

CEOS LAND PRODUCT



SUBGROUP REPORT

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LPV outline



- **Review of subgroup goals and objectives**
- **Ongoing LPV activities**
 - LAI intercomparison and Manfredi work
 - Albedo workshop
 - Land cover-best practices
 - Vegetation Continuous fields
 - Special Issue – in progress
 - Future meetings
- **Accuracy Statements**

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CEOS Definition



Validation:

the process of assessing by independent means the quality of the data products derived from the system outputs

LPV operates under this definition, but with the understanding that validation activities should consider user accuracy needs and feedback to algorithm improvements.

Mission Statement & Goals

- to foster **quantitative validation** 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 economy** of global satellite product validation *via* developing and promoting international standards and protocols for field sampling, scaling, error budgeting, data exchange for global land product validation
- to advocate **mission-long validation** and intercomparison programs for current and future earth observing satellites.

Objectives: with GEOSS opportunities

- Work with users to define uncertainty objectives
 - Focus on GEOSS application areas
- Identify opportunities for coordination and collaboration
 - Capitalize on field data networks coordinated through GEOSS
- Develop consensus “best practice” protocols for data collection and description
 - GEOSS could “approve/publish” related document
- To develop procedures for validation, data exchange and management - with a focus on land product validation core sites (done in conjunction with WGISS)
 - GEOSS could “approve” related activities
- To serve as a clearinghouse for accuracy statements on CEOS member global land products (possibly through the CEOS/WMO database?)

