorophyll, phenology?)
- Energy (albedo, short and long wave fluxes, (T° ?))
- Soil (moisture, type)

Products not targeted

- Net Ecosystem Exchange/Productivity (NEE/NEP)
- Evapotranspiration

LPV structure

- **A structural problem:**
  - biophysical products are not as close to sensors as radiometric calibration is!!
  - Community is large and scattered: more focus on product families corresponding to a better identified (unified?) community (land cover, fire, biophys. , energy, soil)
- **New structure under completion**
  - Land cover (M. Herold, M. Friedl?)
  - Fire (K. tansey, C. Justice ?)
  - Biophysical characteristics (R. Fernandes, Nasa ?)
  - Energy (G. Shaepman, C. Schaaf?)
  - Soil (W. Wagner, Y. Kerr?)

LPV web site
http://lpvs.gsfc.nasa.gov/

web curator: Jaime Nickeson, NASA GSFC

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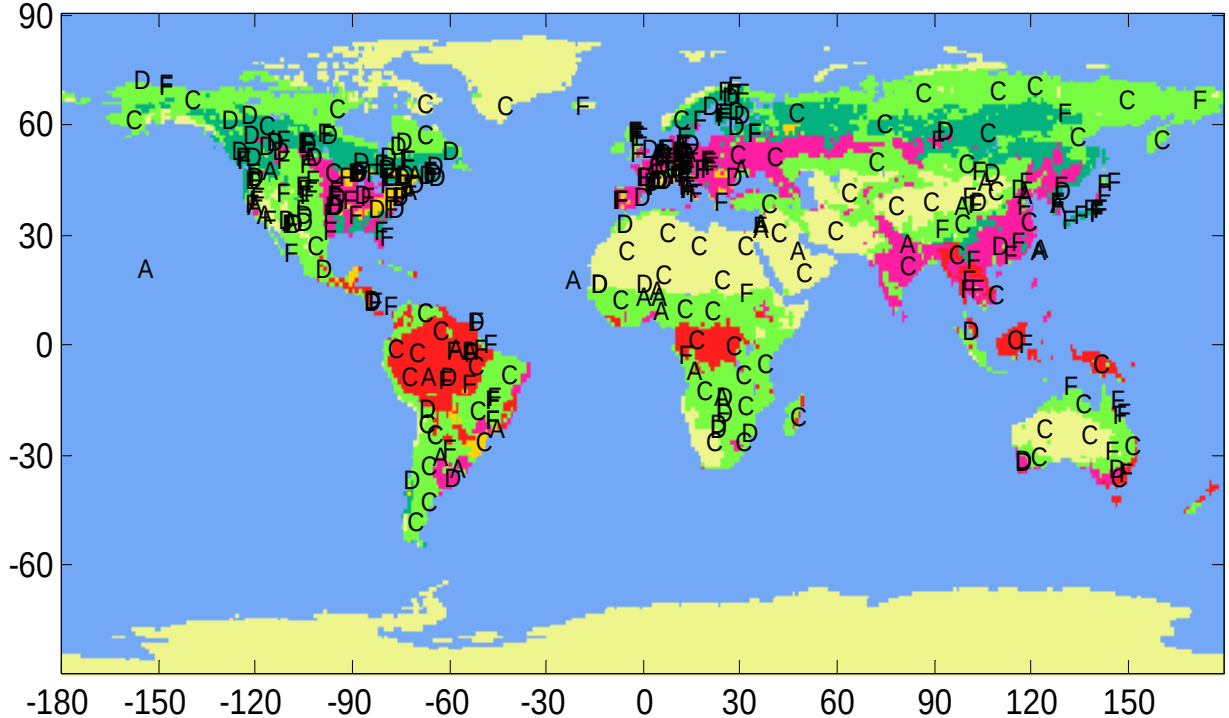
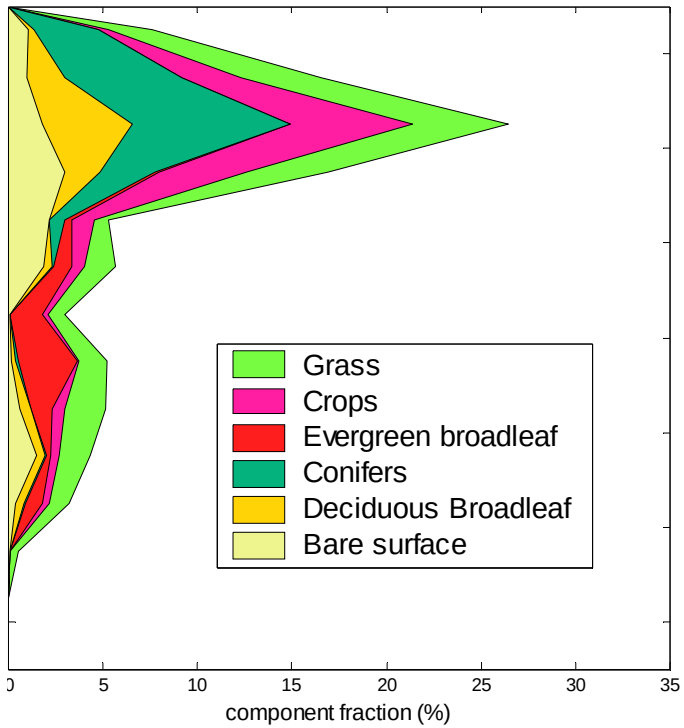
Intercomparison over CEOS-BELMANIP



