Harmonization: Examples from the Land Product Validation Subgroup

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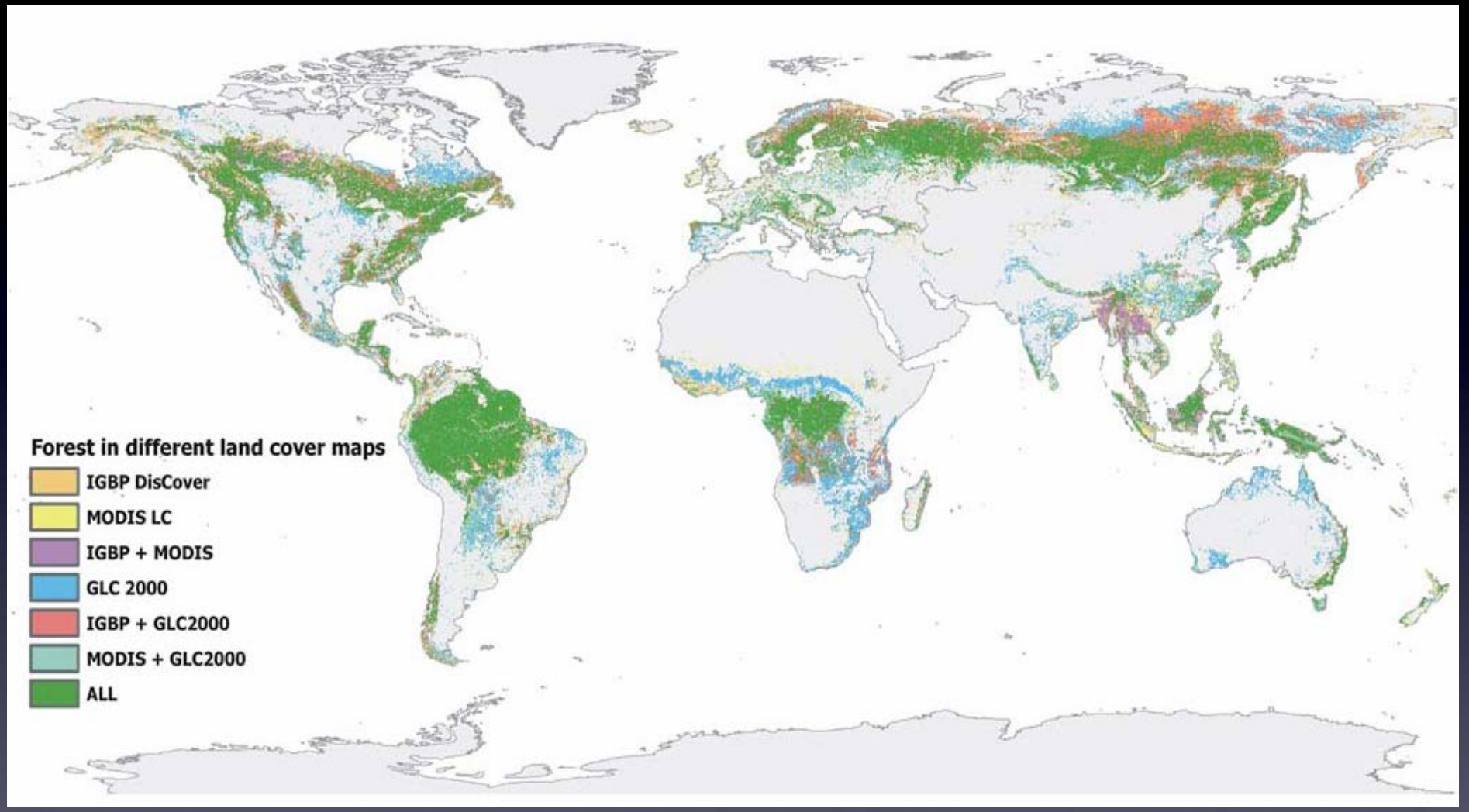
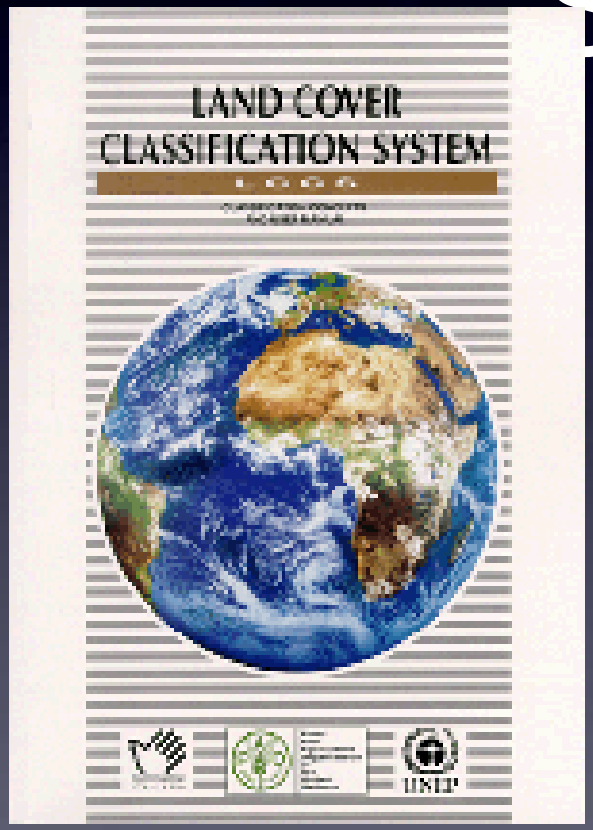
WGCV Chairs Desnos, Ungar, and Cao have all been helpful with LPV activities.