LPV outline

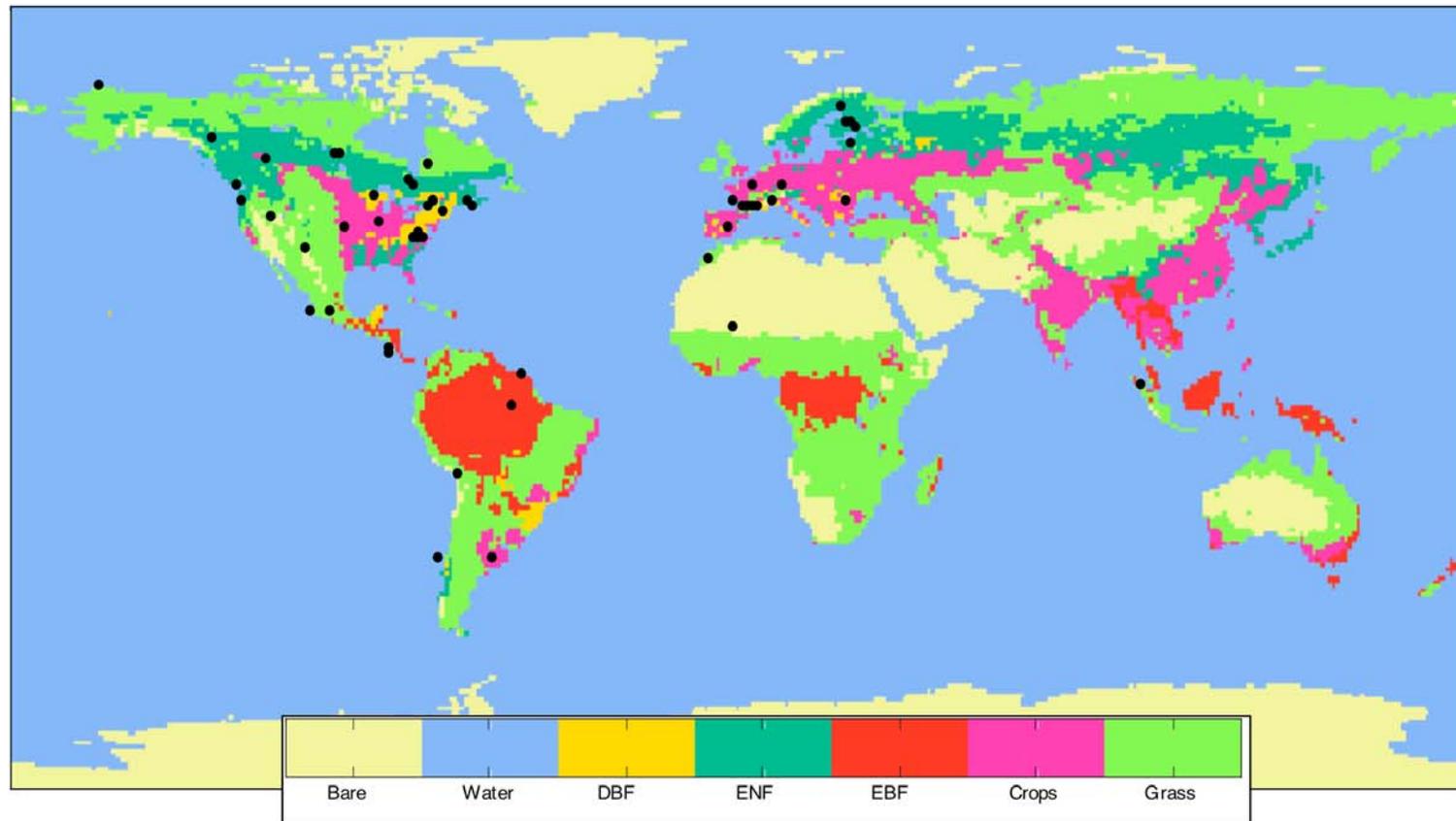


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“Intercomparison” General Timeline

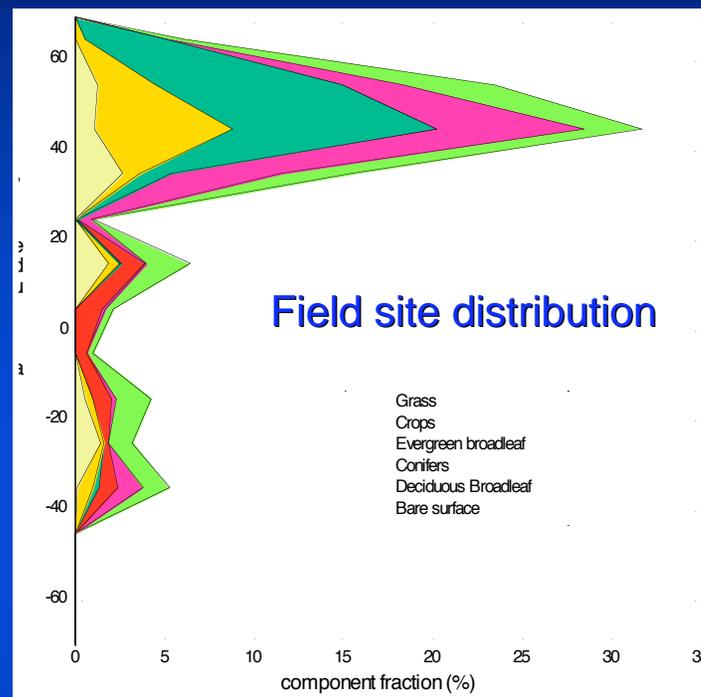
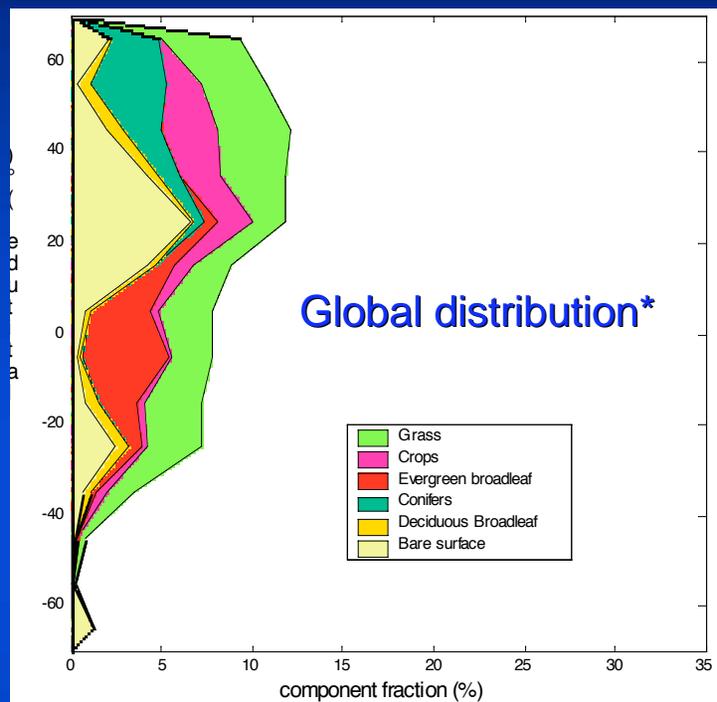
	LAI	Albedo	Fire	Land cover
Topical meeting to establish data requirements	Boston U Privette et al. 1998	Boston U Privette et al. 2002	Lisbon - fire Morisette et al. 2001	Toulouse 2001
Decide on Sites		EGU, Vienna 2005	Darmstadt (geostationary) 2004	Percent cover: 2005
Develop data sharing infrastructure	Frascati, Italy Privette et al. 2001			Boston U 2004
Field Campaigns & individual product analysis	Montana August 2004			
Synthesis of results	Current, on-going research			

