

Augmented Reality meets Earth Observation (ARmEO)

Francesco Vuolo and Matthias Husinsky

¹University of Natural Resources and Life Sciences, Vienna (BOKU University), Peter Jordan Str. 82, 1990 Vienna Austria

²University of Applied Sciences, St. Pölten (FHSTP), Campus-Platz 1, 3100 St. Pölten, Austria

New digital technologies enable efficient management systems that enhance farm profitability, minimize environmental impacts, and improve production sustainability while raising safety and health standards. Notably, work-related health issues are most prevalent in agriculture, hunting, and forestry, yet these sectors lag in digitalization, ranking second last among European industries. Even when supportive data is available, practitioners often hesitate to adopt digital tools due to concerns over complexity and reliability. However, digitalization and automation hold immense potential to drive transformative improvements in working conditions, workforce resilience, and productivity while supporting sustainability and economic goals.

This paper introduces the development and field demonstration of **ARmEO**, an augmented reality (AR) prototype developed by BOKU and FHSTP and tested successfully with Austrian farmers, crop consultants, and researchers in spring 2023. Utilizing satellite-based data and AR glasses, ARmEO integrates geospatial information directly into the operator's field of view, providing critical insights in real-time without interrupting workflows. Key use cases included: **Field scouting**, enabling quick analysis of vegetation progress over the season and growth anomalies and **Field management**, facilitating variable rate fertilizer application.

The system allows users to compare Earth observation data with real-world environments side-by-side, greatly enhancing the intuitiveness and accessibility of spatial data. While tailored for agriculture, ARmEO demonstrates significant potential for applications in forestry and grassland management. This innovation could revolutionize smart forestry, making satellite data more actionable for field practitioners and fostering collaboration through data sharing. The project highlights the transformative role of AR technologies in promoting sustainable, efficient, and engaging practices in agriculture and beyond.



Images and functions from the ARmEO prototype demonstrated in Austria in 2023

<https://armeio.fhstp.ac.at>