



Fire Weather Index : from high resolution climatology to Climate change impact study

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Fire meteo indices provide efficient guidance tools for the prevention, early warning and surveillance of forest fires. These indices are only based on meteorological input data. Fire meteorological danger is estimated by Météo-France at national level through the use of Fire Weather Index. This study deals with the impact of climate change on fire danger in France. It has been motivated by the numerous forest fires during the 2003 drought and it aims at finding whether such events will be more frequent in the future.

The first step of this project was to produce a high resolution FWI climatology. Safran model has been used to derive a 50-year hydrometeorological reanalysis, running from 1958 to 2008, on a 8 km regular grid. This reanalysis has been used in order to assess a long-term trend (a statistically significant increase in FWI for France).

Then climate change potential impact on forest fire risk has been studied with climate change scenarios (ARPEGE V4 model with 3 emissions scenarios : A1B, A2 and B1) with special focus on downscaling and correction methods. Quantile-quantile normalization approach has been applied in order to calculate daily FWI from 2030 to 2100. Observed climatology (1958-2008 reanalysis on a 8km grid) has been compared to model climatology. Correction method has been applied for each statistical threshold. This method allowed us to produce downscaled FWI data and to study climate change impact at 8 km resolution.

Trends are very clear for FWI and in terms of total number of daily FWI above a threshold. We can expect a huge increase in forest fire risk by 2060. All the French territory could face an average fire risk currently observed on Mediterranean area only. According to A2 and A1B scenarios, the year 2003 could become in France the standard in terms of fire risk by 2060.