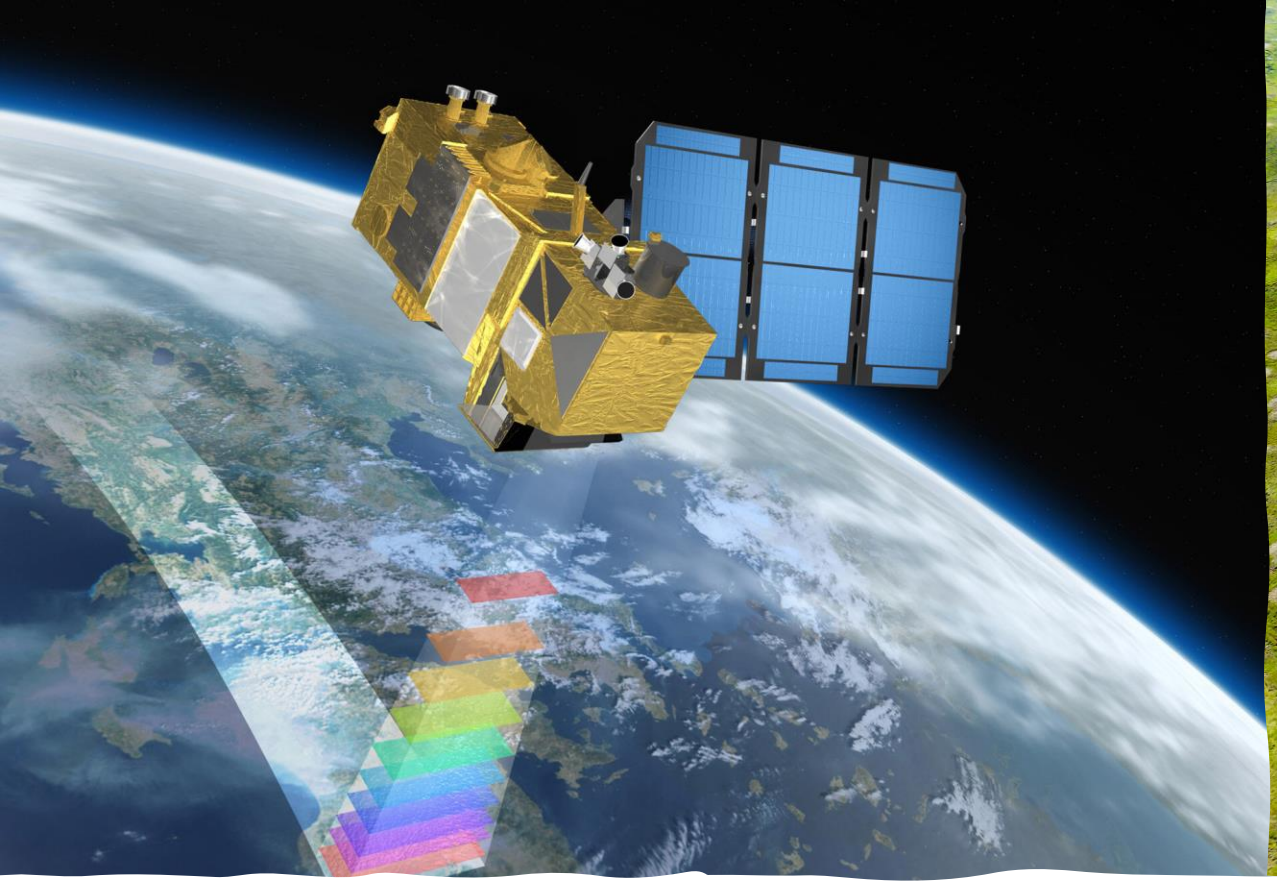
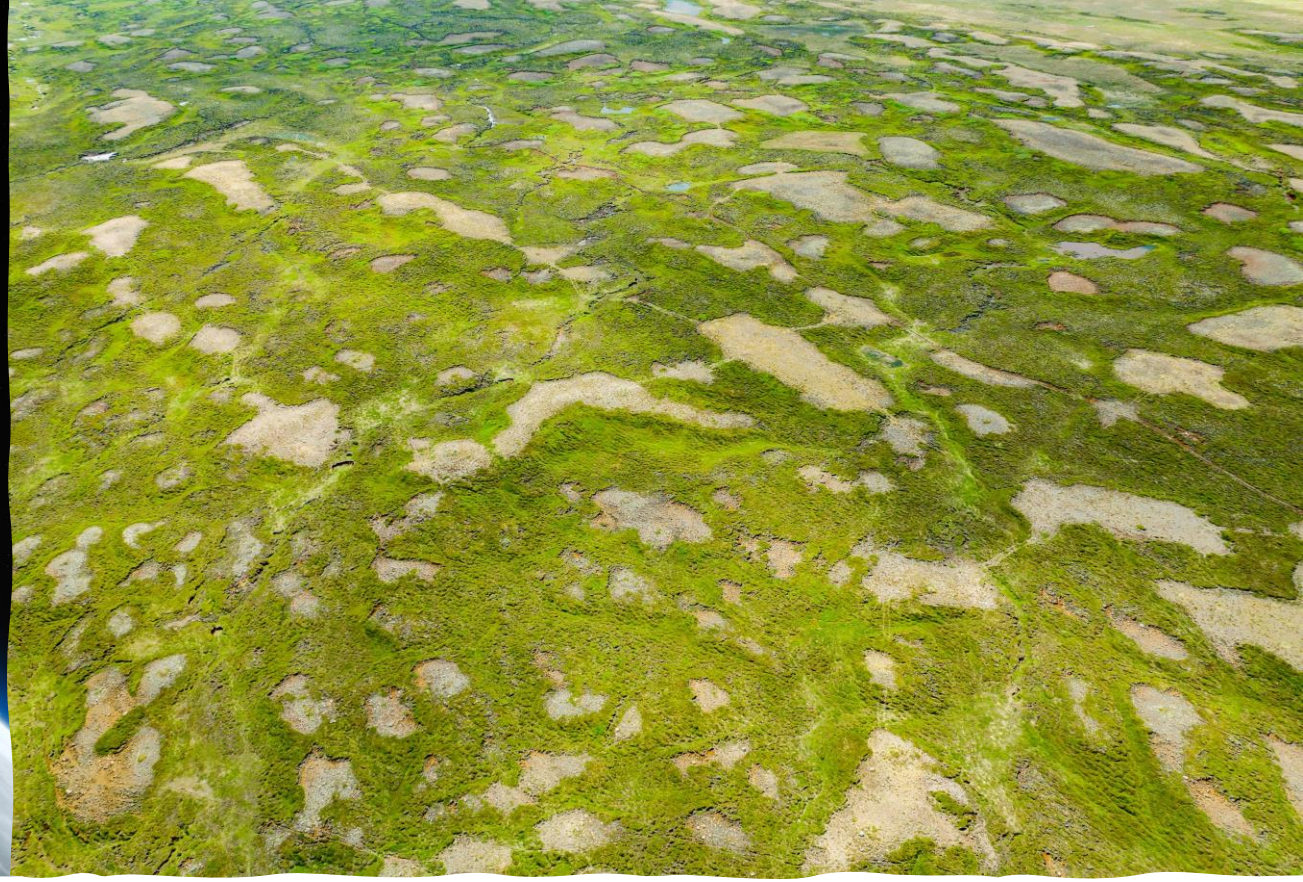