“Harmony” by Criss Digital Art
http://criss.site.voila.fr/index.html



Herold et al., 2006. A Joint Initiative for Harmonization and Validation of aLand Cover Datasets, IEEE TGRS 44(7)1719-1727.

Cover Classification System



Classification Concepts

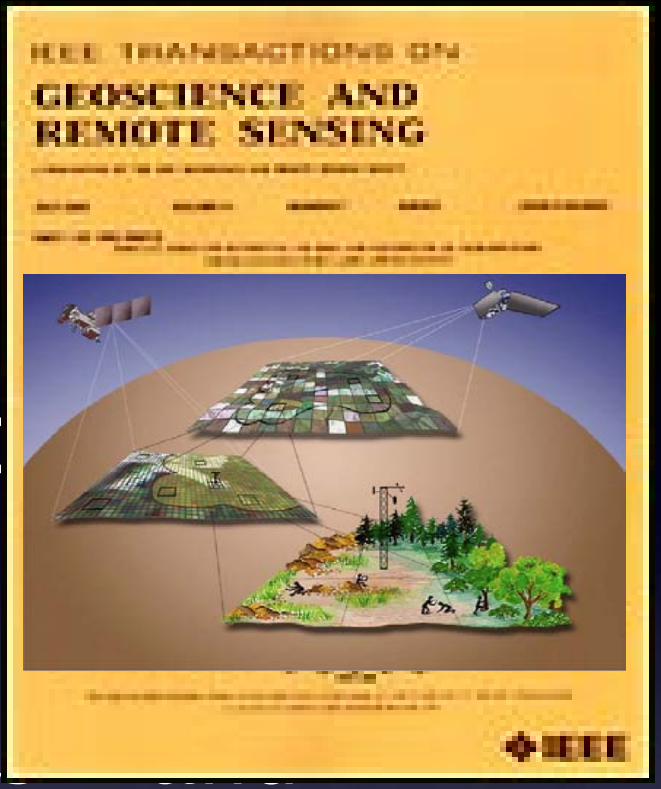
and User Manual

with software

Gregorio & Jansen

FAO Land and Water Development Division

Documentation: Special issue providing "acceptable practic



3 "framework" papers
19 "validation result
4 "user response" papers
(an attempt to solicit "user feedback").

IEEE TGARS 44(7)

CEOS Document on Land Cover

Primary finding

- Call for global inter-comparisons
- “Hybrid” statistical sampling using fixed sites
- Confidence layers (model-based accuracy)

Edited by: Strahler

Authors: Boschetti, Foody, Friedl, Hansen, Herold, Mayaux, Morisette, Stehman, Strahler, & Woodcock

available through the LPV

Terminology: the CEOS Validation Hierarchy

Stage 1 Validation: Product accuracy has been estimated using a small number of independent measurements obtained from selected locations and time periods and ground-truth/field program efforts.

Stage 2 Validation: Product accuracy has been assessed over a widely distributed set of locations and time periods via several ground-truth and validation efforts.

Stage 3 Validation: Product accuracy has been assessed, and the uncertainties in the product well-established via independent measurements made in a systematic and statistically robust way that represents global conditions.

Morisette, J.T., F. Baret, S. Liang, 2006. Special issue on Global Land Product Validation, *IEEE TGARS* 44(7) 1695-1697.

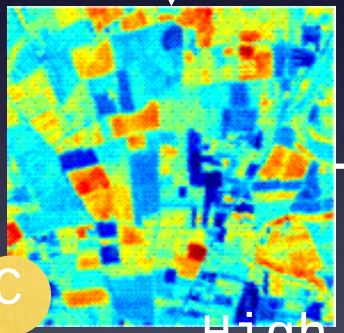
Land product validation framework

Field data

High resolution imagery

Transfer function

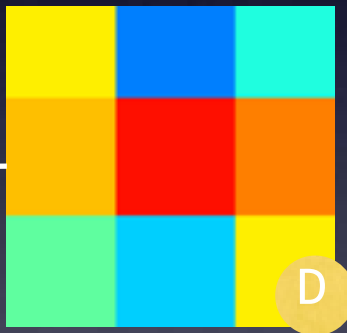
T



High resolution "Product"

Aggrega te & Relate

R



Moderate resolution "Product"

