

# Global Efforts to Estimate Forest Biomass

**Frank Martin Seifert**  
**ESA Earth Observation Programmes**

**Satellites in support of national Greenhouse Gases  
reporting and Global Stocktake**  
**COP25 Side Event | 6 December 2019 | Madrid**

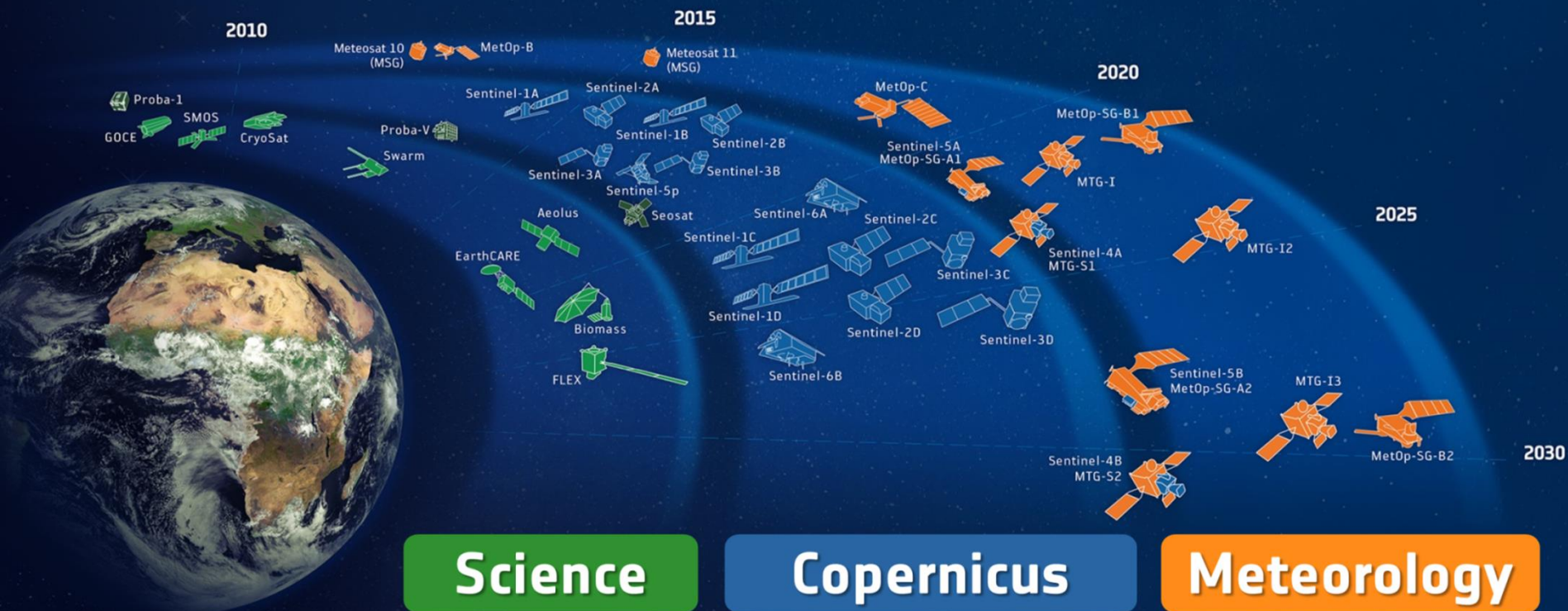
ESA UNCLASSIFIED - For Official Use

# ESA Earth Observation

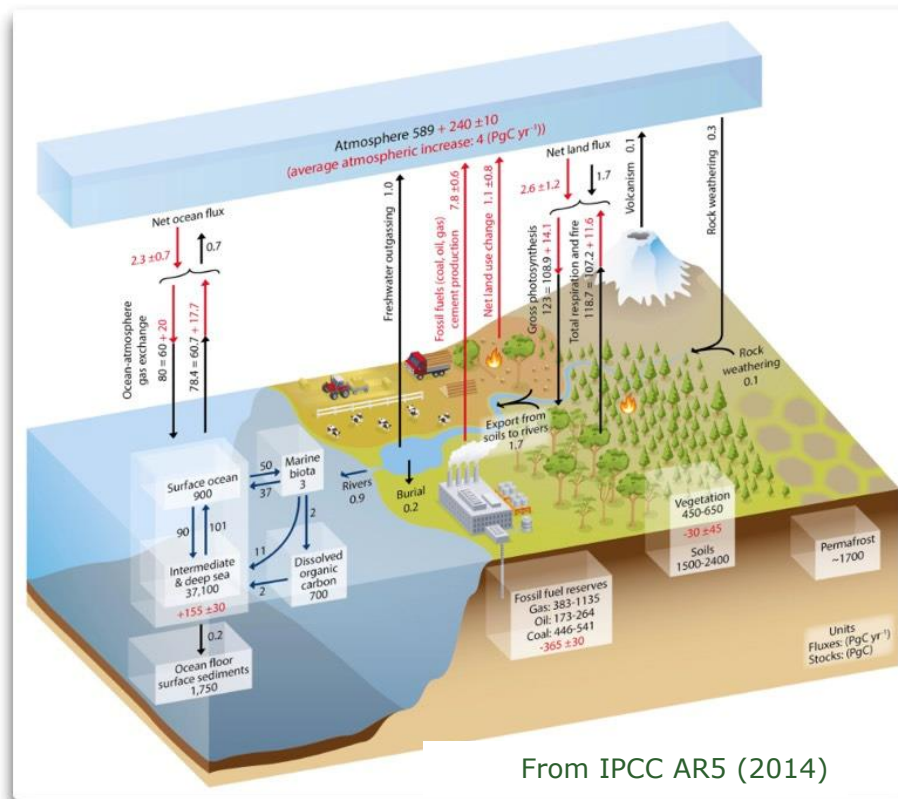