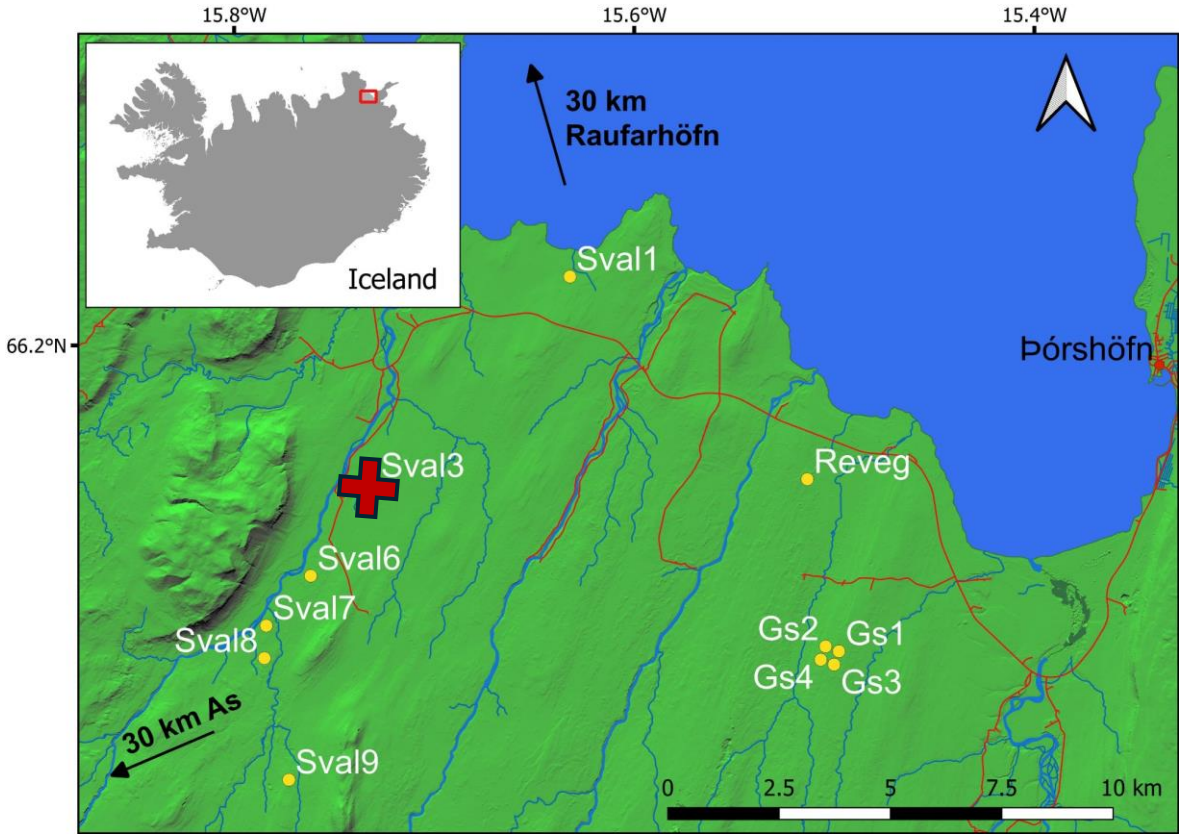


