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The role of spatial and temporal model resolution in a flood event storyline approach in Western Norway

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A physical climate storyline approach is applied to an autumn flood event caused by an atmospheric river in the West Coast of Norway. The aim is to demonstrate the value and challenges of higher spatial and temporal resolution in simulating impacts. The modelling chain used is the same as the one used operationally, to issue flood warnings for example. Its output is therefore familiar to many users, which we expect will facilitate stakeholder engagement. Two different versions of a hydrological model are run to show that on the one hand, the higher spatial resolution between the global and regional model is necessary to realistically simulate the high spatial variability of precipitation in such a mountainous region. On the other hand we also show that the intensity of the peak streamflow is only captured realistically with hourly data. The higher resolution regional atmospheric model is able to simulate the fact that with the passage of an atmospheric river, some valleys receive high amounts of precipitation and others not. However, the coarser resolution global model shows uniform precipitation in the whole region. Translating the event into the future leads to similar results: while in some catchments, a future flood might be 50% larger than a present one, in others no event occurs because the atmospheric river does not hit that catchment.