THE FIRST FOREST BIOMASS MAP OVER POLAND DERIVED FROM A SYNERGY OF OPTICAL AND SAR DATA

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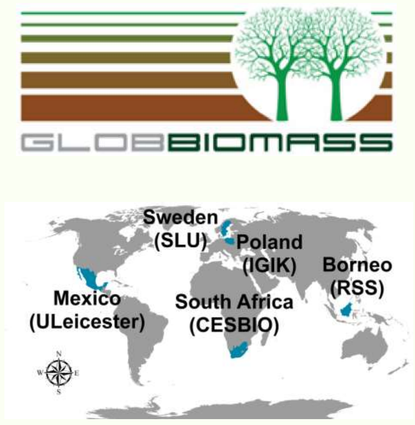
ESA GLOBIOMASS PROJECT

Forest above-ground woody biomass is a fundamental biophysical variable describing the amount of woody matter within a forest. Assessment of forest above-ground woody biomass (AGB) is essential for national and regional forest carbon stocks and carbon stock changes estimation and reporting. The authors present the first forest biomass map over Poland, which was obtained in the framework of the **ESA GlobBiomass** project. The main purpose of the ESA GlobBiomass project is to better characterize and to reduce uncertainties of AGB estimates by developing an innovative synergistic mapping approach in five regional sites (Sweden, Poland, Borneo, Mexico, South Africa) for the epochs 2005, 2010 and 2015 and one global map for the year 2010.

The project develops an innovative synergistic mapping approach by combining SAR, LiDAR and optical datasets, further supported by auxiliary EO-derived products and in situ information. Furthermore, the biomass estimation relyes as much as possible on physically-based methods and adapt to regional forest and environmental conditions. More on: **www.globbiomass.org**



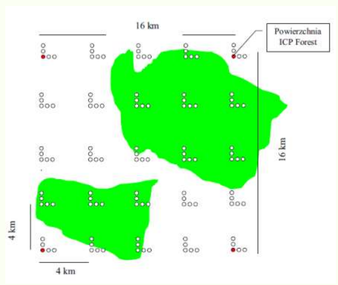
GlobBiomass regions

REFERENCE DATA

National Inventory of Forest Condition

location of plots corresponds to ICP Forests Network

- Systematic 16 x 16 km grid – inside 25 L-shaped group of sampling plots concisting of 5 sampling plots located 200 m apart
- Circular plot size ~0.05 ha (~11.28 m radius)
- Convertion GSV to AGB



From GSV to AGB:

DBH, height and number of trees,

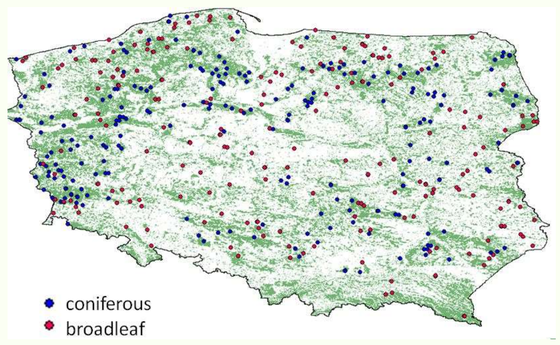
growing stock volume

GSV

biomass expansion factors (BEFs) (IPCC, 2006)
+
wood density (WD) following IPCC guidelines
National Center for Emission Management

Biomass

Forest biomass [t/ha]