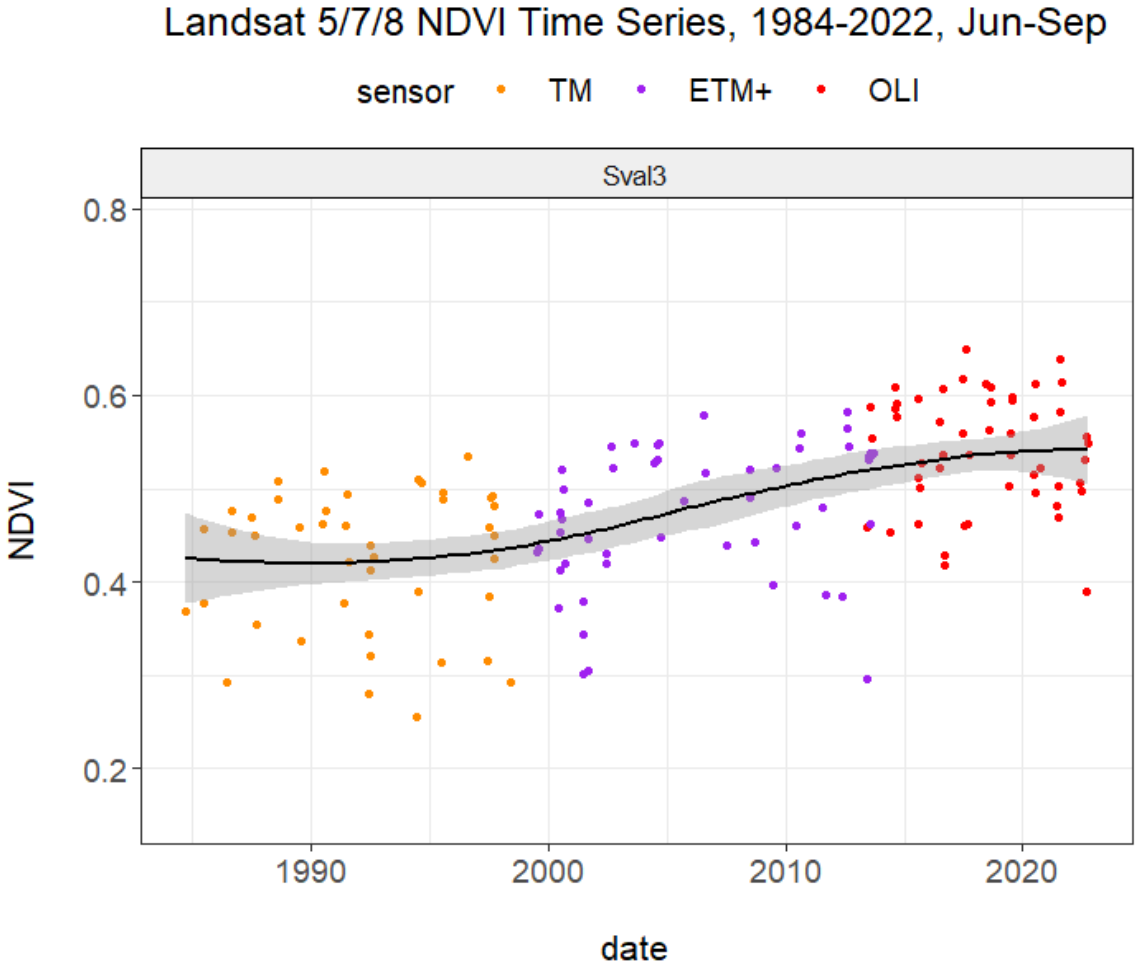


The crucial role of spatial resolution and sensor quality in satellite imagery for soil erosion monitoring: A case study in Iceland