LAI Intercomparison sites: 9 groups and 56 sites



Validation of global moderate resolution LAI Products: a framework proposed within the CEOS Land Product Validation subgroup, Morisette...Privette... Nickeson, et al, in press, TGARS special issue

Representative nature of site networks



- VALERI (27)
- CCRS (27)
- BIGFOOT (9)
- Others (35)
- **TOTAL= 100**

Benchmark Land Multi-site Analysis and Inter-comparison of Products (BELMANIP) proposes to combine Aeronet, Fluxnet & field sites, plus 78 additional sites for a globally representative sample.

Evaluation of the representativeness of networks of sites for the validation and inter-comparison of global land biophysical products. Proposition of the CEOS-BELMANIP, Baret, Morisette, et al, in press, TGARS special issue

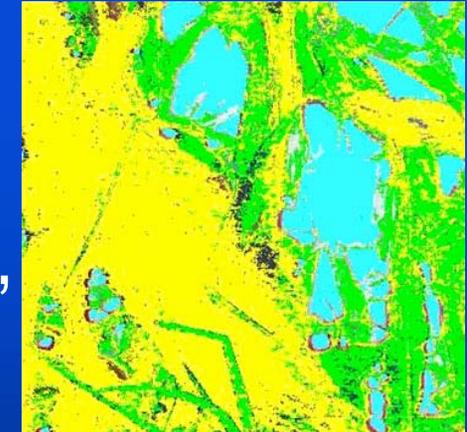
Manfredi results



Photo



“Caneye”
results



Analysis of Uncertainties of LAI Retrievals from LAI-2000, AccuPAR and DHP Optical Instruments over Croplands of Cordoba, Argentina

K. Swanson, S. Garrigues, N.V. Shabanov, J. Morisette and R.B. Myneni, in progress.

Albedo/BRDF Intercomparison

Proposed:

