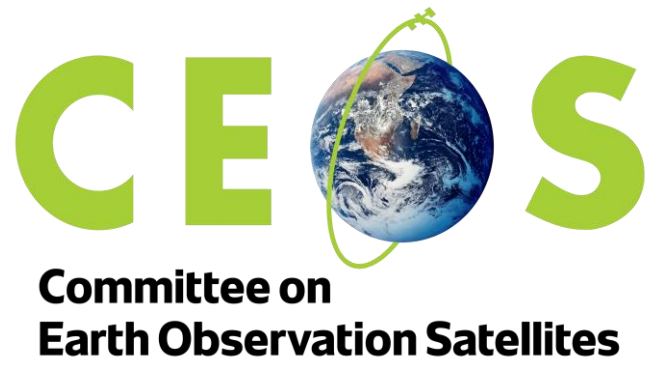
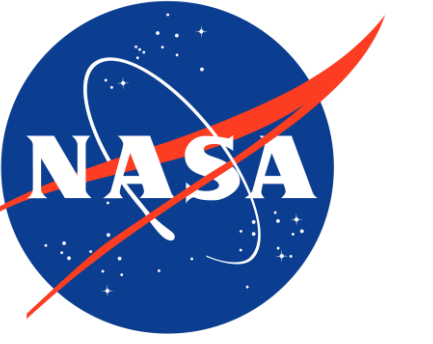


Harmonizing Earth Observation Datasets With Climate Policy Needs

Neha Hunka¹, Laura Duncanson¹, Joana Melo², Giacomo Grassi²
representing collaborators on Committee on Earth Observation Satellites (CEOS) Biomass Harmonization

1 University of Maryland, Department of Geographical Sciences, 4600 River Road, MD 20737, USA
2 European Commission, Joint Research Centre, Via E. Fermi 2749-TP 261, I-21027 Ispra (VA), Italy