## “Taking the Pulse of our Planet”



# ESA-DEVELOPED EARTH OBSERVATION MISSIONS

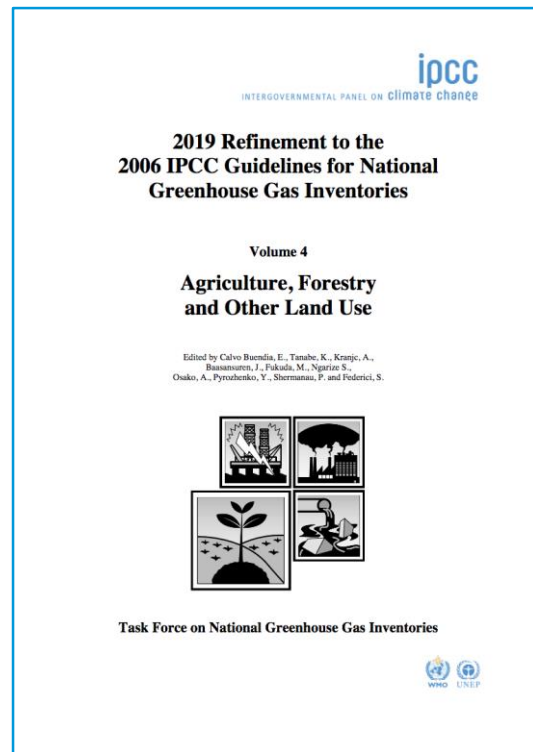


- Terrestrial carbon stock, part of carbon cycle and input to climate models;
- More specific biomass density maps & emission factor defaults (IPCC guidelines);
- Better emission estimation and spatial explicit tracking of biomass changes;
- Policy requirements from Paris Agreement: REDD+ and NDC reporting, and Global Stocktake;



