

Update on LPV Metrics for Cal/Val

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LPV Validation Hierarchy

Validation Stage - Definition and Current State		Variable
1	Product accuracy is assessed from a small (typically < 30) set of locations and time periods by comparison with in-situ or other suitable reference data.	Fapar Snow Cover Phenology LST & Emissivity Fire Radiative Power
2	Product accuracy is estimated over a significant set of locations and time periods by comparison with reference in situ or other suitable reference data. Spatial and temporal consistency of the product and consistency with similar products has been evaluated over globally representative locations and time periods. Results are published in the peer-reviewed literature.	Leaf Area Index Burned Area
3	Uncertainties in the product and its associated structure are well quantified from comparison with reference in situ or other suitable reference data. Uncertainties are characterized in a statistically rigorous way over multiple locations and time periods representing global conditions. Spatial and temporal consistency of the product and with similar products has been evaluated over globally representative locations and periods. Results are published in the peer-reviewed literature.	Land Cover Albedo Soil Moisture
4	Validation results for stage 3 are systematically updated when new product versions are released and as the time-series expands.	

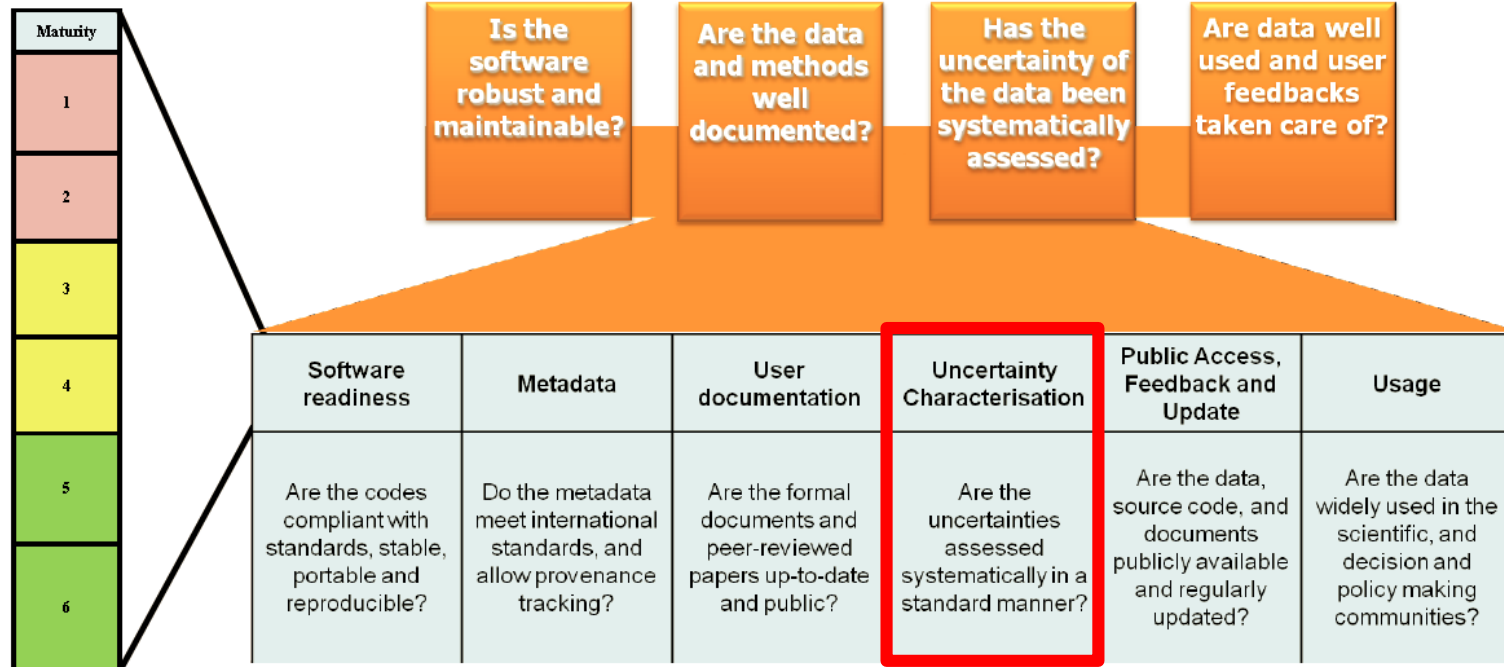
Current Status

LPV Validation Stages covering one column within the WG-Climate System Maturity Matrix (Schulz et al.)

Maturity Matrix Concept



Maturity Matrix Concept



*From Jörg Schulz, EUMETSAT
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Assessment for Climate Data Records*

Sub-Matrix - Uncertainty

SOFTWARE READINESS	METADATA	USER DOCUMENTATION	UNCERTAINTY CHARACTERISATION	PUBLIC ACCESS, FEEDBACK, UPDATE	USAGE
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Standards	Validation	Uncertainty quantification	Automated Quality Monitoring
None	None	None	None
Standard uncertainty nomenclature is identified or defined	Validation using external reference data done for limited locations and times	Limited information on uncertainty arising from systematic and random effects in the measurement	None
Score 2 + Standard uncertainty nomenclature is applied	Validation using external reference data done for global and temporal representative locations and times	Comprehensive information on uncertainty arising from systematic and random effects in the measurement	Methods for automated quality monitoring defined
Score 3 + Procedures to establish SI traceability are defined	Score 3 + (Inter)comparison against corresponding CDRs (other methods, models, etc)	Score 3 + quantitative estimates of uncertainty provided within the product characterising more or less uncertain data points	Score 3 + automated monitoring partially implemented
Score 4 + SI traceability partly established	Score 4 + data provider participated in one inter-national data assessment	Score 4 + temporal and spatial error covariance quantified	Score 3 + monitoring fully implemented (all production levels)
Score 5 + SI traceability established	Score 4 + data provider participated in multiple inter-national data assessment and incorporating feedbacks into the product development cycle	Score 5 + comprehensive validation of the quantitative uncertainty estimates and error covariance	Score 5 + automated monitoring in place with results fed back to other accessible information, e.g. meta data or documentation

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Current Status

- Goal is to merge that one column with CEOS-LPV approach.
- This will require work on terminology (uncertainty, error, accuracy etc.) as well as on the stages and requirements.

Other Areas To Address

- Current system maturity matrix has Level 1 (little or non-validated) and Level 2 (minimally validated).
- At the highest validation level, there needs to come in the quality of the reference data, which, at this time, is still not addressed by either of the WGs tables.

Next Steps

- Generate a document (with LPV as lead author) that is available for review to the entire WGCV.
- In the inventory cycle 3 of WG-Climate (~2018) both WGs will come to a finalized, integrated version of the validation stages with the maturity matrix.
- LPV (Gabriela Schaepman-Strub) will contribute to these efforts through a pending paper to be submitted to the RSE Special Issue on Earth Observation of Essential Climate Variables (<http://goo.gl/7oK8of>)
- Paper will include finalized description of LPV stages that fits within the maturity matrix format.