Operational tools improving forest biodiversity Monitoring from space: Finding solutions to 2030 conservation targets

The preservation of biodiversity has become a major challenge for sustainable development at local, national to global levels. To address the current forest conservation needs, we need operational methods to assess the distribution of natural resources while integrating information on habitat conditions; inform conservation planning, and support the assessment of forest ecosystem services. The understanding of complex processes at the forest landscape level can be supported by the variety of sensors available and the ability to develop original methods to use and combine information resulting in opportunities to predict the consequences of changes in drivers at different scales and plan for more efficient mitigation measures within a context of global change. This session aims to showcase a series of studies and robust frameworks that demonstrate how coupling remote sensing, artificial intelligence and ground observations with models can provide operational solutions toward a better understanding of complex forested landscape processes to support efficient planning toward sustainable management. In the end, we aim at discussing the role of innovative tools and coupling models to find ways to better capitalise monitoring forested landscapes globally.

Increased access to satellite imagery and new developments in remote sensing data analyses coupled with species models and artificial intelligence can support biodiversity conservation targets by stepping up monitoring processes at various spatial and temporal scales. More satellite imagery is indeed becoming available as open data, while remote sensing–based techniques are constantly developing, offering a plurality of application options. Even further, the coming observations that enable monitoring ecosystem extent and other essential biodiversity variables go far beyond products of the past in terms of spatial and spectral resolution and, consequently, the types of ecologically relevant measures that can be generated to improve the state and management of resilient forested landscapes.

The variety of sensors available and the ability to develop original methods to use and combine information has resulted already in many forest ecology applications: the availability of image archives (Landsat) and the development of satellite constellations like Copernicus contributes to global monitoring of forest ecosystems while cutting edge technologies such as imaging spectroscopy, LiDAR and RADAR provide new perspectives on the possibility to accurately map phenology, species diversity, community distribution, leaf traits, biomass, and ecosystem extent contributing to filling the biodiversity data knowledge gap.

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