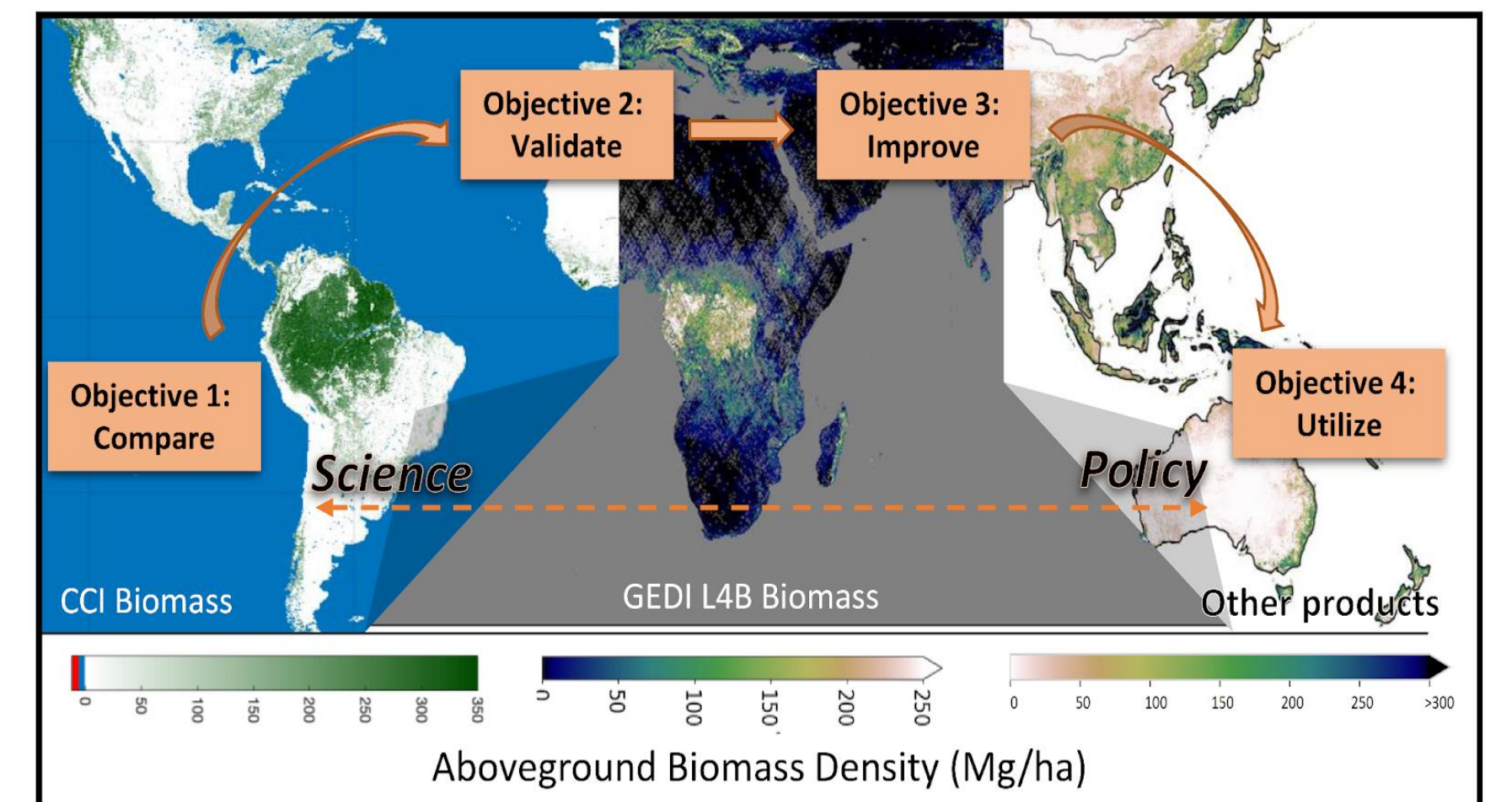


Biomass Harmonization

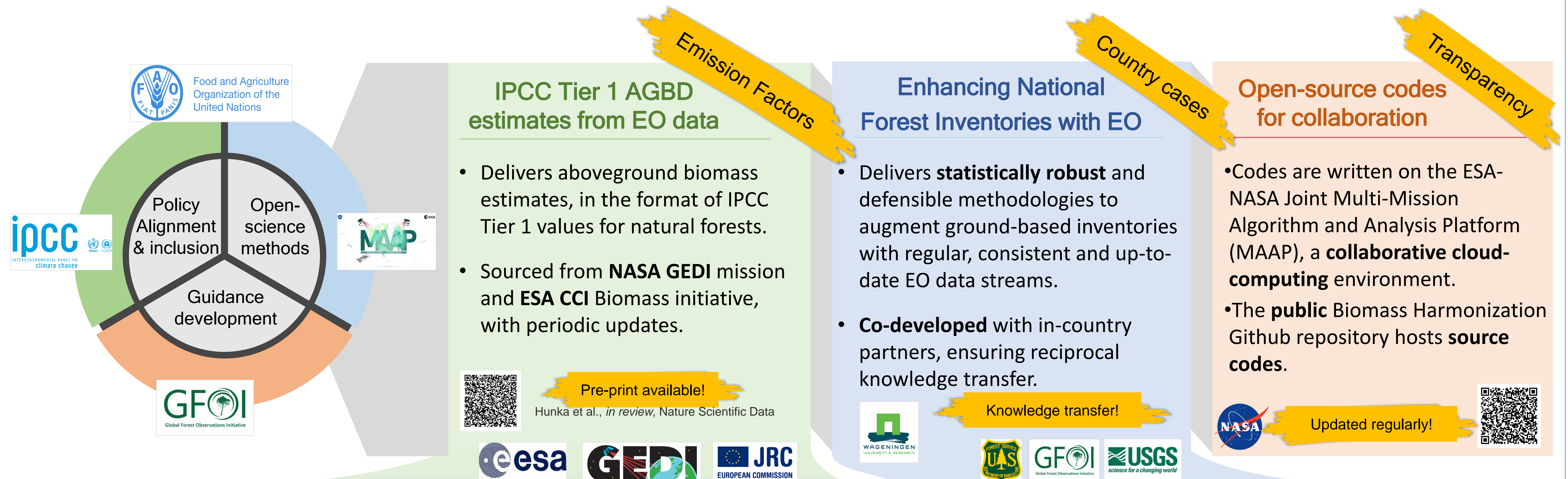


The science gap: Space-based biomass maps are not used in national climate policy-related assessments

- **Earth Observation (EO)** data are uniquely positioned to provide estimates of forest aboveground biomass density (AGBD) in accordance with the United Nations Framework Convention on Climate Change (UNFCCC) principles of **'transparency, accuracy, completeness, consistency and comparability'**. They can provide added value to nations' assessments of carbon gains/losses
- Yet, neither open access to EO datasets nor the increasing availability of computational power has proven sufficient for their wide uptake in climate policy-related assessments.
- Currently, there is a **lack of sufficient methods and guidance** on use of AGBD maps for reporting national-level forest carbon estimates. The use of space-based AGBD or height maps for national-level reporting is nearly non-existent.



