

ESA DUE GlobBiomass

1st User Workshop

WP1000: User Requirements Engineering

Valerio Avitabile, Anatoly Shvidenko, Dmitry Schepaschenko, Martin Herold

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WP1000 Objectives:

1. Assessment and consolidation of User Requirements
2. Harmonize the major definitions and classification schemes for the global and regional products
3. Develop a solid and consistent description of the GlobBiomass products (from user perspective)
4. Outline the prospective research needs for remote sensing assessment of major ecological indicators of ecosystems

WP1000 Outcomes:

1. User Requirement Document (URD)
2. Product Specification Document (PSD)

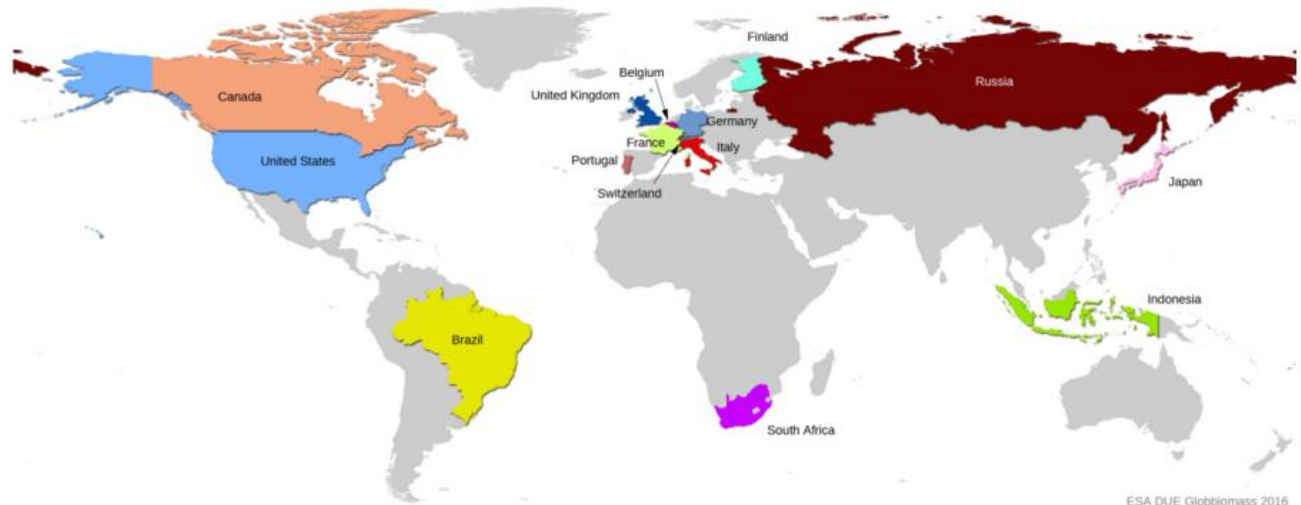
D1: User Requirements Document

Inputs:

- 2012 Jena Biomass Consultation Survey
- 2015 GlobBiomass Regional Survey
- Literature: GCOS (2010) , GTOS (2009)

User organizations:

- Regional forestry representatives of project regions
- GlobBiomass User group: 20 User Organizations
- 5 biomass monitoring networks



User needs and directions

User community	Scale		
	<i>Global</i>	<i>Regional</i>	<i>Local</i>
Science	<ul style="list-style-type: none"> Sustainability of <u>LULC management</u> Impact of forests on <u>global biogeochemical cycles</u> Change and <u>dynamics</u> of forest cover Extent and severity of <u>disturbances</u> 	<ul style="list-style-type: none"> State and <u>productivity</u> of forests Assessment of <u>carbon cycling</u> <u>Early detection</u> of global change impacts Monitoring of disturbances 	<ul style="list-style-type: none"> Dynamics of state, vitality and productivity individual <u>forest plots</u> Understanding of <u>disturbance</u> regime and their <u>dynamics</u> Detection of <u>climate change impacts</u> <u>Stability</u> of natural landscapes
Policy	<ul style="list-style-type: none"> Global assessment of <u>state and dynamics</u> of forest cover (FAO FRA, reporting to international convention) Afforestation, reforestation, deforestation (<u>ARD</u>) processes, <u>REDD+</u> policies 	<ul style="list-style-type: none"> National (regional) land <u>management</u> National forest <u>policies</u> National <u>reporting</u> to UNFCCC and other international conventions <u>Certification</u> of forest management and industry 	<ul style="list-style-type: none"> Operational support of <u>sustainable forest management</u> Development of standards of sustainable land- and forest management
Forest management and industry	<ul style="list-style-type: none"> Global strategies of transition to <u>sustainable forest management</u> (SFM) 	<ul style="list-style-type: none"> National and regional programs of SFM <u>Forest inventory</u> <u>ARD</u> processes National and regional programs of <u>development of forest industry</u> 	<ul style="list-style-type: none"> <u>Forest inventory</u> and monitoring <u>Planning</u> of forest operations <u>Adaptation</u> to climate change Auditing <u>Certification</u> of forest Management and forest industry