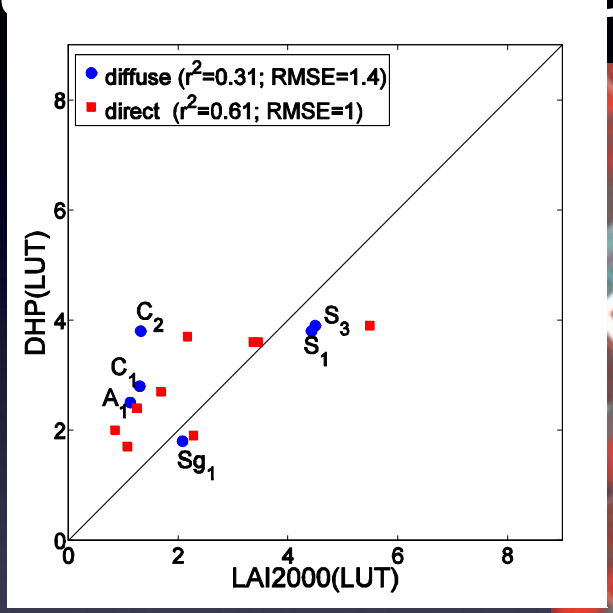
Accuracy Assessment

for one product, at one site, at one point in time

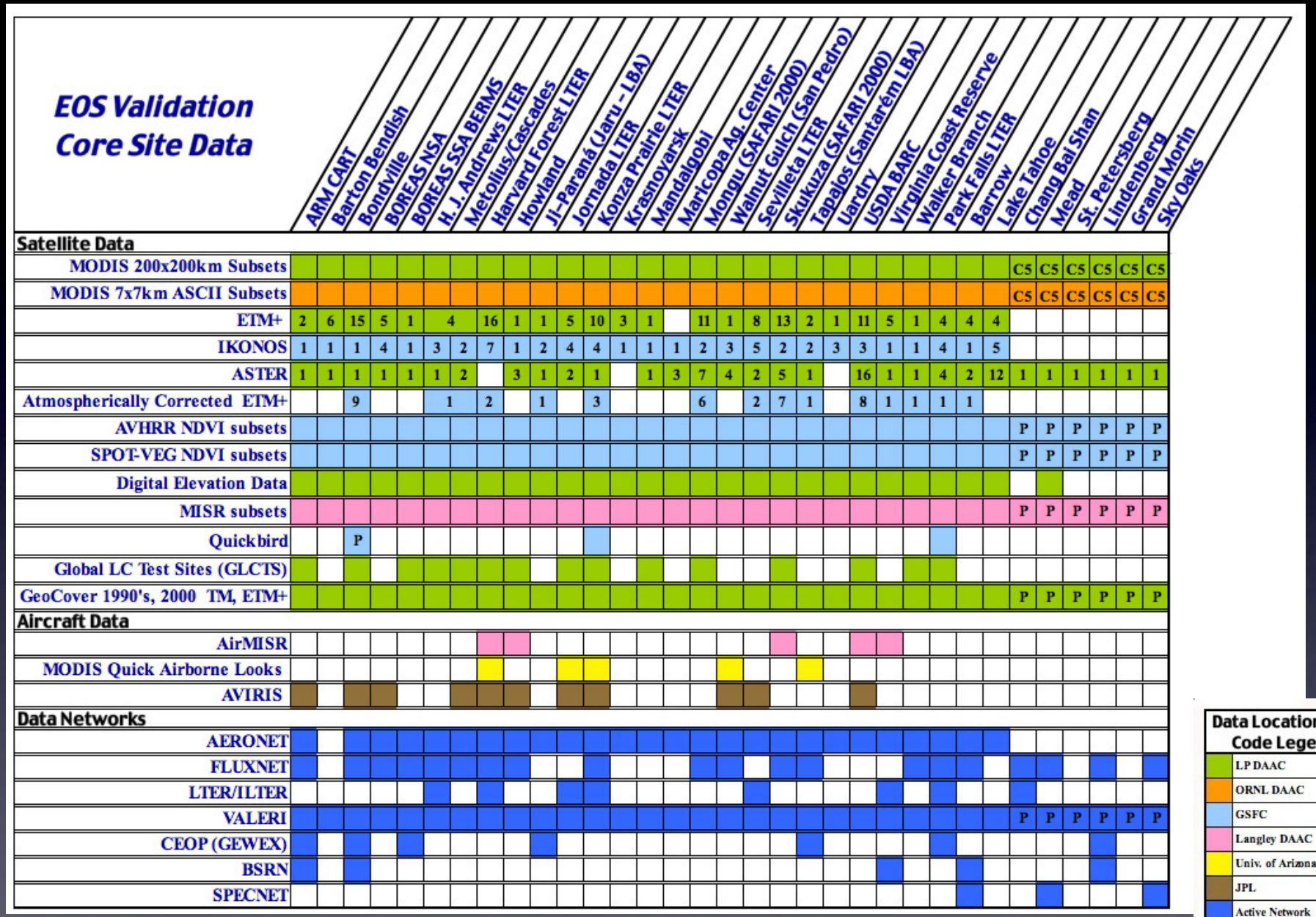
Harmonizing field measurement technique

Compared three sensors in a range of crop types and illumination conditions.

Conducted as part of WGCV-23, 2005, Argentina.

