Factor Analysis of Wildfire and Risk Area Estimation in Korean Peninsula Using Maximum Entropy

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The number of wildfires and accompanying human injuries and physical damages has been increased by frequent drought. Especially, Korea experienced severe drought and numbers of wildfire took effect this year. We used MaxEnt model to figure out major environmental factors for wildfire and used RCP scenarios to predict future wildfire risk area. In this study, environmental variables including topographic, anthropogenic, meteorologic data was used to figure out contributing variables of wildfire in South and North Korea, and compared accordingly. As for occurrence data, we used MODIS fire data after verification. In North Korea, AUC(Area Under the ROC Curve) value was 0.890 which was high enough to explain the distribution of wildfires. South Korea had low AUC value than North Korea and high mean standard deviation which means there is low anticipation to predict fire with same environmental variables. It is expected to enhance AUC value in South Korea with environmental variables such as distance from trails, wildfire management systems. For instance, fire occurred within DMZ(demilitarized zone, 4kms boundary from 38th parallel) has decisive influence on fire risk area in South Korea, but not in North Korea. The contribution of each environmental variables was more distributed among variables in North Korea than in South Korea. This means South Korea is dependent on few certain variables, and North Korea can be explained as number of variables with evenly distributed portions. Although the AUC value and standard deviation of South Korea was not high enough to predict wildfire, the result carries an significant meaning to figure out scientific and social matters that certain environmental variables has great weight by understanding their response curves. We also made future wildfire risk area map in whole Korean peninsula using the same model. In four RCP scenarios, it was found that severe climate change would lead wildfire risk area move north. Especially North Korea has low management level for wildfire, it had higher variability due to climate change.