Georg Kodl
University of St Andrews

UAV survey sites and NDVI time series



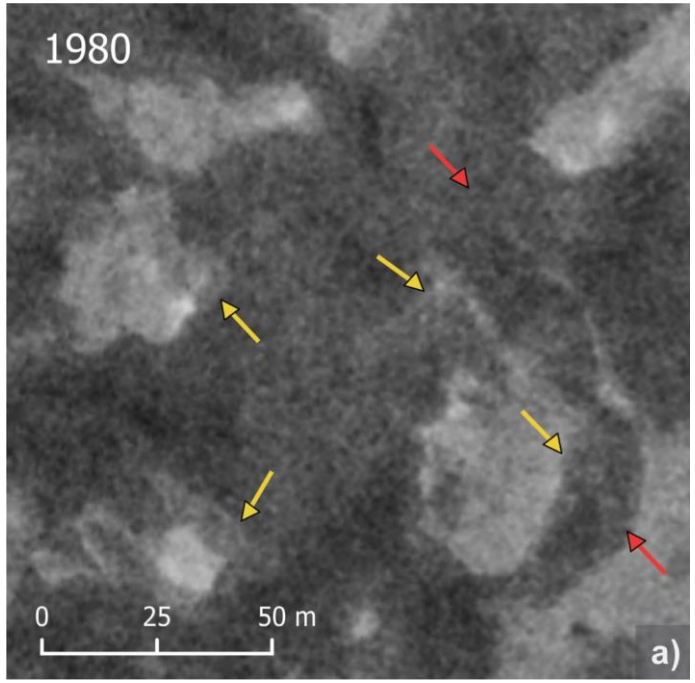


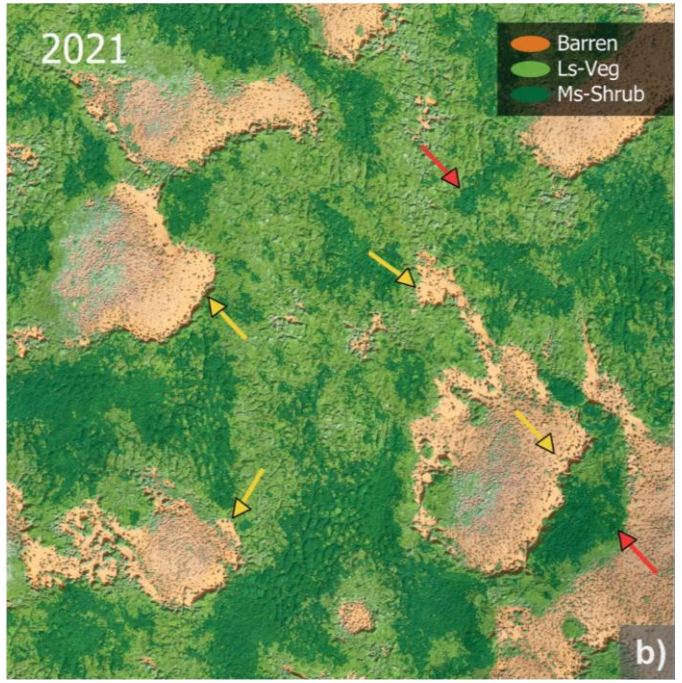
Multispectral drone survey
12x sites with area 300x300 m

