

Forest fire risk prediction on sub-seasonal and seasonal timescale in Finland

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In Finland, the Finnish Meteorological Institute (FMI) produce operationally short-range forest fire risk forecasts and issues warnings during the fire season. The forest fire risk is assessed using the Finnish Forest Fire Index (FFI) developed for boreal forest environment.

The forest fire risk forecast plays a crucial role for the rescue services by facilitating their activity, e.g. planning of fire survey flights. Thus, by estimating the expected fire danger a few weeks and even months in advance would allow rescue services and other authorities to prepare for potential forest fires earlier in advance and thereby reduce the environmental and socio-economic impact of fires. However, sub-seasonal and seasonal prediction applications of forest fire risk predictions are still rare and have not been studied at FMI yet. Therefore, the applicability of sub-seasonal and seasonal forecasts in the prediction of fire danger in Finland were tested and evaluated in the present study. The extended and long-range fire risk forecasts for Finland were produced in the scope of the ERA4CS project SERV_FORFIRE.

A statistical model was developed using gridded observational data of air temperature, precipitation rate, relative humidity and volumetric soil moisture for the time period 2003-2015 to estimate the Finnish Forest Fire Index (FFI) for sub-seasonal and seasonal timescale. For evaluation purposes 6-week and seasonal fire risk outlooks were produced for Finland using as input reforecast data provided by ECMWF ENS and SEAS5 system respectively for the time period 2010 to 2016. The statistical model and the skill of the fire danger prediction was examined using standard verification methodology. According to the first results the sub-seasonal forest fire danger predictions showed more promising results than the seasonal ones. The developed semi-operational fire danger forecasts will be tested together with fire managers during the fire season 2019.