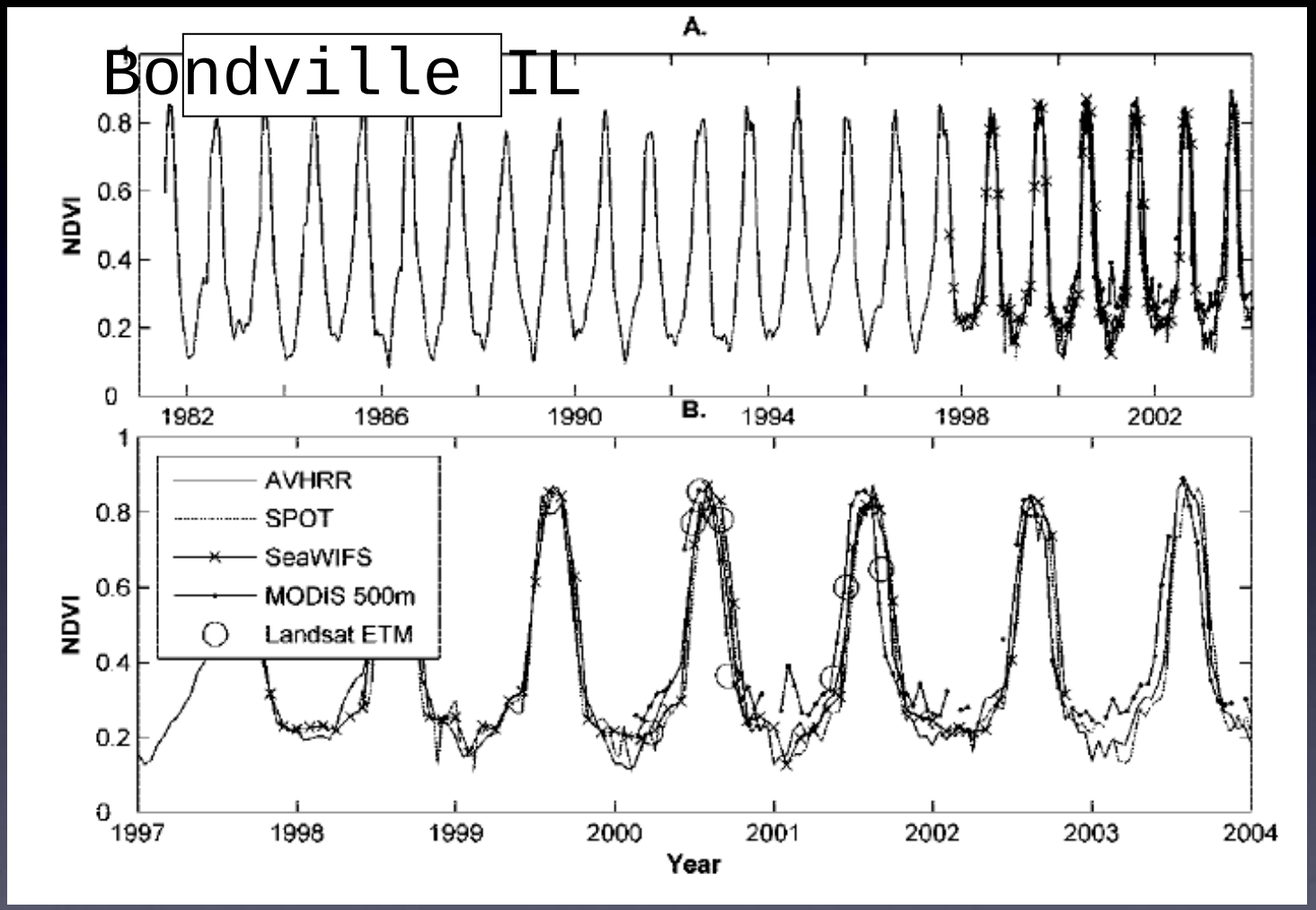


Garrigues, S., N.V. Shabanov, K. Swanson, J. Morisette, F.Baret and R.B. Myneni (in press) Intercomparison and Sensitivity Analysis of Leaf Area Index Retrievals from LAI-2000, AccuPAR, and Digital Hemispherical Photography over Croplands. *Agricultural and Forest Meteorology.*



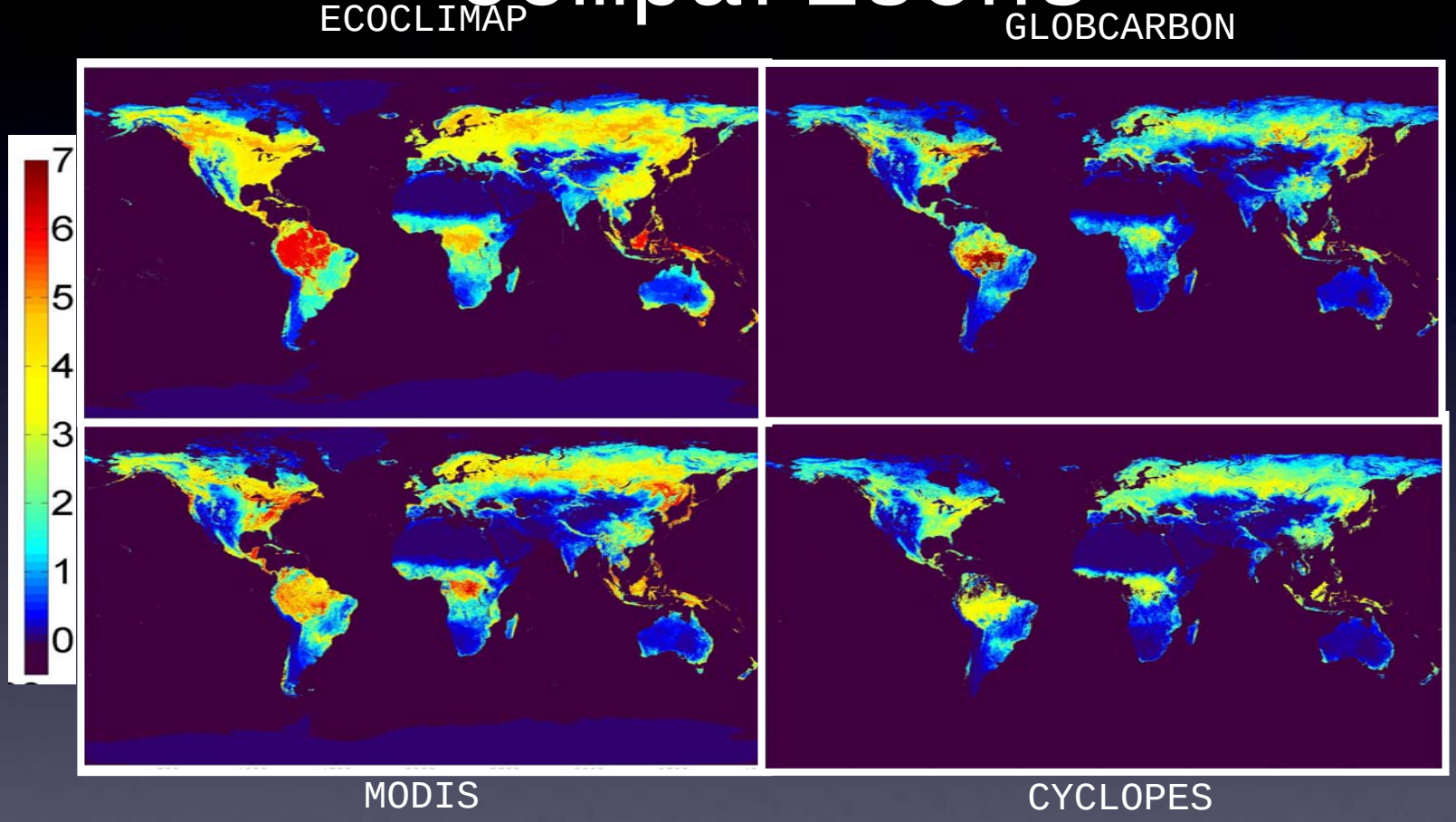
Nickeson, J., J. Morisette, J. Privette, C. Justice, D. Wickland, 2007. Coordinating Earth Observing System Land Validation, *EOS Transactions*, 88(7)81-82.