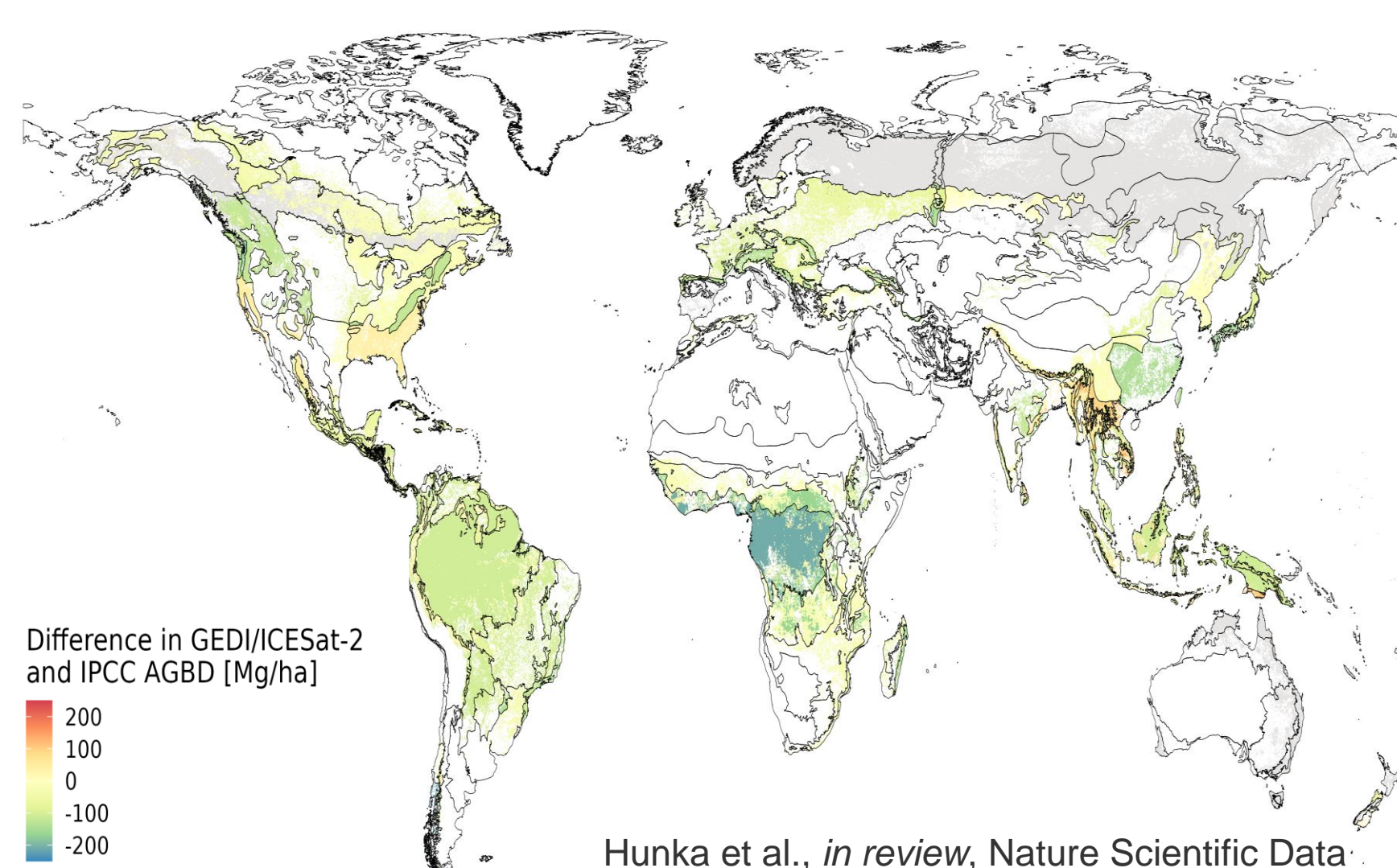
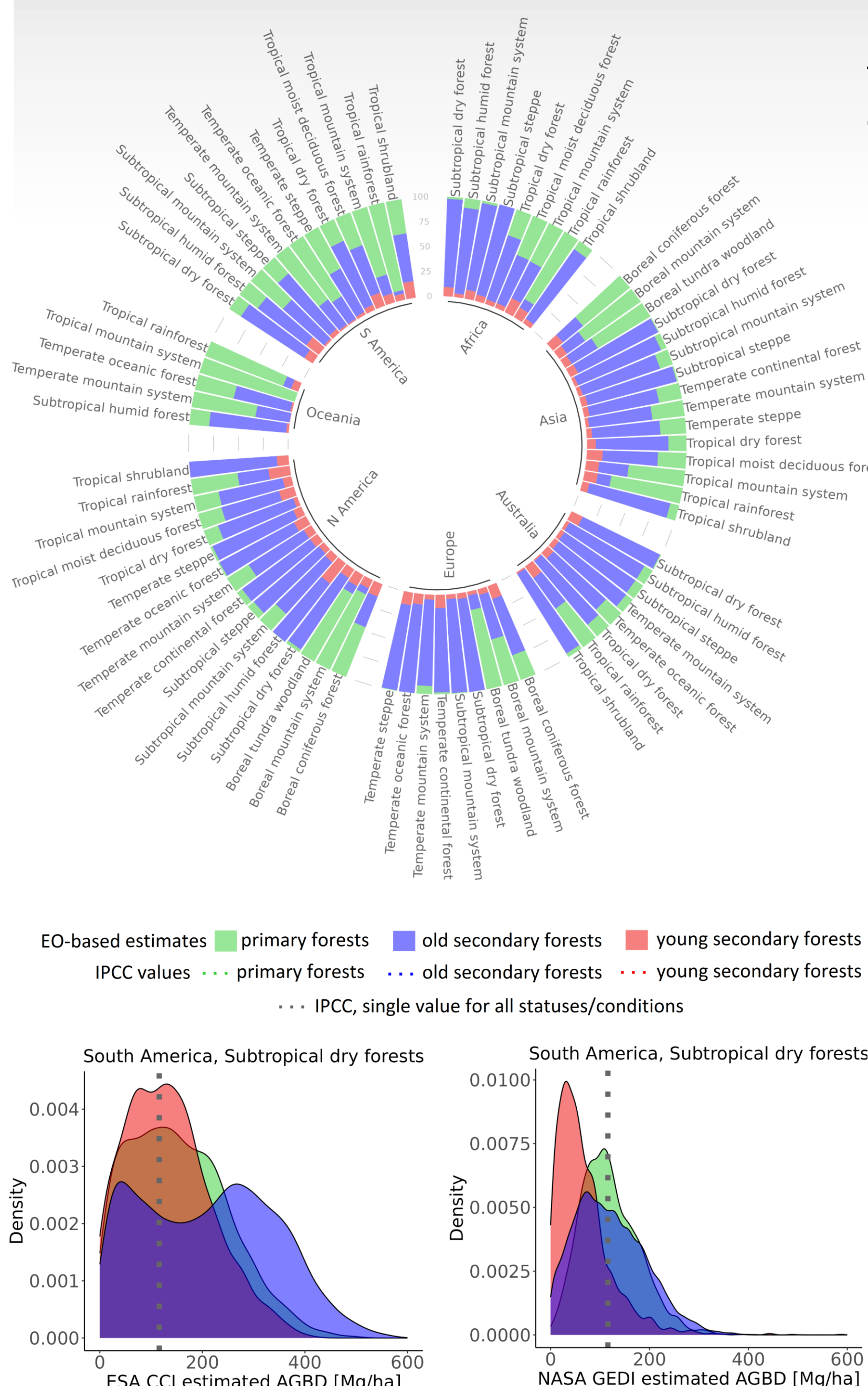
The goal: Facilitate the use of space-based vegetation height or biomass estimates in routine policy reports



