



Seasonal and diurnal changes of thunderstorm activity in Poland

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Thunderstorms often cause major economic, environmental and human losses especially in densely populated and industrial areas. Although it is publicly accepted that frequency of extreme meteorological events has recently increased due to climate change, results of studies on long-term trends of thunderstorm activity are not so consistent. Studies on long term changes of thunderstorm occurrences on monthly and sub-daily basis have not been yet performed. Knowing these changes can help various groups to manage the risks associated with this hazard timely and efficiently. This study investigates trends in thunderstorm reports from 1966 to 2015 in Poland based on synoptic weather data. Mostly increasing trends are observed that dominate south-central part of Poland. Thunderstorm frequency increases from April to July (but not in June), the most in July. Negative trends in other parts of Poland are observed in September and June. More thunderstorms will be expected overnight in land areas. At the coast locations noticeable increase is observed around noon. These findings proof existence of significant changes in the seasonal and diurnal cycles over last 50 years. Observed changes can be explained by seasonally diversified temperature trends, intensification of mesoscale convective storms and land feedback. Cases of significant trends, which are mostly positive, indicate that possibility of stronger thunderstorm activity in future climate is very likely.