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Assessing the performance of various machine learning algorithms for forest disturbance mapping

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One of the key elements in monitoring forest changes is Remote Sensing. With the increase of public available satellite images, like Landsat and Sentinel 1 and 2 (DeVries et al. 2015), the accuracy of forest disturbance mapping in space and time has also increased significantly. Even though the number of available satellite images has increased, tracking changes in space and time still has to deal with cloud cover. Obtaining images for at least two distinct points in time, with very similar environmental conditions is not always easy to achieve (Rodriguez-Galiano and Chica-Olmo 2012). In this paper we assessed the accuracy of different machine learning algorithms for mapping forest disturbance for small time intervals and not very similar environmental conditions (Pelletier et al. 2016). We considered the forest disturbance as full canopy removal without a special emphasize on the natural or anthropogenic processes (Griffiths et al. 2014). Hence, any significant change in canopy recorded between two or more time intervals was considered disturbance. Our test site is Făgăraș Mountains, located in the central part of Romania. For this site we used the entire archive for Landsat and Sentinel-2 imagery. Because of the lack of available images for each year, the time intervals are not equal throughout the entire time period. To compensate for the uneven time intervals and better understand the space-time patterns in forest disturbance, we gradually increased the time interval by 1, assessed the forest disturbance pattern for the new time interval and continue until we reached one big time interval, delimited by the first and the last available images.