



Mapping catastrophic ice damage in forested area: a case study for a deciduous forest in Hungary

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In December 2014 a catastrophic ice disturbance affected the forests of the Börzsöny Mts., Hungary. Planning salvage logging is an urgent task after such events. The use of Earth Observation (EO) data in near real-time could facilitate such planning at a critical time. However, conventional remote sensing studies apply data of passive multispectral sensors, hence the earliest post-event canopy cover damages could be examined only after foliation. Synthetic Aperture Radar (SAR) is an active remote sensing technique, which could be used for the detection of forest disturbances even outside the vegetation period. Due to its 12 days revisit time Sentinel-1 may play an important role in the fast detection of the damaged forests in the case of such events. In this work, we analyze the potential of Sentinel-1 SAR data in mapping natural disturbances in forests, through the 2014 ice break event.

We made 4 classifications with the different combination of the following variables: radar backscatter coefficients, polarimetric descriptors, interferometric coherence and optical data. We put great emphasis on the reference datasets: 3 types of field-based reference datasets were used, which include re-surveys (explicit data on changes). Based on the field data and orthophoto comparison the damaged patches were delineated manually as the most reliable reference.

We have found that none of the classifications were suitable for identifying the crown loss damages properly, but all of them were capable to detect the uproot damages. The classification using all of the variables proved to be the most reliable. The interferometric coherence with the polarimetric radar data provided the best information compared to the classification including optical data.