Using Core Site data: multi-sensor analysis



Brown, M. E. et al., 2006. Inter-Sensor Validation of long-term NDVI time series from AVHRR, SPOT-Vegetation, SeaWIFS, MODIS, and LandSAT ETM+, *IEEE TGARS*, 44(7)1787-1793.

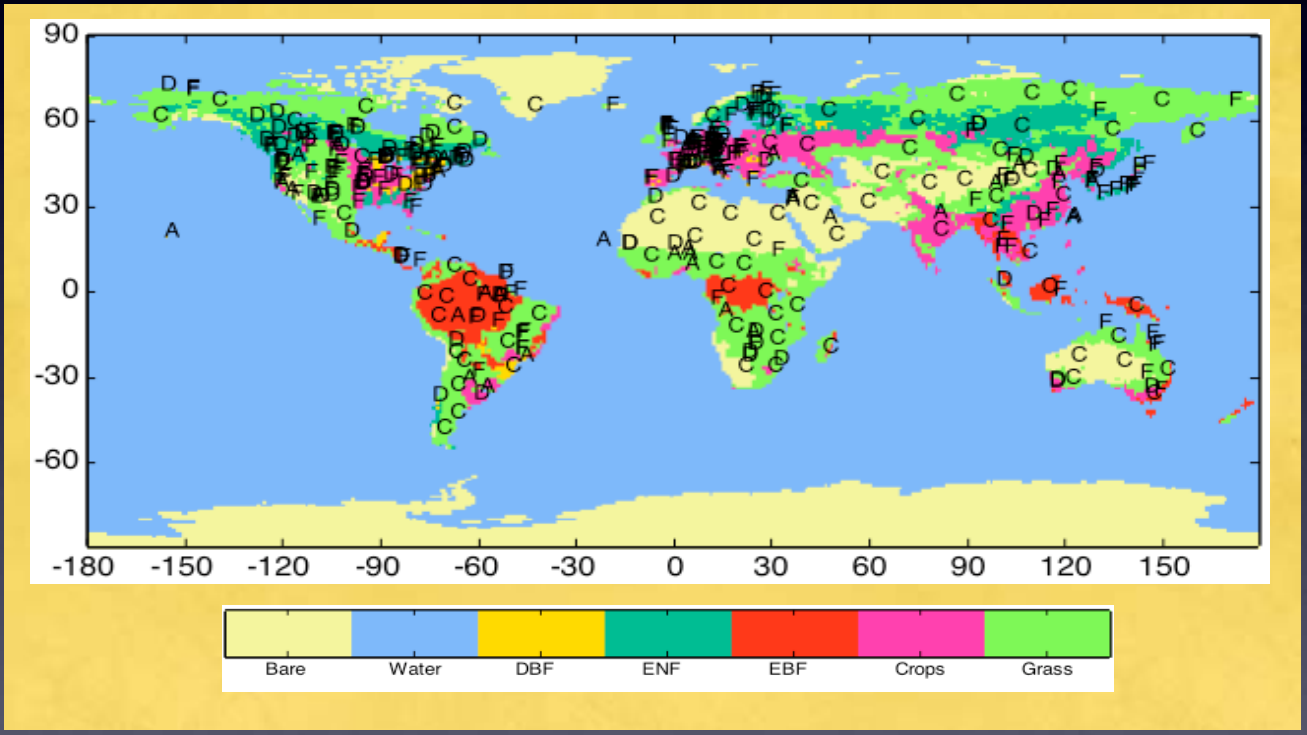
Results: a global Leaf Area Index Inter-comparisons



Garrigues, et al., (in press).Validation and Intercomparison of Global Leaf Area Index Products Derived From Remote Sensing Data, *JGR*.