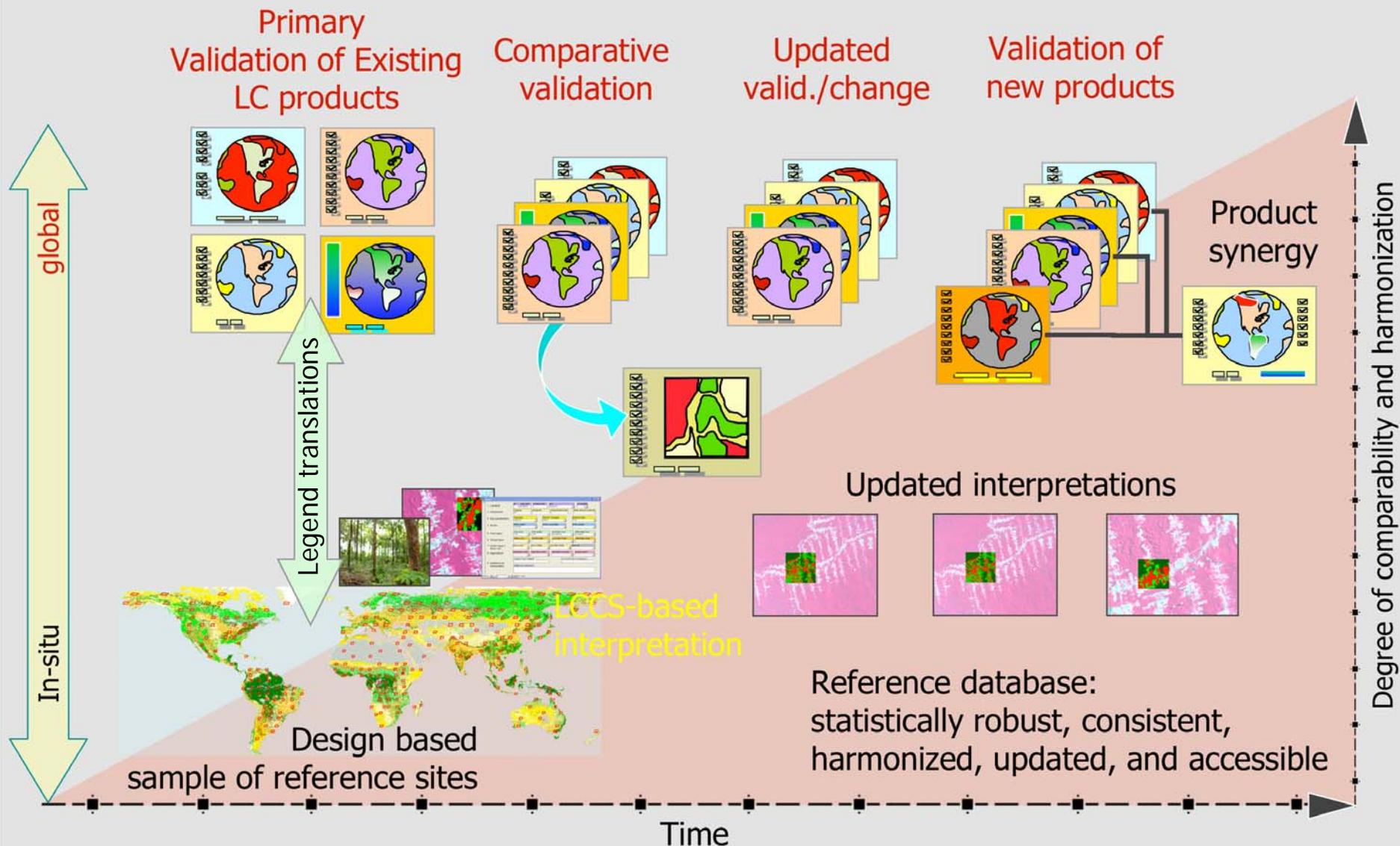
“Virtual experiments” (inter-compare 2002-2003 data for 5 sites)

“Real experiment” (2006?)

Sensors	Platform	Spatial resolution ¹	Satellite revisit time ²	Spectral domain ³	Temporal resolution of product
MODIS	Terra/Aqua	1 km	1 day	0.3-5.0	16 days
MISR	Terra	0.275-1 km	8 days	0.4-1.0	8 days
MERIS	ENVISAT	0.3-1.2 km	2-3 days	0.4-1.0	10 days
VEGETATION	SPOT 4-5	1 km	1 day	0.4-2.4	10 days
POLDER	ADEOS 1-2	6 km	1 day	0.4-1.0	10 days
PARASOL	MYRIADE	6 km	1 day	0.4-1.0	10 days
SEVIRI	MSG	1-3 km	15 min	0.4-1.6	1-10 days
Meteosat	GOES	2.25 km	30 min	0.4-0.8	10 days
ISCCP	(climatology)	60 km	NA	0.3-3.0	30 days
ECOCLIMAP	(climatology)	1 km	NA	0.3-3.0	30 days

Baret, F., C. Schaaf, J. Morisette, and J. Privette, “Report on the Second International Workshop on Albedo Product Validation”, 2005, Earth Observer, May/Jun 2005, 17(3)13-17.

