# Zoltán L, Z. Friedl, V. Pacskó, I. Orbán, E. Tanács, B. Magyar, D. Kristóf, T. Standovár (2021): Application of Sentinel-1 radar data for mapping ice disturbance in a forested area. European J. Remote Sensing 54(1): 568-587.

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Abstract

In 2014 a catastrophic ice storm occurred in the forests of Börzsöny Mts., Hungary. In this study we analyzed the potential of Synthetic Aperture Radar (SAR) data, complemented, and compared with optical imagery, in mapping this event. Great emphasis was put on reference data: three types of field-based reference datasets were used and the damaged patches were delineated manually based on the visual interpretation of pre- and post-event orthophotos. Four classifications with different set-ups were carried out by applying the eXtreme Gradient Boosting method. Combinations of radar backscatter coefficients, polarimetric descriptors, interferometric coherence, and optical data variables were tested. All classifications were suitable for identifying uprooted trees properly (1–11% underestimation), but none of them could detect crown loss accurately (55–58% overestimation), based on the validation of the most damaged area. Proper differentiation of healthy forests with various levels of canopy closure in the reference data seems crucial for accurate canopy loss estimation. In the case of methods using only Sentinel-1 imagery, interferometric coherence together with polarimetric descriptors provided the best results (OA: 65.7%). This setup can be useful for immediate uproot damage detection for planning salvage logging if a natural disturbance happens outside the vegetation period.

habitat: oak-hornbeam forests, beech forests
forest diseas, pathogens, pests

forest structure: stand
methodology: survey, inventory, monitoring
remote sensing
remote sensing: space image
map: forest management map
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