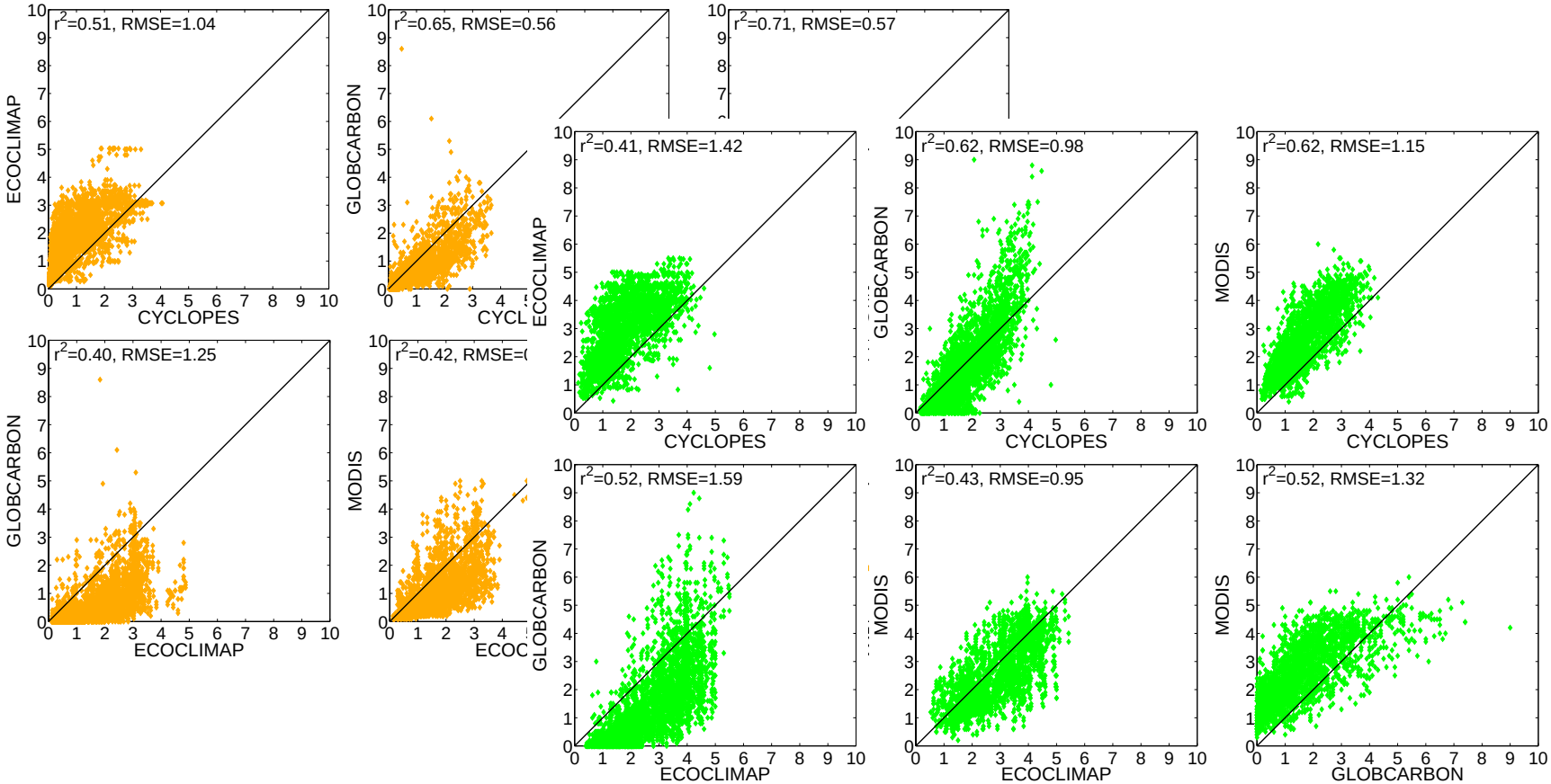


397 sites representing the variability over surface types and latitudes

Working Group on Calibration & Validation CEOS

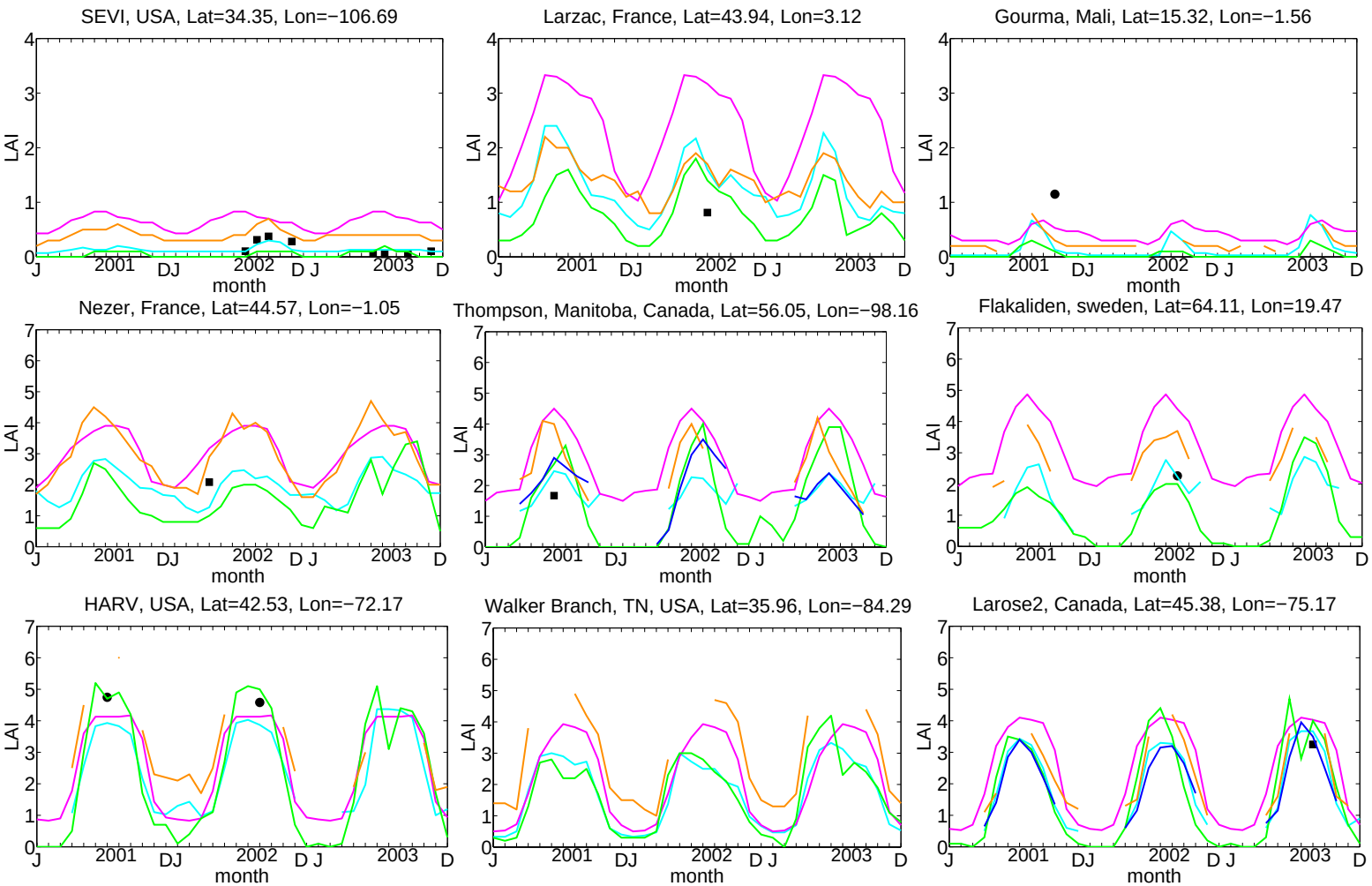
Baret, F. et al., 2006. Evaluation of the representativeness of networks of sites for the global validation and inter-comparison of land biophysical products. Proposition of the CEOS-BELMANIP. IEEE Transactions on Geoscience and Remote Sensing, 44(7: special issue on global land product validation): 1794-1803.