→ Arctic tundra greening since 1980s

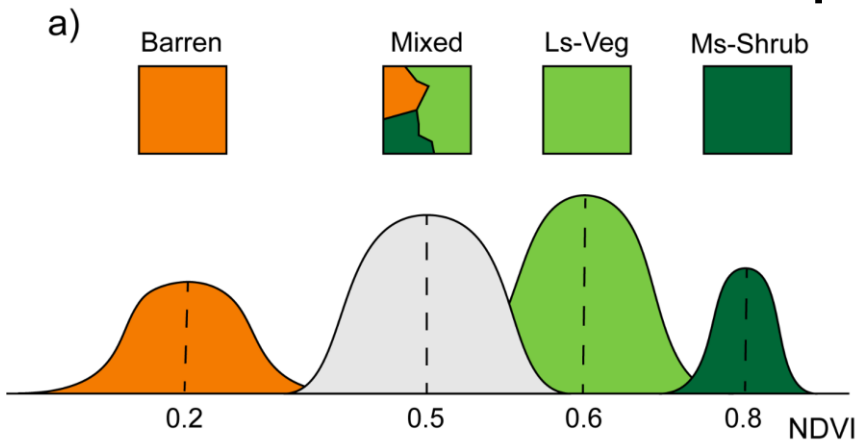
Vegetation cover loss since 1980s

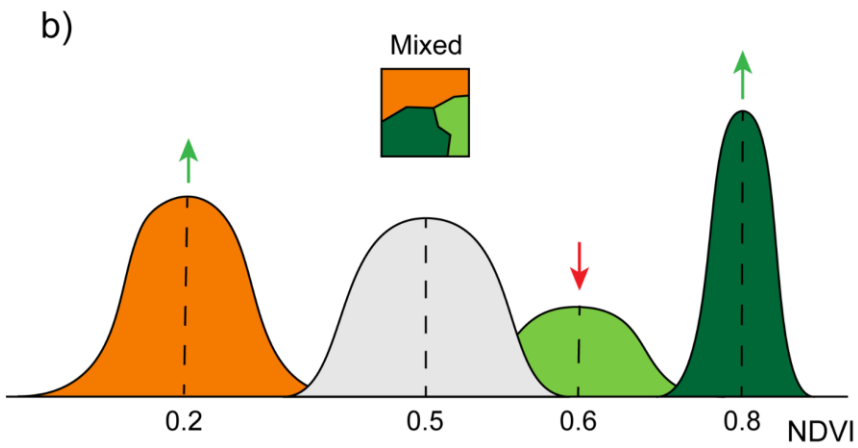
Soil erosion
Shrub growth



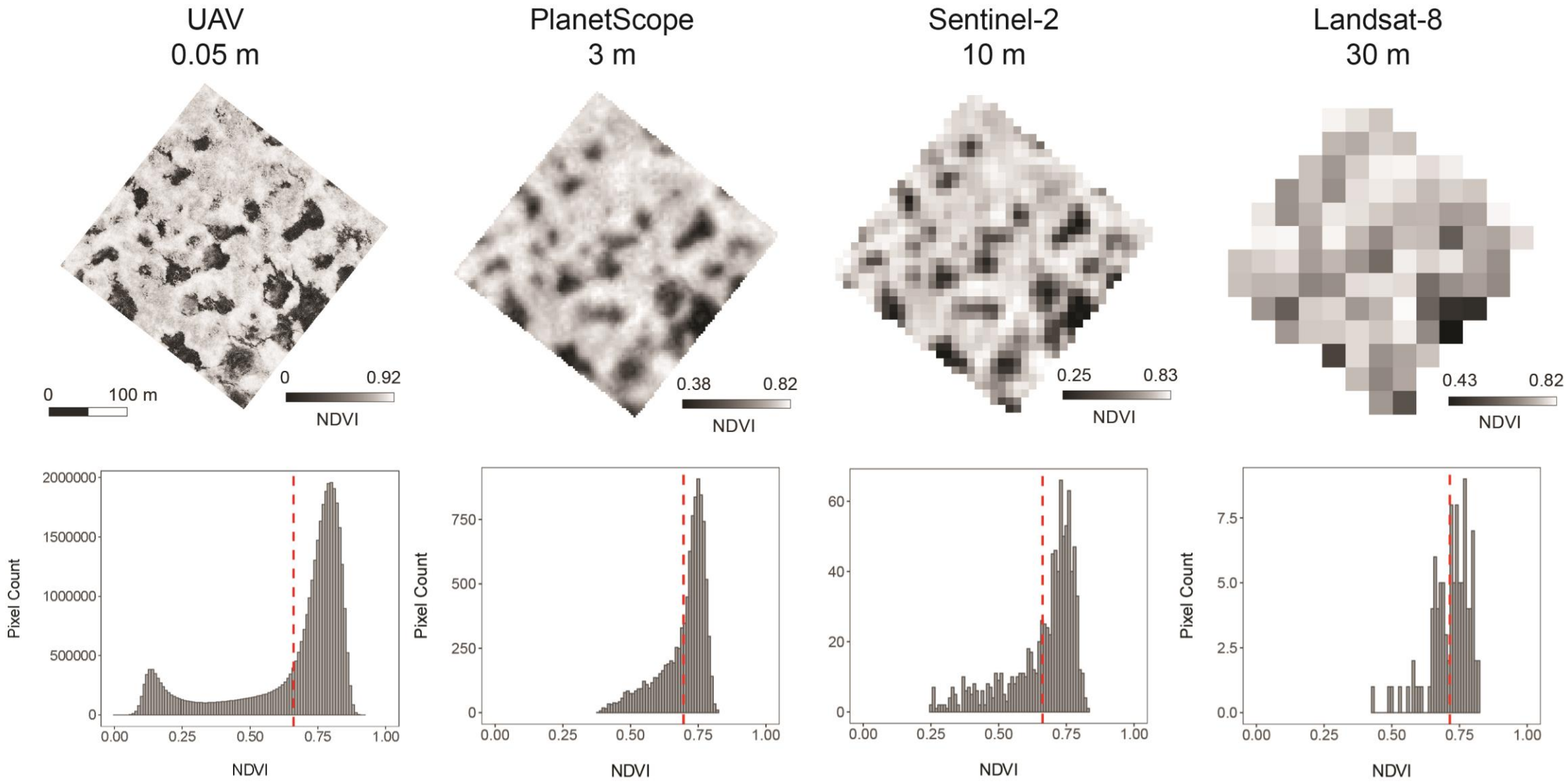


Spectral confusion

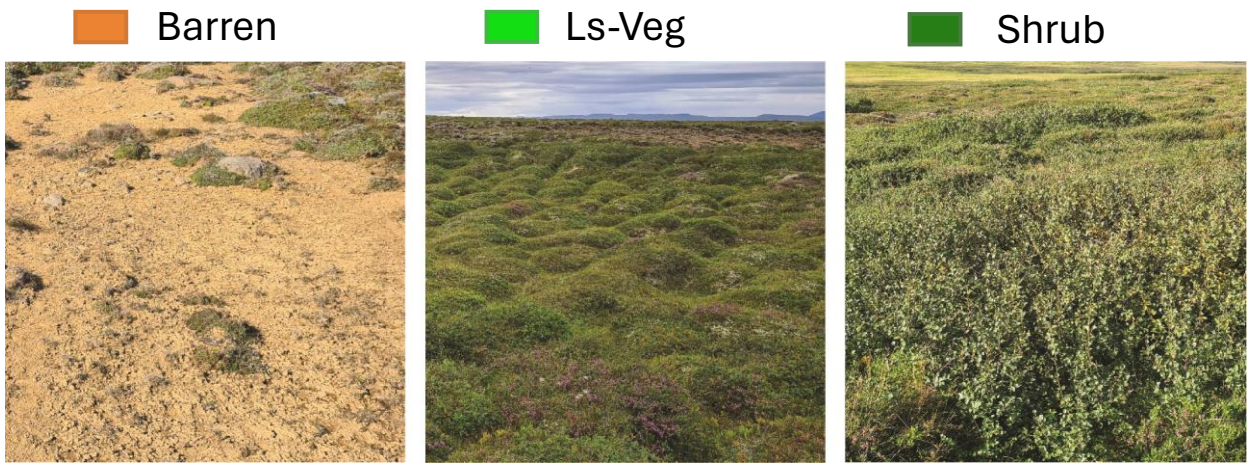


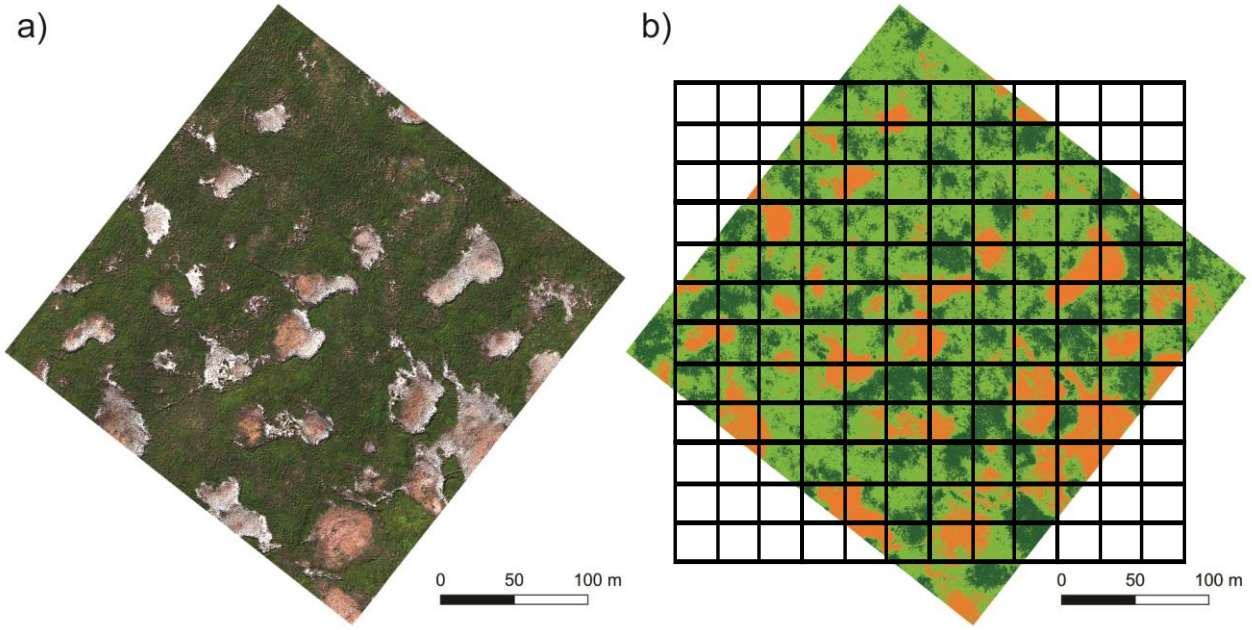


