



Increased spring frost risk under climate change in Switzerland

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We assessed future changes in spring frost risk over the Aare river catchment that comprises the Swiss Plateau, the most important agricultural region of Switzerland. An ensemble of 15 bias-corrected regional climate models simulations forced by RCP 4.5 and RCP 8.5 concentration pathways from the EXAR data set were analysed in two time periods (2021–2055 and 2061–2095). The reference data were taken from the bias-corrected 20th Century Reanalysis V2c (20CRv2) from the same data set and actual observations. We proposed and tested a methodology for estimating a beginning of a vegetation outbreak using temperature data and only those frost events that occurred after the start of spring were analysed. Frost events were significantly (at 1% level) more frequent in those years in which spring started earlier in the historical climate and this feature was in accordance with climate model simulations. The largest increase in spring frost risk was simulated in the 2061–2095 period by models forced by the RCP 8.5 concentration pathway. The study showed that the increase in spring frost risk is associated with rising global temperatures and it is notable even in the near future under the ‘low concentration’ RCP 4.5 pathway.