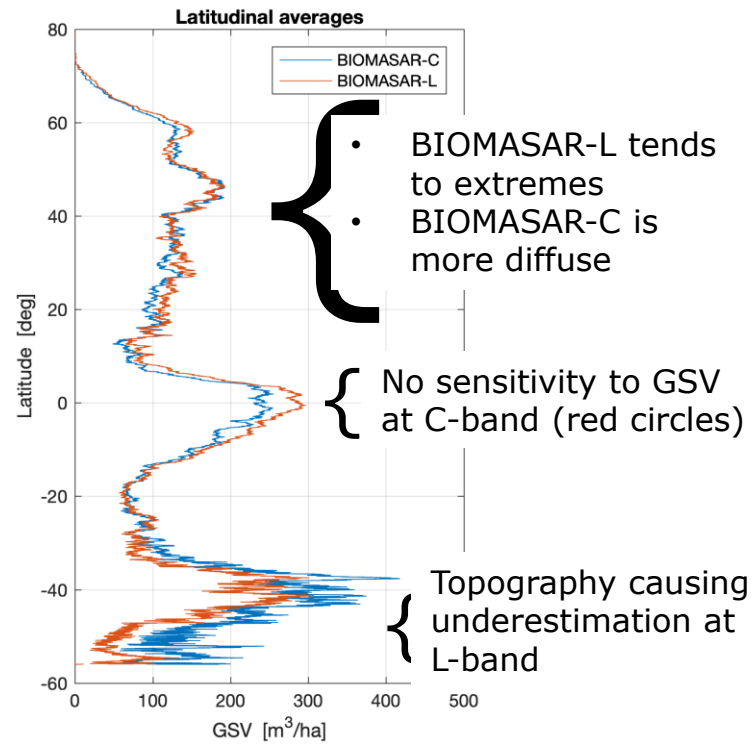
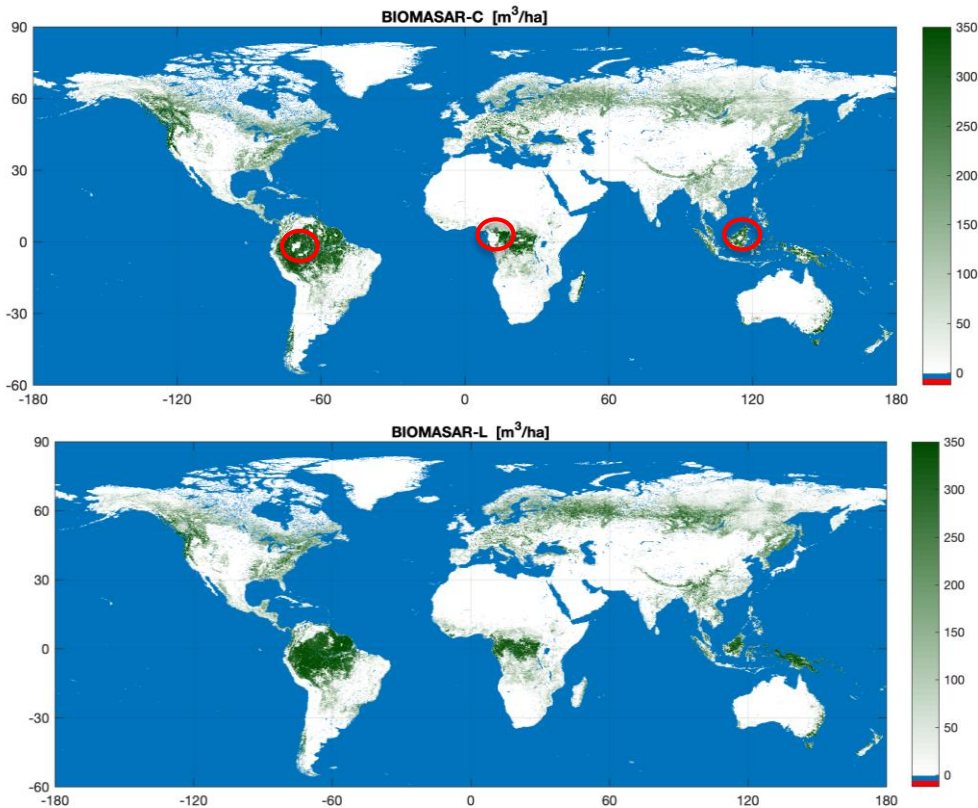
From IPCC AR5 (2014)