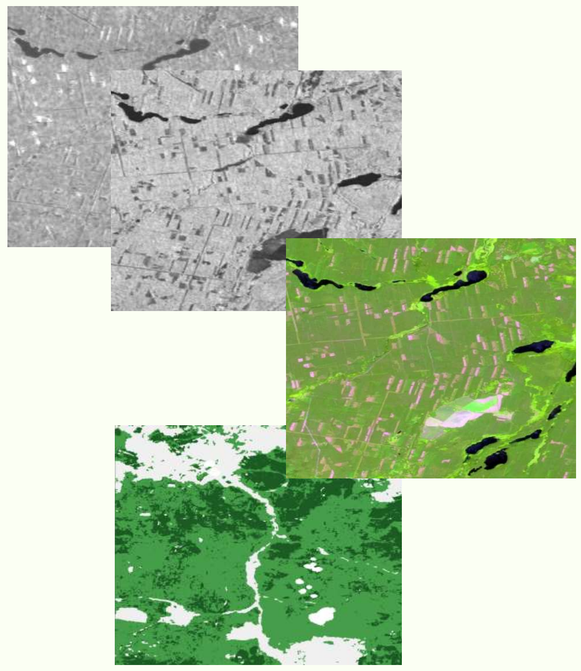


REMOTE SENSED DATA

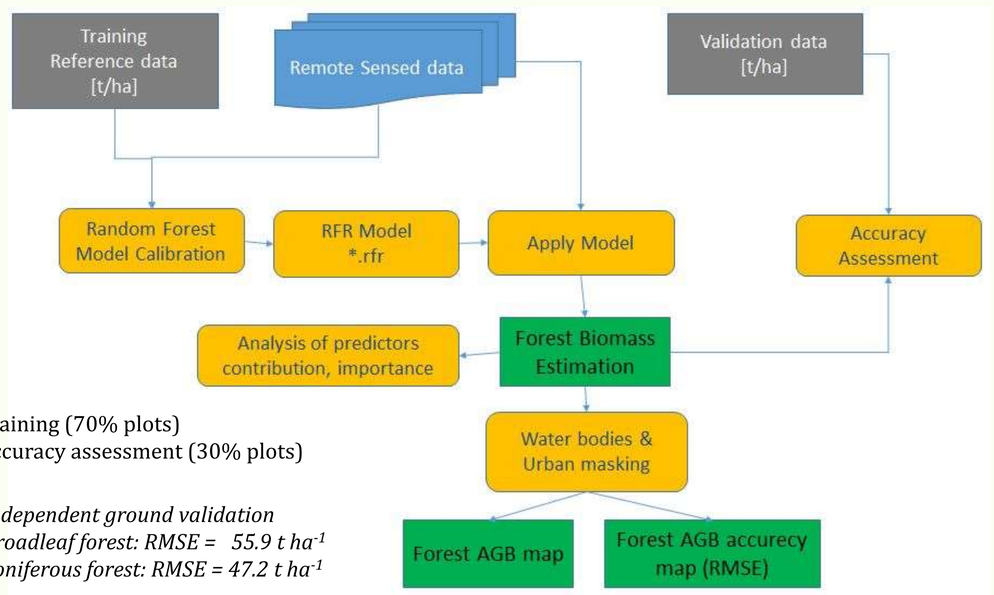
- **ALOS PALSAR mosaic for 2009 and 2010**
  - 25 m spatial resolution
  - HH, HV polarisation
  - Band math (HV/HH, HV/(HV+HH), HH-HV, (HH-HV)/HH)

- **Landsat 7/8 Surface Reflectance mosaic** (source: Hansen/UMD/Google/USGS/NAS)
  - Reference years 2010-2013
  - 30 m spatial resolution
  - Bands 3,4,5 and 7

- **Forest type map –** Copernicus High Resolution Layers
  - Reference year 2012
  - 20 m spatial resolution

