

GFOI R&D Session on integrating EO and ground data for enhanced forest-related biomass estimation

Acknowledgements:



Interested in the session's outputs?

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Workshop summary will be available at <https://gfoi-rd.gfz.de/>

In collaboration with



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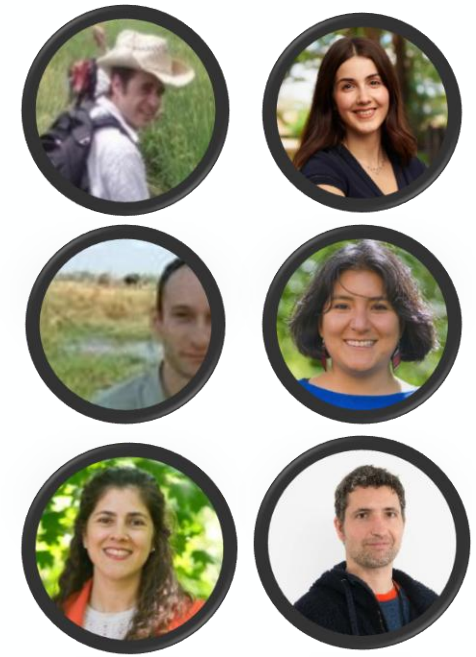


3 parallel discussion groups focusing on opportunities challenges and perspectives

- **Opportunities:** what does EO products enable that wouldn't be possible doing without them
- **Challenges:** what are the remaining challenges on...(topic of subgroup)
- **Perspectives:** what should we prioritize going forward on.../where do you see the most potential for impact

- **Today's approach, per question:**
 1. Self reflection (1 minute)
 2. Discussing with a partner (2 minutes)
 3. Group discussion (7 minutes)

- **GROUP 1:**
Key considerations in the design phase of new field surveys while leveraging from EO information
- **GROUP 2:**
Requirements and considerations when harmonizing existing NFI data to make it interoperable with EO data
- **GROUP 3:**
Current and emerging opportunities to integrate EO products with existing NFIs for enhancing biomass estimation for MRV



GROUP 1: Key considerations in the design phase of new field surveys while leveraging from EO information

- **The EO-informs-NFI pathway should be further explored.** Most current efforts focus on using field data to calibrate EO products. Group 1 discussions highlighted the potential of the reverse: using EO data to inform *where*, *when*, and *how* to design ground-based campaigns while ensuring compatibility with EO products. More demonstration cases that replicate EO-informed field survey designs (e.g. PathFinder project) in tropical and data-scarce regions are needed, to improve not only biomass estimation but also the monitoring of forest dynamics, disturbance, and carbon change over time.

GROUP 2: Requirements and considerations when harmonizing existing NFI data to make it interoperable with EO data

- **Technical barriers are real but solvable.** Spatial-temporal mismatches, pixel-plot size discrepancies, GPS co-registration errors and lack of local allometric equations are well-identified data harmonization issues with emerging methodological solutions that require validation efforts for biomass monitoring and reporting.
- **Common standards and regional networks are the priority next step for harmonizing information.** Progress depends on harmonized data collection and definitions, incentives for data sharing, NFI-networks and replication of EO-ground based data integration efforts in tropical regions where the need is greatest.

GROUP 3: Emerging opportunities to integrate EO products with existing NFIs for enhancing biomass estimation for MRV

- **EO and ground data are complementary, not competing.** Combining NFI plots with EO-derived predictors tends to outperform approaches that use either data source alone, particularly for filling data gaps and small area estimation, while also improving spatial and temporal analysis. The question is no longer whether to integrate, but how best to do so for each specific application. Comparative studies that benchmark integration frameworks across country and regional settings should be further encouraged, generating evidence on which approaches perform best for specific MRV applications and scales

CROSS GROUP TAKEAWAYS

- **Adoption is held back by institutional and trust barriers.** Different institutions may often work in parallel and without coordination, and lack of transparency in both EO and NFI workflows undermines the mutual trust needed for integration. The disconnect between NFI and EO scientific communities; as well as between practitioners and scientist, was flagged across all three groups, pointing to the need to establish and sustain dedicated interdisciplinary spaces (such as StatEO and potential future iterations) and to invest in capacity-building programs that bring NFI specialists and EO scientists into stronger, more structured collaboration.
- **Guidance and actionable recommendations are urgently needed.** Across all groups, participants flagged the need of clear, country-accessible guidance on how to integrate EO and ground data in practice. Grounded country-level cases and success stories that can inform best-practice and decision-support tools are essential to move from research to operational adoption.