- Approved and published by IPCC in 2019  
<https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html>
- Couple of important issues:
  - Increasing role for Earth Observations
  - Tier 1 updates: in particular for forest (biomass, regrowth etc.)
  - Guidance on use of allometry, biomass density maps





# CCI Biomass: based on C- and L-band SAR data

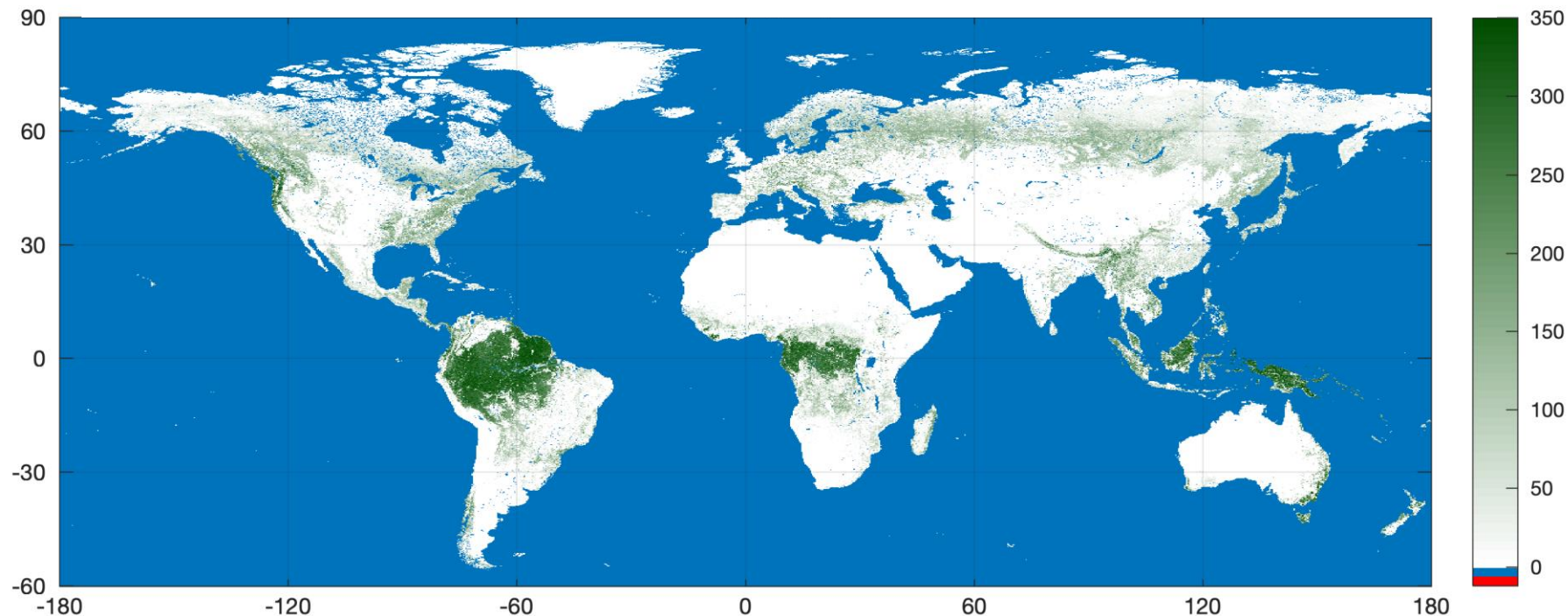




# CCI Biomass 2017

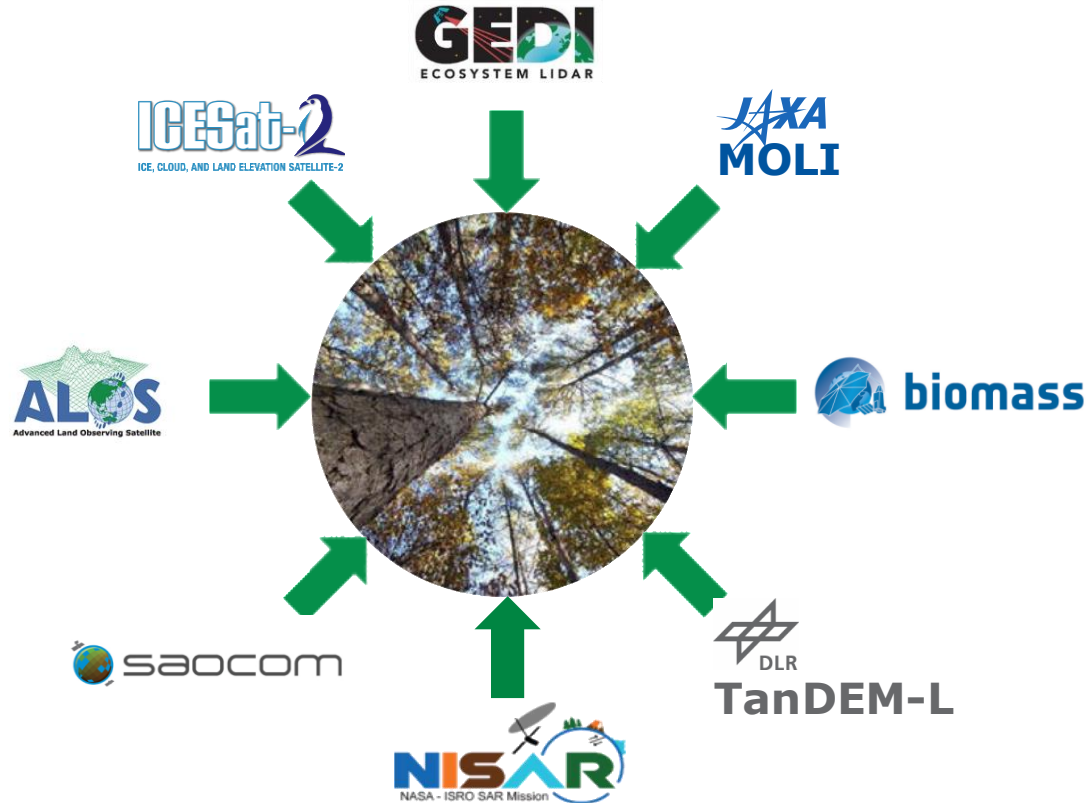


Epoch 2017, AGB (Mg/ha) @ 100m



Climate Change Initiative's Open Data Portal <http://cci.esa.int/data>

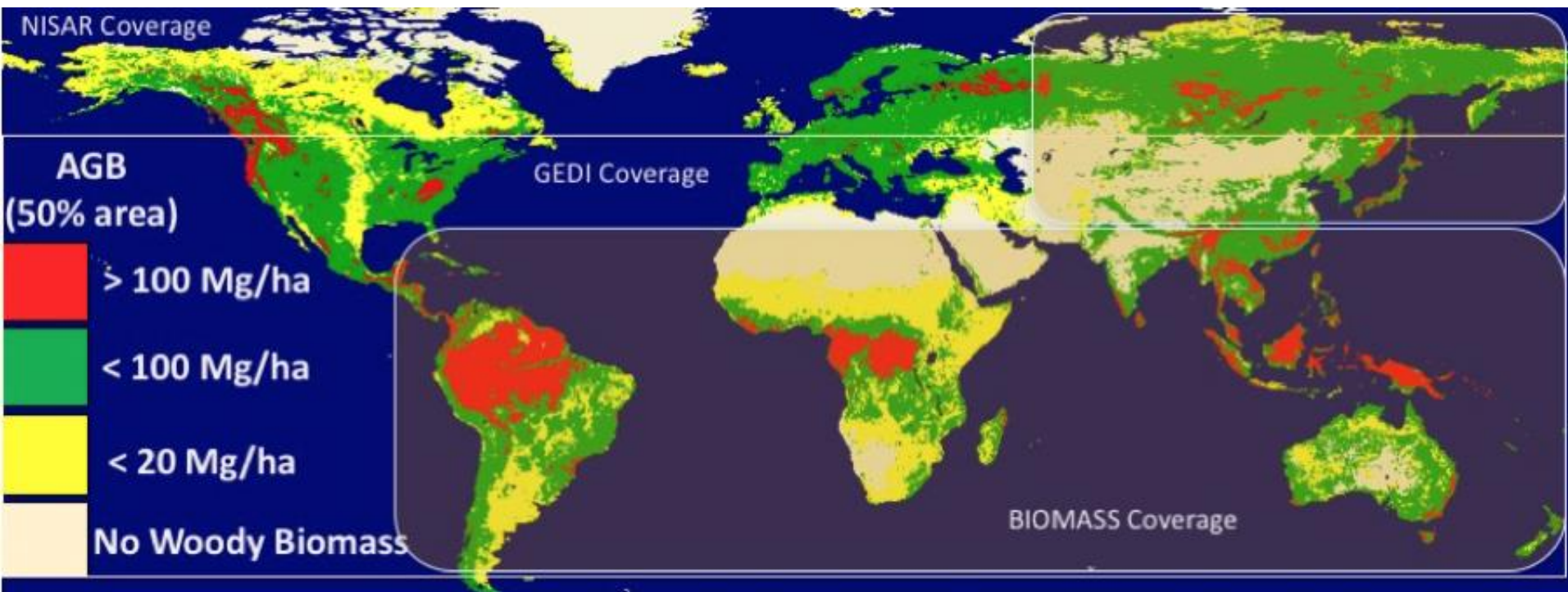