Results:
The BELMANIP Global Network of Sites

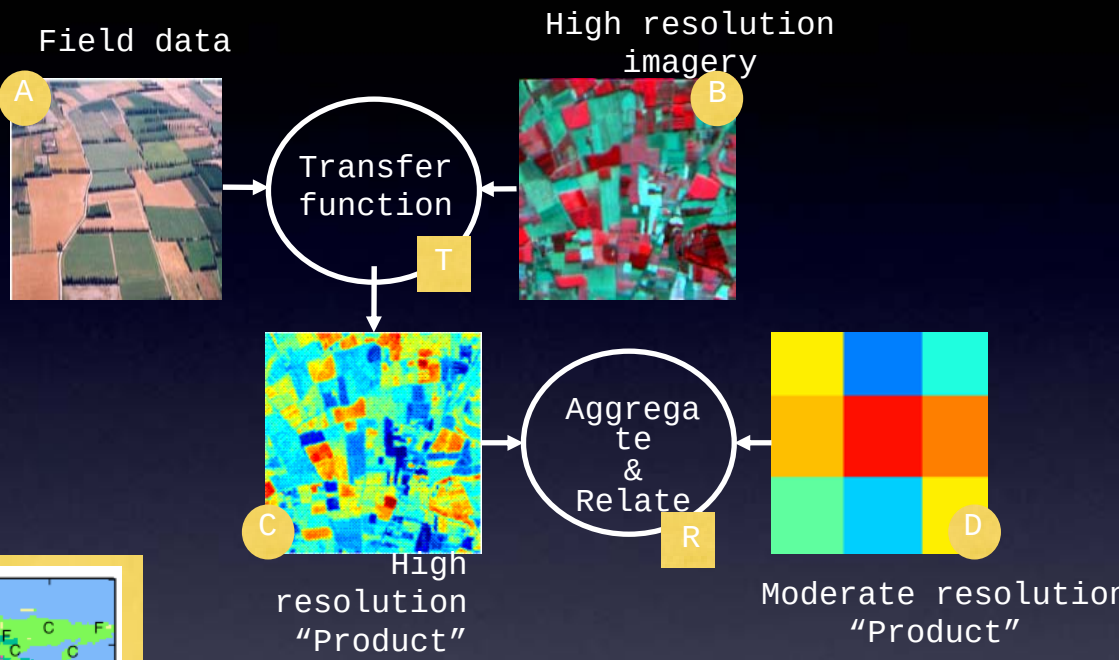
- representative sampling of global land surface types
- about 400 sites from several networks: direct validation sites (D: BIGFOOT, VALERI…), AERONET (A), FLUXNET (F)…

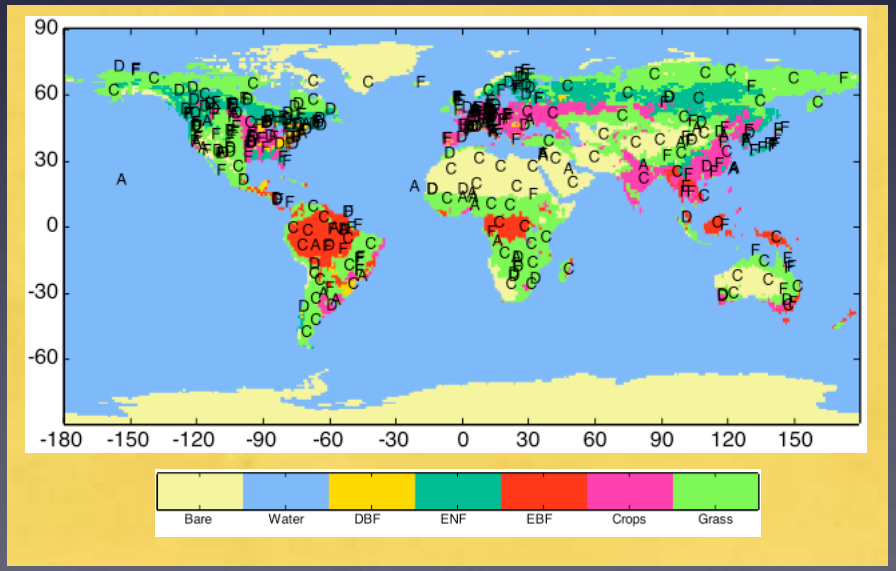


Baret, F., et al. 2006, Evaluation of the representativeness of networks of sites for the validation and inter-comparison of global land biophysical products. Proposition of the CEOS-BELMANIP, *IEEE TGARS*, 44(7)1794-1803.

Cal/Val portal

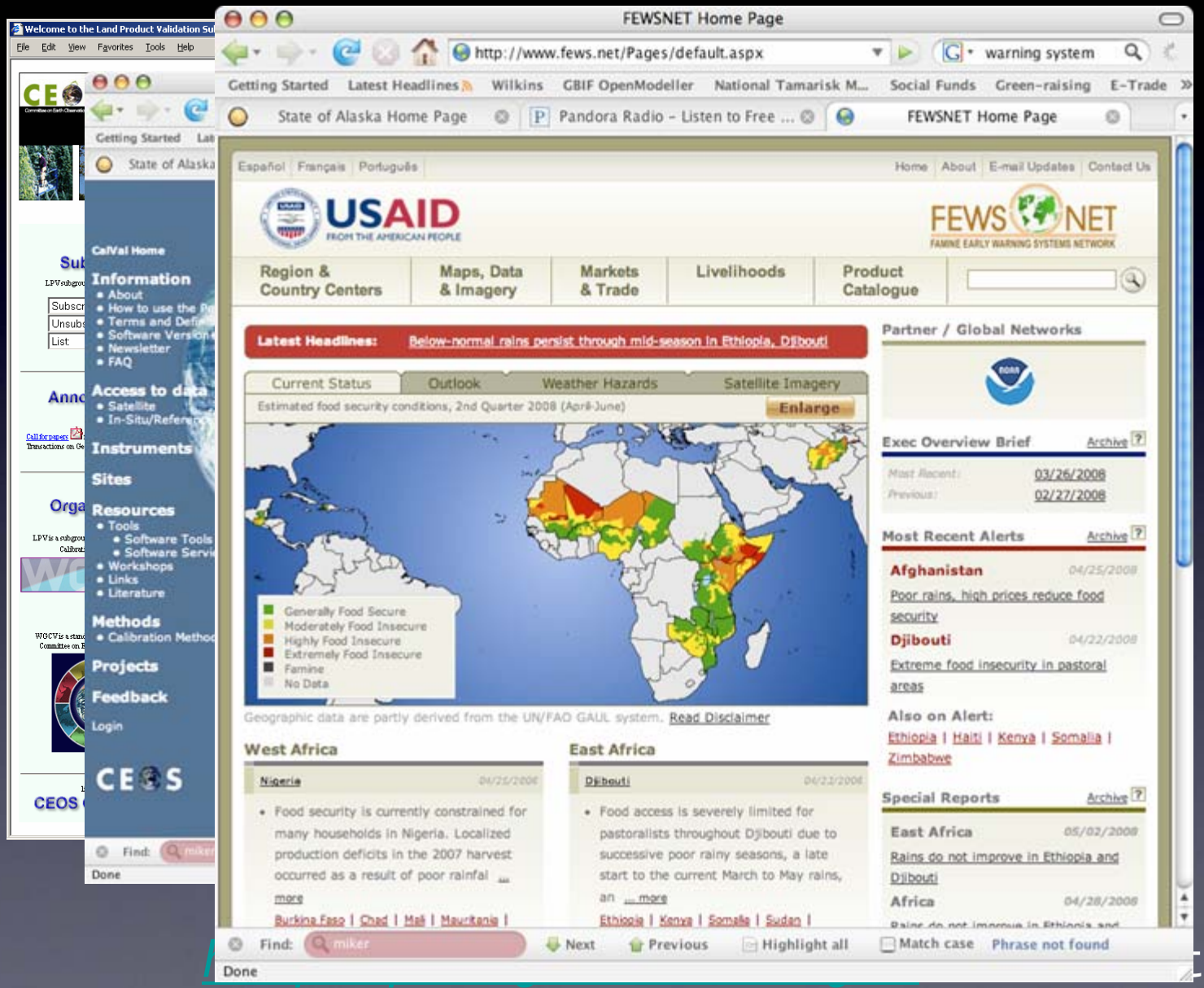
For each CEOS member product, provide guidance on each validation component…





