Towards an integrated forest fire danger assessment system for the alpine region

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ABSTRACT – In the last years devastating forest fires around the globe proved quite well, that wildfires are a major issue in a world of climate change. Also the alpine region encounters higher temperatures, more heatwaves and an increasing number of forest fires. Improving the forest fire danger assessment is a core element to prevent and better anticipate the occurrence of fires. While meteorological systems to predict fire danger are common in many countries, other relevant factors as vegetation data, topography, lightning occurrence and human impact are not generally used. We introduce an integrated forest fire danger assessment system (IFDS) for the alpine country of Austria that includes i) daily fire weather index data, ii) a high resolution danger assessment of the vegetation, iii) a topography based estimation of fire occurrence, iv) a lightning fire occurrence assessment and v) a countrywide analysis of fire danger through human activities. The system was implemented as a prototype in early 2018 with different weighting variants. The main aim was and is to learn and understand the connections of the different modules and to identify inadequate datasets, which are likely especially regarding the parameters vegetation and human activity. A first performance analysis was done with forest fire data from the year 2018. It could be shown that the used stand-alone fire weather index had a slightly better overall prediction accuracy than the IFDS, while some variants of the IFDS relatively performed better when considering the number of false alerts. The implementation of a similar IFDS in other countries may be beneficial, if the necessary datasets are available at high resolution and reliability. Further test runs and improvements of the IFDS will be conducted in the future.

Keywords: Alpine region; forest fire danger assessment; integrated fire danger; mountain forests

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