User Requirements

Product characteristics (general):

- Fully documented, transparent and standardized mapping methods
- Easy to use and interpret
- Free and open access
- Clear and transparent reporting of accuracy / uncertainty

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D1

User Requirements Document

Prepared for European Space Agency (ESA-ESRIN)

In response to ESRIN/Contract No. 4000113100/14/I_NB



Prepared by

Wageningen University and Research Centre, Laboratory of Geoinformation
Science and Remote Sensing, The Netherland

Friedrich-Schiller-University Jena, Department for Earth Observation, Germany

International Institute for Applied Systems Analysis, Ecosystem Services and
Management Program, Austria

April 2015

D2: Product Specification Document

Content:

- › Biomass estimation methods
- › Product Specifications
- › Glossary of Terms and Definitions
- › Prospective research needs
 - Case-study for Northern Eurasia

DUE GlobBiomass

D2

Product Specification Document

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Products Specification

- › Product specification from the user perspective
- › Requirements:
 - Threshold: **Minimum**, below which the product is of limited use
 - Target: **Ideal**, beyond which there is no significant improvement
- › Translation of User Requirements in specifics for the GlobBiomass global and regional products

Product Specification: Global

	GLOBAL PRODUCT	
	Threshold requirements	Target requirements
Product	Map of aboveground biomass	Map of AGB with associated uncertainty Map of biomass change Map of belowground biomass Map of live and dead AGB
Spatial resolution	500 - 1000 m	70 – 250 m
Temporal resolution	Every 5 years	1 year (annual maps)
Accuracy	Higher than existing maps	< 10% (rel. RMSE)
Other requirements	Fully documented, transparent and standardized mapping methods Metadata available Open access	Robust and standardized validation scheme with protocol Clear and transparent reporting of regional accuracy / uncertainty Consistent spatial-temporal coverage Consistency with forest area change data Free and open access

