Does increasing the spatial resolution of a regional climate model improve the simulated daily precipitation?

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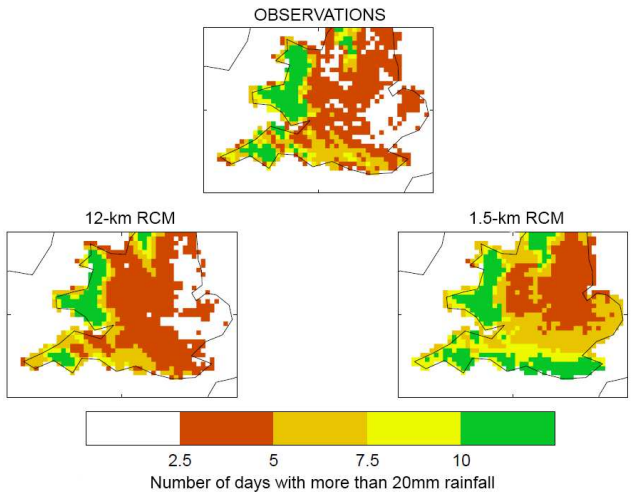
What we found and how

The Met Office has performed climate simulations using models with different levels of spatial detail (grid boxes of 1.5-, 12-, and 50-km resolutions) over the southern United Kingdom. Examining these indicated that the finer model resolutions decrease the errors in the simulation of the amount of precipitation over elevated terrain (e.g. Wales). For extreme events that may cause flooding (>50 mm a day) the 12-km model is too intense relative to the 1.5-km model. However, the finest resolution (1.5-km) model has the worst precipitation biases overall when compared to lower-resolution simulations.

Why this is important

This research sheds some light on whether we need to use highly detailed climate models to assess future climate change and if so which information is most useful. These results yield mixed results for the value of high-resolution (1.5-km) simulations. However, other ways to assess the models (such as how long precipitation lasts, and when it occurs during the day) clearly favour the high-resolution model (see Kendon et al. (2012)). This will help us determine which climate model information is most useful for assessing flood risk.



CONVEX results have shown that the more detailed 1.5-km model may not lead to improvements in modelling how often extreme events occur. Figure adapted from Chan et al. (2013).

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For more information:

Does increasing the spatial resolution of a regional climate model improve the simulated daily precipitation? Chan *et al.*, 2013, Climate Dynamics, DOI: 10.1007/s00382-012-1568-9. (http://link.springer.com/article/10.1007%2Fs00382-012-1568-9)

Related work:

Realism of rainfall in a very high-resolution regional climate model. Kendon *et al.*, 2012, J. Climate 25: 5791–5806. doi:10.1175/JCLI-D-11-00562.1. (http://journals.ametsoc.org/doi/abs/10.1175/JCLI-D-11-00562.1)