



## **Do high-resolution convection-permitting experiments on Europe need to be driven by high resolution global runs?**

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Challenges of getting appropriate climate-change scenarios over Europe both come from having a good representation of the synoptic systems reaching Europe and having a good-enough representation of local and orographic processes in Europe. Therefore we perform both the evaluation of the driving global model and its dynamical downscaling with a 2.2km regional model on the present day period, in the perspective of using this configuration in a future climate scenario.

20-year long atmosphere-only simulations with the Unified Model of the Met Office were run at different global resolutions (130km, 60km and 25km) and the highest resolution was chosen to give the boundaries of a European-wide convection permitting simulation with a 2.2km resolution. The synoptic situation of the different global resolutions are comparable in terms of latitudinal distribution of the jets and weather regimes but there is consistent improvement in the frequency of storms reaching Europe at 25km resolution. High resolution global runs therefore mainly show added value in the high-frequency synoptic drivers.

Compared to high resolution precipitation datasets, the 25km resolution is showing good representation of winter precipitation distribution, although with too many days of moderate precipitation in Western Europe. It shows a dry bias in summer, consistent with a mean jet too north.