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Using the EC-Earth atmospheric model to quantify the impact of recent thinning of Arctic sea ice

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The atmospheric general circulation model EC-EARTH has been employed to investigate the influence of a realistic change in recent Arctic sea ice thickness on local and remote climate.
To investigate the atmospheric response of a realistically thinning sea ice compared to a uniform ice thickness of 1.5 m, two 32-year-long sets of simulations have been performed covering the period 1982-2013 and driven by observed SST and SIC which are only differing by the description of the sea ice thickness. Thickness data is taken from the GIOMAS dataset, which assimilates observed sea ice conditions.
The results suggest that the atmospheric impact of recent declining thickness compared to a uniform thickness shows a higher warming trend over the central Arctic, consistent with the observed sea ice thinning, and a less strong warming trend over continental Europe. The influence of a variable thickness is most pronounced in winter and in the lowermost troposphere.
Overall, the Arctic SAT response to a realistic sea ice loss including its thinning is in better agreement with the one seen in the reanalysis product ERA-Interim. Precipitation and cloud cover responses do not show a significant reponse to a realistic thickness change. Further analysis of potential remote responses to Arctic sea ice thinning is currently being performed.