



Contribution ID: 29 Contribution code: 3-RSM

Type: **Oral presentation (9:10 AM - 4:10 PM)**

## **Retrieval of grassland traits from optical satellite data –the challenge of developing transferable models**

*Tuesday 15 July 2025 14:10 (15 minutes)*

Spatially explicit information on grassland traits (e.g., biomass, plant N content) can support the optimization of grassland management. Previous studies demonstrated the potential of remote sensing to retrieve different plant traits in grasslands using multispectral and hyperspectral sensors. However, most of these studies used empirical approaches and are therefore hardly transferable to other regions. Hybrid retrieval approaches, combining physically-based models with machine learning (ML), aim for a better model generalization and transferability. These hybrid approaches were mainly developed for hyperspectral data and crops such as wheat and maize. In this study, we developed and tested hybrid retrieval models for different grasslands traits like aboveground biomass (AGB) and canopy N content based on the radiative transfer model (RTM) PROSAIL-PRO and Gaussian process regression (GPR) using hyperspectral EnMAP data. Three datasets of in-situ and partially corresponding satellite data of differently managed grasslands from Poland, Germany, and Italy, were available for model calibration and validation. Finally, the trained retrieval models were applied to available EnMAP scenes of the test regions to map the selected grassland traits. Despite promising results in the model testing, the validation results of the retrieval models were not satisfying. In our contribution we will present details of our approach and the results as well as the challenges in developing transferable retrieval models for grasslands.

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**Session Classification:** Remote Sensing & Modelling

**Track Classification:** Day 1: Science (English) / Tag 1: Wissenschaft (Englisch): Remote Sensing & Modelling