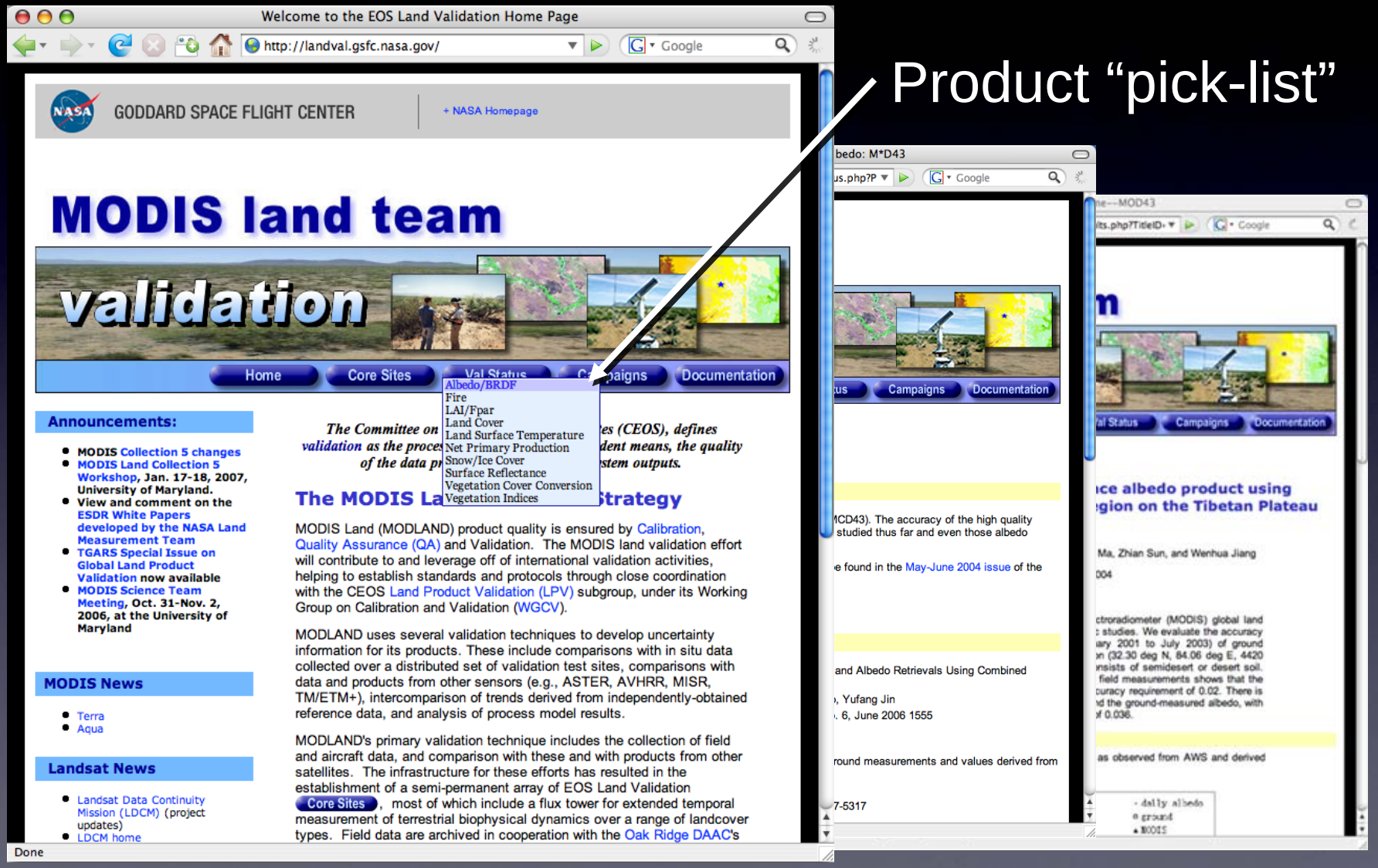
… and the sites where the validation activities will occur…

…and relaying results to users.



