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Mid-latitude summer climate variability in the IPCC AR4 simulations

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Several recent studies have suggested that global warming might lead to an enhancement of the interannual variability of summer climate in the mid-latitudes, both for temperature and precipitation. In this study we investigate this issue using simulations from the IPCC fourth assessment report. We focus in particular on Central Europe and North America, two regions that have experienced extreme summers in recent years. The intercomparison of the model simulations suggests that there is in general considerable agreement between the different GCMs regarding possible increases in summer climate variability, though there can be substantial differences regarding the geographical distribution, amplitude, and seasonal evolution of this effect. Finally, we also analyze the processes responsible for this result, and contrast in particular the respective roles of changes in circulation patterns and land surface processes.