Intercomparison



Scatterplots: large differences depending on products and vegetation type

Intercomparison



Grassland

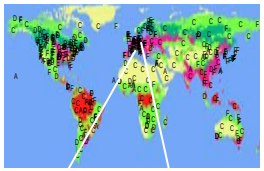
Needle leaf forest

Deciduous forest

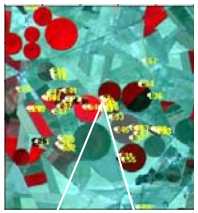
Temporal distribution: similar patterns (except ecoclimap)

But differences in continuity (smoothness, gaps) and magnitude

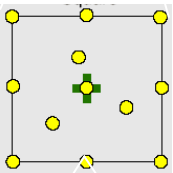
Direct validation: Comparison with ground measurements: bottom-up approach



50-100 sites



20-100 ESUs/site



10-100 measurements/ESU

Global validation

Scatter plot

Medium resolution products to be validated

Value(s) at the site level

Transfer function

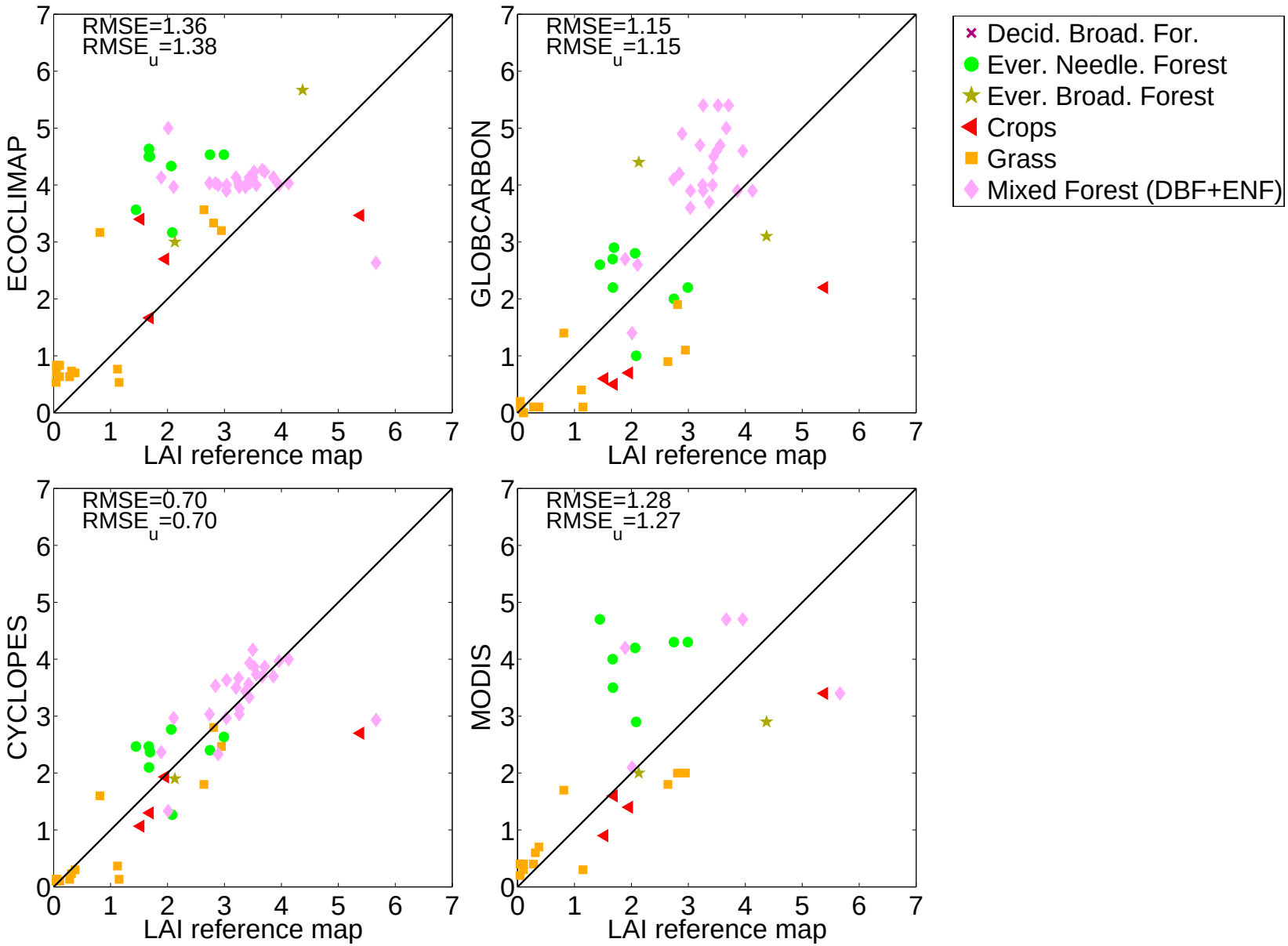
High spatial resolution image (SPOT/TM/ASTER …)