Framework for joint GOFC-GOLD/CEOS Harmonization/Validation initiative



CEOS “best practices” document

Global Land Cover Validation: Recommendations for Evaluation and Accuracy Assessment of Global Land Cover Maps

Edited by: Strahler

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

Primary finding:

Call for global inter-comparisons

“Hybrid” statistical sampling using fixed sites

Confidence layers (model-based accuracy)

Vegetation Continuous Fields

- Use sampling IKONOS:ETM+/ASTER for global validation for 2000 era
- Use JAXA's PRISM on ALOS
 - Request acquisition schedule and data access plan from JAXA

Potential upcoming meetings

- FAO Agricultural monitoring (March '06)
- Validation of Vegetation index
 - Time series and continuity
 - phenology metrics
 - Time and location TBD
- Global Vegetation Monitoring
 - Proposed multi-sensor workshop
 - Missoula Montana
 - Week of August 7th?
(or the week after IGARSS)

Inter-sensor workshop: GEOSS focus

- *Strategic Activities*
Engage “CEOS, IGOS-P, GCOS, GBIF and WCRP to develop mechanisms for aligning the strategic plan and activities of these organization with GEOSS 10 year-Implementation plan targets” (p.4).
- *User interface and user requirement development*
proposes (TASK 10) “a planning meeting for a workshop to be co-hosted by GEO...in 2006, to identify initial concept and plan of action to develop a biodiversity monitoring system” (p.6).
- *Continuity of Critical Observations*
Prepare of “a letter from GEO Co-Chairs to CEOS regarding (five) critical items”, two of which are
“Identifying core product from MODIS, MERIS, AASR, VEGETATION and SeaWiFS for which continuity and quality improvements have to be insured” and
- “Ensuring coherence of mission requirements among future EO systems, including Sentinels, METOP, NPOESS, etc.” (p.9)

<http://earthobservations.org/docs/GEO%200107R%20WPT%20REPORT.pdf>

http:landval.gsfc.nasa.gov/LPVS

Matches WGCV page layout and graphic

Quick links to:

- Listserves
- Announcements
- WGCV
- CEOS and
- CEOS calendar

Welcome to the Land Product Validation Subgroup - Microsoft Internet Explorer

File Edit View Favorites Tools Help

CEOS WORKING GROUP ON CALIBRATION & VALIDATION
Committee on Earth Observing Satellites
Land Product Validation Subgroup

Home Landcover Biophysical Fire/Burn Surface Rad

Subscribe!
LPV subgroup topical mailing lists:
Subscribe: [v]
Unsubscribe: [v]
List: [v]

Announcing...
Call for papers: [v] for LPV special issue in IEEE Transactions on Geoscience and Remote Sensing.

Organization:
LPV is a subgroup of the Working Group on Calibration and Validation.

WGCV is a standing Working Group of the Committee on Earth Observing Satellites

link to 2004
CEOS Calendar [v]

Mission
To foster quantitative validation of higher-level global land products derived from remote sensing data and to relay results so they are relevant to users

Background
The subgroup on Land Product Validation (LPV) is one of six subgroups of the Working Group on Calibration and Validation (WGCV), which itself is one of two standing working groups within the Committee on Earth Observing Satellites (CEOS, see also [CEOS structure](#)). The six WGCV subgroups are:

- Infrared and Visible Optical Sensors (IVOS)
- Atmospheric Chemistry (AC)
- Microwave Sensors (MS)
- Synthetic Aperture Radar (SAR)
- Terrain Mapping (TM)
- Land Product Validation (LPV)

The Land Product Validation subgroup arose out of the recognition in the late nineties that standardized approaches to global product validation were essential for wide acceptance and use of proposed global land products. Several programs at the time were aimed at global monitoring of Earth processes, many with plans to distribute higher level data products. A common approach to validation would encourage widespread use of validation data, and thus help us to move toward standardized approaches to global product validation. With the high cost of in-situ data collection, the potential benefits from international cooperation are considerable and obvious.