Global forest status/condition and AGBD estimates from EO datasets

In contrast to the static snapshot of forest status/conditions in the current IPCC guidelines, **periodically updated EO-based datasets can reflect dynamic forest conditions**. This study provides:

- A complete dataset of **EO-derived AGBD estimates** (years circa 2020-2022) in the same practical and concise **format of the IPCC Tier 1 table for natural forests** (Table 4.7, IPCC 2019), derived from GEDI and ICESat-2, and ESA CCI Biomass, and
- The underlying **global stratification** used in the IPCC table, **classifying forests by Geographic Ecological Zones, continents and forest status/condition**, i.e. primary (intact old growth or with no active anthropogenic intervention), young secondary (≤ 20 years) and old secondary (> 20 years) forests.



Geostatistical model-based integration

In Mexico, the primary obstacle to enhancing their well-established NFI with public, global-scale EO products (vegetation height or AGBD maps) is the lack of a **statistically defensible methodology, documented with open-source code**, that does so, while directly addressing the nation's reporting needs.

- In collaboration with the **Comisión Nacional Forestal (CONAFOR)**, this study co-develops a **geostatistical model** that integrates **NASA's GEDI heights** and **ESA's CCI Biomass** with Mexico's NFI and country-specific allometric equations.
- Results provide **point-location and area-wide predictions of AGBD**, with the **transparent disclosure and traceable sources of uncertainty**.