Value at the ESU level

Averaging

Individual measurements

Direct Validation: results



OLIVE

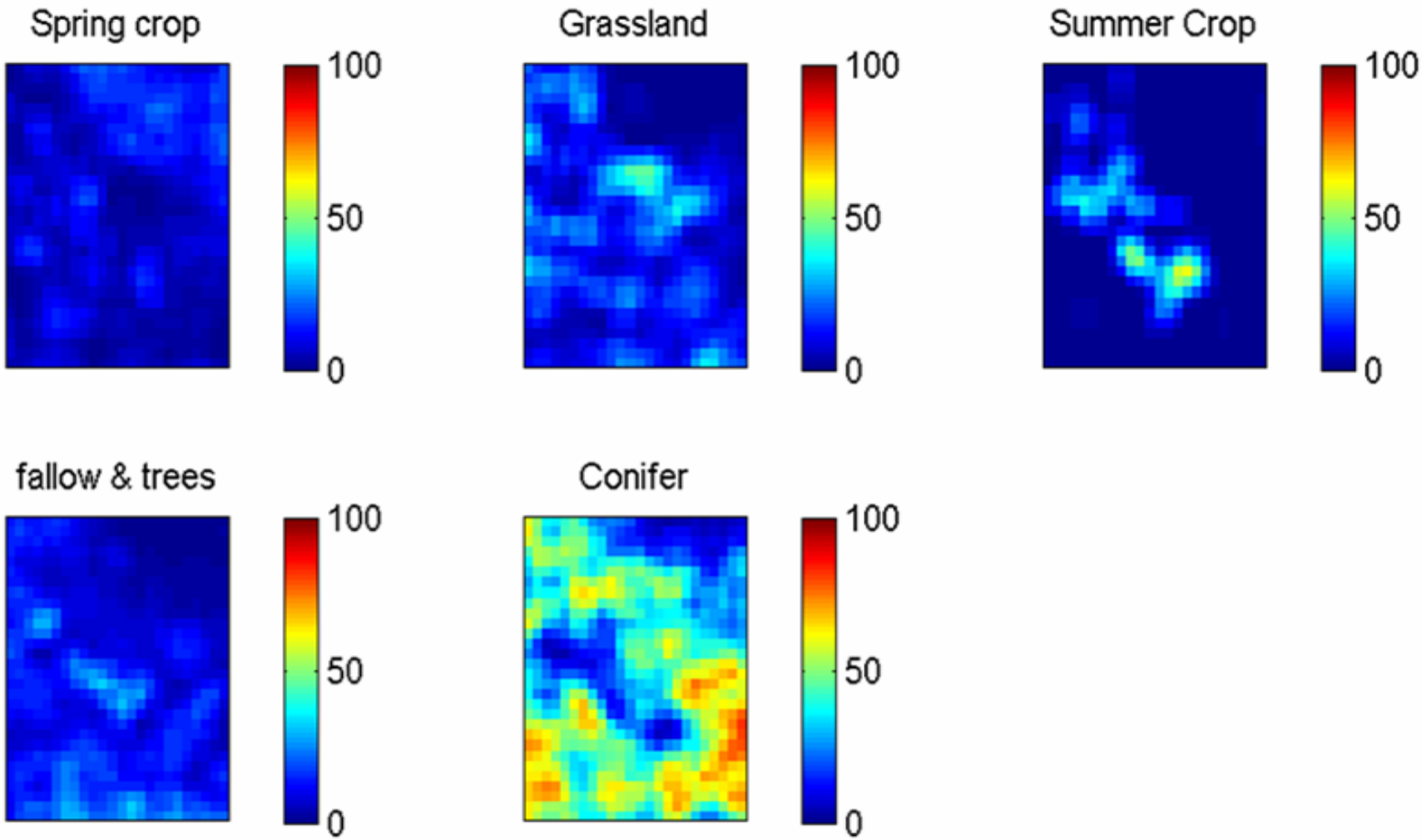
- – Successive versions (collections) of products
- – New products
- – Traceability / transparency
- – Consensus framework for validation
- – Capitalization of information
  - For the products evaluated
  - For the ground measrements
- – Easy access for the community

- **development of OLIVE:**
  On Line **I**nteractive **V**alidation **E**xercise
  - Supported by ESA

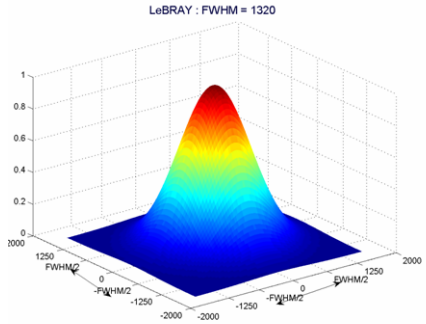
Characterization of products PSF

- Confusion between sampling interval and actual spatial resolution
- PSF known at the sensor level … but several processes degrades sensor PSF
- PSF required for
  - Validation
  - Fusion
    - Between products
    - With other information
- On going work over VEGETATION, MODIS and MERIS fAPAR products

Impact of PSF on applications



Abundance of land cover class within medium resolution pixels



Results

LE BRAY

	Projection	FWHMx	FWHMy	ρ(3km)	ρ(1km)
MERIS	UTM, WGS84	1490	1750	0.91	0.91
MODIS	Sinusoïdal	1600	1550	0.76	0.43
VGT (CYC)	Plate Carrée	1360	1380	0.96	0.96

SUD OUEST

	Projection	FWHMx	FWHMy	ρ(3km)	ρ(1km)
MERIS	UTM, WGS84	2030	1530	0.87	0.74
MODIS	Sinusoïdal	2130	2030	0.64	0.41
VGT (CYC)	Plate Carrée	1600	1615	0.76	0.66

CONCLUSION

- Extension of the validation exercise
  - Continuous validation (OLIVE)
  - Other products
    - fAPAR
    - Albedo
- Contribution to virtual constellations
- Topical workshops
    - Albedo (Beijing March 2009)
    - Fire (Montana June 2009)
- Need more interactions with Land-cover community
  - Best practices
  - relation with agencies/GEO