Comparison imagery



Classified land cover





Shannon evenness index

relative abundances

$$SHEI = \frac{\sum_{i=1}^{m}(P_i * \ln(P_i))}{ln(m)}$$

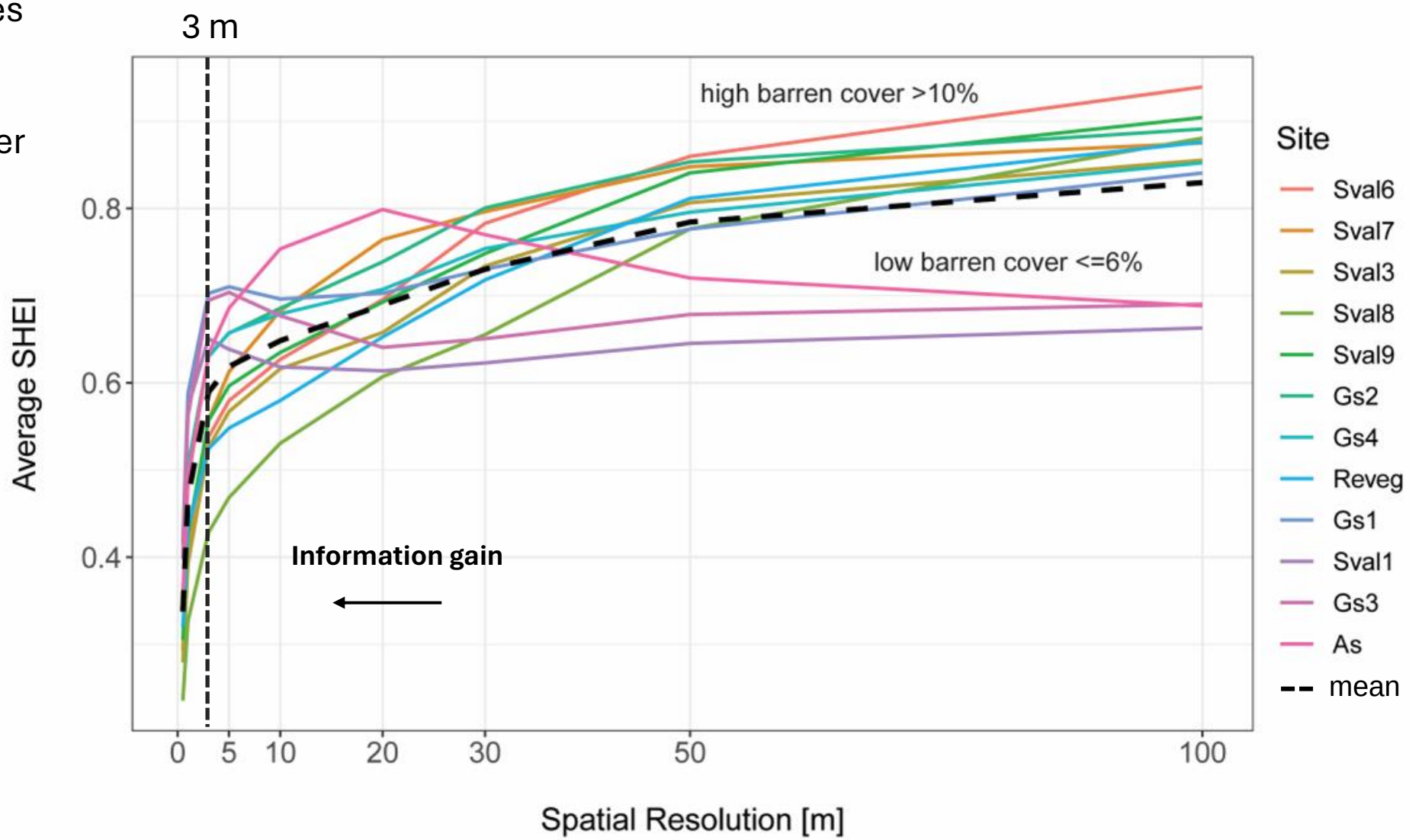
land cover types

SHEI provides information on area composition and richness of a land cover in a grid cell.

Mixed Pixel for different spatial resolutions

1 -> all land cover types are evenly distributed

0 -> only one land cover is present



Key Takeaways

- Sentinel-2 most suitable for long-term monitoring of soil erosion in Iceland
- UAVs are essential for ground-truthing and monitoring small-scale soil cover changes
- SHEI is an effective metric for evaluating spatial resolutions for various landscape settings

G. Kodl, R. Streeter, N. Cutler, T. Bolch (2024). **Arctic tundra shrubification can obscure increasing levels of soil erosion in NDVI assessments of land cover derived from satellite imagery**, *Remote Sensing of Environment*. *DOI:* 10.1016/j.rse.2023.113935

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