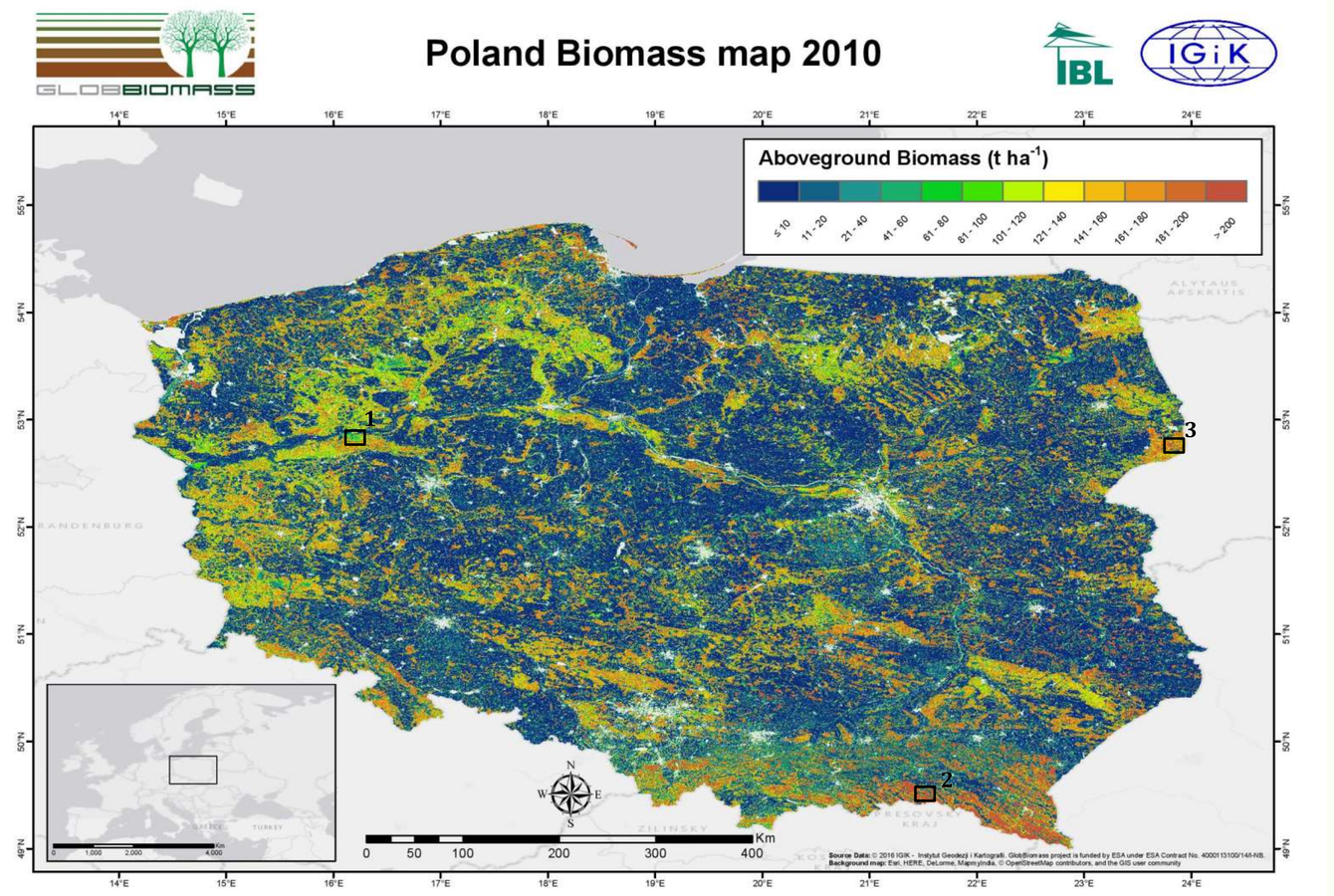


METHODOLOGY



Training (70% plots)
Accuracy assessment (30% plots)

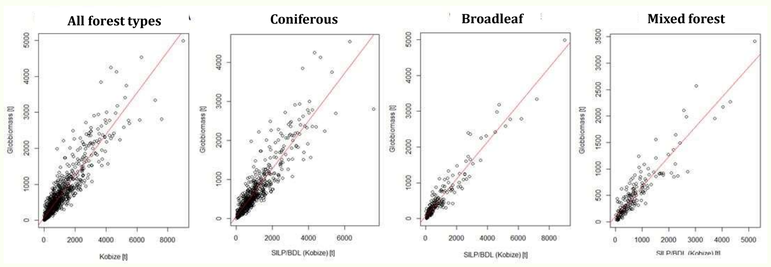
Independent ground validation
Broadleaf forest: RMSE = 55.9 t ha^{-1}
Coniferous forest: RMSE = 47.2 t ha^{-1}

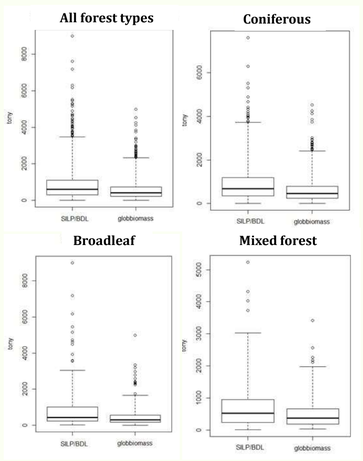


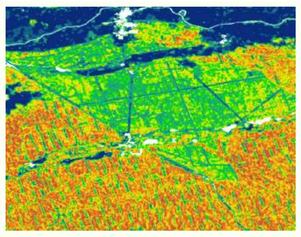
ACCURACY ASSESSMENT

Independent validation at forest stand level

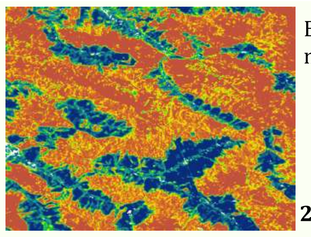
Validation performed at 1166 stands:
743 coniferous, 236 broadleaf and 187 mixed forest
Reference data collected in 2012



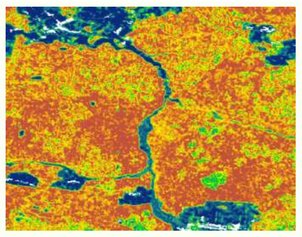




Puszcza Notecka burn scar from 1992 **1.**



Beskid Niski mountains **2.**



Białowieża NP **3.**

ACKNOWLEDGEMENTS

The project is funded by European Space Agency (ESA) under ESA Contract No. 4000113100/14/I-NB. Thanks to the State Forest National Forest Holding for providing the reference data. Special thanks to the GlobBiomass consortium for recommendation and scientific advice. The forest typ map (high resolution layer) was produced in the framework of Copernicus GIO Land Monitoring programme received funding from the European Union and are the property of the European Union. The Institute of Geodesy and Cartography in Warsaw was responsible for verification and enhancement of the high resolution layers.