Oral presentation/talk

Title: **Assessment of permanent grassland age and grassland mowing counts using time series from Landsat and Sentinel imagery**

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Abstract

In the first national monitoring of permanent grassland, we focussed on two variables: the age of permanent grassland and the number of mowing events. This aimed to provide insights into the spatio-temporal patterns of conservation, signs of conversion and management intensity. The age of grassland was determined for all permanent grassland areas in Slovenia from 2000 to 2021 using Landsat 5/8 time series adjusted to Sentinel-2. The number of mowing events was analysed from 2017 to 2021 using Sentinel-1/2 time series due to limited reference data. A pixel-based approach was applied using various machine learning techniques. The results were aggregated to NUTS administrative regions and illustrate the state and dynamics of grassland permanence and change, and intensity of use. Understanding the age of grassland helps assess ecosystem condition and stability and guides conservation efforts, while data on mowing events helps monitor grassland utilisation intensity. Remarkably, 98.8 % of permanent grasslands has remained unchanged over the 21-year period, with significant regional differences in NUTS3, some showing less than 0.3 % change and others almost 5 % loss. For mowing detection, we combined radar and optical data with two vegetation index-based algorithms, achieving a 28% improvement over using a single method. On average, grassland in Slovenia is mowed 2-3 times, less than 3 times 33% of permanent grassland is mowed, which indicates a still good condition for grassland ecology and biodiversity conservation. The presentation will also discuss the benefits and limitations of information obtained from Earth observation by applying machine learning models to support geo-statistics.