The Hokkaido Island located in North Japan has been experienced historical land use change since 150 years ago when Japanese began to develop. Therefore, the original boreal forest in Hokkaido Island has been replaced by cropland, paddy field, and urban areas.

This study aims to evaluate the impact of the historical land use/land cover change on regional climate in Hokkaido area. Although the impact of deforestation on regional climate has been studied in many previous works, our knowledge on high-latitude areas with snow cover is still limited. Motivated with this fact, we conducted a dynamical downscaling experiment using regional climate model with two different vegetation maps, namely original land cover and current land cover.

According to the results in numerical experiments with different land cover maps, the difference in annual mean temperature is very small when it is averaged over whole island area. However, the prominent temperature differences are found over urban areas. The difference in annual mean temperature for urban area is 1.1 K due to the urbanization effect which is very close to the observed difference in long-term temperature trend between rural area and urban area. Therefore, we conclude that the recent urbanization in North Japan is a primary factor as well as global warming to cause rapid warming in big cities in Hokkaido Island.