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Realism of sub-hourly precipitation in a convection-permitting model

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Convection-permitting atmospheric models have been shown to add value to coarser models with parametrized convection for the simulation of extreme precipitation, in particular for short-duration (i.e. sub-daily) extremes of a convective nature. The accurate simulation of such short-duration events is key for the forecasting of flash-flooding and for predicting how the flash-flooding risk may change in the future. As such, evaluation of the realism of short-duration (extreme) precipitation in convection-permitting models is an important endeavour. Owing to a lack of observational datasets at both high spatial and temporal resolution, however, most evaluations of convection-permitting models have to date been at the hourly (or longer) temporal scale. The validation of precipitation in convection-permitting models at the sub-hourly scale has thus been identified as an important challenge for both weather forecasting and climate science (e.g. Chan et al., 2016).

Using a unique regional micro-gauge network with 5-minute precipitation observations spanning on average 20 years, we analyse the performance of the COSMO-CLM model at 0.02° (∼2.2 km) resolution in simulating the characteristics – both mean and extreme – of observed precipitation during this period. Preliminary results will be presented, with a focus on extremes and wet-period frequency.