NISAR: Global Coverage (similar SAOCOM, ALOS-4), Sensitivity to AGB < 100 Mg/ha

BIOMASS: Tropical and East Eurasia Coverage, Sensitivity to AGB > 50 Mg/ha

GEDI: Sampling between 51.6° North/South (MOLI), Sensitivity to AGB > 20 Mg/ha





## Data Component

(Country Needs Assessment, data accessibility, in-situ data, validation, country link and international policy link)

## R&D

(Biomass Expert Meetings, funding opportunities for gap filling)

## MGD

(Emission Factors, maturity assessment)

## CB

(Capacity Building related to biomass estimation)



CARB-16  
CARB-23

## LSI VC

### Forests SG

Multi-mission user interaction and data strategy, facilitate data uptake

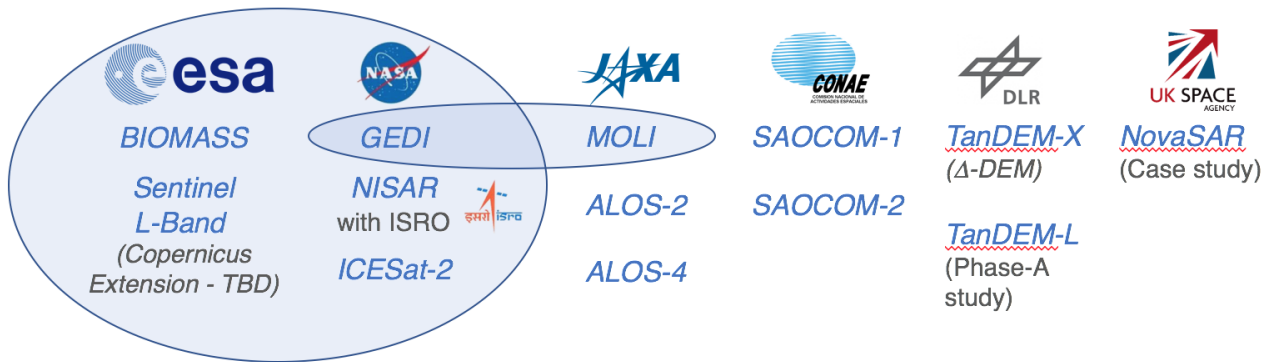
## WGCV

### LPV

Biomass Product Calibration, Cross-calibration, Validation Protocol

## Space Agencies

Biomass related Missions



- Enter "Golden Age" of dedicated missions for biomass estimation
- Large variety of sensors and measurement principles
- Increased knowledge on terrestrial global carbon stock and dynamics
- Cooperation and coordination is key:  
In-situ data, validation and accuracy assessment
- Biomass maps could contribute to GHG reporting and the global stocktake.

