

Review of the article “Forest fire risk assessment in Sweden using climate model data: bias correction and future changes” submitted to “Nat. Hazards Earth Syst. Sci. Discuss.” By W. Yang, M. Gardelin, J. Olsson, and T. Bosshard.

Wildfires are not common or widespread in Sweden, but they can be severe. It is of great importance to assess the future change in the fire risk. In this study, the authors first dynamically downscaled the simulation from global climate model to a regional 25km resolution using a regional climate model, RCA3. Then the systematic errors of the downscaled results were corrected using in situ observations. Finally, the validated dynamic-statistic correction method was used to project the future change in fire risk on point scale of Sweden. The correction method developed has been proven useful. The results show important information for local government and rescue agency. However, the manuscript needed to be improved for both the scientific preciseness and the technical side before it can be accepted for publication in Natural Hazards and Earth System Sciences. In what follows we suggest several improvements.

Major points:

1. There are distinct climate regimes in Sweden, such as the different climate regime between northeast and northwest Sweden. Can the few stations in northern Sweden represent the different climates? How will this affect the results, especially for northern Sweden? In section 5.2, the author wrote ‘... Edsbyn in northern Sweden ...’. Does station Edsbyn a good indication of the climate for Northern Sweden?
2. The projection is largely affected by the selected global climate model. Why choose ECHAM5?
3. Number of sample is very important in statistical analysis. The simulated annual mean number of days with high fire risk is small than that from observation, especially for northern part. Will this affect the robustness of the results? Will the results be the same if the authors choose $FWIX \geq 4$ instead of $FWIX \geq 5$?
4. Since the authors are talking about the impact of climate variables on the same time change in fire risk, why not focus on the climate variables for the fire season, i.e. from April to October, instead of using the traditional three seasons, from March to November?
5. We lack a discussion on which process is the major impact factor to the projected fire risk for different fire season. What is the role of short term changes in weather conditions versus long term drying condition?

Specific comments:

1. In section 5.2, after 'Using the corrected data, early spring at the Edsbyn station is found to become more prone to forest fire, followed by autumn, and then summer (top panel in Fig. 13)...' We cannot get the same conclusion for station Edsbyn based on Fig. 13. For example, the author said, 'In the intermediate future, the risk in early summer becomes even lower (i.e., approximately -50 %)', while we found from Fig.13 that the maximum difference between 2041-2070 and 1966-1995 is around -20% for the DBS corrected results in summer time. Please have a check whether all the results are based on the DBS corrected simulation or not.
2. Are results presented in Fig. 14 focus on the fire season, Apr to Oct?
3. What do SD/SD1 and SD2 mean?
4. Fig.1 should be Fig.2 and Fig.2 should be Fig.1 according to the text.
5. On page 22, line 5, the authors stated: "At station Edsbyn, the cut-off value varies from 0.85 (spring) to 1.56 (summer)". We guess the units are mm/day, or?
6. Please consider using difference color for Fig. 11-13.