…tor: Jaime Nickeson, NASA GSFC

Harmonizing results, communicated to users...



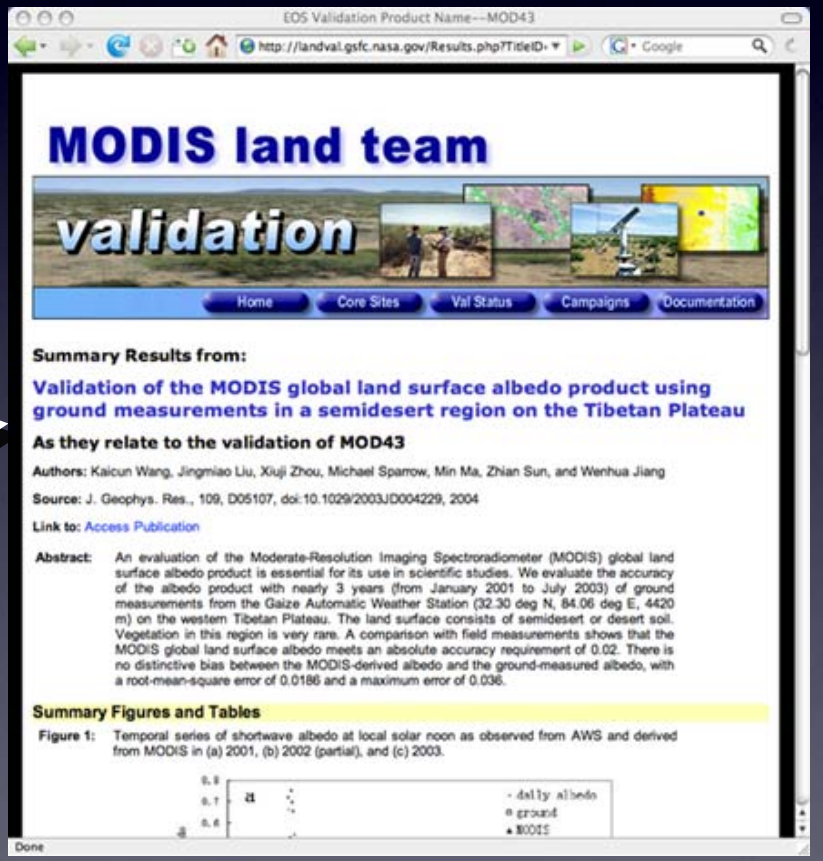
Communicating results...

Accuracy statement for each product

Communicating results...

Support material for each accuracy statement

*- updated by product producer **and** the validation community.*



On-LIne Validation Exercise (OLIVE)

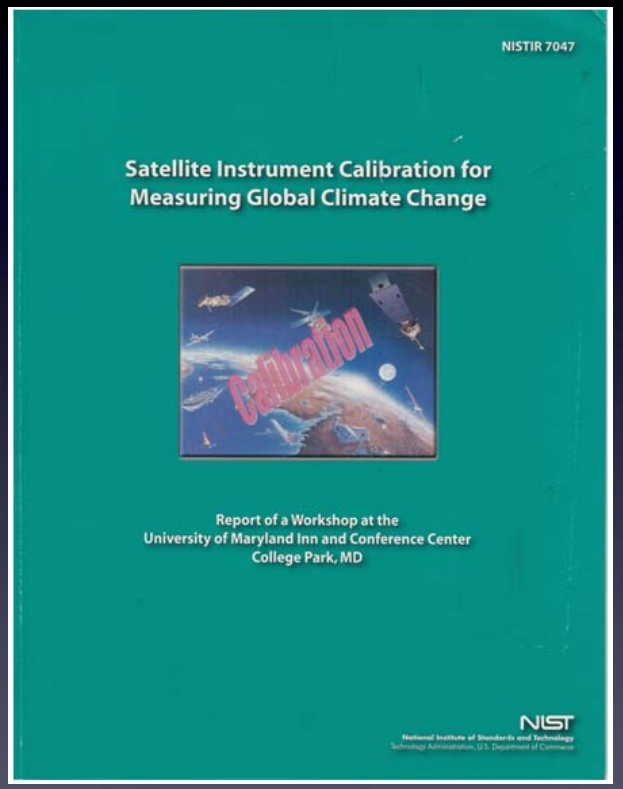
- Necessity to ensure the quality of the validation and intercomparison procedures of land surface variables - OLIVE will be based on “state of the art” validation approaches (Morisette et al., 2006; Baret et al., 2006; Garrigues et al., 2008)
- Necessity for transparency and independency (from product maker) in the validation process
- Maximize efficiency and limit duplicated actions through coordinated international effort
- Encourage the community to provide new validation dataset following similar standard protocols defined by OLIVE: definition of an “OLIVE” reference for validation dataset
- Facilitate reprocessing of validation results with new versions of products or new validation dataset
- Provide updated and accurate assessment of product accuracy for the user community
- Force the products to better agree with the standards defined by CEOS

OLIVE Implementation

- targeted products : Land surface variables : LAI, Fapar, Fcover, albedo
- Prototype provided by INRA, Avignon & NASA’s GSFC
- Operational implementation by ESA

Future: There is still a need to define land product accuracy requirements

The land validation community could build on the experience of the calibration community.



ASIC^3 WORKSHOP

Achieving Satellite Instrument Calibration for climate Change May 16-18, 2006

Ohring, G., J. et al. (2007), Achieving Satellite Instrument Calibration for Climate Change, *Eos Trans. AGU, 88*(11), 136

http://journals.aol.com/rrveh1/WAIT-NOTYET-/entries/2005/02/17/fieldnote---flight/789