Previous requests for assistance from the original International Global Observing Strategy (IGOS) pilot projects and two subsequent ad hoc meetings of the WGCV identified a clear need for improved international collaboration concerning the validation of land products derived from Earth observing satellites. A new subgroup within the WGCV was proposed to the CEOS Plenary in Stockholm at the end of 1999, receiving full support. The LPV was officially adopted as a subgroup at the WGCV-17 meeting in October of 2000.

The LPV subgroup activities are divided up into four themes that compliment the research agenda of the Global Observations of Forest and Land Cover Dynamics (GOF/C/GOLD) program, namely biophysical products, fire/burn scar detection, and land cover mapping. In addition to the GOF/C/GOLD themes, the LPV subgroup includes an Albedo/Surface Radiation thematic group. Working with GOF/C/GOLD, who seek the common goal of coordinated validation of fire products by standardized protocols, LPV aims for similar coordination for all land products.

Pull-down menu for main topical areas:

- Land cover
- Biophysical
- Fire/Burn
- Surface Radiation

Each pull-down lists:

- Background
- Producers *
- Meetings
- Case studies
- Intercomparisons

* input needed

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Accuracy statements



- Should be “user-oriented” and supported with peer-review literature
- Standardize/summarize information for each product
- MODIS land team had planned to update CEOS information for MODIS land products

CEOS/WMO page

Satellite Systems and Requirements
(The Official CEOS/WMO Online Database)
Data source: CEOS/WMO database, release February 2003, Version 2.5

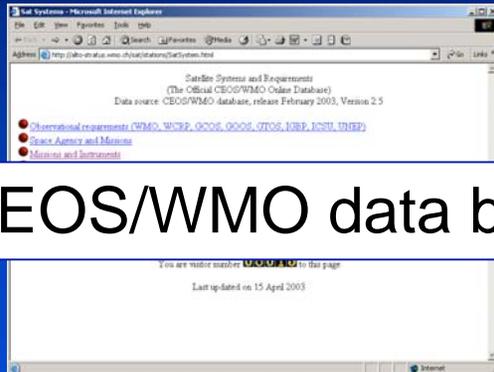
- [Observational requirements \(WMO, WCRP, GCOS, GOOS, GTOS, IGBP, ICSU, UNEP\)](#)
- [Space Agency and Missions](#)
- [Missions and Instruments](#)
- [Instruments](#)
- [Parameters measured by a space-based instrument](#)
- [Parameters measured by a surface-based instrument](#)
- [Instruments that measure a parameter](#)

[[Up](#)]

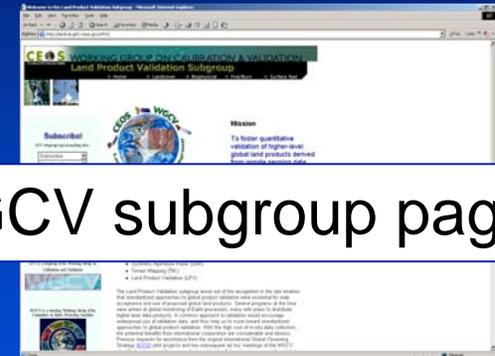
You are visitor number **08015** to this page

Last updated on 15 April 2003

CEOS/WMO database, potential framework



CEOS/WMO data base



WGCV subgroup page

Link to accuracy statement for each product

- Overall accuracy statement
- Link to QA information
- List of support material

... supporting materials

- Title, author, abstract
- Figures/captions
- Tables/captions

Producer maintained validation page

MODIS example: "Accuracy Statements" (2/3)