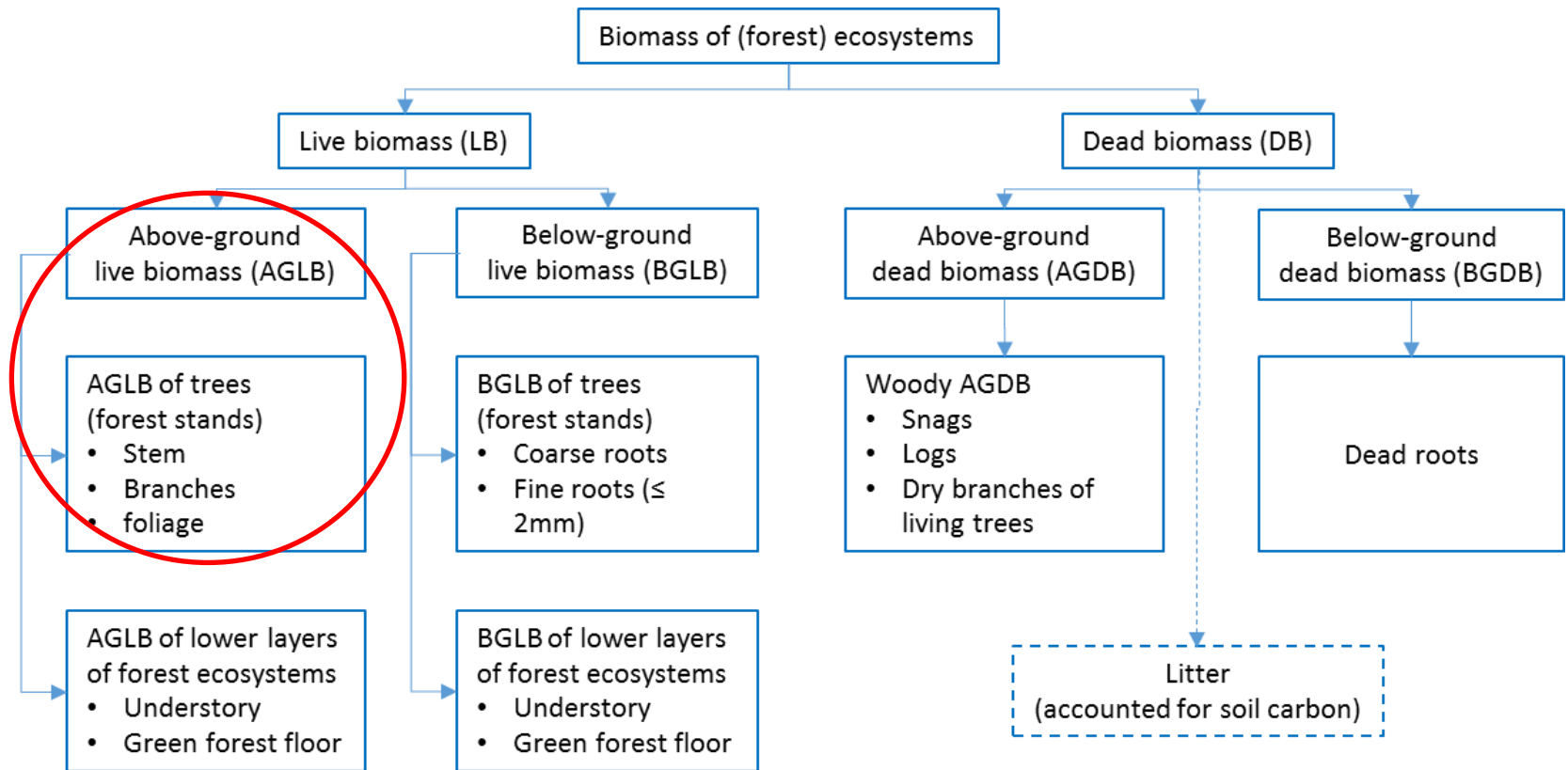
Product Specification: Regional

	REGIONAL PRODUCTS	
	Threshold requirements	Target requirements
Product	Map of aboveground biomass Map of biomass change	Map of forest biomass with associated uncertainty Map of biomass change Map of live and dead biomass Map of disturbances and recovery Non-wood biomass components
Spatial resolution	250 - 500 m at regional scale 100-150m (sub)national scale	30 – 250 m at regional scale ≤10 – 30 m at national/local scale
Temporal extent	2010	2000 – present
Temporal resolution	Every 5 years	From 1 to 3 times per year (depending on dynamics)
Accuracy	Higher than existing maps	< 10 – 30 % (rel. RMSE)
Other requirements	Metadata available	Provide pre-processed data Fully documented, transparent and standardized mapping methods Clear and transparent reporting of accuracy / uncertainty Forest area map Provide high resolution (≤5 m) Digital Terrain Model Geolocation error of L1 products < 3m User-friendly interface Capacity building materials

Glossary of terms

- › Focus on Land Cover/Use & forestry terms
- › Common language to communicate with user communities and compliant with GlobBiomass specifics
- › Not a trivial task:
 - The same term may have different meaning in different disciplines
 - Some terms have no standardized definition within the same discipline
 - Some terms refer to biophysical parameters not measurable from RS
- › Key (disputed) definitions:
 - Forest
 - Biomass

Biomass pools: a proposal



- A revised biomass definition appropriate to the product may be defined during the product development

Key message for map producers

Provide clear and un-ambiguous definition of:

- › Forest (if applied)
 - *Canopy cover %*
 - *Minimum area (ha)*
 - *Other (minimum height, Land Use, etc.)*

- › Biomass
 - *Live / dead*
 - *AGB / BGB*
 - *Woody / foliage*
 - *Min DBH*

[Optimal: live woody AGB dbh > 0 cm ?]

Prospective research needs

Moving from AGB mapping towards a Full Verified Carbon Account to support decisions at fine scale and modelling of complex ecological processes and indicators (e.g., NPP), will require:

- › Regional models relating biometric parameters with productivity
- › Better understanding of impacts of forest structure on RS signals
- › Spatially and temporally comprehensive assessments (time-series)
- › Including dynamics Including all carbon pools (e.g., dead wood, roots)
- › Comprehensive and reliable accuracy assessment

-> Case-study of Northern Eurasia