The image shows a screenshot of the EOS Land Validation website. A blue arrow points from the text "Accuracy Statement for each product" to the "General Accuracy Statement" section of the MOD09 product page. The page includes a navigation menu, a news section, and a "Core Sites" section. The "General Accuracy Statement" section is highlighted in yellow and contains the following text:

Status for: Surface Reflectance (MOD09)

General Accuracy Statement

Validation at [stage 1](#) has been achieved for the surface reflectance product (MOD09). The accuracy of the MODIS operational surface reflectance product is better than .5% reflectance or 5% of the signal - whichever is greatest, with slight variation from band to band.

Product status updated on October 2003

Supporting Studies:

Title: Atmospheric correction of MODIS data in the visible to middle infrared: first results
Author: Eric F. Vermote, Nazmi Z. El Saleous and Christopher O. Justice
Source: Remote Sensing of Environment, 83: 97-111.
[View Summary Results From This Document](#)

Additional Validation and Product Quality

[PL Maintained Validation Page](#)
[Product Quality Documentation for MOD09A1 - Terra](#)
[Product Quality Documentation for MOD09GHK - Terra](#)
[Product Quality Documentation for MOD09G0K - Terra](#)

Summary Figures and Tables

Figure 1: The validation of the atmospheric correction has been done partially by continuing to validate the aerosol optical thickness used in the correction algorithm by comparison to AERONET data as it is

MODIS example: "Accuracy Statements" (3/3)

The screenshot displays the MODIS land team validation website. The main heading is "MODIS land team validation". Below it, there are navigation buttons for "Home" and "Core Sites". A "News" section lists several items, including "MODIS Vegetation workshop II, University of Montana, 17-19 August 2004". A "MODIS News" section lists "Terra" and "Aqua". A "Landsat 7 News" section lists "Landsat ETM+ Dataset Transition" and "Report following the Scan Line".

The central focus is the "EOS Land Validation" page for "Surface Reflectance". It features a "General Accuracy Statement" and "Supporting Studies". A blue arrow points from the text "updated by product PI" to the "Supporting Studies" section. The "Supporting Studies" section includes a link to "Product Quality Documentation for MOD09A1...Terra" and "Product Quality Documentation for MOD09A2...Terra".

On the right, there is a "MODIS land team validation" page with a "Summary Results from:" section. The title is "Atmospheric correction of MODIS data in the visible to middle infrared: first results". The authors are "Eric F. Vermote, Nazmi Z. El Saleous and Christopher O. Justice". The source is "Remote Sensing of Environment, 93: 97-111". There is a link to "Access Publication". The abstract states: "The MODIS instrument provides major advances in moderate resolution earth observation. Improved spatial resolution for land observation at 250 and 500 m and improved spectral band placement provide new remote sensing opportunities. NASA has invested in the development of improved algorithms for MODIS, which will provide new data sets for global change research. Surface reflectance is one of the key products from MODIS and is used in developing several higher-order land products. The surface reflectance algorithm builds on the heritage of the Advanced Very High Resolution Radiometer (AVHRR) and SeaWiFS algorithms, taking advantage of the new sensing capabilities of MODIS. Atmospheric correction by the removal of water vapor and aerosol effects provides improvements over previous coarse resolution products and the basis for a new time-series, which will extend through to the NPOESS generation imagers. This paper summarizes the first evaluation of the MODIS surface reflectance product accuracy, in comparison with other data products and in the context of the MODIS instrument performance since launch. The MODIS surface reflectance product will provide an important time-series data set for quantifying global environmental change."

Below the abstract is a "Summary Figures and Tables" section. "Figure 1:" is described as "The validation of the atmospheric correction has been done partially by continuing to validate the aerosol optical thickness used in the correction algorithm by comparison to AERONET data as it is".

Support material for each Accuracy Statement - updated by product PI and validation community

